RETRO CANVAS ROUTE

Version 2.0 Build 20260115

MANUAL

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Contents

1 Introduction

1.1 How this manual is organized

The Retro Canvas Route has been built as a fictitious line of the Dutch National Railways (Nederlandse Spoorwegen, NS), representing the years around 1990, with a strong bias towards driving pleasure, both for the eye and the mind. The infrastructure is characterized by concrete sleepers and colour light signals. Apart from some sidings all tracks have been fitted out with overhead lines. The surrounding landscape and city buildings will create a realistic impression. The effective track length is around 55 km.

In this manual you will find instructions on installing the route in chapter 2. The software includes all necessary Wilbur Graphics scenery and rolling stock assets. We expect that you already own the DTG ELAP addon, plus the ChrisTrains rolling stock that is used in the scenarios. Chapter 3 contains an overview of the route and track plans of all station yards, followed by an index of the included WG rolling stock in chapter 4. There you will also find a specification of the ChrisTrains assets that are needed to run the scenarios. Chapter 5 will introduce you to the NS lightsignals system ('NS daglichtseinen 1954'), while chapter 6 is reserved for an overview of all available scenarios.

In the Appendix user manuals excerpts of all included Wilbur Graphics locomotives can be found.

2   Installation

2.1   Download contents

The TrainworX/Wilbur Graphics Retro Canvas Route (RCR) is being offered as a .zip-file and will contain the following items, apart from the `Readme EN.txt` -file :

Language User Manuals:
- `WG_RCR_Handbuch_V2_0_build_20260115.pdf`)
- `WG_RCR_Manual_V2_0_build_20260115.pdf`)
- `WG_RCR_Handleiding_V2_0_build_20260115.pdf`)

Installer program `WG_RCR_V20_build_20260115.exe`

Please see the *release notes.txt* for the latest changes and corrections.

2.2   Installation

After starting the installer you will be prompted to

- Select a language (Dutch/English/French/German)
- Indicate an alternative path to the installation folder (default is ../SteamApps/Railworks/etc.)
- Accept the licence agreement (EULA)

2.3   Removing the Retro Canvas Route

To remove the RCR we strongly advise you to limit this action to the deletion of the folder:

`67ac1f9a-b1ca-4bd3-89e4-b27d24a15b23`

From the folder as specified by the path below:

```
C:\Program Files (x86)\
Steam\steamapps\common\RailWorks\Content\Routes
```

2.4   Required add-ons

You cannot simulate railway services in a Dutch route without having ChrisTrains rolling stock on the roster. We therefore are assuming that most of these products have already been acquired by our esteemed users. In chapter 4 we will summarize the ChrisTrains rolling stock objects that have been scheduled to make an appearance in the route's scenarios.

In the RCR route we have been using scenery objects that DTG have omitted from newly bought TSC versions since 2015. This concerns passenger characters on platforms, some railway personnel etc., but is also important for rendering the terrain. User who came on board from that version on can remediate this by purchasing the DTG addon *European Loco and Asset Pack (ELAP),* which is (reasonably priced) on offer at the Steam website.

2.5 Settings and hardware requirements

The hardware and software requirements that are recommended by Train Simulator 2019 supplier DTG have been observed by the developer when building this product.

Minimum system requirements:

OS	Windows® 10/11
Processor:	2.8 GHz Core 2 Duo (3.2 GHz Core 2 Duo recommended), AMD Athlon MP (multiprocessor variant or comparable processors)
Memory:	4 GB RAM
Graphics:	512 MB with Pixel Shather 3.0 (AGP PCIe only)*
DirectX®:	9.0c
Hard Drive:	6 GB HD space
Sound:	Direct X 9.0c compatible

* Laptop versions of these chipsets could work but are not supported by TS Classic. It may be possible that the drivers for your video and sound cards must be updated.

We suggest that you will incorporate the graphics settings in your version of TS Classic as shown in the pictures below:
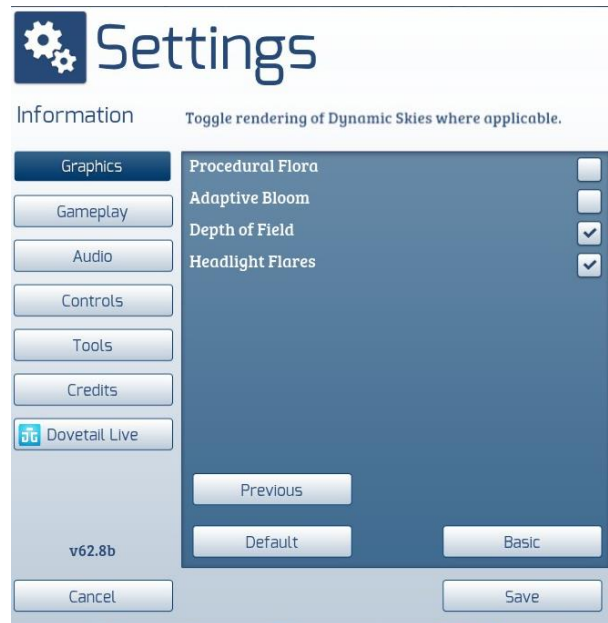
You could consider to make adjustments to these settings when implementing this route on more advanced PCs than specified by DTG, but we have not tested this product under those conditions.

When running scenarios in this route the rquired memory capacity will, under normal circumstances, not exceed 2.5 Gigabytes. We nevertheless recommend to limit the number of parallel and background jobs anyway.

2.6   Notice to (beginning) scenario creators

It goes without saying that user who are building their own scenarios will have a responsibility of their own for an acceptable framerate and other performance parameters. When TS is running in its own window you will be able to keep a close watch on these in the Task Manager window (speedlink CTRL+ALT+DEL). When required the sim's framerate can be made visible in the TS window by hitting SHIFT+Z.

3   The route

3.1   Overview
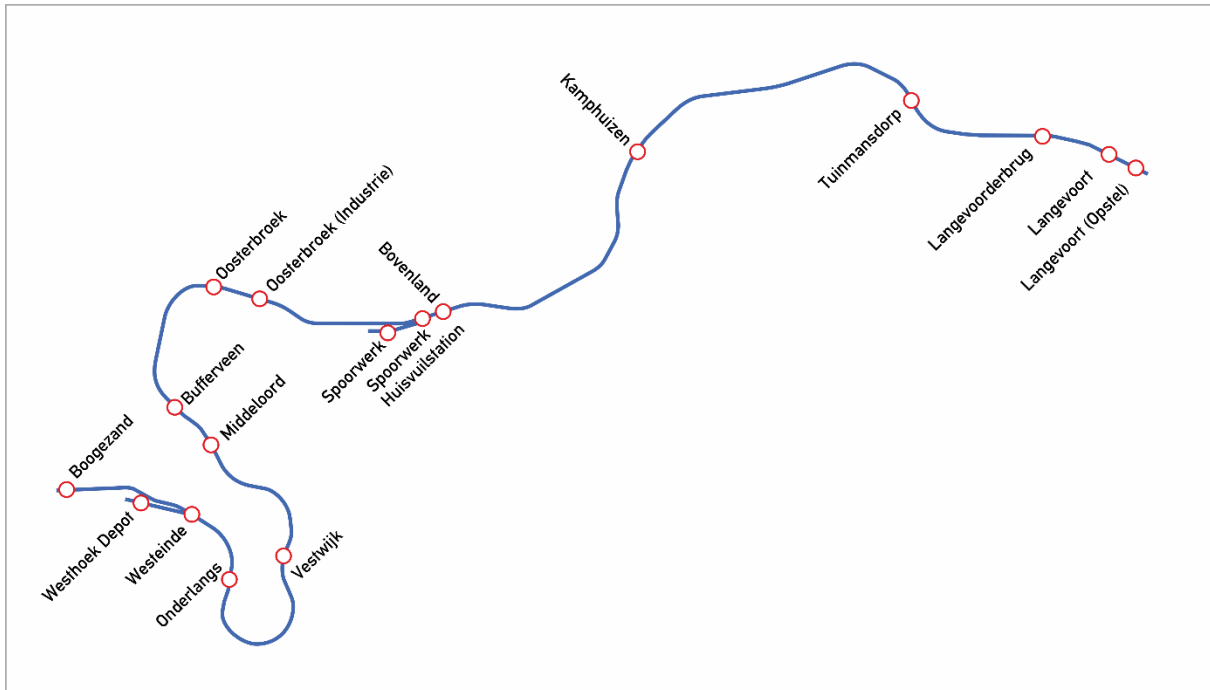
3.2   Sections numbering

Ever since the beginning of railway history safety requirements made it necessary to introduce signalling, for which railway lines got divided into sections, taking braking distances into account. Access to sections is controlled by home signals. In this route sections have been numbered as given in the table below:

Section no.	Location
01	Westhoek Opstelterrein (Wh), Boogezand (Bgz)
02	Westeinde (We)
03	
04	
05	Onderlangs (Odl)
06	
07.a/b	
08	Vestwijk (Vw)
10	
11.a/b	
12	Middeloord (Mdo)
13	
14	Bufferveen (Bfv)
15	
16	Halte Oosterbroek (Obk)
17	

18	Oosterbroek Mach. Fabriek (Obk MF)
19	
20	Spoorwerk Werkplaats & VAM-station (Spw VAM)
21	Spoorwerk Rangeer (Spw Ra)
22	Halte Bovenland (Bvl)
23	
24	
25	
26	Kamphuizen (Khz)
27	
28	
29	
30	Halte Tuinmansdorp (Tmd)
31	
32	
33	Langevoorderbrug (Lvb)
34	Langevoort (Lvt)
35	Langevoort Opstelterrein (LvO)

3.3   Mileage Posts

RCR Kilometer Posts

Km	Lat	Long	
17	52.45855	5.26331	Langevoort Opstel
18	52.46186	5.24936	Langevoort
19	52.46438	5.23477	Langevoorderbrug
20	52.46506	5.21976	
21	52.46546	5.20402	
22	52.46680	5.18870	
23	52.47152	5.17830	Tuinmansdorp
24	52.47878	5.17133	
25	52.48371	5.15750	
26	52.48339	5.14259	
27	52.48073	5.12784	
28	52.47881	5.11227	
29	52.47788	5.09722	
30	52.47648	5.08269	
31	52.47064	5.07085	
32	52.46447	5.06140	Kamphuizen
33	52.46041	5.05670	
34	52.45550	5.05360	
35	52.45123	5.05152	
36	52.44650	5.05188	
37	52.43723	5.04656	
38	52.43076	5.03110	
39	52.42663	5.01837	
40	52.42523	5.00345	
41	52.42632	4.98878	
42	52.42407	4.97460	Spoorwerk
43	52.42193	4.96022	
44	52.42217	4.94495	
45	52.42243	4.92970	
46	52.42535	4.91580	
47	52.42913	4.90243	Oosterbroek Industrie
48	52.43210	4.88677	Oosterbroek
49	52.43286	4.87881	
50	52.43195	4.87079	
51	52.42856	4.86472	
52	52.42367	4.86210	
53	52.41880	4.86023	
54	52.41398	4.85838	

| Km	Lat	Long	
55	52.40944	4.85803	
56	52.40505	4.86175	
57	52.40136	4.86740	Bufferveen
58	52.39826	4.87328	
59	52.39466	4.87830	Middeloord
60	52.39035	4.88198	
61	52.38576	4.88596	
62	52.38236	4.89261	
63	52.38131	4.90026	
64	52.37914	4.90759	
65	52.37501	4.91186	
66	52.37000	4.91287	
67	52.36514	4.91010	Vestwijk
68	52.36041	4.90863	
69	52.35113	4.91268	
70	52.34309	4.90585	
71	52.34282	4.89110	
72	52.35036	4.88356	
73	52.36022	4.88740	Onderlangs
74	52.36917	4.88490	
75	52.37438	4.87291	Westeinde
76	52.37833	4.85875	
77	52.38215	4.84363	
78	52.38198	4.82899	Boogezand

