

*Design document*

***Basic Data for ETCS Data Preparation  
Station Murska Sobota  
ETCS Level 1 Slovenia***

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**Table of changes**

Zaporedna številka spremembe	Z A D E V A	Objavljeno v Uradnih objavah		Velja od
		Številka	Leto	
1	2	3	4	5

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## **1 SCOPE**

This document contains the characteristics and data of the track, which is needed for the ETCS Level 1 data preparation. It includes the maximum and limited speed for main and side tracks, for all routes which are relevant for ETCS and signal aspects from the ETCS equipped signals and the gradient profile.

## 2 References and Terms

### 2.1 Referenced Documents

Id	Reference
[1]	Speed Profile Murska Sobota 08.2015
[2]	Gradient Profile Murska Sobota 08.2015
[3]	Route tables 5.8.2015

**Table 1 : Referenced Documents**

### 3 Speed profile

The summarized speed profile describes the different speed ranges on the tracks. Limited and maximum speeds with associated locations are specified in this chapter. The input for this chapter comes from the official speed profile for the whole project from the Slovenian Railways .

The limited speed is valid from the first to the last switch of the station, for every train route set into/through/out of station with deviation position of points in the route.

The maximum speed will be used on the block and in station only on the main track for stopping at the exit signal and for transit run through the station with all switches in the train route in straight position.

Limited speed for station	
Station	Limited Speed km/h
Murska Sobata	50
Dankovci	60
Hodos	50

Maximum line speed from Murska Sobota to Hodos					
Station / Block	Nagibno Tehniko / ETCS Category 1	Lahki Vlaki / ETCS Category 5	Drugi Vlaki / ETCS Category 4	From KM	To KM
	[km / h]				
Murska Sobot - Puconci - Dankovci - Mackovci - G.Petrovci - Salovci - <b>Hodos</b>	80			33.700	37.635
	110	90	85	37.635	39.505
	100			39.505	44.090
	80			44.090	44.510
	100			44.510	70.200

## 4 Train route

The chapter describes all possible train routes, which are relevant for ETCS, from one ETCS equipped signal to the next signals with the correct signal aspects at the start and target signals. The chapter includes also a short description about the function of the start signals, the signal equipment and the detection of the lamps. It contains the basic information for ETCS data preparation to project routes and signals.

### 4.1 Legend

Number	Numer of lamps are on the signal needed to be implemented into ETCS
Colour	Which lamps are on the signal
Detection	Which lamps are connected with LEU
G	Green
Gfl	Green flashing
Ye	Yellow
Ye1(fl)	Yellow 1 (flashing)
Ye2 (fl)	Yellow 2 (flashing)
Rd	Red
Fall back	If the lamp is defect the fall back aspect will be shown
W (K)	Cross; Short entry indicator (SZ(20))
Wfl (K)	Flashing Cross; Short entry indicator – braking distance not assured (SZ(21))
Yefl (K)	Flashing Cross; Short entry pre-indicator – braking distance not assured (SZ(22))
W(A)	Arrow – no overlap route (SZ(23))
G(C)	Green circle (SZ(68))
LMT	Limit Track Signal
Target signal	Notice: If only the signal name is shown at the target signal column, it means this is only a direct route. If there stand's target and track and/or additional signals in brackets, it means this is a detour route across this listed elements. (e.g.: 32 (O105))
<b>Main signal</b>	
G	SZ2
Gfl	SZ4
Ye2	SZ3
Ye1fl+G	SZ6
Ye1fl+Gfl	SZ7
Ye1fl+Ye2	SZ5
R	SZ1
R+Ye2fl	SZ9
Gfl+Yefl(K)	SZ4+SZ22



Ye1fl+Gfl+Yefl(K)	SZ7+SZ22
Ye1fl+G+Yefl(K)	SZ6+SZ22
Ye2+W(K)	SZ3+SZ20
Ye1fl+Ye2+W(K)	SZ5+SZ20
Ye1fl+Ye2+Wfl(K)	SZ5+SZ21
Ye1fl+Ye2+W(A)	SZ5+SZ23
Ye1fl+Ye2+W(K)+W(A)	SZ5+SZ20+SZ23
<b>Distant signal</b>	
G	SZ11
Gfl	SZ12
Ye2	SZ10
Gfl+Yefl(K)	SZ12+SZ22
<b>Limit track signal</b>	
R	SZ16
W	SZ17
W+G(C)	SZ17+SZ68

Remarks – additional explanation to route tables:

\* By setting train routes to the open line e.g. A1e, A2e, or the block signal with his own distant signal - the movement authority is given to the next main signal taking into account like the next main signal is on SZ1 (red).

