

# RFLI - Rail for London (Infrastructure) Ltd

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## Crossrail Central Operating Section Timetable Planning Rules 2020

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**Rail for London (Infrastructure) Ltd.**

5 Endeavour Square  
Stratford London  
E20 1JN

Email: [RFLaccessplanning@tfl.gov.uk](mailto:RFLaccessplanning@tfl.gov.uk)

[tfl.gov.uk](http://tfl.gov.uk)

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## 1. Introduction and General Notes

### 1.1 Purpose

1.1.1 The purpose of this document is to define the Timetable Planning Rules (TPR) regulating the standard timings between stations and junctions together for the Crossrail Central Operating Section (CCOS) enabling trains to be scheduled into the working timetable in accordance with Rail for London Infrastructure Limited (RFLI) CCOS Network Code Part D.

1.1.2 The CCOS TPR is one of a pair of documents along with the CCOS Engineering Access Statement (EAS), when consulted by RFLI with the relevant users of the railway provide rights of access that, with track access agreements of train operators, are described as 'firm rights' and enjoy priority in the timetabling process.

1.1.3 TPR contains necessary information required to undertake the compilation of the timetable such as standard timing points, sectional running times for specific train types, headway and margin limits to be maintained between trains, station working rules and route capability data.

### 1.2 Scope

1.2.1 This document is applicable to the CCOS owned and operated by RFLI.

### 1.3 Index of Routes

LOR	LOR_NAME
XR001	WESTBOURNE PARK JUNCTION TO PUDDING MILL LANE JUNCTION
XR002	STEPNEY GREEN JUNCTION TO ABBEY WOOD (ALSIKE ROAD JUNCTION)

### 1.4 Applicable Sectional Appendix and Rule Book

1.4.1 The CCOS Sectional Appendix applies available via the National Electronic Sectional Appendix (NESA).

1.4.2 The RFLI Central Operating Section Rule Book applies throughout CCOS.

### 1.5 CCOS Planning Definitions

#### 1.5.1 Train Classification

First Character	Description
9	Passenger trains operating on the Crossrail Central Operating System
3	Empty Coaching Stock (ECS) movements between Paddington (Crossrail) and Westbourne Park; Priority ECS if specially authorised.
5	Other ECS
6	Maintenance trains

Second Character	Description
A	ECS to Old Oak Common Depot
C	To Chadwell Heath or Gidea Park
J	To Maidenhead or Reading
K	To West Drayton or Slough
T	To Heathrow Airport
U	To Abbey Wood via Canary Wharf (and ECS and maintenance trains to Plumstead sidings)
V	ECS to Ilford Depot
W	To Shenfield
Y	To Paddington via Tottenham Court Road (and ECS and maintenance trains to Westbourne Park sidings)

Third and fourth characters will run in sequential order throughout the day, with 01 following 99.

### 1.5.2 Days of Operation

Abbreviation	Description
M	Monday
T	Tuesday
W	Wednesday
Th	Thursday
F	Friday
S	Saturday
Su	Sunday
EWD	Every Week Day (Monday to Saturday)
<b>Suffixes</b>	
O	Adding this indicates that the train will run only on that day or those days shown
X	Adding this indicates that the train will not run on that day or those days shown
<b>General</b>	
BHX	Denotes that this train does not run on a bank holiday

### 1.5.3 Traction and Rolling Stock

Abbreviation	Description
EMU	Any electric multiple unit
ECS	Empty Coaching Stock (electric multiple units only)
OTM	On Track Machine - Infrastructure Maintenance Units/ Vehicles

### 1.5.4 Activity and Other Codes

Abbreviation	Description
RM	Reverse Move (line codes for each timing point must be used to provide route detail)

## 2. Route Description

### 2.1 Planning Geography

2.1.1 All timing points in the CCOS are specified in the tables in 2.1.2 below.

2.1.2 Timing Points shown in bold are mandatory.

Table 2-1: CCOS Timing Points

<b>XR001 WESTBOURNE PARK JUNCTION TO PUDDING MILL LANE JUNCTION</b>				
<b>Timing Point</b>	<b>Eastbound</b>	<b>Westbound</b>	<b>Code</b>	<b>Notes</b>
<b>Westbourne Park Junction</b>		3 4 5 6 D1		<i>To/from Great Western Main Line (GW103)</i>
Westbourne Park	E W A	E W A B C	S	Siding or line detail must be shown
Royal Oak Crossover			X	
<b>Paddington (Elizabeth Line)</b>				
Bond Street			S	
<b>Tottenham Court Road</b>				
Fisher Street Crossover			X	
Farringdon (Elizabeth Line)			S	
<b>Liverpool Street (Elizabeth Line)</b>				
Vallance Road Crossover			X	
Whitechapel			S	
<b>Stepney Green Junction</b>				<i>To/from Abbey Wood Elizabeth Line (XR002)</i>
<b>Pudding Mill Lane Junction</b>	EL			<i>To/from Seven Kings (EA 1010)</i>
<b>XR002 STEPNEY GREEN JUNCTION TO ABBEY WOOD (ALSIKE ROAD JUNCTION)</b>				
<b>Timing Point</b>	<b>Eastbound</b>	<b>Westbound</b>	<b>Code</b>	<b>Notes</b>
<b>Stepney Green Junction</b>				<i>To/from Westbourne Park Junction (XR001)</i>
<b>Canary Wharf</b>				
Victoria Dock Crossover			X	
<b>Custom House</b>				Platform detail must be shown
Custom House Crossover			X	
Woolwich (Elizabeth Line)			S	
Plumstead Maintenance Depot			S	Timing point for trains to/from Maintenance Depot
Plumstead Carriage Sidings			S	Timing point for trains to/from Sidings
Plumstead Reversing Siding			S	Timing point for trains to/from Sidings or to/from Maintenance Depot
<b>Plumstead East Junction</b>				
<b>Abbey Wood (Elizabeth Line)</b>				Platform detail must be shown
<b>Abbey Wood Crossrail Siding</b>				
Abbey Wood Transfer Line			F	
Alsike Road Junction			F	<i>To/from Dartford Junction (SO290)</i>