3.4   Station layouts descriptions

3.4.1   Overview

For each station layout in the route a schematic picture has been included, referencing to signal numbers and siding and platform names. Signals are identified by a four-digit code, in which the left hand positions have been reserved for the two-digit section-ID.
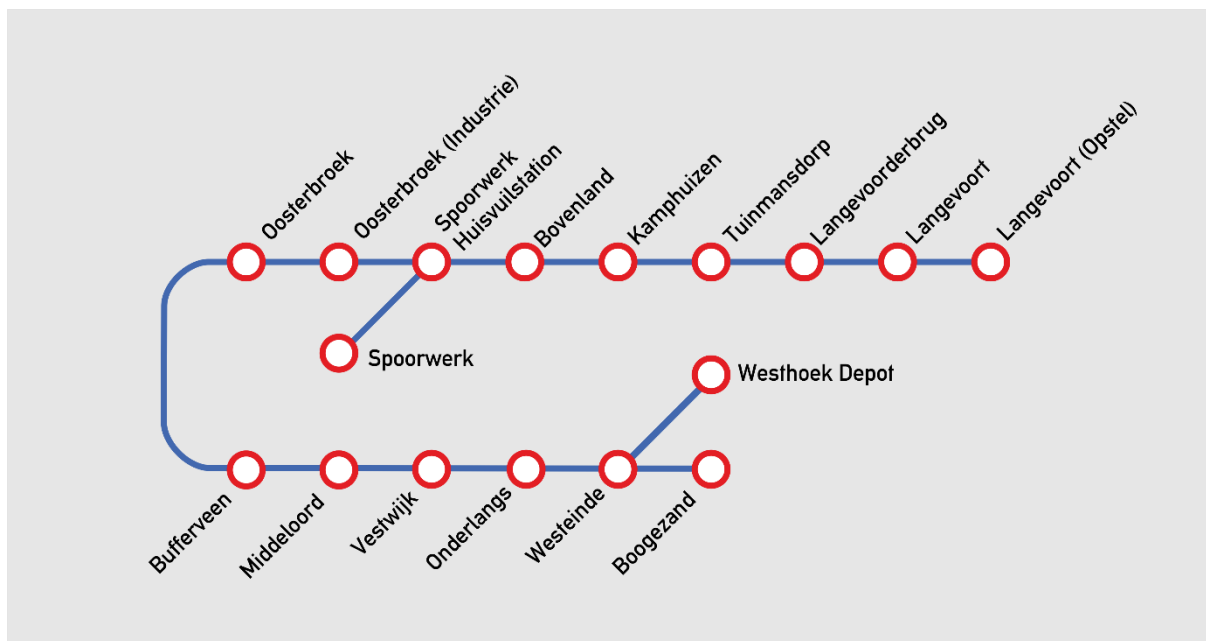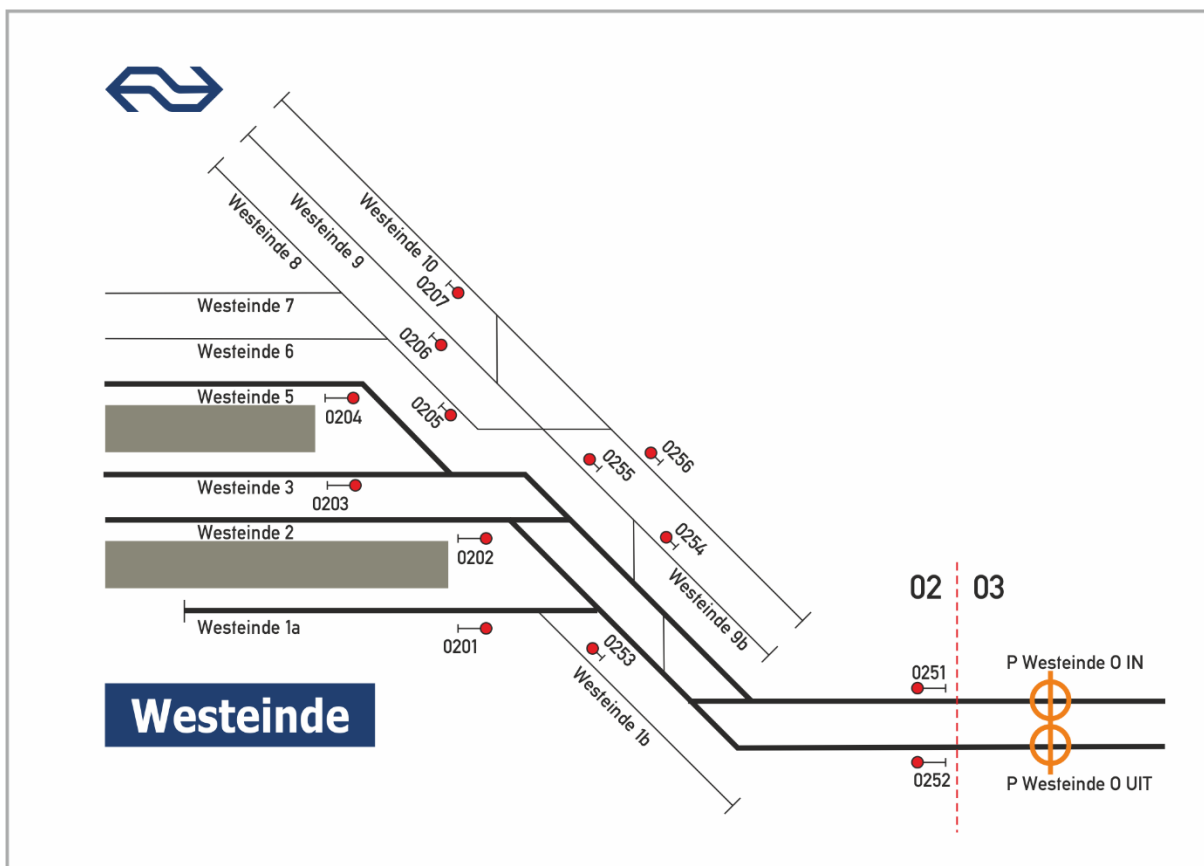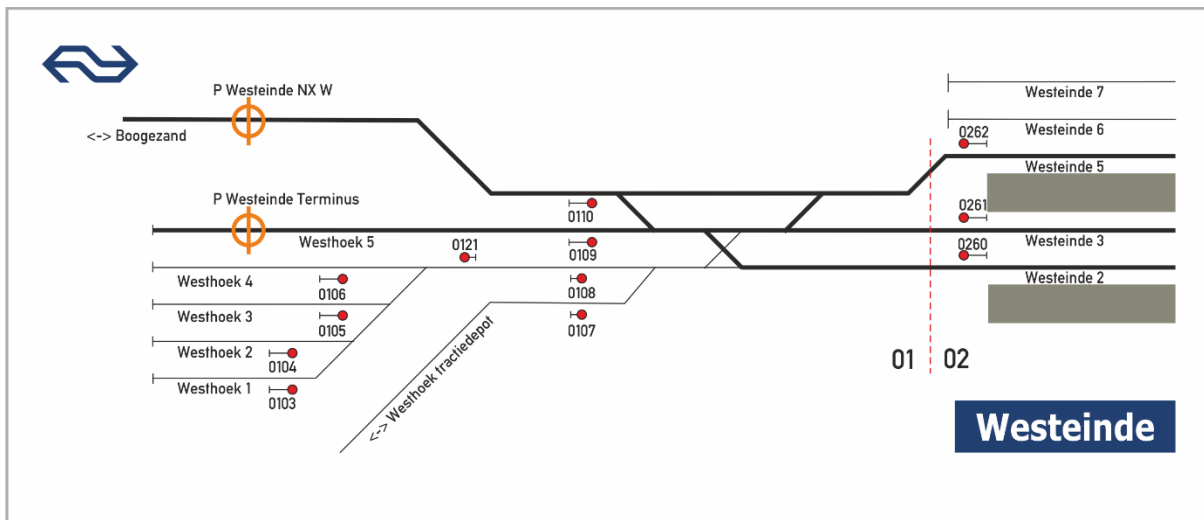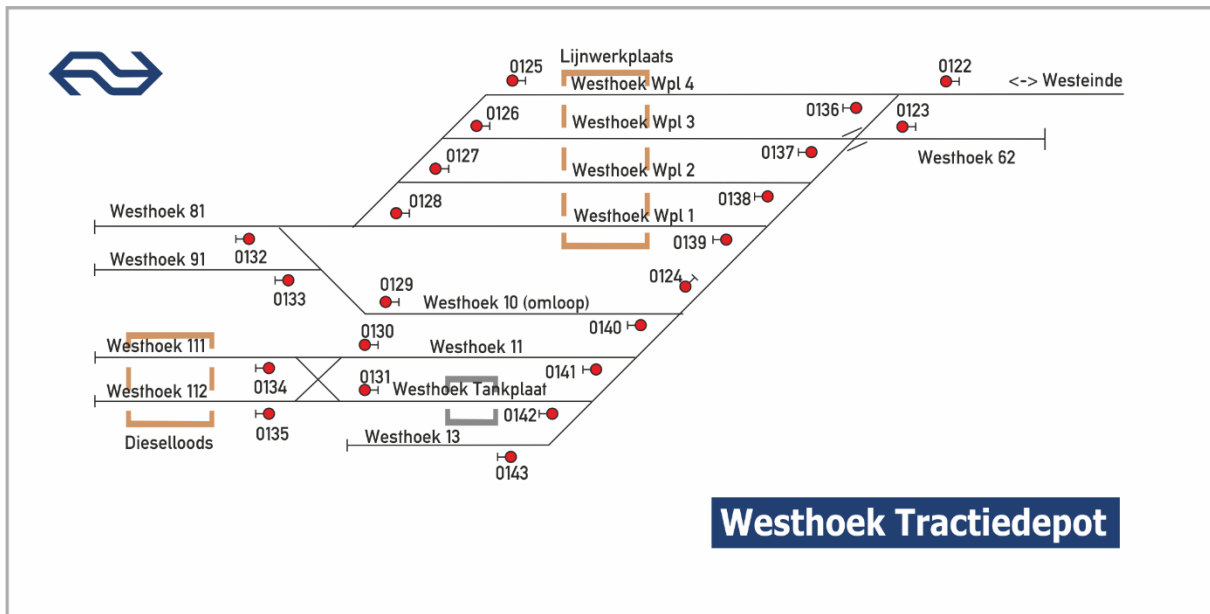