\*\* By long exit train routes (from limit track signal to the open line, in column of **Destination Signal Aspect** the signal aspects of exit signal are listed and not the real destination of the train route. The movement authority is prolonged by the exit signal.

## 4.2 Hodos (HD)

Route table						
Hodos						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
	Number	Colour	Yes/No			
1	2	3	4	5	6	7
PA1		G	YES	G	Ye2	A1
	2			G	G	
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	
				Gfl	Ye1fl+Gfl	
				Gfl	Ye1fl+Ye2+W(K)	
				Ye	R	
A1		Ye1	YES	Ye2	R	32
	5			Ye1fl+Ye2	R	12, 12(105),12(O105), 22, 22(105), 22(O105), 32(105), 32(O105), 42 ,42(O105), 52,,52(O105),62
entry signal		R	YES	Ye1fl+Ye2+W(K)	R	M2012, M2012 (105), M2012(O105) M2062
				G	G	32
				Ye1fl+G	G	32 (105),32 (O105)
		G	YES	Ye1fl+Gfl	Ye1fl+G	12, 12(105),12(O105), 22,22(105), 22(O105), 42, 42(O105),52, 52(O105),62
				G	Ye2 (fall back)	32
				Ye1fl+G	Ye2 (fall back)	32 (105),32 (O105)
		Ye2	YES	Ye1fl+Gfl	Ye1fl+Ye2 (fall back)	12, 12(105),12(O105), 22,22(105), 22(O105), 42, 42(O105),52, 52(O105),62
				R		
		W(K)	YES	R+Ye2fl/Calling on		
M2012		W	YES	R		
	2			W	Ye1fl+G	B1e(12) (long exit) **
LMT		R	YES	W	Ye1fl+Ye2 (fall back)	
M2062		W	YES	R		
	2			W	Ye1fl+G	B1e (62) (long exit)**
LMT		R	YES	W	Ye1fl+Ye2 (fall back)	

Route table						
Hodos						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal	Number	Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
		Colour	Yes/No			
1	2	3	4	5	6	7
12	4	Ye1	YES	Ye1fl+G	R	B1e*
				Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
22	4	Ye1	YES	Ye1fl+G	R	B1e*
				Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
32	4	Ye1	YES	G	R	B1e*
				Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
42	4	Ye1	YES	Ye1fl+G	R	B1e(205), B1e(O205)*
				Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
52	4	Ye1	YES	Ye1fl+G	R	B1e(205), B1e(O205)*
				Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			

Route table						
Hodos						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal	Number	Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
		Colour	Yes/No			
1	2	3	4	5	6	7
62		Ye1	YES	Ye1fl+G	R	B1e*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
PB1		G	YES	G	Ye2	B1
	3			G	G	
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	
				Gfl	Ye1fl+Ye2+W(K)	
		Yefl(K)	YES	Gfl	Ye1fl+Gfl	
				Gfl+Yefl(K)	Ye1fl+Ye2+Wfl(K)	
				Ye	R	
B1		Ye1	YES	Ye2	R	31
	5			Ye1fl+Ye2	R	11,21,41,51,61
entry signal		R	YES	Ye1fl+Ye2+Wfl(K)	R	M3011
				Ye1fl+Ye2+W(K)	R	M61
		G	YES	G	G	31
				Gfl	Ye1fl+G	31
				Ye1fl+Gfl	Ye1fl+G	11,21, 41(205), 41(O205), 51, 51(O205), 61
		Ye2	YES	G	Ye2 (fall back)	31
				Gfl	Ye1fl+Ye2(fall back)	31(105, O105)
				Ye1fl+Gfl	Ye1fl+Ye2 (fall back)	11, 21, 41(205, O205), 51, 51(O205), 61
		W(K)	YES	R		
				R+Ye2fl/Calling on		
M3011		W	YES	R		
	2			W	Ye1fl+G	A1e (11(203,105,O105)) long exit **
LMT		R	YES	W	Ye1fl+Ye2 (fall back)	
M61		W	YES	R		
	2			W	Ye1fl+G	A1e (61)(long exit)**
LMT		R	YES	W	Ye1fl+Ye2 (fall back)	

Route table						
Hodos						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
		Number	Colour	Yes/No		
1	2	3	4	5	6	7
11		Ye1	YES	Ye1fl+G	R	A1e(203, 105, O105)*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
21		Ye1	YES	Ye1fl+G	R	A1e(203, 105, O105)*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
31		Ye1	YES	G	R	A1e (203)*
	4			Ye2 (fall back)	R	
exit signal		R	YES	Ye1fl+G	R	A1e (105, O105)*
				Ye1fl+Ye2 (fall back)	R	
		G	YES	R		
				R+Ye2fl/Calling on		
		Ye2	YES			
41		Ye1	YES	Ye1fl+G	R	A1e(105, O105)*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			