2.1.3 At Westbourne Park, no more than one minute pathing time shall be allowed. Any time in addition required at this location must be inserted as a Westbourne Park stop.

## 2.2 Route Opening Hours

2.2.1 The Elizabeth Line Route Control Centre is manned on a 24hour, seven days per week basis.

## 3. Infrastructure Restrictions

### 3.1 Bi-Directional Operation

3.1.1 The CCOS running lines are fully signalled for bi-directional operation.

### **3.2 Capacity Constraints**

3.2.1 Where bi-directional working is to operate or trains are to be routed to run on a line other than that normally planned for them, constraints on capacity will apply.

3.2.2 Please refer to the relevant CCOS EAS Section 4 times.

### **3.3 Traction Power Supply Restrictions**

3.3.1 Under normal conditions, the 25kV traction power supply will not place any restrictions on the use of approved electric traction.

3.3.2 Under maintenance conditions, sections of the electrified network may be blocked to electric traction. These restrictions are contained within the CCOS EAS for the relevant year.

3.3.3 Further restrictions may arise in connection with engineering possessions which shall be requested via the CCOS EAS amendment process.

### 3.4 Ventilation System Restrictions

3.4.1 No more than two trains may occupy a ventilation section at any time. This is enforced via the signalling system (refer to paragraph 4.1 below).

3.4.2 Eastbound and westbound tunnels may be considered as separate ventilation sections.

3.4.3 The ventilation sections are defined as follows:

XR001 WESTBOURNE PARK JUNCTION TO PUDDING MILL LANE JUNCTION		
Code	Tunnel	Description
VS01E	EASTBOUND	Royal Oak Portal to Paddington (Elizabeth Line) [exc.]
VS02E		Paddington (Elizabeth Line) station
VS03E		Paddington (Elizabeth Line) [exc.] to Bond Street [exc.]
VS04E		Bond Street station
VS05E		Bond Street [exc.] to Tottenham Court Road [exc.]
VS06E		Tottenham Court Road station
VS07E		Tottenham Court Road [exc.] to Farringdon (Elizabeth Line) [exc.]
VS08E		Farringdon (Elizabeth Line) station
VS09E		Farringdon (Elizabeth Line) [exc.] to Liverpool Street (Elizabeth Line) [exc.]
VS10E		Liverpool Street (Elizabeth Line) station
VS11E		Liverpool Street (Elizabeth Line) [exc.] to Whitechapel [exc.]
VS12E		Whitechapel (Elizabeth Line) station
VS13E		Whitechapel [exc.] to Stepney Green
VS14E		Stepney Green to Eleanor Street
VS15E		Eleanor Street to Pudding Mill Lane Portal
VS15W	WESTBOUND	Pudding Mill Lane Portal to Eleanor Street
VS14W		Eleanor Street to Stepney Green
VS13W		Stepney Green to Whitechapel (Elizabeth Line) [exc.]
VS12W		Whitechapel station
VS11W		Whitechapel [exc.] to Liverpool Street (Elizabeth Line)
VS10W		Liverpool Street (Elizabeth Line) station
VS09W		Liverpool Street (Elizabeth Line) [exc.] to Farringdon (Elizabeth Line) [exc.]
VS08W		Farringdon (Elizabeth Line) station
VS07W		Farringdon (Elizabeth Line) [exc.] to Tottenham Court Road [exc.]
VS06W		Tottenham Court Road station
VS05W		Tottenham Court Road [exc.] to Bond Street [exc.]
VS04W		Bond Street station
VS03W		Bond Street [exc.] to Paddington (Elizabeth Line) [exc.]
VS02W		Paddington (Elizabeth Line) station
VS01W		Paddington (Elizabeth Line) [exc.] to Royal Oak Portal
XR002 STEPNEY GREEN JUNCTION TO ABBEY WOOD (ALSIKE ROAD JUNCTION)		
Code	Tunnel	Description
VS16E	EASTBOUND	Stepney Green to Canary Wharf [exc.]
VS17E		Canary Wharf station
VS18E		Canary Wharf [exc.] to Victoria Dock Portal
VS19E		Connaught Tunnel
VS20E		North Woolwich Portal to Woolwich [exc.]
VS21E		Woolwich station
VS22E		Woolwich [exc.] to Plumstead Portal
VS22W		WESTBOUND
VS21W	Woolwich station	
VS20W	Woolwich [exc.] to North Woolwich Portal	
VS19W	Connaught Tunnel	
VS18W	Victoria Dock Portal to Canary Wharf [exc.]	
VS17W	Canary Wharf station	
VS16W	Canary Wharf [exc.] to Stepney Green	



### 3.5 Platform Lengths

3.5.1 The table below shows the maximum length of train that may use each of the platforms at the following passenger stations. All lengths are quoted in metres.