Tuinmansdorp station
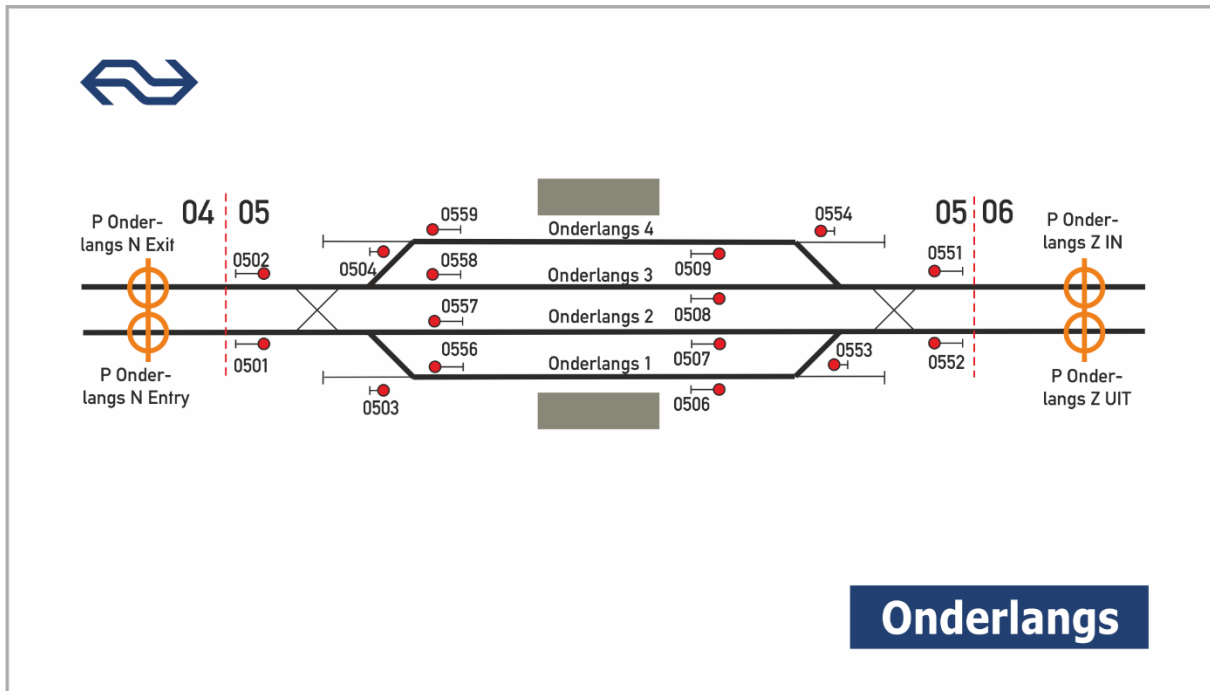
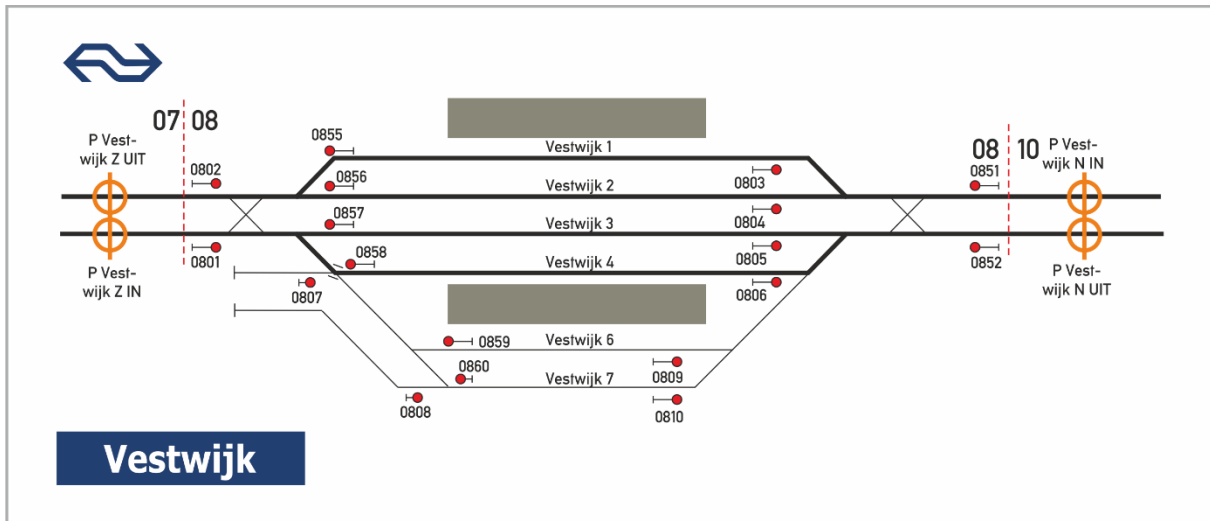### 3.4.2 Boogezand
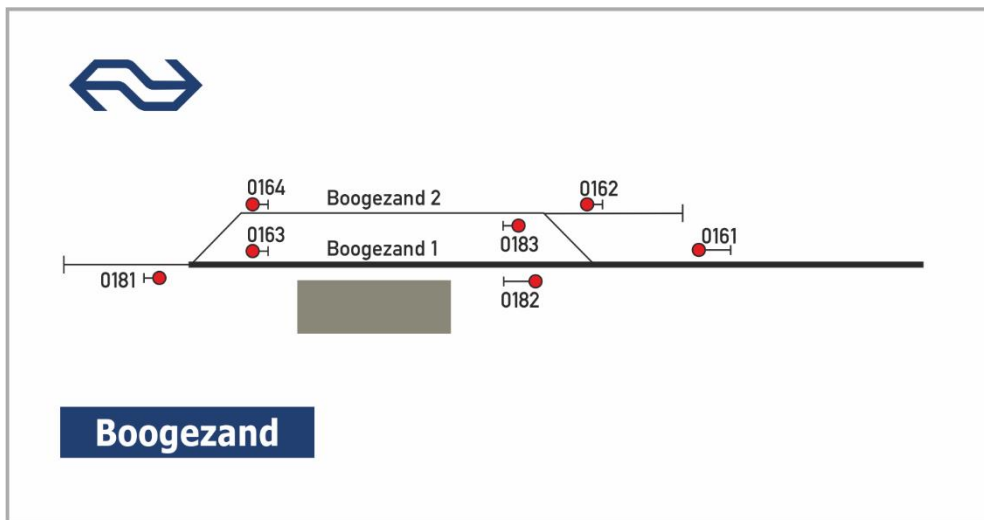
3.4.3   Westeinde

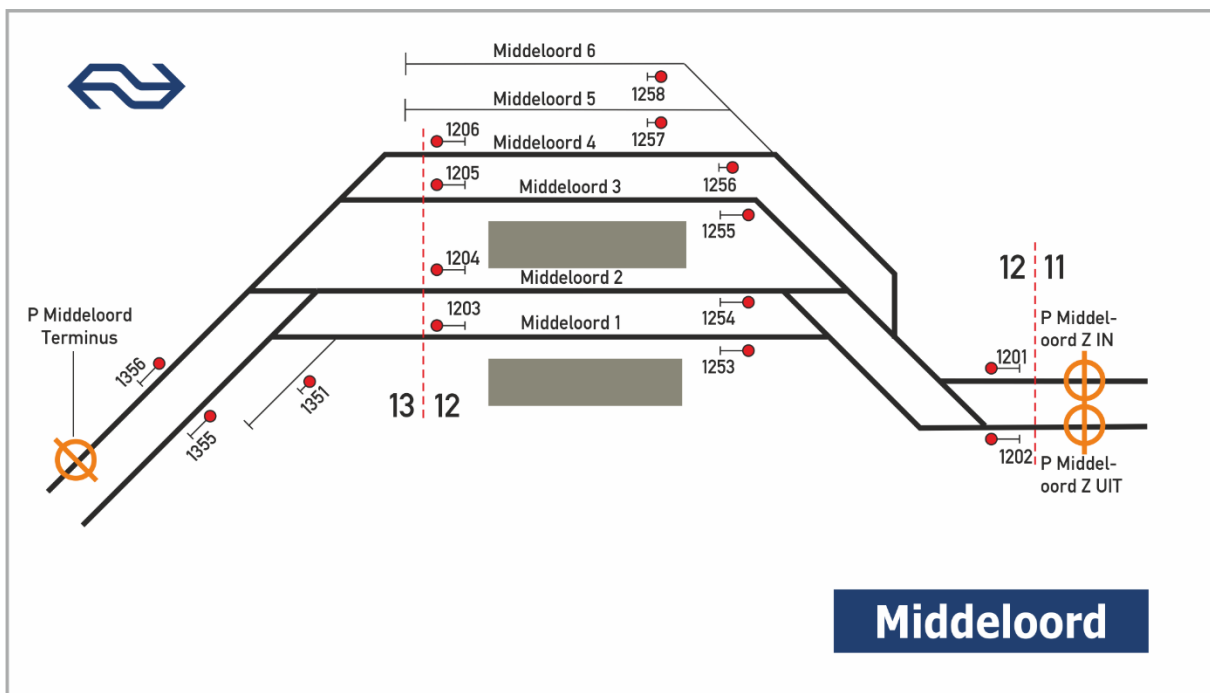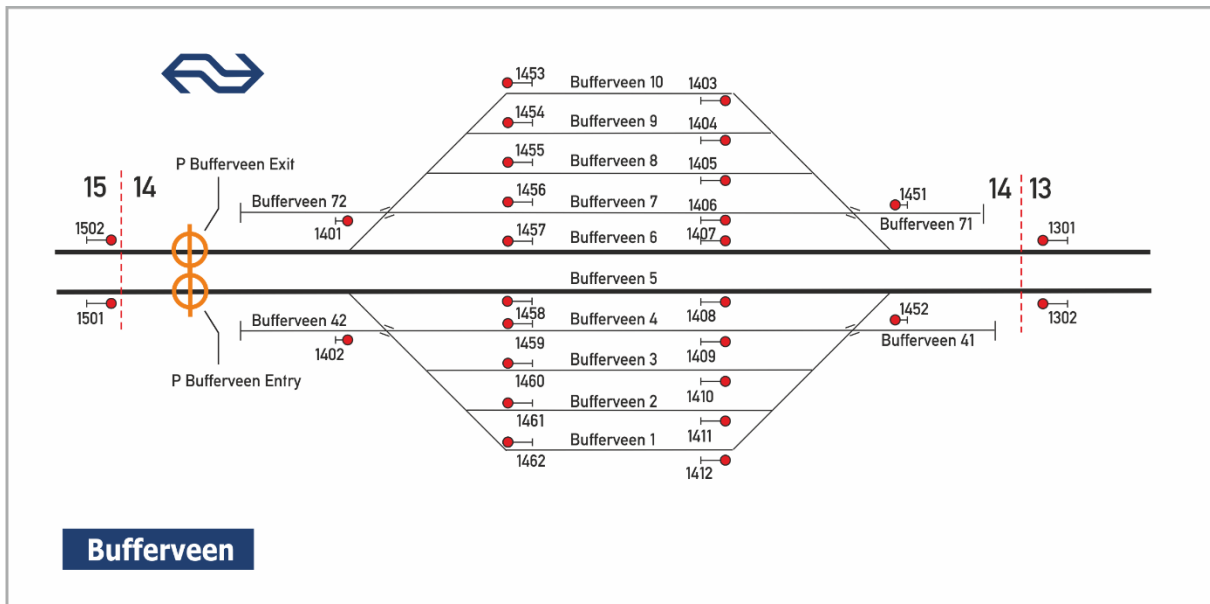Next to the passengers station the MPD Westhoek is also part of the layout:
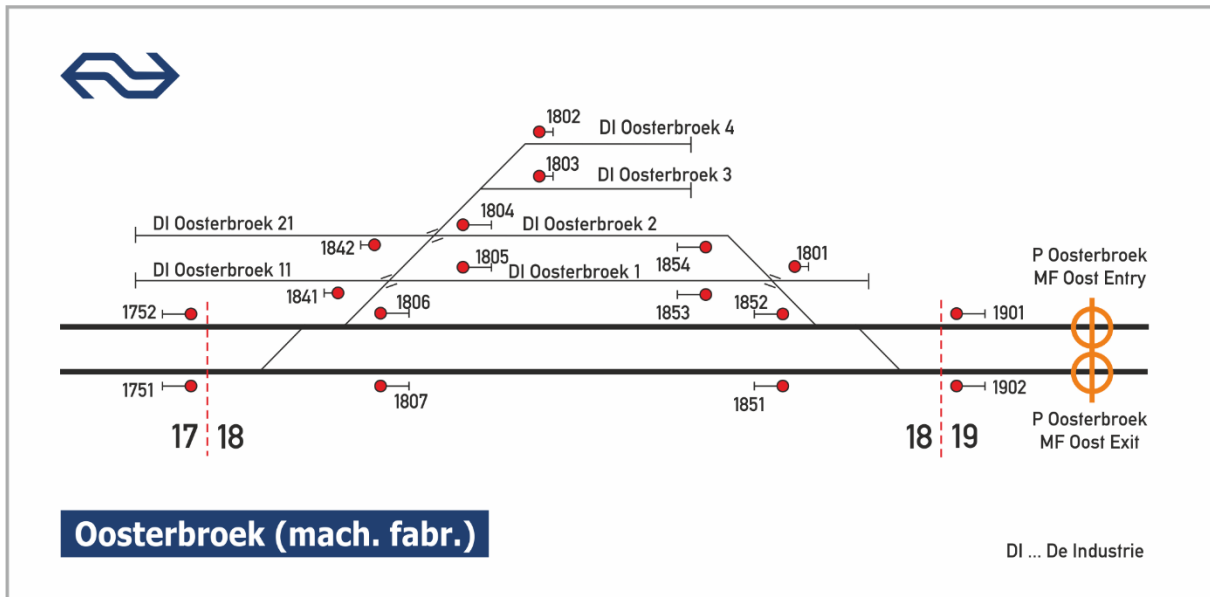
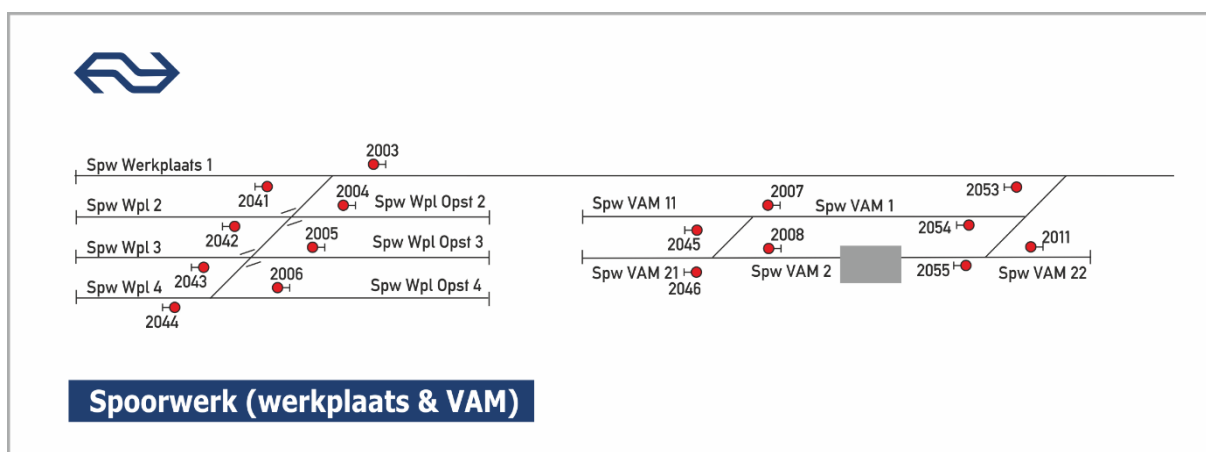### 3.4.4   Onderlangs