<i>Route table</i>						
Hodos						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
	Number	Colour	Yes/No			
1	2	3	4	5	6	7
51		Ye1	YES	Ye1fl+G	R	A1e(105, O105)*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
61		Ye1	YES	Ye1fl+G	R	A1e*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			

## 4.3 Dankovci (DA)

Route table						
Dankovci						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
	Number	Colour	Yes/No			
1	2	3	4	5	6	7
PA1		G	YES	G	Ye2	A1
	2			G	G	
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	
				Gfl	Ye1fl+Gfl	
				Ye	R	
A1		Ye1	YES	Ye2	R	22
	4			Ye1fl+Ye2	R	12
entry signal		R	YES	G	G	22
				Ye1fl+Gfl	Ye1fl+G	12
		G	YES	G	Ye2 (fall back)	22
				Ye1fl+Gfl	Ye1fl+Ye2 (fall back)	12
		Ye2	YES	R		
				R+Ye2fl/Calling on		
22		Ye1	YES	G	R	B1e*
	4			Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
12		Ye1	YES	Ye1fl+G	R	B1e*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			
PB1		G	YES	G	Ye 2	B1
	2			G	G	
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	
				Gfl	Ye1fl+Gfl	
				Ye	R	
B1		Ye1	YES	Ye 2	R	21
	4			Ye1fl+Ye2	R	11
entry signal		R	YES	G	G	21
				Ye1fl+Gfl	Ye1fl+G	11
		G	YES	G	Ye2 (fall back)	21
				Ye1fl+Gfl	Ye1fl+Ye2 (fall back)	11
		Ye2	YES	R		
				R+Ye2fl/Calling on		
21		Ye1	YES	G	R	A1e*
	4			Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			

<i>Route table</i>						
Dankovci						
SIGNAL	SIGNAL LAMPS			Signal Aspect Start Signal	Signal Aspect Target Signal	Signal Target Target Signal
Symbol Type Start Signal	Number	Colour	Yes/No			
1	2	3	4	5	6	7
11		Ye1	YES	Ye1fl+G	R	A1e*
	4			Ye1fl+Ye2 (fall back)	R	
exit signal		R	YES	R		
				R+Ye2fl/Calling on		
		G	YES			
		Ye2	YES			



## 4.4 Murska Sobota (MS)

Route table						
Murska Sobota						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal	Number	Detection		Signal Aspect Aspect Start Signal	Destination Signal Aspect	Signal Target Target Signal
		Colour	Yes/No			
PA1		G	YES	G	G	A1
				G	Ye2	A1
	2			Gfl	Ye1fl+Gfl	A1
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	A1
				Gfl	Ye1fl+Ye2+W(k)	A1
				Ye	R	A1
A1		Ye1	YES	G	G	22
	5			G	Ye2(fall back)	22
entry signal		R	YES	Ye2	R	22
				Ye1fl+Gfl	Ye1fl+G	12
		G	YES	Ye1fl+Gfl	Ye1fl+Ye2(fall back)	12
				Ye1fl+Ye2	R	12
		Ye2	YES	Ye1fl+Gfl	Ye1fl+G	(M32)32
				Ye1fl+Gfl	Ye1fl+Ye2(fall back)	(M32)32
		W(k)	YES	Ye1fl+Ye2	R	(M32)32
				Ye1fl+Ye2+W(k)	R	M32
				R		
				R+Ye2fl		/Calling on
22		Ye1	YES	G	R	B1e*
	4			Ye2(fall back)	R	B1e*
exit signal		R	YES	R		
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			
12		Ye1	YES	Ye1fl+G	R	B1e*
	4			Ye1fl+Ye2(fall back)	R	B1e*
exit signal		R	YES	R		
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			
32		Ye1	YES	Ye1fl+G	R	B1e*
	4			Ye1fl+Ye2(fall back)	R	B1e*