3.5.2 The quoted lengths are the useable lengths from headwall to headwall unless otherwise specified (e.g. ramp to ramp).

3.5.3 Passenger trains longer than the quoted lengths will not be accepted.

Code (TIPLC)	Station	Platform	Effective Length (m)	Notes
PADTLL	Paddington (Elizabeth Line)	A	205	All platforms fitted with platform edge screen doors.
	Paddington (Elizabeth Line)	B		
BONDST	Bond Street	A		
	Bond Street	B		
TOTCTRD	Tottenham Court Road	A		
	Tottenham Court Road	B		
FRNDXR	Farringdon (Elizabeth Line)	A		
	Farringdon (Elizabeth Line)	B		
LIVSTLL	Liverpool Street (Elizabeth Line)	A		
	Liverpool Street (Elizabeth Line)	B		
WCHAPXR	Whitechapel	A		
	Whitechapel	B		
CANWHRF	Canary Wharf	A		
	Canary Wharf	B		
CUSTMHS	Custom House	A		No platform edge screen doors
	Custom House	B		
WOLWXR	Woolwich	A	Both platforms fitted with platform edge screen doors.	
	Woolwich	B		
ABWDXR	Abbey Wood	3	No platform edge screen doors	
	Abbey Wood	4		

### 3.6 Siding Lengths

3.6.1 The table below shows the maximum length of train that may use each of the sidings at the following locations. All lengths are quoted in metres.

Code (TIPLC)	Location	Siding	Effective Length (m)	Notes
WBRNPKS	Westbourne Park	A	205	Eastbound running line
	Westbourne Park	3		Turnback 'A' / through siding
	Westbourne Park	4		Turnback 'B' - reversing only
	Westbourne Park	5		Turnback 'C' - reversing only
	Westbourne Park	B		Westbound running line
PLMSRS	Plumstead	Reversing		
ABWDXRS	Abbey Wood	Crossrail	205	Abbey Wood Crossrail Siding beyond platform 3
	Abbey Wood	Transfer	TBC	Freight only connection to Network Rail North Kent Line

## 4. Rolling Stock Restrictions

### 4.1 Communications Based Train Control signalling system

- 4.1.1 Rolling Stock must be fitted with a Communications Based Train Control (CBTC) signalling system<sup>1</sup> compatible with Siemens Rail Automation “Trainguard MT” Communications Based Train Control signalling system to operate over the CCOS.
- 4.1.2 An automatic reversing facility is available to assist in the prompt reversal of trains terminating at Paddington (Elizabeth Line) station and to move trains between Abbey Wood station and Plumstead stabling sidings. This facility may also be used to operate over the crossovers at Fisher Street, Vallance Road and Custom House.
- 4.1.3 CBTC interfaces with standard lineside signalling at the boundaries with the NR Network at Westbourne Park Junction in the West and between Pudding Mill Lane Junction and Stratford station in the East.
- 4.1.4 Rolling Stock traversing the interfaces must be able to transition between networks on the move without interruption between the respective signalling systems.

### 4.2 Automatic Train Operation (ATO) Limits

- 4.2.1 Trains shall be planned to operate in Automatic Train Operation (ATO) mode in normal conditions.
- 4.2.2 The ATO operation limits are as follows:

XR001 Westbourne Park Junction to Pudding Mill Lane Junction			
Route Section	Passenger	ECS	OTM
Westbourne Park Junction to Stepney Green Junction	Mandatory	Mandatory	Permitted
Stepney Green Junction to Pudding Mill Lane Junction	Mandatory	Mandatory	Permitted
XR002 Stepney Green Junction to Abbey Wood (Alsike Road Junction)			
Route Section	Passenger	ECS	OTM
Stepney Green Junction to Abbey Wood	Mandatory	Mandatory	Permitted
Plumstead East Junction to Plumstead Reversing Siding	Mandatory	Mandatory	Permitted
Plumstead Reversing Siding to Plumstead Carriage Sidings	N/A	Mandatory	Permitted
Plumstead Reversing Siding to Plumstead Maintenance Depot	N/A	N/A	Not Permitted
Abbey Wood to Alsike Road Junction	N/A	Not Permitted	Not Permitted

- 4.2.3 Engineers trains or on-track machines (OTM) may operate in ATO mode if suitably equipped but should be planned to operate in CBTC Protected Manual Mode.

