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14th July 2023

Dear Louise,

Proposal to supplement the CP6 Track Usage Price List

The purpose of this letter is to propose a supplement to the Control Period 6 (CP6) Track Usage Price List, consistent with Schedule 7 of the Track Access Contract between First MTR South Western Trains Limited (SWR) and Network Rail. In particular, a new Variable Usage Charge (VUC) rate for the Class 701 vehicle type.

This supplement to the Track Usage Price list has been agreed between Network Rail and SWR. It is required due to the introduction next year of the new vehicles onto the network.

The new VUC rates proposed in this letter were calculated using the agreed CP6 VUC calculator developed by Network Rail in 2017/18 prices. The output sheet from the calculator, which sets out the proposed new rate and input information, is appended to this letter along with a document showing the detailed working.

If you have any queries in relation to the calculation of the proposed new VUC rate, or the content of this letter more generally, we would, of course, be happy to discuss this with you in more detail.

Yours sincerely,

Lee Shuttlewood
Network Rail

Robert Hodgkinson
First MTR South Western Trains Limited

Appendix 1

Summary of the new rates calculated for the class 701s:

Vehicle	Calculated rate
T	4.06 p/vm
701/5M1	8.15 p/vm
701/5M2	5.1 p/vm
701/0M1	7.69 p/vm
701/0M2	5.08 p/vm

Please see attached for the output sheet(s) in 2017/18 prices from the CP6 VUC calculator setting out the proposed new rate(s) and input data.

Appendix 2 contains the formation and detail of each vehicle for the rates in appendix 1.

Appendix 3 contains the T-Gamma averages for the class 701.

Appendix 4 contains the user defined T-Gamma values of each vehicle of the Class 701 before averaging.

Appendix 2

Summary of 10 Car Class 701 vehicle characteristics for VUC
Maximum speed of all vehicles 100mph

- The VUC for a Class 701/0 unit is calculated as 2 x 701 T + 6 x 701/0M1 + 2 x 701/0M2

701 T is composed of vehicles:

- TLW(DC): Axles 4 / Tare weight 27.949t / Seats 34 / Unsprung mass 971kg / Curving class TLW (appended below)

Average values for calculator: Axles 4 / Tare weight 27.949t / Seats 34 / Unsprung mass 971kg / Curving class TLW (appended below)

Calculated VUC: 4.06p/vm

701_0M1 is composed of vehicles:

- DM(DC): Axles 4 / Tare weight 39.531t / Seats 56 / Unsprung mass 1290kg / Curving class DM (appended below)
- EM2(DC): Axles 4 / Tare weight 36.368t / Seats 60 / Unsprung mass 1283kg / Curving class EM (appended below)
- EM1(DC): Axles 4 / Tare weight 36.368t / Seats 60 / Unsprung mass 1283kg / Curving class EM (appended below)
- DM(DC): Axles 4 / Tare weight 39.531t / Seats 56 / Unsprung mass 1290kg / Curving class DM (appended below)

Average values for calculator: Axles 4 / Tare weight 37.95t / Seats 58 / Unsprung mass 1287kg / Curving class M1(Ave) (appended below)

Calculated VUC: 7.69p/vm

701_0M2 is Composed of vehicles

- (P)M(DC_1): Axles 4 / Tare weight 29.47t / Seats 60 / Unsprung mass 1263kg / Curving class PMDC (appended below)
- M3(DC_1): Axles 4 / Tare weight 28.7t / Seats 60 / Unsprung mass 1266kg / Curving class M34 (appended below)
- M3(DC_1): Axles 4 / Tare weight 28.7t / Seats 60 / Unsprung mass 1266kg / Curving class M34 (appended below)
- (P)M(DC_1): Axles 4 / Tare weight 29.47t / Seats 60 / Unsprung mass 1263kg / Curving class PMDC (appended below)

Average values for calculator: Axles 4 / Tare weight 29.085t / Seats 60 / Unsprung mass 1265kg / Curving class M2(Ave) (appended below)

Calculated VUC: 5.08p/vm

Summary of 5 Car Class 701 vehicle characteristics for VUC
Maximum speed of all vehicles 100mph

- The VUC for a Class 701/5 unit is calculated as *1 x 701 T + 2 x 701/5M1 + 2 x 701/5M2*

