

Eastleigh Area Connectivity Report

Capability & Capacity Analysis – System Operator

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References				
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1	Timetable Planning Rules 2019	Wessex	13/07/2018	V4.0
2	BPlan		August 2018	

Abbreviations	
Acronym	Meaning
P-P	Pass to Pass (A type of Sectional Running time)
P-S	Pass to Stop (A type of Sectional Running time)
S-S	Stop to Stop (A type of Sectional Running time)
SRT	Sectional Running Time
Tph	Train(s) per hour
TPR	Timetable Planning Rules

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Part A: Executive Summary

Eastleigh Borough Council is looking at how to make best use of the rail capacity in the Eastleigh area to encourage road users to make the journey by rail. In addition they are exploring the potential for a rail connection for a new housing development, proposed at Allington Lane.

Across a three hour period midweek, between 11:00 and 14:00, this analysis looked at the following three questions:

- What are the best use options for the Portsmouth Harbour – Southampton (via Eastleigh) services?
- What are the options for operating 2 trains per hour (tph) from Portsmouth Harbour to London Waterloo via Eastleigh, and 1 train per hour from Portsmouth Harbour to Southampton via Eastleigh?
- Could a new Station proposed near Allington Lane, between Eastleigh and Hedge End, be accommodated in any of these services?

The analysis showed that changes to paths between Portsmouth Harbour and Southampton Central via Eastleigh would not be achievable due capacity constraints at Southampton Central Station and Eastleigh Station. Whilst there is overall capacity available at these stations this does not join up with the identified paths that work across the rest of the Southampton Central to Portsmouth Harbour route.

In the December 18 timetable there is 1 train per hour (tph) between Portsmouth Harbour and London Waterloo via Eastleigh. The analysis showed that an increase to 2 tph would not be possible with the current timetable. There is capacity on the network but this cannot be utilised due to the timetable structure between Clapham Junction and London Waterloo, and also Shawford Junction and Eastleigh, where speed differentials are an issue. This could be resolved if services were to be run on minimum margins, but having services running on minimum margins would have performance implications. If a suitable path were to be identified, Portsmouth Harbour station as a terminus would make it difficult for an additional service to use because 2 out of 4 platforms are in use constantly and the remaining 2 platforms having a high usage.

A new station at Allington Lane would be able to provide an additional stop on the existing Portsmouth Harbour to London Waterloo service via Eastleigh. In order to accommodate this additional stop, changes would need to be made to the timings of the existing services and there would be an increase in the overall journey time by around 2 minutes.

Part B: Introduction

B.01 Background

Eastleigh Borough Council want to know how to make best use of the rail capacity in the area to encourage road users to make the journey by rail instead, and also look at potential for a rail connection to a new housing development.

The Wessex route study identified a requirement for increased connectivity for passengers, but also improved journey times and the two are not harmonious.

B.02 Aims and Objectives

There are several questions that have been addressed by this analysis but primarily it has looked at the best use of the current services and what the possibilities are to address connectivity issues to Southampton Airport Parkway. The analysis has been based on three off peak hours 11:00 and 14:00 in the December 18 timetable. It has been broken down into the following key questions:

B.02.01 What are the best use options for the Portsmouth Harbour – Southampton (via Eastleigh) services?

- A. What are the options for providing a stopping service along the Fareham line?
- B. Could these services be increased to 1tph to provide connectivity?
- C. What does that mean to capacity at Southampton and Eastleigh?

B.02.02 What are the options for operating 2tph Portsmouth Harbour to London Waterloo via Eastleigh and 1tph Portsmouth Harbour to Southampton via Eastleigh?

- A. What are the options for providing a stopping service along the Fareham line in these services?

B.02.03 Could a new station proposed near Allington Lane, between Eastleigh and Hedge End, be accommodated in any of these services?

B.03 Geographic Scope

The geographic scope for this analysis was Southampton Central/Portsmouth Harbour to London Waterloo as shown in Figure 1.