### 4.3 Auto-Drive Operation

- 4.3.1 Auto-Drive/ Auto-Reverse Operation of ECS services is available for the following moves:

- Abbey Wood to Plumstead CS (driver in trailing cab from Abbey Wood to Reversing Siding);
- Plumstead CS to Abbey Wood (driver in trailing cab from Plumstead Reversing Siding to Abbey Wood);
- Paddington to Paddington via Westbourne Park (driver walking through train during transit);

<sup>1</sup> A derogation from regulation 14 (2) (d) of the Railways (Interoperability) Regulations 2011 was granted to CCOS 26/01/2012 pending future migration to Level 3 ETCS.

- Tottenham Court Road to Tottenham Court Road via Fisher Street Crossover (driver walking through train during transit);
- Farringdon to Farringdon via Fisher Street Crossover (driver walking through train during transit);
- Whitechapel to Whitechapel via Vallance Road Crossover (driver walking through train during transit)

4.3.2 Auto-Reverse Operation of ECS services is available for the following moves:

- Woolwich to Plumstead CS via Plumstead East Junction (driver in trailing cab from Plumstead East Junction to Plumstead Reversing Siding);
- Plumstead CS to Woolwich via Plumstead East Junction (driver in trailing cab from Plumstead Reversing Siding to Plumstead East Junction).

4.3.3 Auto-Reverse Operation (Zorro Moves) of trains in passenger service are permitted but may only be planned at the following crossovers:

- Fisher Street;
- Vallance Road;
- Custom House East.

#### **4.4 Train Length Limits**

4.4.1 The maximum length of any train consist is limited to 205metres.

#### **4.5 Passenger Stock Restrictions**

4.5.1 The CCOS is cleared only for Bombardier Aventura Model LV-BXR-13 (Class 345) against the RFLI Standard CRL1-XRL-O6-STD-CR001-50005: Crossrail Central Operating Section Requirements for Maintaining Infrastructure Clearances.

4.5.2 The Vehicle Change (Part F of the CCOS Network Code) process deals with the introduction of new vehicles.

4.5.3 The installation of Platform Screen Doors at all stations between Paddington (Elizabeth Line) and Woolwich inclusive with the exception of Custom House dictate that only Class 345 rolling stock may call at these stations.

#### **4.6 Engineers Train Restrictions**

4.6.1 Timetabled engineering trains (e.g. measurement and recording) are limited to a maximum length of 150metres and must be fitted with a compliant CBTC system.

4.6.2 Timetabled moves may not depart Plumstead before 23:00EWD or 22:30Su and must be timed to arrive by 06:00EWD or 08:00Su.

#### **4.7 Locomotive Route Availability**

4.7.1 The maximum axle load for the CCOS shall be commensurate with the Network Rail RA 4 rating.

4.7.2 Diesel-powered locomotives are not permitted to operate on CCOS. Special arrangements apply for the use of diesel locomotives on engineering trains.

4.7.3 When diesel locomotives are to be operated there must be no restrictions on the ventilation system.

#### **4.8 Freight Vehicle Restrictions**

4.8.1 Freight vehicles must comply with Standard CRL1-XRL-O6-STD-CR001-50005 Crossrail Central Operating Section Requirements for Maintaining Infrastructure Clearances.

#### **4.9 Freight Train Load Limits**

4.9.1 Maximum axle load as per Standard CRL1-XRL-O6-STD-CR001-50005: Crossrail Central Operating Section Requirements for Maintaining Infrastructure Clearances.

4.9.2 Dangerous goods are not permitted on the CCOS.

## 5. Running Times, Margins and Allowances

### 5.1 Sectional Running Time

5.1.1 Sectional Running Times (SRT) provided in the tables in sections **Error! Reference source not found.** and 5.1.4 below are given in minutes.

5.1.2 SRTs are split by type into 4 different timing links:

- 1) Start to Stop (S-S) – wheels start at first timing point to wheels stop at second timing point
- 2) Start to Pass (S-P) – wheels start at first timing point to front of train passing the second timing point
- 3) Pass to Stop (P-S) – the front of train passing first timing point to wheels stop at second timing point
- 4) Pass to Pass (P-P) – front of the train passing the first timing point and passing the second timing point

5.1.3 SRTs for passenger and ECS are based on Class 345 timing rolling stock specifically designed for operating the CCOS.