701 T is composed of vehicles:

- TLW(DC): Axles 4 / Tare weight 27.949t / Seats 34 / Unsprung mass 971kg / Curving class TLW (appended below)

Average values for calculator: Axles 4 / Tare weight 27.949t / Seats 34 / Unsprung mass 971kg / Curving class TLW (appended below)

Calculated VUC: 4.06p/vm

701_5M1 is composed of vehicles:

- DM(DC): Axles 4 / Tare weight 39.531t / Seats 56 / Unsprung mass 1290kg / Curving class DM (appended below)
- DM(DC): Axles 4 / Tare weight 39.531t / Seats 56 / Unsprung mass 1290kg / Curving class DM (appended below)

Average values for calculator: Axles 4 / Tare weight 39.531t / Seats 56 / Unsprung mass 1290kg / Curving class DM(Ave) (appended below)

Calculated VUC: 8.15p/vm

701_5M2 is Composed of vehicles

- (P)M(DC_1): Axles 4 / Tare weight 29.47t / Seats 60 / Unsprung mass 1263kg / Curving class PMDC (appended below)
- M3(DC_2): Axles 4 / Tare weight 29.02t / Seats 60 / Unsprung mass 1266kg / Curving class M34 (appended below)

Average values for calculator: Axles 4 / Tare weight 29.235t / Seats 60 / Unsprung mass 1265kg / Curving class M2(Ave) (appended below)

Calculated VUC: 5.1p/vm

Appendix 3

T- Gamma averages

TLW					
Just 'TLW'					
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	113.5	0	105	0
	400	51.2	2.1	45.1	2.4
	600	42.7	0.9	39.1	1.3
	800	23.5	0.9	21.8	1
	1000	13.7	0.5	12.3	0.6
	1200	8.8	0.4	8.4	0.5
	1400	6.6	0.4	6.3	0.4
	1800	4	0.5	3.8	0.5
	2200	2.1	0.2	2	0.2
	2600	1.4	0.2	1.3	0.2
	3000	1.1	0.2	1	0.3
	4000	0.7	0.3	0.6	0.3
	6000	0.5	0.4	0.5	0.4
	8000	0.5	0.5	0.5	0.5
	10000	0.4	0.6	0.5	0.5

DM (Ave)					
Average of 2 x DM					
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	166.8	0.0	143.8	0.0
	400	71.0	3.0	61.4	2.9
	600	60.9	1.2	56.7	1.7
	800	33.6	1.2	32.3	1.9
	1000	20.4	0.8	20.1	1.3
	1200	12.9	0.5	12.9	0.8
	1400	9.6	0.5	9.5	0.8
	1800	5.8	0.6	5.8	0.8
	2200	3.3	0.3	3.9	0.9
	2600	2.2	0.4	2.5	0.2
	3000	1.7	0.4	1.7	0.3
	4000	1.1	0.5	1.0	0.4
	6000	0.7	0.5	0.8	0.6
	8000	0.6	0.6	0.8	0.8
	10000	0.6	0.6	0.7	0.9

M2 (Ave)					
Average of PMDC + M34					
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	117.0	0.0	120.6	0.0
	400	53.1	2.2	51.3	2.3
	600	44.1	0.9	44.7	1.4
	800	24.3	0.9	23.9	1.2
	1000	14.2	0.6	15.0	0.8
	1200	9.1	0.4	9.6	0.6
	1400	6.9	0.4	7.1	0.5
	1800	4.2	0.5	4.4	0.6
	2200	2.3	0.2	2.6	0.1
	2600	1.5	0.2	1.7	0.2
	3000	1.1	0.2	1.2	0.2
	4000	0.7	0.3	0.8	0.3
	6000	0.5	0.4	0.7	0.7
	8000	0.5	0.5	0.7	0.8
	10000	0.4	0.5	0.7	0.8

M1 (Ave)					
Average of 2 x DM + 2 x EM					
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	154.8	0.0	145.5	0.0
	400	67.5	2.8	62.2	2.9
	600	59.3	1.3	57.1	1.7
	800	33.2	1.4	32.5	1.9
	1000	20.4	1.0	20.2	1.3
	1200	12.9	0.6	13.0	0.8
	1400	9.5	0.6	9.6	0.8
	1800	5.7	0.7	5.8	0.8
	2200	3.5	0.6	3.9	0.9
	2600	2.3	0.3	2.5	0.2
	3000	1.7	0.4	1.8	0.3
	4000	1.1	0.5	1.0	0.4
	6000	0.7	0.5	0.8	0.6
	8000	0.6	0.6	0.8	0.8
	10000	0.6	0.6	0.7	0.9