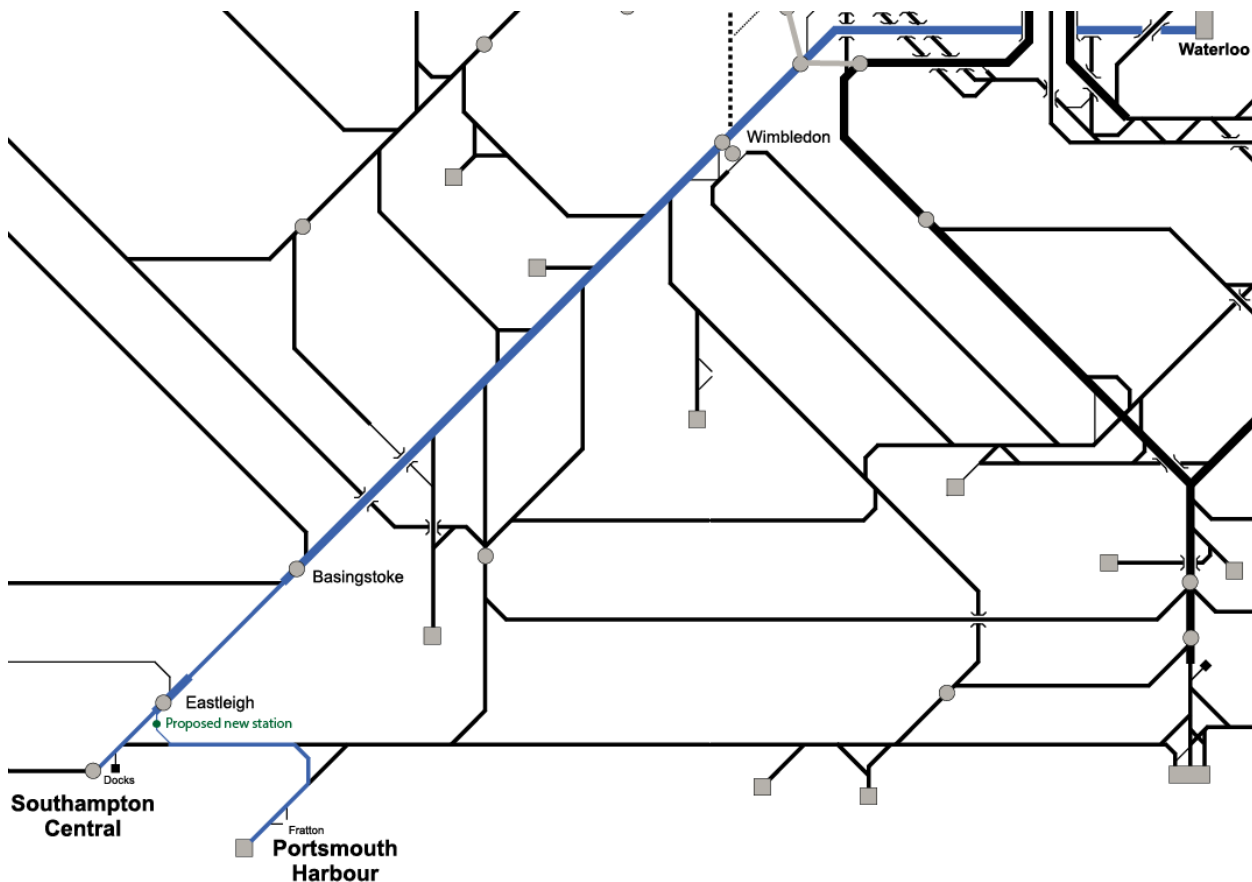


Figure 1: Geographic scope for analysis

B.03.01 Proposed new station site

The site for the proposed new station is Allington Lane which is at approximately 75 miles and 30 chains as shown in Figure 2 on the following page.