Table 5-1: Eastbound passenger and ECS Sectional Running Times

EASTBOUND		Line	S-S	S-P	P-S	P-P
From	To					
Westbourne Park Junction	Westbourne Park				1	½
Westbourne Park Junction	Paddington (Elizabeth Line)				2½	2
Westbourne Park	Paddington (Elizabeth Line)		2		1½	1½
Paddington (Elizabeth Line)	Bond Street		2½			
Paddington (Elizabeth Line)	Tottenham Court Road				3	2½
Bond Street	Tottenham Court Road		1			
Tottenham Court Road	Farringdon (Elizabeth Line)		2½		2½	
Tottenham Court Road	Liverpool Street (Elizabeth Line)				3	2½
Farringdon (Elizabeth Line)	Liverpool Street (Elizabeth Line)		1½			
Liverpool Street (Elizabeth Line)	Whitechapel		2		2	
Liverpool Street (Elizabeth Line)	Stepney Green Jn					2½
Whitechapel	Stepney Green Jn			1		
Stepney Green Jn	Puttling Mill Lane Jn					2½
Stepney Green Jn	Canary Wharf				2	2
Canary Wharf	Custom House		3		3	2½
Custom House	Woolwich		3½			
Custom House	Plumstead East Jn					4½
Woolwich	Plumstead East Jn		2½	2		
Plumstead Rev Siding	Plumstead East Jn		2½	2		
Plumstead Rev Siding	Plumstead CS		2			
Plumstead East Jn	Abbey Wood (Elizabeth Line)				1½	
Abbey Wood (Elizabeth Line)	Abbey Wood Crossrail Siding		2			

Table 5-2: Westbound passenger and ECS Sectional Running Times

WESTBOUND							
From	To	Line	S-S	S-P	P-S	P-P	
Abbey Wood Crossrail Siding	Abbey Wood (Elizabeth Line)		2	1½			
Abbey Wood (Elizabeth Line)	Plumstead East Jn			1			1
Plumstead CS	Plumstead Rev Siding		2				
Plumstead East Jn	Plumstead Rev Siding		3		2½		
Plumstead East Jn	Woolwich		2½		2		
Plumstead East Jn	Custom House						4½
Woolwich	Custom House		3½				
Custom House	Canary Wharf		3	2½			2½
Canary Wharf	Stepney Green Jn			2			2
Stepney Green Jn	Stepney Green Jn						2½
Stepney Green Jn	Whitechapel				1		
Stepney Green Jn	Liverpool Street (Elizabeth Line)						2½
Whitechapel	Liverpool Street (Elizabeth Line)		2	2			
Liverpool Street (Elizabeth Line)	Farringdon (Elizabeth Line)		1½				
Liverpool Street (Elizabeth Line)	Tottenham Court Road			3			2½
Farringdon (Elizabeth Line)	Tottenham Court Road		2	2			
Tottenham Court Road	Bond Street		1½				
Tottenham Court Road	Paddington (Elizabeth Line)						2½
Bond Street	Paddington (Elizabeth Line)		2½				
Paddington (Elizabeth Line)	Westbourne Park CS		2	1½			1½
Paddington (Elizabeth Line)	Westbourne Park Junction			2½			2
Westbourne Park	Westbourne Park Junction			1			½

5.1.4 Sectional Running Times (Non-Passenger Stock) are intended for scheduled moves of engineering trains and on track machines.

Table 5-3: Eastbound non-passenger Sectional Running Times

EASTBOUND							
From	To	Line	S-S	S-P	P-S	P-P	
Westbourne Park Junction	Westbourne Park				1		
Westbourne Park Junction	Paddington (Elizabeth Line)						2½
Westbourne Park	Paddington (Elizabeth Line)			2			1½
Paddington (Elizabeth Line)	Tottenham Court Road				3		2½
Tottenham Court Road	Liverpool Street (Elizabeth Line)						2½
Liverpool Street (Elizabeth Line)	Whitechapel				2½		2
Liverpool Street (Elizabeth Line)	Stepney Green Jn						2½
Whitechapel	Stepney Green Jn			1			
Stepney Green Jn	Pudding Mill Lane Jn						2½
Stepney Green Jn	Canary Wharf						2
Canary Wharf	Custom House		3		3		2½
Custom House	Woolwich						
Custom House	Plumstead East Jn						4½
Plumstead Rev Siding	Plumstead East Jn		2½	2			
Plumstead Rev Siding	Plumstead CS		2				
Plumstead East Jn	Abbey Wood (Elizabeth Line)				1½		1½
Abbey Wood (Elizabeth Line)	Abbey Wood Crossrail Siding		2		1		

**Table 5-4: Westbound non-passenger Sectional Running Times**

WESTBOUND						
From	To	Line	S-S	S-P	P-S	P-P
Abbey Wood Crossrail Siding	Abbey Wood (Elizabeth Line)		2	1½		
Abbey Wood (Elizabeth Line)	Plumstead East Jn			1		1
Plumstead CS	Plumstead Rev Siding		2			
Plumstead East Jn	Plumstead Rev Siding		3		2½	
Plumstead East Jn	Custom House				5	4½
Custom House	Canary Wharf			2½		2½
Canary Wharf	Stepney Green Jn					2
pudding Mill Lane Jn	Stepney Green Jn					2½
Stepney Green Jn	Whitechapel				1	
Stepney Green Jn	Liverpool Street (Elizabeth Line)					2½
Whitechapel	Liverpool Street (Elizabeth Line)			2		
Liverpool Street (Elizabeth Line)	Tottenham Court Road			3		2½
Tottenham Court Road	Paddington (Elizabeth Line)					3
Paddington (Elizabeth Line)	Westbourne Park CS				2	1½
Paddington (Elizabeth Line)	Westbourne Park Junction					2
Westbourne Park	Westbourne Park Junction			1		½