3.4.5 Vestwijk

3.4.6 Middeloord

3.4.7 Bufferveen

3.4.8   Oosterbroek

3.4.9 Spoorwerk

Spoorwerk (rangeerterr.)

Spoorwerk (werkplaats & VAM)

3.4.10 Kamphuizen
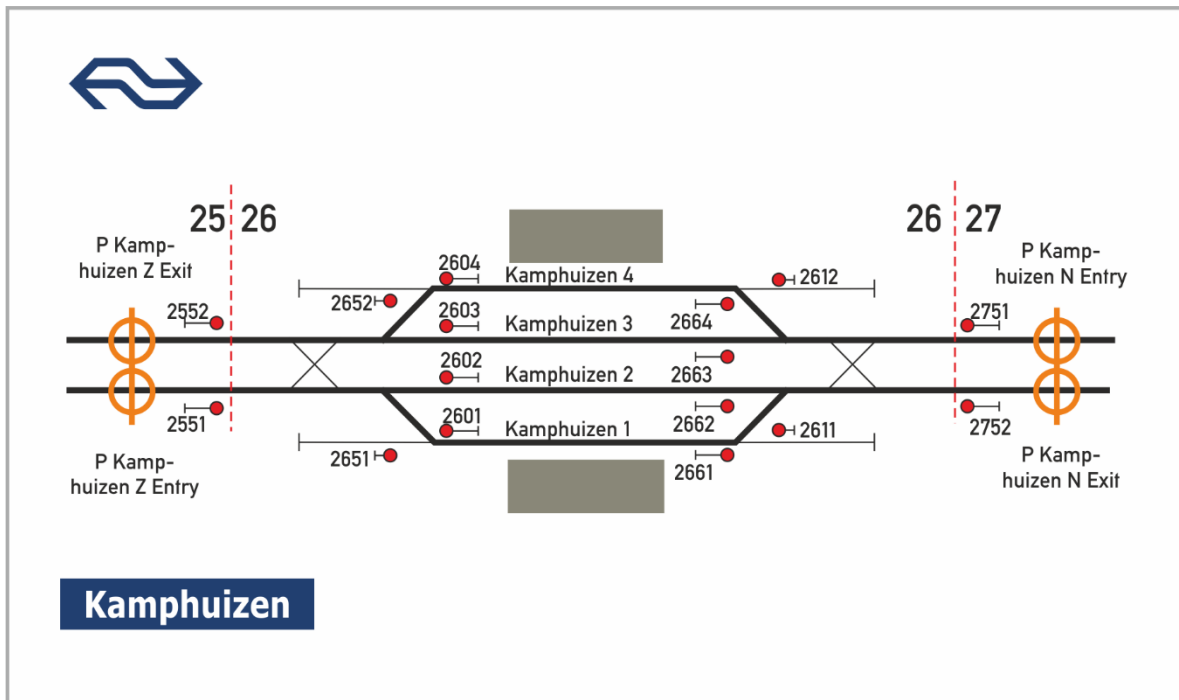
3.4.11 Langevoort
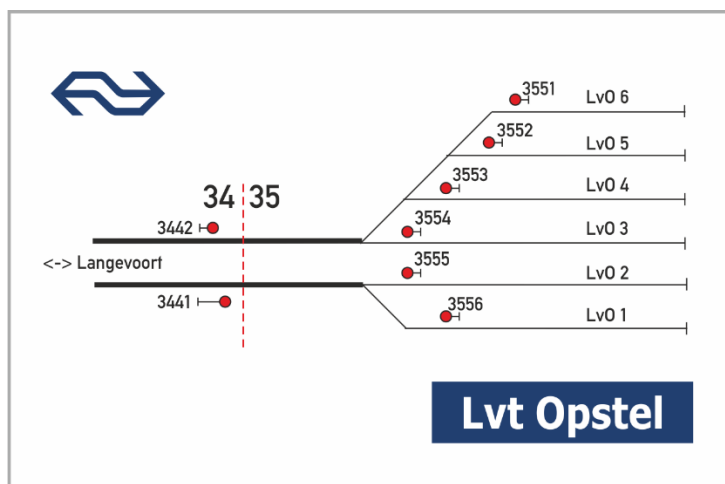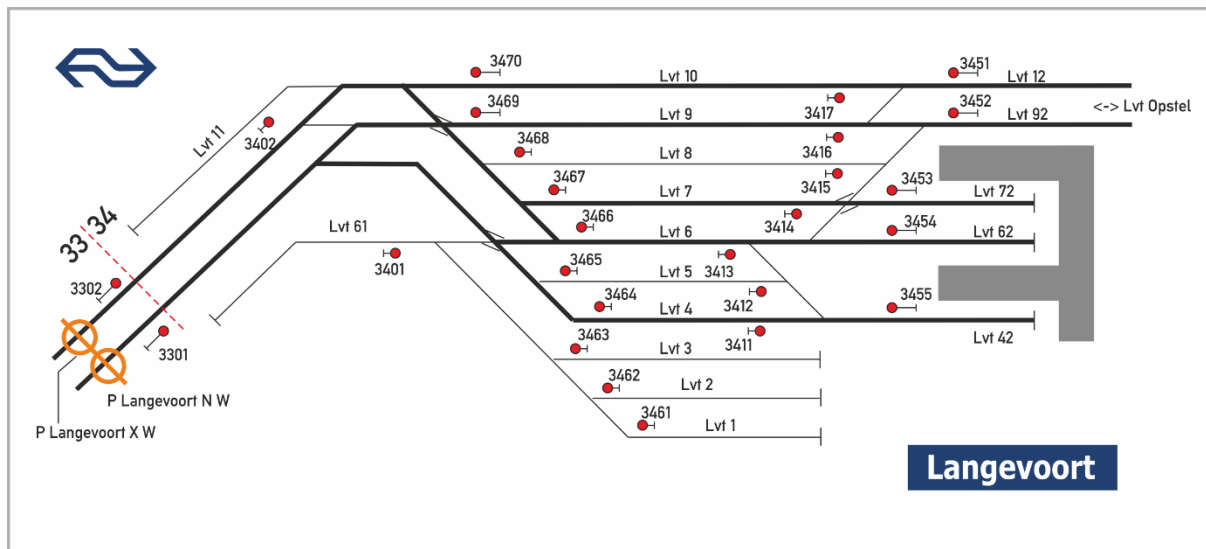
4 Rolling stock

When the RCR's installation has completed the following rolling stock will be available for deployment in the scenarios:

4.1 Wilbur Graphics

4.1.1 Motive Power

Object Browser	Folder	Asset Name
WG NS 1123	NS_1100_tp4	WG_NS_1123
WG NS 1143	NS_1100_tp4	WG_NS_1143

Object Browser	Folder	Asset Name
WG NS 1615	NS_1700	WG_NS_1615
WG NS 1722	NS_1700	WG_NS_1722
WG NS 1734	NS_1700	WG_NS_1734
WG NS 1737	NS_1700	WG_NS_1737

Object Browser	**Folder**	**Asset Name**
WG NS 2407	NS_2400_tp4	WG_NS_2407
WG NS 2454	NS_2400_tp4	WG_NS_2454
WG NS 2561	NS_2400_tp4	WG_NS_2561

Object Browser	**Folder**	**Asset Name**
WG NS 325 huisstijl	NS_200_tp4	WG_NS_325
WG NS 345 huisstijl	NS_200_tp4	WG_NS_345

Object Browser	**Folder**	**Asset Name**
WG NS 622 huisstijl	NS_500_tp4	WG_NS_622_huisst
WG NS 673 huisstijl	NS_500_tp4	WG_NS_673_huisst
WG Locon 9702	Locon 9702	WG_Locon_9702

Object Browser	Folder	Asset Name
WG SSN BR 23 023	DB_BR_23	WG_SSN_BR_23_023
WG SSN BR 23 023 T26	DB_BR_23	WG_SSN_BR_23_023_T26

Object Browser	Folder	Asset Name
WG V100 VolkerRail 203-1 'Tom'	V_100	WG_V100_VolkerRail_203_1
WG V100 VolkerRail 203-5 'Tyke'	V_100	WG_V100_VolkerRail_203_5
WG V 100 Locon_220	V_100	WG_V_100_Locon_220

4.1.2 Coaches

Object Browser	Folder	Asset Name
WG tb CIWL F 1287 flash	CIWL_train_bleu	WG_CIWL_F_1287
WG tb CIWL PS 4035 flash	CIWL_train_bleu	WG_CIWL_PS_4035
WG tb CIWL R 4008 flash	CIWL_train_bleu	WG_CIWL_R_4008

Object Browser	Folder	Asset Name
WG DB 119 Apmz	DB_119_ABpmz	WG_DB_119_Apmz
WG DB 119 Bpmz	DB_119_ABpmz	WG_DB_119_Bpmz

Object Browser	Folder	Asset Name
WG NS ICR Apmz	NS_ICR_ABpmz	WG_NS_ICR_Apmz
WG NS ICR BDpmz	NS_ICR_ABpmz	WG_NS_ICR_BDpmz
WG NS ICR Bpmz	NS_ICR_ABpmz	WG_NS_ICR_Bpmz

Object Browser	Folder	Asset Name
WG SSN Mitropa WRm 217	DR_Mitropa_WR4g	WG_SSN_Mitropa_WRm_217
WG SSN Bm 232	DB_Abüm4	WG_SSN_Bm_232
WG SSN Bm 232 blauw	DB_Abüm4	WG_SSN_Bm_232B

4.1.3   Freight waggons

Object Browser	Folder	Asset Name
WG DB Cargo Fals 167	DB_Fals_167	WG_DB_Cargo_Fals_167
WG DB VTG Fals 167	DB_Fals_167	WG_VTG_Fals_167
WG DB Fads 176	DB_Fads_176	WG_DB_Fads_176
WG NS Fals 254 (Kalk)	NS_Fals_254	WG_NS_Fals_254

Object Browser	Folder	Asset Name
WG DB Glmhs 50 flash	DB_Glmhs	WG_DB_Glmhs_flash

Object Browser	Folder	Asset Name
WG DB ZZw 51 Esso 581226 rmpltfrm	DR_ZZw_51	WG_DB_Esso_ZZw_51_rmpltfrm
WG DB ZZw 51 EVA 572355	DR_ZZw_51	WG_DB_Eva_ZZw_51_572355
WG DB ZZw 51 Mobil 580783	DR_ZZw_51	WG_DB_Mobil_ZZw_51_580783
WG DB ZZw 51 Shell flash	DR_ZZw_51	WG_DB_Shell_ZZw_51_flash
WG DB ZZw 51 VTG 596551	DR_ZZw_51	WG_DB_VTG_ZZw_51_596551
WG NS ZZw 51 NAM 500813	DR_ZZw_51	WG_NS_NAM_ZZw_51_500813