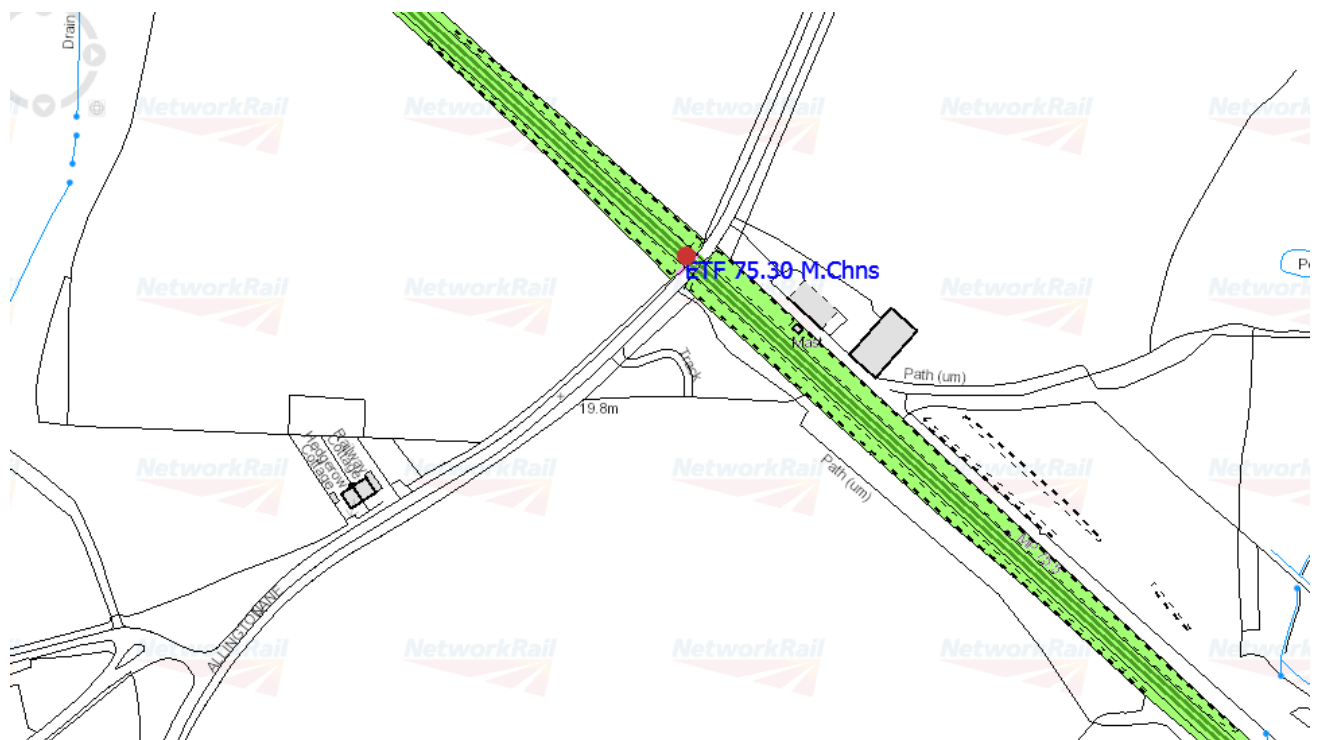


Figure 2: Proposed new station location

Part C: Findings

C.01 What are the best use options for the Portsmouth Harbour-Southampton (Via Eastleigh) Services?

A. What are the options for providing a stopping service along the Fareham line?

The analysis considered at first a service stopping at all stations between Portsmouth Harbour and Southampton Central via Eastleigh¹. However this was not possible to achieve due to constraints between Eastleigh and Southampton Central with different services running with different speeds. Therefore, paths were considered stopping at all stations between Portsmouth Harbour and Eastleigh², and then stopping only at Southampton Airport Parkway and Southampton Central, and this is possible but dependent on the station capacity at Portsmouth Harbour, Eastleigh Station and Southampton Central Station.

B. Could these services be increased to 1tph to provide connectivity?

All of the paths identified, detailed in **Table 1**, worked across the three off peak hours analysed with the exception of one path that could not be accommodated due to a British Pullman Charter Service.

Whilst there are paths available, Southampton and Eastleigh stations do not have the capacity to accommodate these services at the times required.