## 5.2 Headways

5.2.1 Headway values are given in minutes.

5.2.2 All routes are shown.

**Table 5-5: Headway Values**

XR001 Westbourne Park Junction to Pudding Mill Lane Junction			
Timing Points Included	Down	Up	Notes
Westbourne Park Junction to Stepney Green Junction	2	2	
Stepney Green Junction to Pudding Mill Lane Junction	2	2	
XR002 Stepney Green Junction to Abbey Wood (Alsike Road Junction)			
Timing Points Included	Down	Up	Notes
Stepney Green Junction to Abbey Wood	2	2	
Abbey Wood (Elizabeth Line) to Abbey Wood Crossrail Siding			Single Line – one train in section
Abbey Wood Crossrail Siding to Abbey Wood (Alsike Road Junction)			Single Line – one train in section

## 5.3 Junction Margins and Station Planning Rules

5.3.1 All times shown are in minutes. Where adjustments to SRTs are shown, the value must be added to the normal SRTs. Negative adjustments are specially identified.

5.3.2 Minimum station allowances are the minimum practical for the particular type of stock. These are shown with exceptions being listed by line of route where applicable.

5.3.3 It is permitted to time a departure from a siding at Westbourne Park with a lower letter in the alphabet at the same time as an arrival at a higher letter (for example, a departure from Siding B

may be timed to coincide with an arrival in Siding C). The margin values given in the table below apply.

Table 5-6: Standard Junction Margins and Station Dwell Times

<b>STANDARD VALUES – MINIMUM</b>	
<b>Dwell Time</b>	
Bond Street, Custom House, Farringdon, Whitechapel and Woolwich	½
Canary Wharf, Liverpool Street, Paddington and Tottenham Court Road	1
Class 345	½
Passenger to ECS with no change of direction	1
<b>Junction Margin</b>	
Standard Value	1½
Departure following conflicting arrival	1
<b>Minimum Turnarounds</b>	
Class 345 (standard)	7
Class 345 (Auto-Reverse)	2
<b>Platform / Siding Re-occupation</b>	
Same direction	1½
Opposite direction	2
<b>Zorro Moves</b>	
Standing time between each leg of a Zorro Move	½
<b>Definition of Peak Services</b>	
AM Shoulder Peak [SX only]	0700-0744*, 0915-0959*
AM Peak [SX only]	0745-0914*
<i>*arrival time at Tottenham Court Road</i>	
PM Shoulder Peak [SX only]	1600-1644**, 1815-1859**
PM Peak [SX only]	1645-1814**
<i>**departure time from Tottenham Court Road</i>	

## 5.4 Exceptions

- 5.4.1 Abbey Wood re-occupation time shall be planned at 2 ½ minutes.
- 5.4.2 Westbourne Park siding detail must be indicated with the relevant track code.

## 5.5 Timing Allowances

- 5.5.1 None apply to Elizabeth Line Class 345 services as a 10% uplift is included in the SRT calculation method (see 7.4.4 and 7.4.8 below).

## 6. Timetabling Considerations

### 6.1 Station Dwell Times

- 6.1.1 Variation from the standard station dwell values provided in Table 5-6 (e.g to 45 seconds) may be permitted subject to the provision of a timetable download mechanism from Network Rail Capacity Planning or the agreement of a working timetable overlay facility.



6.1.2 Where a facility indicated in 6.1.1 exists, station dwells should be bid at ½ or whole minute values. For example two consecutive stations requiring 45seconds dwells should be planned as Station Y ½ minute and Station Z 1 minute.

6.1.3 Prior to submitting bids, TOCs should seek guidance from the RFLI Strategy and Performance Team.

6.1.4 Departures shall be advertised in the public timetable at the truncated minute value.

## 6.2 Single Line Working

6.2.1 CCOS is bi-directionally signalled throughout. It is therefore permissible to construct timetables based on single line working based upon available infrastructure.

## 6.3 Light Locomotive Movements

6.3.1 All light engine movements must be planned.

# 7. Procedure for Amending the Values in the Timetable Planning Rules

## 7.1 General Considerations for Timetable Planning Rule Changes

7.1.1 TPR should provide for current and anticipated service levels, taking cognisance of the Decision Criteria set out in D4.6 of the CCOS Network Code and CCOS Specialised Infrastructure designation.

7.1.2 Values generated by this methodology will be subject to condition [D2.2] of the CCOS Network Code.

## 7.2 Guiding Principles

7.2.1 Where a gap or deficiency in the delivery of the timetable has been identified, there are four potential courses of action to consider:

- Revise operational activities;
- TPR review;
- Timetable change; or
- Infrastructure interventions.

7.2.2 TPR values can be calculated in a number of legitimate ways including:

- a. Use of On Train Monitoring Recorder (OTMR) systems;
- b. CBTC system recorded actual timing values;
- c. Use of computer simulation tools (e.g Dynamis); or
- d. Manual timing of trains (in sufficient quantity).

7.2.3 Prior to proposal of upwards revisions of TPR values, the aim should be to enhance operational delivery prior to altering TPR values. This approach must be agreed by the parties with defined outputs and delivery timescales, whereby all parties accept the risk of performance under delivery

in the interim as a result of delaying TPR change. All stakeholders are responsible for reviewing and optimising their own operational delivery performance.