Object Browser	Folder	Asset Name
WG NS EDK6a gen schutwgn tp4	EDK_typ_6a	WG_EDK6a_gen_schutw_tp4
WG NS EDK6a transport tp4	EDK_typ_6a	WG_EDK6a_gen_transprt_tp4

Object Browser	Folder	Asset Name
WG NS Gs flash	NS_Gs	WG_NS_Gs_flash

Object Browser	Folder	Asset Name
WG NS Sgns 7 20' A-M-H	NS_Sgns	WG_NS_Sgns7_2A2M2H
WG NS Sgns 7 20' APL	NS_Sgns	WG_NS_Sgns7_2A2A2A
WG NS Sgns 7 20' Cont. Ships	NS_Sgns	WG_NS_Sgns7_2C2C2C
WG NS Sgns 7 20' Gouda VV	NS_Sgns	WG_NS_Sgns7_2V2V2V
WG NS Sgns 7 20' HAPAG	NS_Sgns	WG_NS_Sgns7_2H2H2H
WG NS Sgns 7 20' MAERSK	NS_Sgns	WG_NS_Sgns7_2M2M2M
WG NS Sgns 7 20' WilburG	NS_Sgns	WG_NS_Sgns7_2T2T2T
WG NS Sgns 7 20' Ts-Ts-V	NS_Sgns	WG_NS_Sgns7_2T2T2V
WG NS Sgns 7 40' APL	NS_Sgns	WG_NS_Sgns7_4A
WG NS Sgns 7 40' ContShips	NS_Sgns	WG_NS_Sgns7_4C
WG NS Sgns 7 40' Gouda VV	NS_Sgns	WG_NS_Sgns7_4G
WG NS Sgns 7 40' HAPAG	NS_Sgns	WG_NS_Sgns7_4H
WG NS Sgns 7 40' MAERSK	NS_Sgns	WG_NS_Sgns7_4M
WG NS Sgns 7 40' WilburG	NS_Sgns	WG_NS_Sgns7_4T
WG NS Sgns 7 ledig	NS_Sgns	WG_NS_Sgns7_lm

Object Browser	Folder	Asset Name
WG NS Slps ACTS flash	NS_Slps	WG_NS_Slps_ACTS_flash
WG NS Slps ledig mat flash	NS_Slps	WG_NS_Slps_lm_flash

Object Browser	**Folder**	**Asset Name**
WG NS Rs	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4
WG NS Rs type Y32 trucks	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_GP200
WG NS Rs NKF	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_NKF
WG NS Rs Phoenix	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_Phoenix
WG NS Rs rails	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_rails
WG NS Rs sparren	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_spar
WG NS Rs stammen	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_stam
WG NS Rs trekkers/tractors	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_JD_5100
WG NS Rs Wilbur Graphics	NS_SSlmas53_tp4	WG_NS_SSlmas_53_tp4_WilburG

Object Browser	**Folder**	**Asset Name**
WG SBB Gbs	SBB_Gbs	WG_SBB_Gbs

Object Browser	**Folder**	**Asset Name**
WG SNCF Gas A tp4	SNCF_Gas	WG_SNCF_Gas_A

4.2 ChrisTrains

© ChrisTrains

The route features a significant amount of scenarios featuring ChrisTrains payware rolling stock. These are the locomotives and wagons specified below. If you don't own them yet, you can purchase them from the ChrisTrains webshop, which can be accessed via this link: https://www.christrains.com/en/ts_buy.html

4.2.1 Motive power

Object Browser	ChrisTrains Shop
NS Class 2200 …	ChrisTrains NS2200 for Train Simulator
NS Class 6400 …	ChrisTrains NS6400 for Train Simulator
NS mP3000 …	ChrisTrains mp3000 for Train Simulator

4.2.2 Electrical Multiple Units (EMUs)

Object Browser	ChrisTrains Shop
CT NS VIRMm …	ChrisTrains NS IRM for TrainSimulator
NS DD-IRM …	ChrisTrains NS IRM for TrainSimulator
NS Mat64 Plan V …	ChrisTrains NS Mat64 for TrainSimulator
NS V-IRM …	ChrisTrains NS IRM for TrainSimulator
NS ICMm …	ChrisTrains NS ICMm for TrainSimulator
	ChrisTrains NS ICMm Paint Pack
NS SGM …	ChrisTrains NS SGM for TrainSimulator

4.2.3 Goods rolling stock

Object Browser	ChrisTrains Shop
NS FCCPPS	ChrisTrains NS FCCPPS for TrainSimulator
NS Hbbkkss	ChrisTrains NS mP3000 PTT Paint Pack
NS Koppelwagen	ChrisTrains NS Koppelwagen for TrainSimulator
NS Tads …	ChrisTrains NS Tads wagon for TrainSimulator

5 Signalling

5.1 Introduction

5.1.1 Definitions
Home signal:
A light signal which can show 'Danger'.

Speed limit:
Depending on your speed:

- To reduce speed to the prevailing speed, or
- To increase speed to the prevailing speed

P-signal:
An automatic signal, marked ,P'.

Drive on sight:
To be able to stop at any given spot behind the signal.
Limit your speed. Do not exceed 40 km/h.

Speed:
Number x 10 km/h

Line speed:
The line's permitted maximum speed

Local speed:
Locally permitted maximum speed, as indicated by signs or signals.

5.1.2 Signal positions
Signals can be found at the right hand side of tracks, or above a track for which they are valid, with the exception of signals:

- On left hand tracks of double track sections or lines;
- Midget signals that cannot be placed at the right hand side, due to local circumstances.

5.1.3 Signals validity
All signals are valid for trains and yard movements.

5.1.4 Speed adjustments
When adjusting speed you must observe the following rules:
- Speed reductions must be started when the first vehicle of a consist passes the signal that is indicating a speed reduction
- Speed increments can only be effected when the last vehicle of a consist has passed the signal that allows a speed increment.

5.2   Light signals

5.2.1   Definitions

Red variant indicates "Danger". The term *red variant* implies that a signals' shown primary colour is **red**.

Green variant indicates "Passing allowed". The term *green variant* implies that a signals' shown primary colour is **green**.
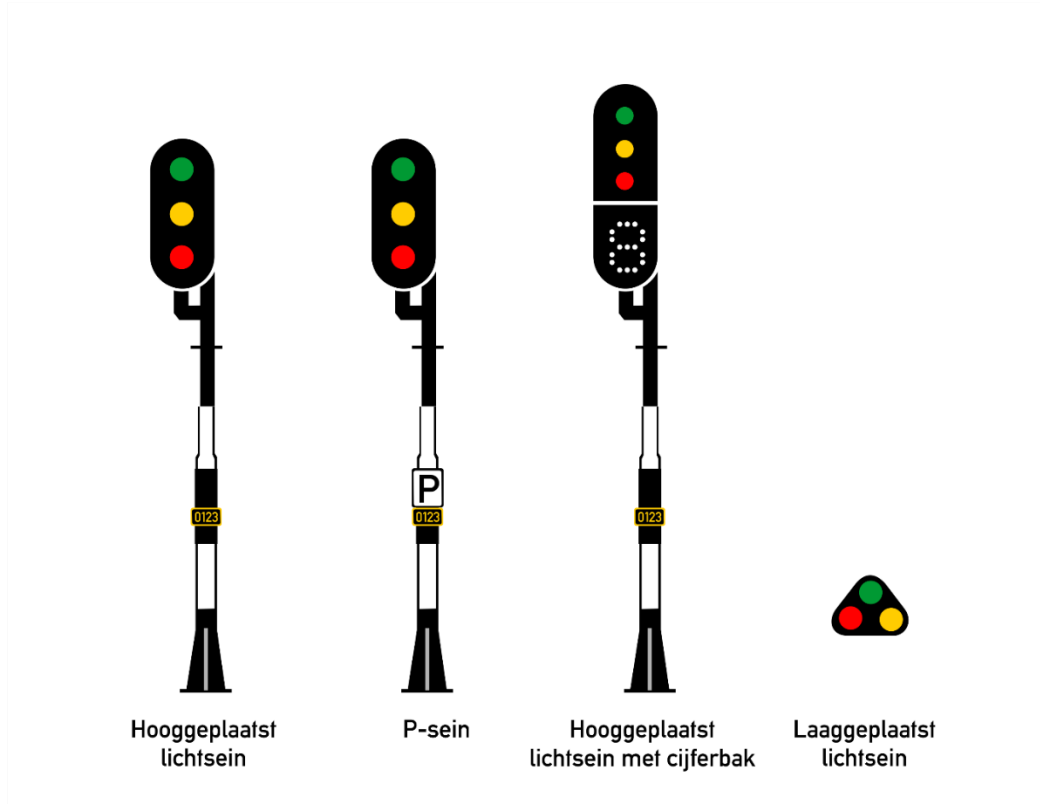
Yellow variant indicates "Speed reduction". The term *yellow variant* implies that a signals' shown primary colour is **yellow**.

White variant indicates "Passing allowed". The term *white variant* implies that a signals' shown primary colour is **white**.

5.2.2   Related signals

The Dutch National Railways signalling system "Signalstelsel 1954" which has been applied to the Retro Canvas Route will either require a train driver:

- to drive at a given speed -or-
- to reduce speed

Signal indications will be arranged in such a way that a train driver can follow up on the instructed actions. The signal 'Reduce Speed' will be shown at such a distance that a required speed reduction can be timely carried out. Timely means that the available braking distance is sufficient to get at the required speed.
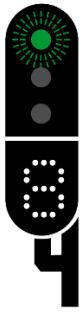
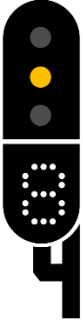### 5.2.3 Pictured light signals (standard height and midget)

Hooggeplaatst lichtsein   P-sein   Hooggeplaatst lichtsein met cijferbak   Laaggeplaatst lichtsein

5.2.4 Green variants

Picture	Signal	Indication
	High green	Pass with local speed. If this is not known, then depart at 40 km/h.
	Flashing green	Pass at 40 km/h.

	Flashing green with digit	Pass at speed as indicated by the number shown (x 10 km/h)
	Midget green	Pass at 40 km/h.

5.2.5 Yellow variants

Picture	Signal	Indication
	Yellow (high and midget)	Reduce speed to 40 km/h or lower when necessary in order to stop at the next "Danger" showing signal.
	Yellow with digit	Reduce speed as indicated by the number (x 10km/h). A speed reduction must be ultimately effected at the next light signal.

Picture	Signal	Indication
	Flashing yellow (high and midget)	Drive-on-sight

5.2.6   Red variants

Picture	Signal	Indication
	Red (high and midget)	Stop in front of the signal.

5.2.7   White variants

Picture	Signal	Indication
	Departure light signal	Permission to depart.

5.3   Signs

5.3.1   Speed signs

Picture	Signal	Betekenis
	Speed reduction sign	Reduce speed as indicated by the number (x 10km/h).
	Speed sign	Pass at speed as indicated by the number (x 10km/h)
	Line speed sign	Permission to increase speed as indicated by the number (x 10km/h)

5.3.2   Other signs

Picture	Signal	Indication
	Track end stop	Stop in front of signal.
	Station approach sign	Station without entry signal at brake distance.

		Sign 'Overhead line ends'	Do not pass with raised pantographs.
		Number sign	Indicates the location where a train head must be stopped, depending on the number of coaches as shown by the sign.
		Number sign	Indicates the location where every stopping train must be brought to a halt, when other number signs do not apply.
		P-Sign	P-signal (automated signal along the line outside station layouts).

6 Scenarios

6.1   Gameplay Settings

When playing the scenarios we recommend the following TS Gameplay settings:

These setting assume that steam locomotives will be fired by the player. Coupling actions will also be part of the player's tasks. Of course you may activate the settings concerned.