M2 (Ave)					
Average of 2 x PMDC + 2 x M34					
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	117.0	0.0	120.6	0.0
	400	53.1	2.2	51.3	2.3
	600	44.1	0.9	44.7	1.4
	800	24.3	0.9	23.9	1.2
	1000	14.2	0.6	15.0	0.8
	1200	9.1	0.4	9.6	0.6
	1400	6.9	0.4	7.1	0.5
	1800	4.2	0.5	4.4	0.6
	2200	2.3	0.2	2.6	0.1
	2600	1.5	0.2	1.7	0.2
	3000	1.1	0.2	1.2	0.2
	4000	0.7	0.3	0.8	0.3
	6000	0.5	0.4	0.7	0.7
	8000	0.5	0.5	0.7	0.8
	10000	0.4	0.5	0.7	0.8

Appendix 4

T- Gamma values – User Defined

		DM			
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	166.8	0	143.8	0
	400	71	3	61.4	2.9
	600	60.9	1.2	56.7	1.7
	800	33.6	1.2	32.3	1.9
	1000	20.4	0.8	20.1	1.3
	1200	12.9	0.5	12.9	0.8
	1400	9.6	0.5	9.5	0.8
	1800	5.8	0.6	5.8	0.8
	2200	3.3	0.3	3.9	0.9
	2600	2.2	0.4	2.5	0.2
	3000	1.7	0.4	1.7	0.3
	4000	1.1	0.5	1	0.4
	6000	0.7	0.5	0.8	0.6
	8000	0.6	0.6	0.8	0.8
	10000	0.6	0.6	0.7	0.9

		EM			
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	142.7	0	147.1	0
	400	64	2.6	62.9	2.9
	600	57.7	1.3	57.5	1.7
	800	32.7	1.6	32.7	1.9
	1000	20.3	1.2	20.3	1.3
	1200	12.9	0.7	13	0.8
	1400	9.3	0.6	9.6	0.7
	1800	5.5	0.7	5.8	0.8
	2200	3.7	0.8	3.9	0.9
	2600	2.3	0.2	2.5	0.2
	3000	1.6	0.3	1.8	0.3
	4000	1	0.4	1	0.4
	6000	0.6	0.4	0.8	0.6
	8000	0.5	0.5	0.8	0.8
	10000	0.5	0.5	0.7	0.9

		PMDC			
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	118.7	0	122.8	0
	400	53.7	2.2	51.9	2.3
	600	44.5	0.9	45.2	1.4
	800	24.5	0.9	24.2	1.2
	1000	14.3	0.6	15.1	0.8
	1200	9.2	0.4	9.7	0.6
	1400	6.9	0.4	7.2	0.5
	1800	4.2	0.5	4.5	0.6
	2200	2.3	0.2	2.6	0.1
	2600	1.5	0.2	1.7	0.2
	3000	1.1	0.2	1.2	0.2
	4000	0.7	0.3	0.8	0.3
	6000	0.5	0.4	0.7	0.7
	8000	0.5	0.5	0.7	0.8
	10000	0.4	0.5	0.7	0.8

		M34			
		Number of Axles			
		Axle 1	Axle 2	Axle 3	Axle 4
Curve radius/m	200	115.2	0	118.4	0
	400	52.5	2.2	50.6	2.2
	600	43.6	0.9	44.2	1.4
	800	24	0.9	23.5	1.2
	1000	14	0.6	14.8	0.8
	1200	9	0.4	9.5	0.6
	1400	6.8	0.4	7	0.5
	1800	4.1	0.5	4.3	0.6
	2200	2.2	0.2	2.5	0.1
	2600	1.4	0.2	1.7	0.2
	3000	1.1	0.2	1.2	0.2
	4000	0.7	0.3	0.7	0.3
	6000	0.5	0.4	0.7	0.7
	8000	0.5	0.5	0.7	0.8
	10000	0.4	0.5	0.7	0.8