7.2.4 The impact of a proposed TPR value change must be considered by all parties concerned and if deemed necessary, a timetable impact assessment undertaken.

7.2.5 A timetable impact assessment may not be necessary in circumstances where TPR value reduction is proposed, but opportunities to improve the timetable should still be taken.

7.2.6 All TPR change proposals must be considered in the context of any potential need to apply increased and decreased values together as part of a holistic improvement.

7.2.7 TPR values, excluding SRTs, can never be less than the technical value. The process for the generation of SRTs is covered in 7.4 below.

7.2.8 Changes to individual TPRs will be supported by evidence showing how the values were developed. Sources of evidence are to be agreed by the affected parties.

7.2.9 Supporting information must be stored in a format accessible to RFLI and Timetable Participants and must be made available upon request.

7.2.10 A process of rounding will apply to all technical values generated through this methodology in order to express planning values in multiples of half minutes and be compatible with industry-wide systems.

### **7.3 Procedure for Amending Timetable Planning Rules**

7.3.1 When producing TPR change proposals, RFLI and/or the Timetable Participant will set out why the change is proposed, and the planned date for implementation.

7.3.2 The proposal will consist of:

- A proposal number, provided by the appropriate RFLI TPR forum
- Source data and assumptions for both infrastructure and rolling stock
- Supporting evidence as agreed by RFLI and affected parties
- Outputs from simulation models or other methodology, Technical values, planning values, and any rounding applied expressed in seconds and/or %age uplift
- RFLI will consult in accordance with the CCOS Network Code
- RFLI will document responses and decisions taken on implementation or otherwise, so that each TPR entry has an audit trail

### **7.4 Sectional Running Time Amendment**

7.4.1 Section 5.1 above contains the current SRTs for Passenger, ECS and non-passenger trains.

7.4.2 A SRT is the time taken for various train types (Timing Loads) to traverse a Network Link, representing the fastest route of that Network Link.

7.4.3 All SRTs are compiled individually by:

- Direction of travel
- Each track on multiple lines

- Optimal performance possible for line and rolling stock, including acceleration or deceleration impact as appropriate

7.4.4 To take account of factors such as permissive moves, slow speed junctions, crossovers and platform sharing, additional time in the form of adjustment allowance should be added to schedules and listed in Section 5.3 above. If this additional allowance applies to all trains using the SRT, this allowance should be included in the SRT.

7.4.5 SRTs are agreed between TOCs and RFLI as part of the agreement of the CCOS TPR. Normally they will not change from one timetable to the next.

7.4.6 New and revised SRTs are agreed between TOCs and RFLI on an individual basis and are supplied by the method agreed in each instance.

7.4.7 RFLI will, however, re-calculate SRTs for particular train/route combinations in the following circumstances:

- a. Where a TOC anticipates using a train/route combination for which no SRT exists;
- b. Where RFLI anticipates a change to route data, e.g. line speed changes;
- c. SRTs are unrepresentative of actual train performance;
- d. Where it is cost-effective to re-calculate all SRTs on a route at the same time as a re-calculation for a particular train type.

7.4.8 A 10% allowance for engineering shall be included in the TPR calculation.

7.4.9 Network Rail national timetable protocols require rounding of the calculated SRTs to obtain values in half minutes. Rounding shall be carried out cumulatively over a route, with intermediate times being rounded down and arrival at final destination being rounded up. The accumulative value of the SRTs must not be more than +/- half-a-minute from the accumulative value of the 'raw' data at key junctions and stations.

7.4.10 RFLI may carry out other adjustments to the rounded SRTs, e.g. to remove obvious anomalies

7.4.11 RFLI may adjust proposed SRTs for different train types to show the same numeric values in order to make maximum use of available line capacity.

## 7.5 Headways

7.5.1 Current headway values are listed in Table 5-5 above.

7.5.2 The planning headway is the minimum planned time interval between two successive train schedules at a specific timing point on the same line in the same direction, such that the second train can meet its SRT. This is expressed in multiples of half minutes and is derived from the technical headway rounded to at least the next half minute or above by agreement.

7.5.3 Where necessary and appropriate, differential planning headways shall be created for different combinations of:

- Train type (including weight, length and speed)
- Stopping pattern
- Diverging or converging movements

For example, two trains departing from a terminal station may have a different headway depending on whether they depart towards the same line (converging), or to different lines (diverging), as in the latter scenario the route of the second train can be set earlier with least restrictive aspects. In the case of a non-stopping train following a train through a platform, the headway needs to allow the first train to accelerate from the platform without the second train seeing restrictive aspects on approach. This is also the case in scenarios where stopping trains follow one another into a station platform.

7.5.4 The technical headway is the minimum permissible time interval between two successive trains at a specific timing point on the same line in the same direction, such that the second train can meet its SRT. This is expressed in seconds.

## 7.6 Junction Margins

7.6.1 Current standard junction margins are listed in Table 5-6 above.

7.6.2 A Junction Margin is the minimum permissible time interval between two trains that are performing conflicting moves at a timing point, such that the second train can meet its SRT. This is expressed in multiples of half minutes derived from the technical value expressed in seconds.