6.2   Tasks

6.2.1   Overview

00 Materieelshow		FR	
Quickdrive Langevoort-Boogezand		QD	
Quickdrive Boogezand-Langevoort		QD	
01 CT VIRMm2 IC Boogezand-Langevoort	VIRM m2	ST	R
01 IC Boogezand-Langevoort	NS 1700 6 ICR	TT	R
02 IC Langevoort-Boogezand	VIRM 6-bak	TT	R
O3 CT VIRMm3 IC Langevoort-Westeinde v.v.	VIRM m3	TT	R
03 IC Langevoort-Westeinde v.v.	ICM 4 + 2	TT	R
11 Boogezand-Langevoort	SGM2	TT	Spr
12 Langevoort-Boogezand	Plan V 2x2	TT	Spr
14 Stoptrein naar Langevoort	SGM2	TT	Spr
21 Ertstrein Westeinde-Langevoort	NS 2200 mu 20 Fals	ST	G
22 Ketelwagens Langevoort-Westhoek	NS 1100 4-ass ketelwagens	ST	G
23/0 Bediening Machinefabr. Oosterbroek (1)	NS 200	ST	Rangeren
23/1 Bediening Machinefabr. Oosterbroek (2)	NS 2200 goederenwagens	ST	G
24/0 Bediening VAM-station Spoorwerk (1)	NS 500	ST	Rangeren
24/1 Bediening VAM-station Spoorwerk (2)	NS 2400 VAM	ST	G
25 Werktrein Middeloord-Langevoort	NS 2400 Rs	ST	G
26 Kalkwagens Langevoort Westhoek	NS 1700 20 Fals 254	ST	G
27 Goederentrein Spoorwerk-Westeinde	NS 2407 en 2561	ST	G
28 Ophalen gestrand treinstel Plan V	NS 6400 with koppelwagen	ST	G
31 SSN Langevoort - Westeinde(1)	VR V100 cat + SSN 23 023	ST	Extra
32 SSN Langevoort - Westeinde(2)	SSN 23 023	TT	Extra
51 Milkrun service to Langevoort	NS 6400	ST	G
91 Inspectierit Boogezand-Langevoort	mP 3000 Jules	ST	Extra
97 Railfan Westeinde		FR	
98 Railfan Bovenland		FR	

TT = Time tabled, ST = Standard, FR = Free Roam
R = Express passenger service, Spr = Sprinter (Stopping passenger service), G = Goods service, Extra = extra service

6.2.2   01 Intercity Boogezand-Langevoort

For getting familiar with the RCR a time table scenario has been made available in which you drive a through passenger service consist of a NS 1700 series electric loco and ICR type coaches on the full length of the route. You will encounter various other rolling stock combinations along the way.

6.2.3   02 Intercity Langevoort-Boogezand

Another intercity service, now with a VIRM, but the other way around. You will only stop in Langevoort, Middeloord and Westeinde. The scenario ends on Westhoek Track 5.

6.2.4   03 IC Langevoort-Westeinde v.v.

Intercity service with a four coaches NS ICM ('Koploper') EMU. After stops in Kamphuizen, Middeloord and Vestwijk you will change cabs in Westeinde. After that you will return along the same stations to Langevoort, where the scenario ends.

6.2.5   11 Boogezand-Langevoort

This stopping passenger service will naturally stop at all stations, after which the scenario ends in Langevoort. Your consist exists of two SGM2 EMUs, totalling six coaches. The time table has been set up for a maximum speed of 130 km/h taking all stops and speed limits along the way into account.

6.2.6   12 Stopping passengers service Langevoort-Boogezand

You will perform the same task as in scenario 11, but in the reversed direction and with three Plan V two coach EMUs.

6.2.7   14 Stopping passenger service to Langevoort

This scenario has been modelled on the same lines as scenario 11, but things will now start to roll at night with two SGM2 EMUs.

6.2.8   21 Iron ore train Westeinde Opstel-Langevoort Opstel

Bringing a heavy iron ore train from Westeinde to Langevoort will enable you to find out what it is like driving 20 wagons and 1,000 tonnes, headed by three 2200 locos in multiple unit mode.

You may encounter a signal at danger along the way.

6.2.9 22 Tank cars Langevoort-Westhoek

In this standard scenario you are tasked with driving a tank cars train, headed by the NS 1143 electric engine, from Langevoort to Westhoek. Keep your speed around the 100 mark and enjoy the snowy landscape.

6.2.10 23/0 Local goods Machinefabriek Oosterbroek (1)

Shunting service in Oosterbroek Industrie yard. You will put a consist together that you can collect in scenario 23/1.

6.2.11 23/1 Local goods Machinefabriek Oosterbroek (2)

After leaving Westhoek Track 4 you will now deliver a number of empty Rs and Gs wagons at Oosterbroek 1 Industrie. Next, you will collect the waiting consist at track 21 and bring it to Langevoort 6 where this scenario will end.

6.2.12 24/0 Local goods VAM-station Spoorwerk

Shunting VAM garbage cars in Spoorwerk (Ra) yard. You will shift empties and loaded wagons in order to get a consist ready at track Spw A/V 2 for collection in scenario 24/1.

6.2.13 24/1 Local goods VAM-station Spoorwerk

Before leaving Westhoek with the NS 2407 diesel loco you have to pick up a number of VAM empties which must be delivered at Spoorwerk A/V 1. Next, you will collect the waiting consist at track Spw A/V 2 and bring this to Langevoort where the scenario ends.

6.2.14 25 Maintenance of way train Middeloord-Langevoort

Today you will ferry a maintenance of way train between Middeloord and Langevoort Opstel. You may expect to run the engine at full power all the time, without exceeding speed limits.

6.2.15 26 Mineral cars Langevoort Westhoek

Fals 254 self-discharging mineral wagons were a common sight in Holland during the nineties of the 20th century. You will bring a limestone ('kalksteen') train from Langevoort to Westhoek with an NS 1700.

6.2.16 27 Goederentrein Spoorwerk - Westeinde

You will drive a mixed goods train with double heading by two NS 2400 diesel engines. It is raining but that is not unusual by this time of the year. There is much traffic on the route and there is a maintenance crew at work, somewhere down the line.

6.2.17 28 Plan V EMU Recovery

A Plan V EMU has been broken down and must be recovered in the Oosterbroek MF yard. For this job a NS 6400 diesel loco have been assigned to you. Your first action is to pick up a coupling car in Westhoek MPD.

6.2.18 31 SSN Langevoort – Westeinde (1)

The *Stoomstichting Nederland* preservation society will run a steam special today with the SSN 23 023 and ex-DB and ex-DR Mitropa coaches from Langevoort to Westeinde, but at first the SSN-consist must be taken in tow to Langevoort by a V100 diesel since the 23 023 cannot be turned in Langevoort.

6.2.19 32 SSN Langevoort - Westeinde (2)

Now you have the opportunity to drive a former Bundesbahn series 23 steam locomotive when bringing the SSN Jubilee Special from Langevoort to Westeinde, stopping in Middeloord only. At the destination you have to uncouple the loco and leave it at a track near the MPD diesel shed.

6.2.20 51 Milkrun service to Langevoort

Today you will run a freight service on a NS 6400 from Bufferveen to Langevoort, with shunting tasks along the way.

6.2.21 91 Track surveying service Boogezand-Langevoort

This scenario will ask you to drive the survey railcar mP 3000 'Jules' from Boogezand to Langevoort Opstel. There will be no stops, but you may encounter a lot of AI traffic.

7 Appendix

7.1 Cab layout NS 1100
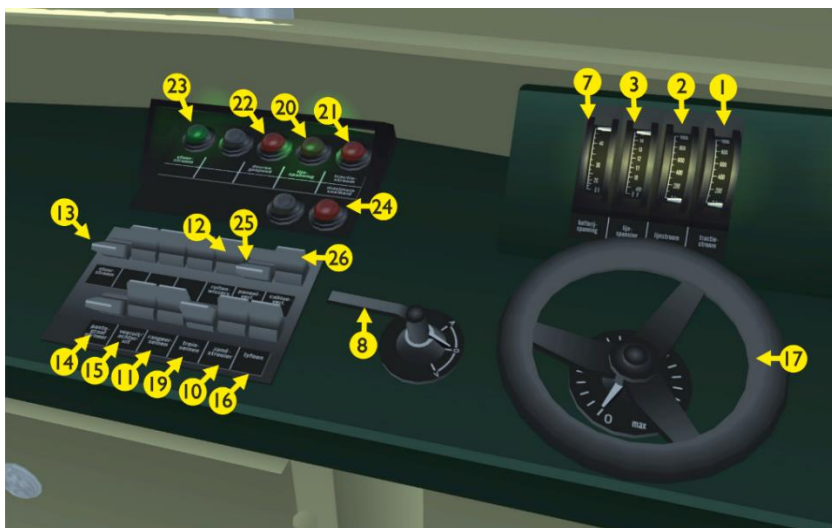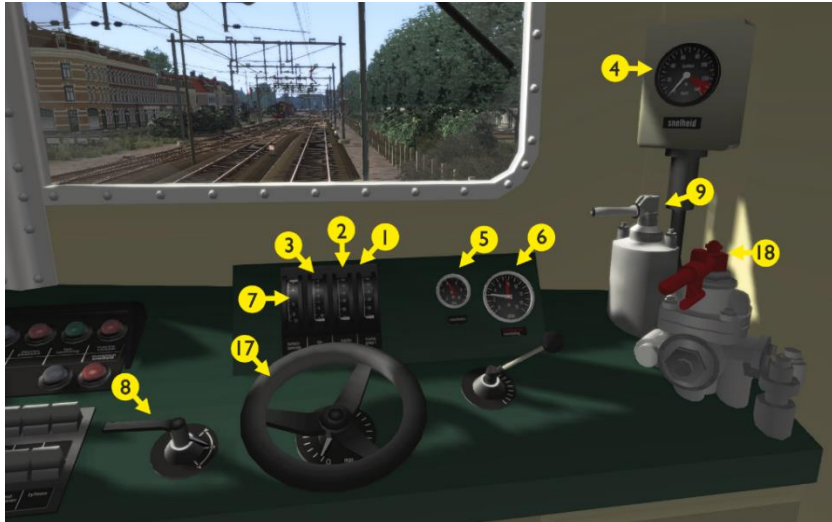
1	Traction current gauge		14	Pantograph up/down	P
2	Line current gauge			Select front/rear panto	CTRL + P
3	Line tension gauge		15	Horn	Space bar
4	Tachometer		16	Horn (short)	N
5	Brake pressure gauge		17	Regulator	A / D
6	Brake pipe/Main res. press. g.		18	Train brake	; / '
7	Control current tension g.		19	Front/rear lights switch	H / Shift + H
8	Reverser	W / S	20	Indicator light line tension	
9	Engine brake	[/]	21	Indicator light line current	
10	Sander	X	22	Indicator light doors	
11	Shunting signals switch	CTRL + F9	23	Indicator light control current	
12	Wipers switch	V	24	Indicator light Vmax	
13	Control current switch	CTRL + 0	25	Panel lights switch	CTRL + F11
			26	Cab lights switch	CTRL + F12

7.2 Cab lay-out NS 1700

|					
1	Armature curr. gauge M1		13	Sander	X
2	Armature curr. gauge M2		14	Shunting signals switch	CTRL + F9
3	Line tension gauge		15	Wipers switch	V
4	Line current gauge		16	Control current switch	CTRL + 0
5	Tachometer		17	Pantograph up/down	P
6	Brake pressure gauge		18	Select front/rear panto	
7	Brake pipe/Main res. press. g.		19	Horn	Space bar
8	Control current tension g.			Horn (short)	N
9	Field current gauge M1		20	Regulator	A & D
10	Field current gauge M2		21	Train brake	; / '
11	Reverser	W / S	22	Front/rear lights switch	H / SHIFT + H
12	Engine brake	[/]	23	Cab lights switch	CTRL + F11
			24	Panel lights switch	CTRL + F12

Notice:

When using short cut P or switch 17 to raise the pantographs switch 18 will stay in its original position ('forward'). Both pantos will respond, but when driving in the forward direction the front panto will automatically be lowered when the engine's speed exceeds 20 km/h. Should we stop and reverse direction then both pantos will still be up and when exceeding the 20 km speed the front panto will again be lowered. *The driving direction alone will not influence the pantographs' behaviour*. To change the latter you must use switch 18 in the 1700 cab and switch 15 in the 1100 cab, respectively.