Route table						
Murska Sobota						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Aspect Start Signal	Destination Signal Aspect	Signal Target Target Signal
	Number	Colour	Yes/No			
exit signal		R	YES	R		
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			
M32		R	YES	W+ G (C)	Ye1fl+G	B1e* (32)**
	3			W+G (C)	Ye1fl+Ye2 (fall back)	B1e* (32)**
Limit track signal		W	YES	R		
		G(C)	YES			
PB1		G	YES	G	G	B1
				G	Ye2	B1
	2			Gfl	Ye1fl+Gfl	B1
pre-signal		Ye	YES	Gfl	Ye1fl+Ye2	B1
				Ye	R	B1
B1		Ye1	YES	G	G	21
	4			G	Ye2(fall back)	21
entry signal		R	YES	Ye2	R	21
				Ye1fl+Gfl	Ye1fl+G	11
		G	YES	Ye1fl+Gfl	Ye1fl+Ye2(fall back)	11
				Ye1fl+Ye2	R	11
		Ye2	YES	Ye1fl+Gfl	Ye1fl+G	31
				Ye1fl+Gfl	Ye1fl+Ye2(fall back)	31
				Ye1fl+Ye2	R	31
				R		
				R+Ye2fl		/Calling on
11		Ye1	YES	Ye1fl+G	R	A1e*
	4			Ye1fl+Ye2(fall back)	R	A1e*
exit signal		R	YES	R		
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			
21		Ye1	YES	G	R	A1e*
	4			Ye2(fall back)	R	A1e*
exit signal		R	YES	R		

Route table						
Murska Sobota						
SIGNAL	SIGNAL LAMPS					
Symbol Type Start Signal		Detection		Signal Aspect Aspect Start Signal	Destination Signal Aspect	Signal Target Target Signal
	Number	Colour	Yes/No			
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			
31		Ye1	YES	Ye1fl+G	R	A1e*
	4			Ye1fl+Ye2(fall back)	R	A1e*
exit signal		R	YES	R		
				R+Ye2fl		/Calling on
		G	YES			
		Ye2	YES			

## 5 Gradients

The gradient profile contains the up- and downhill gradients for both directions. The gradients are given in parts per thousand for the respective area. The gradient values are measured from the main track and are also valid for the side tracks. Gradient information given in this document is the information which was changed with modernisation of the station. For other kilometer positions old gradients are valid.

### 5.1 Hodos – Murska sobota

Gradientprofile Hodos -Murska Sobota			
Gradient for direction from Hodos to Murska Sobota in ppt	Gradient section start point	Gradient section end point	Gradient for direction from Murska Sobota to Hodos in ppt
-2,500	33.800	33.875,00	2,500
-2,165	33.875,00	35.750,00	2,165
0	35.750,00	37.000,00	0
-1,556	37.000,00	37.450,00	1,556
-2,556	37.450,00	37.900,00	2,556
0	37.900,00	38.215,00	0
-0,277	38.215,00	38.258,15	0,277
0,00	38.258,15	38.726,33	0,00
-1,00	38.726,33	38.826,33	1,00
-7,5	38.826,33	39.033,23	7,5
-6,8	39.033,23	39.050,00	6,8
-0,168	39.050,00	39.875,80	0,168
-1,422	39.875,80	40.150,00	1,422
-2,563	40.150,00	40.588,50	2,563
-1,417	40.588,50	41.400,00	1,417
-3,25	41.400,00	41.800,00	3,25
-2,917	41.800,00	42.400,00	2,917
-8,758	42.400,00	42.887,00	8,758
0,164	42.887,00	43.386,80	-0,164
-10	43.386,80	43.830,00	10
-4,4	43.830,00	44.345,00	4,4
-5,4	44.345,00	44.950,00	5,4
-7,3	44.950,00	45.600,00	7,3
-6,4	45.600,00	46.560,00	6,4
-8	46.560,00	47.900,00	8
-8,6	47.900,00	49.330,00	8,6
-7	49.330,00	52.000,00	7
-6,825	52.000,00	52.200,00	6,825
-7,046	52.200,00	52.520,00	7,046
-9,472	52.520,00	55.625,00	9,472
2,041	55.625,00	56.550,00	-2,041
7,05	56.550,00	57.045,52	-7,05
8,265	57.045,52	58.804,80	-8,265
6,781	58.804,80	59.230,83	-6,781

1,886	59.230,83	59.628,52	-1,886
9,591	59.628,52	60.350,00	-9,591
6,842	60.350,00	60.730,00	-6,842
5,482	60.730,00	61.452,76	-5,482
6,446	61.452,76	63.360,52	-6,446
6,411	63.360,52	64.105,52	-6,411
0,185	64.105,52	64.667,27	-0,185
4,293	64.667,27	65.226,37	-4,293
0,848	65.226,37	66.008,52	-0,848
8,023	66.008,52	66.831,52	-8,023
3,009	66.831,52	67.265,52	-3,009
0,992	67.265,52	68.902,52	-0,992
0,758	68.902,52	69.178,00	-0,758

## **6 Infill Balise on Side Track**

The following side tracks will be equipped with additional infill balises:

- Hodos – track 1
- Dankovci – track 1
- Murska Sobota – track 1

**END OF DOCUMENT**