7.6.3 Where necessary and appropriate, differential junction margins shall be created for different combinations of:

- Train type (including weight, length and speed)
- Stopping or passing movements
- Diverging or converging movements

For example, a train accelerating from rest across a junction will require a greater margin to avoid impact on the second train, than a train crossing the same junction at line speed. The stopping pattern of both trains must also be taken into account so that acceleration or deceleration relative to line speed is taken into account.

7.6.4 The calculation of a junction margin consists of a number of components:

1. Time taken between the front of the first train passing the timing point and its rear clearing the relevant axle counter
2. Time taken for the CBTC system to reset the route and give a movement authority to the second train
3. Time taken between the second train commencing movement and its front passing the timing point

7.6.5 A basic junction margin is the sum of 1, 2 and 3 above rounded to the next half-minute above to form the planning margin.

## 7.7 Platform Reoccupation

7.7.1 Current standard platform reoccupation times are listed in Table 5-6 above.

7.7.2 Platform reoccupation is the time between first train departing and second train arriving at a specific platform in the same direction; this commonly defaults to, but should never exceed, the applicable headway.

7.7.3 Platform Reoccupation is measured separately to station dwell time.

7.7.4 The calculation of a platform reoccupation consists of a number of components:

1. Time taken between the first train departing the timing point and its rear clearing the relevant berth;
2. Time taken for CBTC to reset the route and give movement authority to the second train; and
3. Time taken between the second train commencing movement and it arriving at the timing point

7.7.5 Platform reoccupation is the sum of 1, 2 and 3 rounded to the next half-minute above to form the planning value.

## 7.8 Station Dwell Times

7.8.1 Current standard station dwell values are listed in Table 5-6 above.

7.8.2 Station dwell times are the minimum time shown in timetables for trains to be at a stand in a station, from when train wheels stop on arrival to when wheels start on departure.

7.8.3 It includes time for doors to be released open, for passengers to leave and join the train, doors to be confirmed shut and for the train to be dispatched.

7.8.4 Where necessary and appropriate, differential station dwell times shall be created for different combinations of:

- Time of day (e.g. peak hours and weekends);
- Loading patterns;
- Rolling stock; and
- Station staffing arrangements.

7.8.5 Where no station-specific minimum value is specified a standard value of half a minute will apply.

7.8.6 Timetable Participants are responsible for ensuring that station dwell times are robust for operational usage.

## 7.9 Turnround Times

7.9.1 Current standard turnround times are listed in Table 5-6 above.

7.9.2 Turnround Times are the minimum time required for rolling stock to be prepared on completing one service before it forms the next service.

7.9.3 Where necessary and appropriate, differential turnround times shall be created for different combinations of:

- Time of day;
- Rolling stock;
- Station staffing arrangements;
- Train operating staff agreements;
- Journey distance; and
- Miscellaneous operational instructions

7.9.4 Timetable Participants are responsible for ensuring that turnrounds are robust for operational usage and takes account of local operational railway characteristics.

## 7.10 Engineering Recovery Allowances

7.10.1 Engineering Recovery Allowance is additional time included in train schedules to cover the impact of planned temporary speed restrictions associated with engineering works on the network.

7.10.2 A 10% allowance is included in the SRT calculation.

## 8. References

### 8.1 RfL company documents

- CCOS Network Code Part D
- CCOS Network Code Part H
- CCOS Network Code Part J
- RFLI COS Rule Book

### 8.2 References

- Railways and other Guided Transport System (Safety) Regulations 2006.
- Railways (Management of Access and Licensing of Railway Undertakings) Regulations 2016

### 8.3 Abbreviations

ATO	Automatic Train Operation
CBTC	Communications-Based Train Control
CCOS	Crossrail Central Operating Section
EAS	Engineering Access Statement
IM	Infrastructure Manager
LOR	Line of Route
NR	Network Rail
OTM	On Track Machine
RfL	Rail <i>for</i> London
RFLI	Rail <i>for</i> London (Infrastructure) Limited
ROGS	The Railway and Other Guided Transport Systems (Safety) Regulations
SRT	Sectional Running Time
TIPLOC	Timing Point Location (7 Character Code)

TfL Transport *for* London

TPR Timetable Planning Rules

## 8.4 Definitions

Automatic Train Operation	Train speed control, starting and stopping functions undertaken by the train (supervised by the Automatic Train Protection component of CBTC).
Auto-Drive	ATO with the driver or operator situated in the leading cab relative to the direction of travel
Auto-Reverse	ATO with the driver or operator not situated in the leading cab relative to the direction of travel
Communications-Based Train Control	Train-borne determination of a train's location, length and integrity. Employs a continuous data communications link between the train-borne equipment and wayside equipment.
Infrastructure Manager	As defined in Part 1 Section 2 of the Railway and Other Guided Transport Systems (safety) regulations (2006)
Zorro Move	Facilitates the movement of a train to another running line for same direction working using a trailing crossover by use of Auto-Reverse.