¹ Portsmouth and Southsea, Fratton, Hilsea, Cosham, Portchester, Fareham, Botley, Hedge End, Eastleigh, Southampton Airport Parkway, Swaythling, St Denys

² Portsmouth and Southsea, Fratton, Hilsea, Cosham, Portchester, Fareham, Botley and Hedge End

Origin	Depart at Origin	Destination	Arrival At destination	Does the path work?	Is there capacity at all stations?	Which stations can it stop at?
Portsmouth Harbour	10:50:00	Southampton Central	12:04:00	Yes	No	Portsmouth & Southsea Fratton Hilsea Cosham Portchester Fareham Botley Hedge End Eastleigh Southampton Airport Parkway Southampton Central
Portsmouth Harbour	11:50:00	Southampton Central	13:09:30	Yes	No	Portsmouth & Southsea Fratton Hilsea Cosham Portchester

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Origin	Depart at Origin	Destination	Arrival At destination	Does the path work?	Is there capacity at all stations?	Which stations can it stop at?
						Fareham Botley Hedge End Eastleigh Southampton Airport Parkway Southampton Central
Portsmouth Harbour	12:50:00	Southampton Central	14:01:30	Yes	No	Portsmouth & Southsea Fratton Hilsea Cosham Portchester Fareham Botley Hedge End Eastleigh Southampton Airport Parkway Southampton Central

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Origin	Depart at Origin	Destination	Arrival At destination	Does the path work?	Is there capacity at all stations?	Which stations can it stop at?
Southampton Central	11:32:30	Portsmouth Harbour	12:39:30	Yes	No	Southampton airport Parkway, Eastleigh, Hedge End Botley Fareham Portchester Cosham Hilsea Fratton Portsmouth and Southsea Portsmouth Harbour
Southampton Central	12:21:30	Portsmouth Harbour	13:31:00	Yes	No	Southampton airport Parkway, Eastleigh, Hedge End Botley Fareham Portchester Cosham Hilsea

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Origin	Depart at Origin	Destination	Arrival At destination	Does the path work?	Is there capacity at all stations?	Which stations can it stop at?
						Fratton Portsmouth and Southsea Portsmouth Harbour
Southampton Central	13:34:30	Portsmouth Harbour	14:47:00	No	No	Southampton airport Parkway, Eastleigh, Hedge End Botley Fareham Portchester Cosham Hilsea Fratton Portsmouth and Southsea Portsmouth Harbour

Table 1: Paths identified between Portsmouth Harbour and Southampton Central via Eastleigh

C. What does that mean to capacity at Southampton and Eastleigh?

Table 2 shows the platform capacity used at Southampton Central Station for the 3 hours analysed in the December 2018 timetable. Whilst an additional service would only require 13% of station capacity across an hour, the 31 minute turnaround times required for the additional Portsmouth Harbour to Southampton Central via Eastleigh paths to work present problems. This turnaround time is required to enable a path in the opposite direction. There are times when all 4 platforms are in use simultaneously in the December 18 timetable, which results in insufficient capacity for a train to wait here for half an hour. One option considered was for the additional to run into Southampton Down Loop and dwell there. However, with the timings of the paths identified this could not be achieved, due to junction margins and other services using the station at the times required for the paths identified.

	Hours evaluated		
	11:00-12:00	12:00-13:00	13:00-14:00
Platform 1	60%	68%	59%
Platform 2	62%	68%	52%
Platform 3	53%	67%	59%
Platform 4	42%	37%	41%
Total capacity used	54%	60%	53%

Table 2: December 18 Current platform Capacity used at Southampton Central Station

Table 3 shows the platform capacity used at Eastleigh Station for the December 2018 timetable. The additional services between Portsmouth and Southampton would use another 13% of capacity on average for each hour. However due to the paths available for these services there would not be capacity at the times required for these services to run.