7.3 Cab lay-out NS 2400
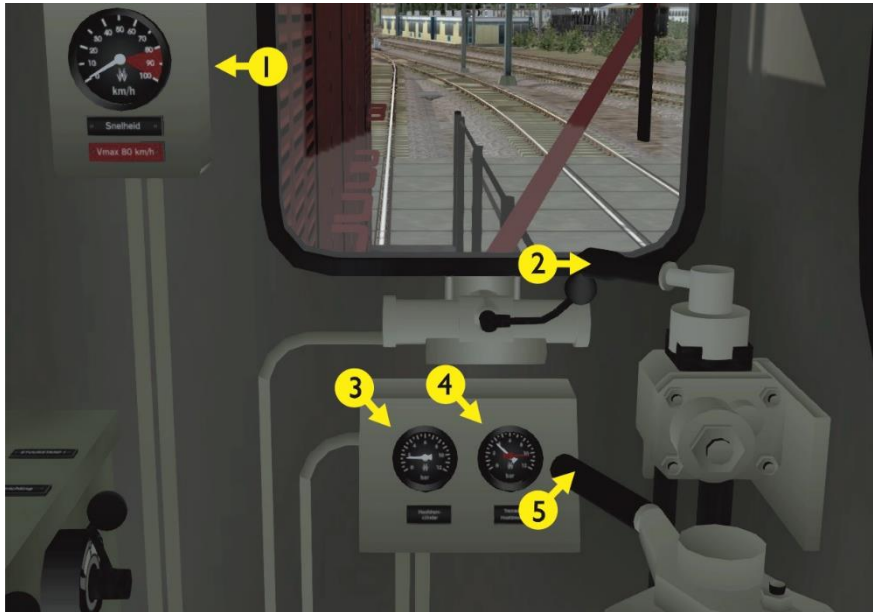
1	Tachometer		8	Reverser	W / S
2	Engine brake	[/]	9	Horn	Space bar
3	Brake pressure gauge			Horn (short)	N
4	Brake pipe/Main res. press. g.		10	Wipers switch	V
5	Train brake	; / '	11	Regulator	A / D
6	Front/rear lights switch	H / SHIFT + H	12	Sander	X
7	Shunting lights switch	CTRL+F9	13	Panel lights switch	CTRL+F12
			14	Cab lights switch	CTRL+F11

7.4   Cab lay-out NS 500
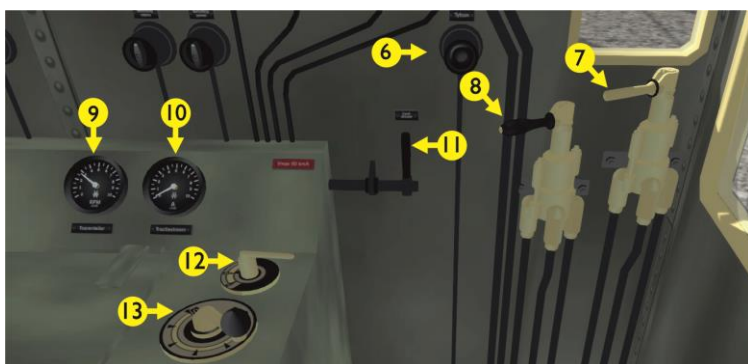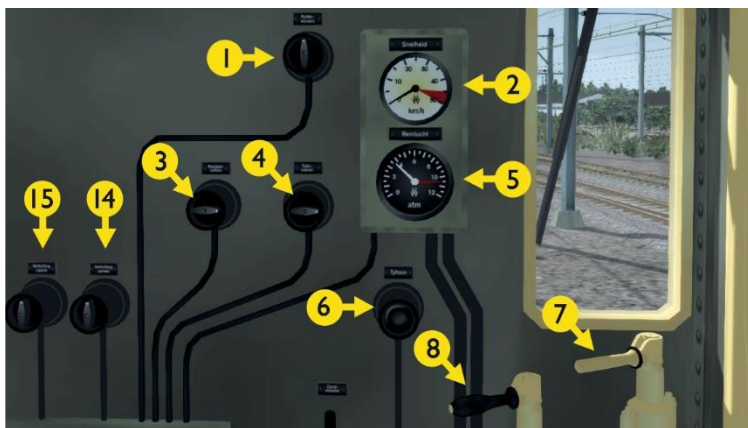
1	Wipers switch	V	8	Train brake	; / '
2	Tachometer		9	RPM gauge	
3	Shunting lights switch	CTRL+F9	10	Traction current	
4	Front/rear lights switch	H/SHIFT+H	11	Sander	X
5	Brake pipe/Main res. press. g.		12	Reverser	W / S
6	Horn	Space bar	13	Regulator	A / D
	Horn (short)	N	14	Panel lights switch	CTRL+F12
7	Engine brake	[/]	15	Cab lights switch	CTRL+F11

7.5   Cab lay-out NS 200
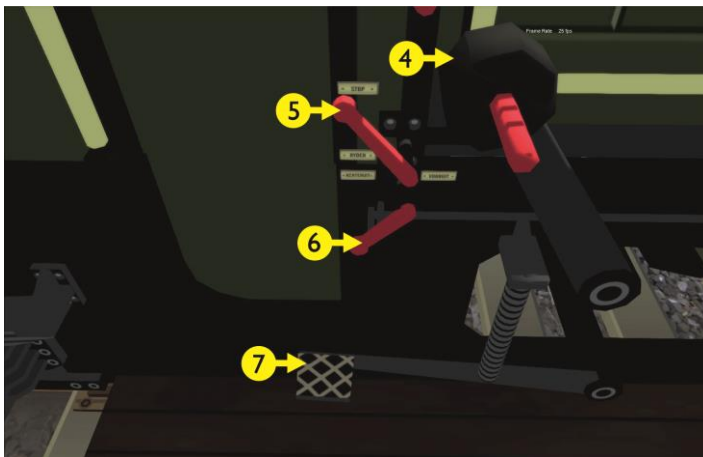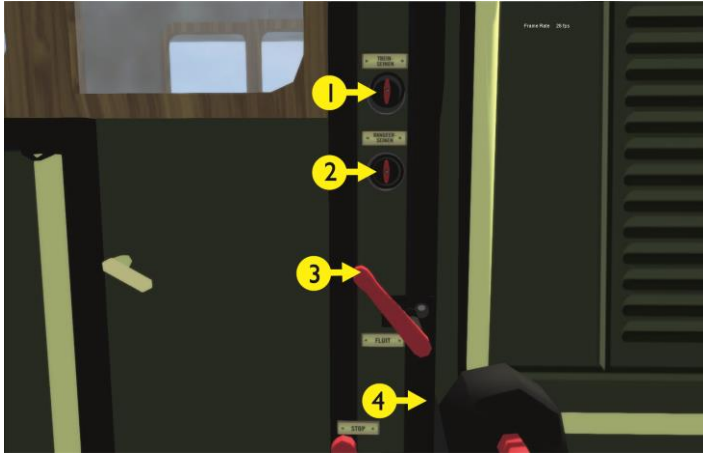
1	Front/rear lights switch	H/SHIFT+H	7	Engine brake	[/]
2	Shunting lights switch	CTRL + F9		Sander	X
3	Whistle	Space bar			
	Whistle (short)	N			
4	Train brake	; / '			
5	Regulator	A / D			
6	Reverser	W / S			

7.6   Cab lay-out SSN 23 023

Like all modern German steam locomotives the 23-series have been fitted out with an electricl lighting system, controlled by a switch panel at the upper right hand side of the cabin. At the start of each scenario the shunting-lights (2) will be switched off, while the gauges lights will be on (4).
Motion link and driving/coupling rods lighting may be switched on at dark.
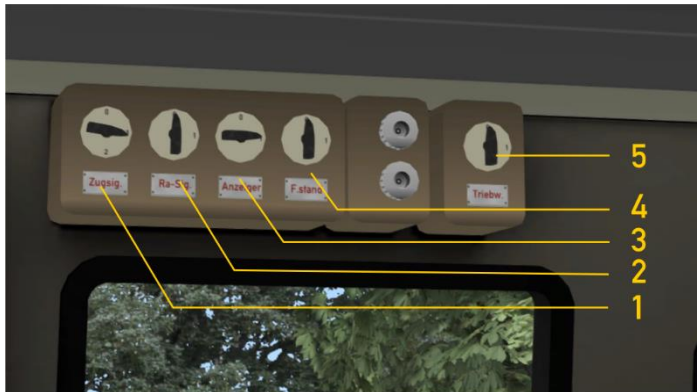
I	Head/tail lights	H / SHIFT +H	4	Gauges lights	CTRL + F11
2	Shunting lights	CTRL + F9	5	Cabin light	CTRL +F12
3	Motion link lighting	CTRL + F10			
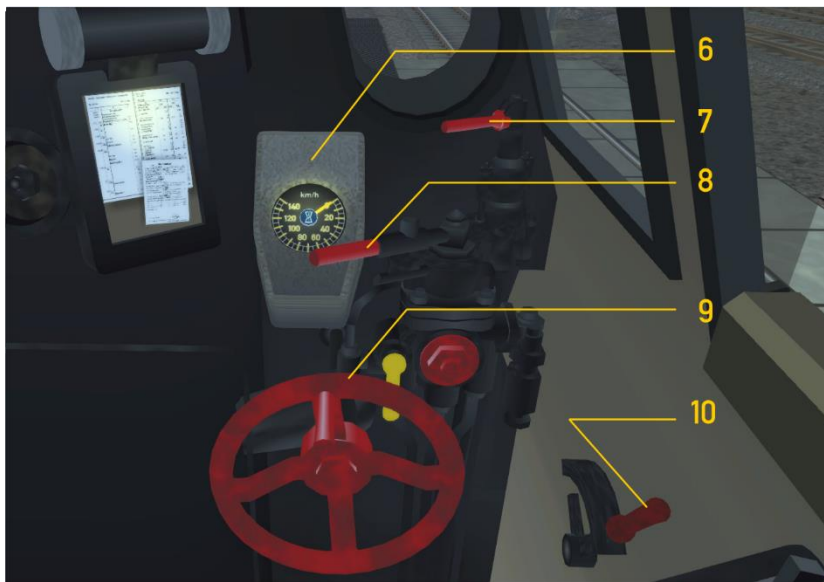
The reverser (9) controls the link motion operation. Next the engine and train brakes handles can be seen (7 and 8 respectively) and the speed indicator (6). Handle (10) serves to operate the cylinder cocks. At scenario start they will be opened.