	Hours evaluated		
	11:00-12:00	12:00-13:00	13:00-14:00
Platform 1	60%	45%	40%
Platform 2	55%	41%	48%
Platform 3	28%	17%	33%
Total capacity used	48%	34%	40%

Table 3: December 18 Current platform Capacity used at Eastleigh Station

At Portsmouth Harbour there are a couple of platforms which are used a lot during the hour, as can be seen from Table 4. However due to the short turnarounds needed for the identified paths at Portsmouth Harbour with some changing of platforms it is possible to accommodate the additional services.

	Hours evaluated		
	11:00-12:00	12:00-13:00	13:00-14:00
Platform 1	58%	48%	58%
Platform 3	87%	70%	67%
Platform 4	67%	75%	90%
Platform 5	90%	100%	87%
Total capacity used	75%	73%	75%

Table 4: December 18 Current platform Capacity used at Portsmouth Harbour Station

Theoretically, at all of the above stations there is capacity to accommodate services if there were to be a complete recast of the timetable to utilise the platform capacity.

C.02 What are the options for operating 2tph Portsmouth Harbour to London Waterloo via Eastleigh and 1tph Portsmouth Harbour to Southampton via Eastleigh?

Currently there is 1 tph between Portsmouth Harbour and London Waterloo via Eastleigh stopping at all stations on the Fareham line. This analysis looked at whether this service could be increased to 2 tph. It was found that this would not be possible with the current timetable on the mainline due to the mix of different services on the mainline between Eastleigh and London Waterloo. A number of options were considered, including removing stops at intermediate stations, however none of these could work across the whole route.

An Up path was identified from Shawford Junction to Clapham Junction but was not compliant outside of this section due to speed differentials of route into London Waterloo, and between Shawford Junction and Eastleigh. For both Clapham Junction and London Waterloo, and the Shawford Junction and Eastleigh sections, there is theoretically capacity, however, the timetable structure does not allow for this additional path.

What are the options for providing a stopping service along the Fareham line in these services?

Currently there is 1tph between Portsmouth Harbour and London Waterloo that stops at all stations along the Fareham Line. Whilst it isn't possible to accommodate a stopping service between Eastleigh and London Waterloo, there is theoretically capacity on the Fareham line for an additional stopping service. This would depend on the timings of any paths as the single line sections between Eastleigh and Eastleigh South Junction and also Botley and Fareham as these are the main constraints on this line.

There may be issues with Portsmouth Harbour Station capacity. Currently 2 of the platforms are in high use each hour and the other 2 platforms, whilst not in constant use, are constrained due to the way services are currently timetabled. If this option were to be pursued more work would be needed to look at if these additional services can use Portsmouth Harbour as a terminus station.

C.03 Could a new station proposed near Allington Lane, between Eastleigh and Hedge End, be accommodated in any of these services?

The assumption used for this analysis was that an additional stop at Allington Lane would increase journey time between Eastleigh and Hedge End by 2 minutes. This includes 1 minute for accelerating, 0.5 minute for braking and 0.5 minutes for dwell time. As these are high level assumptions given that there are no detailed station proposals, further analysis would be needed if this was to progress to determine the Timetable Planning Rules.

For the additional paths identified between Portsmouth Harbour and Southampton Central (noting the platform issues), it is not possible for this additional stop at Allington Lane to be included. This is due to constraints on the nearby single line sections, between Eastleigh and Eastleigh South Junction and also Botley and Fareham. The additional time required would mean that the paths would not be compliant on the single line sections. Therefore any changes to timings as a result of a stop at Allington Lane will mean these services would not be compliant through these sections.

The current services in the December 18 timetable would be able to accommodate the additional stop at Allington Lane. This can be achieved by a combination of reducing the dwell at Fareham to the minimum of 1.5 minutes specified in the TPR's, arriving later into Portsmouth Harbour or departing earlier from Portsmouth Harbour. This later arrival and earlier departure would have an impact on the train diagrams. Whilst this is possible from a timetabling perspective, it is recommended that Economic Analysis is undertaken to

understand the impact that the reduction in dwell time would have on passenger movements at Fareham.

Headcode	Origin and Destination	Changes required
1T38CA	Portsmouth Harbour to London Waterloo	Leaves Portsmouth Harbour a minute earlier, 0.5 minutes of pathing removed approaching Eastleigh South Junction, dwell reduced at Basingstoke by 0.5 minutes
1T25CA	London Waterloo to Portsmouth Harbour	Dwell reduced at Fareham by 1.5 minutes, arrives 0.5 minutes later at its destination, Portsmouth Harbour
1T29CA	London Waterloo to Portsmouth Harbour	Dwell reduced at Fareham by 1.5 minutes, arrives 0.5 minutes later at its destination, Portsmouth Harbour
1T42CA	Portsmouth Harbour to London Waterloo	Departs from Portsmouth Harbour 2 minutes earlier
1T33CA	London Waterloo to Portsmouth Harbour	Dwell reduced at Fareham by 1.5 minutes, arrives 0.5 minutes later at its destination, Portsmouth Harbour
1T46CA	Portsmouth Harbour to London Waterloo	Departs from Portsmouth Harbour 2 minutes earlier

Table 5: Changes to existing services to accommodate new station at Allington Lane

Part D: Conclusion

D.01.01 What are the best use options for the Portsmouth Harbour – Southampton (via Eastleigh) services?

A. What are the options for providing a stopping service along the Fareham line?

It would not be possible to stop at all stations between Portsmouth Harbour and Southampton Central via Eastleigh due to the speed differentials of services on the line between Eastleigh and Southampton Central, however it would be possible to stop at all stations between Portsmouth Harbour and Eastleigh. It would also be possible to stop at Southampton Airport Parkway.

B. Could these services be increased to 1tph to provide connectivity?

Whilst paths have been identified it would not be possible for an additional service to run between Southampton Central and Portsmouth Harbour via Eastleigh due to constraints of platform capacity at Eastleigh and Southampton Central stations.

More detailed analysis would be required on the station capacity to understand what infrastructure changes would be required to enable the Southampton Central to Portsmouth Harbour via Eastleigh paths to be accommodated e.g. new platforms at Southampton Central and Eastleigh.

C. What does that mean to capacity at Southampton and Eastleigh?

Whilst there is some capacity available at Southampton Central and Eastleigh station, the capacity is not available at the time that the identified additional paths require it. As a result additional infrastructure such as additional platforms would be required for these paths to work. Whilst these paths work at Portsmouth Harbour by replatforming other services after this replatforming the station will be almost at capacity, and it is unlikely that there will be sufficient capacity for another terminating service.

D.01.02 What are the options for operating 2tph Portsmouth Harbour to London Waterloo via Eastleigh and 1tph Portsmouth Harbour to Southampton via Eastleigh?

Currently there is 1tph however it is not possible to increase to 2tph due to constraints with the timetable structure and speed differentials between services.

A. What are the options for providing a stopping service along the Fareham line in these services?

Currently there is a service running between London Waterloo and Portsmouth each hour stopping at all stations on the Fareham line. There are a number of constraints that hinder a stopping service along the Fareham line, including single line working and platform capacity at Eastleigh and at Portsmouth Harbour Stations.

D.01.03 Could a new station proposed near Allington Lane, between Eastleigh and Hedge End, be accommodated in any of these services?

A new station at Allington Lane would be able to provide an additional stop on the existing Portsmouth Harbour to London Waterloo service via Eastleigh. This would require some changes to the timings of the existing services and increasing the end to end journey time by around 2 minutes.

Whilst this is possible from a timetabling perspective, it is recommended that Economic analysis is undertaken to understand the impact that the reduction in dwell time would have on passenger movements at Fareham.

For the proposed station at Allington Lane high level assumptions have been used. Therefore further analysis would be needed if this was to progress to determine the Timetable Planning Rules.

Part E: Appendix A – Assumptions

A Class 450 was used in this analysis as this is what currently operates between Portsmouth Harbour and London Waterloo.

For the new station at Allington Lane additional time for stopping and starting was compared with SRT's for a class 450 in BPlan and the difference between a P-P and S-P or P-P and P-S.