6	Speed indicator		9	Reverser	W / S
7	Engine brakes	[ ]	10	Cylinder cocks	C
8	Train brakes	; '			
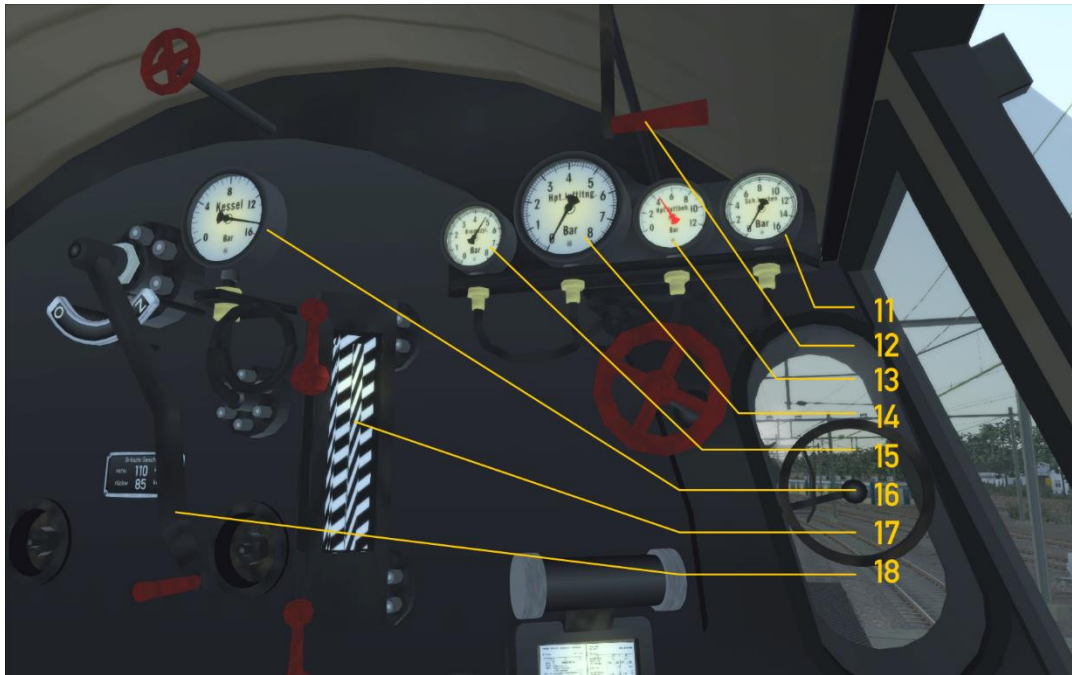
11	Steam chest pressure gauge		15	Brake cylinder pressure gauge	
12	Whistle, long tone	Space bar	16	Boiler pressure gauge	
	Whistle, short tone	N	17	Water level gauge	
13	Main reservoir pressure gauge		18	Regulator	A / D
14	Air brake pipe pressure gauge				

17	Water gauge		Bell	B
19	Dampers	D/SHIFT + D	Blower	, / SHIFT + ,
20	Firebox	F/ SHIFT + F		
21	Sander			

7.7 Cab lay-out V100
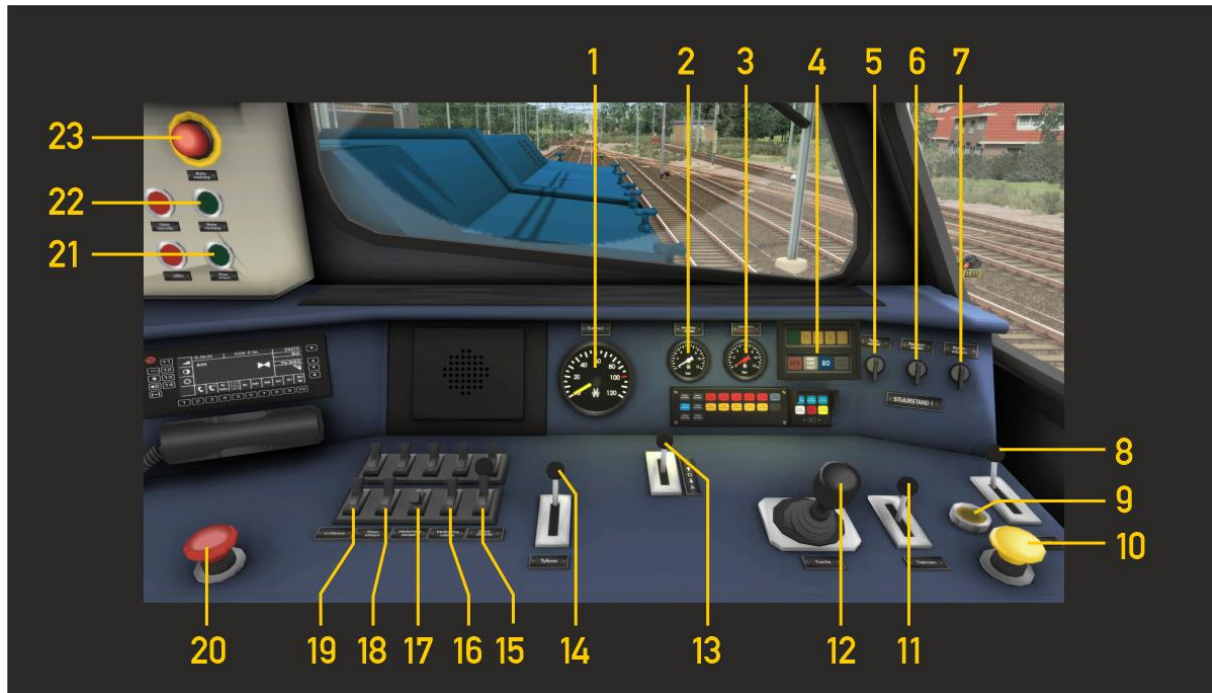
1	Speedometer			13	Reverser	W / S
2	Brake cylinder pressure			14	Whistle	SPACE
3	Train pipe/main res. press.				Whistle-short	N
4	AWS-panel			15	Sander	X
5	Forward/reverse lights	Headlights		16	Cab light	CTRL+F11
6	Shunting lights	CTRL+F9		17	Panel lights	CTRL+F12
7	Wipers	V		18	Control current switch	CTRL+0
8	Engine brake control	[/]		19	Compressor switch	CTRL+1
9	Vigilance warning light			20	Emergency stop	
10	Vigilance reset	NUM ENTER		21	Control current light	
11	Train brake control	; / '		22	Diesel running light	
12	Power lever	A / D		23	Diesel engine start/stop	CTRL+Z

Engine start up procedure: switch on control current (18, CTRL+0) and compressor (19, CTRL+1) before starting the diesel engine (23, CTRL+Z). AWS and driver vigilance will be described in appendix 7.8. Driver vigilance can be switched on/off by CTRL+NUM ENTER. To activate AWS use the U-key.

7.8   Driver vigilance and AWS

Mainline locomotives in this RCR release are equipped with two optional safety features. This concerns NS series 1100, 1700 and 2400, together with the Volker Rail and Locon V100 units. When running these you may activate driver vigilance monitoring (DVM) and/or a close simulation of the Dutch pendant of AWS i.e. Automatic Train Control – First Generation (ATB-EG or ATB). Both systems monitor the player's actions as an engine driver. The DVM's function is to stop the train if the driver should lose consciousness. The ATB takes the same action if the driver does not respond to the commands of the signals along the line. The player can decide for himself whether and which systems he wants to activate in the scenario. Both systems can be used simultaneously if desired.

7.8.1   Driver Vigilance Monitor
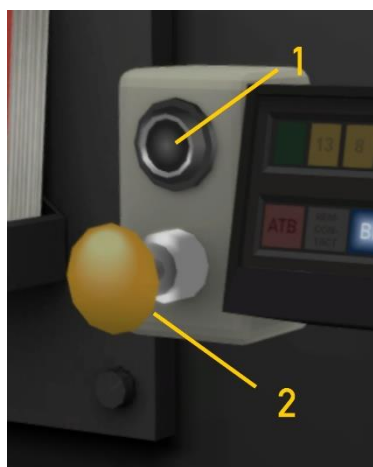
This system expects the driver to click the DVM reset button (2) or press the numeric ENTER key at least once every half minute. When 30 seconds have passed without any of these actions, a buzzer will sound and a flashing red light (1) will appear. From that moment on, the driver has five seconds to respond. Failing that, an emergency brake intervention by DVM will follow. Only after the train has come to a complete stop are the controls released again.

Enabling and disabling DVM is done with the key combination CTRL + NUM ENTER. When lamp 9 of the TAB panel (see below) is lit, DVM is active.

7.8.2   ATB

This safety feature is made up of three process components. The first process is tasked with detecting speed limits that are on the set path of the train while driving, within a distance of 1000-1200 meters. The values found are converted into one of five limits: 40, 60, 80, 130 or 140 km/h. A second process monitors the driver's reactions to the speed limit found. The last part is formed by the ATB panel that provides communication with the driver by lamps and bell signals.


In that panel, in addition to a vigilance light, eight lamps are present that alone or in combination can display the different states that ATB can assume. When ATB is not active, lamp 8 (BD = out of service) lights up. Lamp 7 (brake contact) is shown when the driver applies a train brake – even when the ATB is switched off.

We apply the U key to enable or disable ATB. When ATB is switched on, lamp 8 will extinguish and the speed limit that is currently in force will be displayed by one of the lamps 1 to 5. There is also a ringing sound. When ATB is being switched off, this bell sounds five times in quick succession.

We will explain the operation of the activated ATB by means of an example. In the left image we drive at a speed of 125 km/h. A limitation of 40 km/h has been detected in the right picture. A ringer sounds ('ding') and lamp 5 lights up.
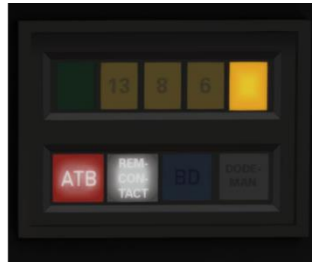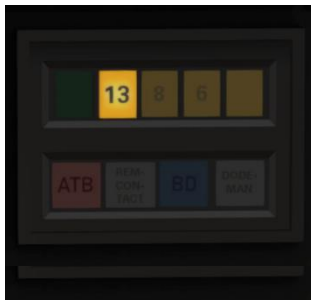
The driver engages the brakes and the brake contact lamp 7 is shown (left). When the assigned speed of less than 40 km/h is reached (with an upper margin of 5 km), three bell signals sound shortly after each other ('ding ding ding').

If the driver does not respond to a speed reduction command within 5 seconds, an alarm bell will ring for 3 seconds. Within this period of time, the driver can still prevent an ATB intervention by still applying the train brakes. If this condition is not met, an emergency stop will be forced upon the train. ATB lamp 6 lights up, as does the brake contact lamp. At the same time, train brakes are fully applied while controller and reverser levers are set to the 'neutral' position. Only after the train has come to a complete stop are these controls released again.

The functions of this 'Wilbur Graphics' ATB version are controlled by a script, which is fed with information that is retrieved from the game while driving a scenario. These data come from the main signals, the section speed limits and/or from speed signs, depending on the tracks, signals and speed signs used. In the real world, the ATB looks at the distance signals when detecting upcoming speed limits. As a result, the simulated ATB may indicate a different restriction than a local speed limit. When driving Timetable and Career scenarios, you should therefore also pay attention to the limit that TS shows in the HUD. Another difference with reality is the possibility to run a scenario without DDM and/or ATB.

7.9   Frequently asked questions

Question: Why have speed limits been applied to station yard through tracks?
Answer: That is a consequence of the station tracks length. Large track yards will not only tax your software and your computer but will result in extended development times as well, and since many different projects compete to get into the building stage, time is always sparse. This is why the distances between yard entry and exit signals will vary around 800 meters, which in turn will result in speed limitations that fit the available braking distances.

Question: Why is it that the Doppler effect at level crossings often seems to be curtailed?
Answer: When a train approaches a level crossing (LC) warning lights and bells will start flashing and ringing. The sound effect will last for 10 seconds, but the lights will keep on flashing while the booms are down. Most trains will pass the LC at that moment, i.e. just when the ringing ends. This will also prevent the Doppler effect to be audible over the full time lapse of the passing event. When you should approach the LC in for example a shunting engine or a slow local freight you may expect to hear no sounds at all when you finally arrive at the LC.

Question: Why do the departure/destination names in the Quick Drive menu window seem to be different from the station names in the route?
Answer: When we assigned names to the QD scenario markers we wanted to make a clear separation between goods and passenger services. Location names with the suffix 'Goederen' will result in paths through shunting yard sidings. When this suffix is missing your selection of departures/destinations train will lead your train along station platforms, while yard sidings will be ignored.

8 Colophon and credits

Development and production:
© Wilbur Graphics, Henk van Willigenburg (www.wilburgraphics.com)

Support:
Erwin Lansbergen a.k.a. Tjoe Tjoe

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Dovetail Games (DTG): TrainSim Academy

Tips and advice:
ChrisTrains.com
Oscar Weijde
Ton van Schaik

Scenarios:
Wilbur Graphics (Henk van Willigenburg)
Ton van Schaik
Oscar Weijde

Testing:
Ton van Schaik, Oscar Weijde, Jan Peet.

Printed sources:
- Handboek Machinist, mei 2001, NS Reizigers
- The Nederlandse Modelspoorweg, hfst. 7. Schuyt & Co, Haarlem 1991, by Gerard Tombroek
- Moderne modelspoorwegen reizigersvervoer, L.J. Veen's Uitgeversmij. NV, Amsterdam 1970.

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