

Suggested new station east of Kidderminster

Technical Note on Timetabling

1. Introduction

Worcestershire County Council (WCC) is considering what level of rail capacity will be needed to meet future demand in the Wyre Forest District region. Options include additional car parking at existing railway stations and the suggestion of a new station located to the east of Kidderminster.

This suggested new station could potentially be an alternative to the expansion of existing stations. The station would be located approximately halfway between Blakedown and Kidderminster, adjacent to the A456 and close to the existing Hodge Hill Farm. The suggested station site is shown on the map below.



Figure 1 – Possible location of new station to east of Kidderminster

The railway distances are: Blakedown 138 miles 54 chains, Kidderminster 135 miles 46 chains. The new station would therefore be located approximately 1½ miles from each of the two existing stations.

This note considers the feasibility from a timetabling perspective of services calling at the suggested station. Section 2 identifies the constraints imposed by existing infrastructure and timetable pattern. Section 3 considers what type of service could be provided at the new station. Section 4 identifies the impact of the hourly Kidderminster-London Paddington service proposed by the North Cotswold Line Taskforce, and Section 5 summarises the conclusions.

2. Constraints and Current Service

2.1. Infrastructure and Planning Constraints

The railway between Blakedown and Kidderminster is double track, with a ruling line speed of 75mph. At Kidderminster there two platforms (platform 1 is the Birmingham platform and platform 2 the platform towards Worcester). There are two crossovers on the south side of the platforms enabling access to a Turnback Siding on the east (Up) side and a Goods Loop on the west (Down)¹ side. Both of these facilities can be used for terminating trains from Birmingham, enabling services to reverse clear of the running lines.

It is not possible for trains to arrive at Kidderminster from Birmingham and depart for Birmingham from the same platform, and therefore all trains undertaking this move must arrive in platform 2, and shunt before departing from platform 1. It is however possible for a train from the Worcester (and London) direction to arrive in either platform and depart from the same platform in the direction from which it came. The extract from the Sectional Appendix² shown below illustrates the layout.


LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
MD430	002	Droitwich Spa to Stourbridge North Junction	OWW	LNW South	05/03/2016
Location	Mileage M	Ch	Running lines & speed restrictions		Signalling & Remarks
Down Kidderminster Goods Loop	134	59			TCB West Midlands SC (DR) Stourbridge Workstation 
	135	00 *			
	135	15			
Kidderminster Junction	135	30			
KIDDERMINSTER	135	46			
Blakedown LC (CCTV)	138	51	Platform Lengths: Blakedown Down Kidderminster: 120 metres Up Kidderminster: 119 metres		
BLAKEDOWN	138	54			

Figure 2 - Extract from Sectional Appendix

¹ In railway parlance “Up” generally means towards London, and “Down” away from London.

² The railway’s detailed map, showing detailed features such as track layout, mileages, and key features.

All train services on the network must be planned in compliance with the industry’s agreed Timetable Planning Rules. These set out, for example, for each route the time apart that trains can be planned when following each other (“headway”) and the allowance needed between conflicting moves, such as at junctions (“margin”). For the section of route in question the planning constraints are summarised in the table below.

Circumstance	Minimum (minutes)
Trains following each other (i.e. headway)	4
Conflict with shunting move	5
Dwell time	1
Turnround (i.e. arriving in station from Birmingham, shunting to other platform and departing for Birmingham)	10

Figure 3 – Timetable planning constraints

In order to accommodate a new station east of Kidderminster the constraints imposed by the minimum values shown in Figure 3 must be adhered to. However, the industry recognises that just because these values are the minimum that can be used in planning, it does not makes them desirable, as the punctuality of services must also be taken into account, and this is a key consideration for any new station proposal. For example, trains terminating at Kidderminster have made a journey of c.60 minutes (from Whitlocks End or Dorridge), and a reasonable turnround time should be commensurate with that.

2.2. Current Services

The current passenger service is operated by West Midlands Trains as part of the Snow Hill Lines group of services. The standard pattern at Kidderminster is four trains per hour each way, The table below illustrates the pattern.



Figure 4 – Stourbridge Line current service pattern

It can be seen that there are six trains per hour each way, two terminating at Worcester, two at Kidderminster and two at Stourbridge Junction. There are variations in the morning peak into Birmingham and the evening peak out of Birmingham in order to maximise capacity.

There are a small number of freight services on the line. In the December 2019 timetable there are up to five each way on a weekday, although some of these run only as required. The destinations are Brierley Hill and Round Oak.

3. Current Timetable Test

3.1. Standard Off-Peak Pattern

Of the four trains per hour in the standard pattern using the Blakedown to Kidderminster section, there are strong reasons for only considering those terminating at or starting at Kidderminster for calls a new station east of Kidderminster. The two per hour that extend to/from Worcester or beyond are carefully timed through the constraints in the Worcester area, including:

- Platforming at Worcester Shrub Hill
- The two independent single lines through Worcester Foregate Street (one from the Kidderminster direction and the other from Shrub Hill)
- The long headways between Worcester Foregate Street and Great Malvern
- The difficult turnback arrangements at Malvern Wells for trains terminating at Great Malvern

Calling at an additional station on a 75-mph line with a diesel train will typically add two minutes into the journey time, impacting on the attractiveness of journeys between locations either side of the new station. In this case, the negative revenue impact would be worse if the proposed station were inserted into the longer distance services (as, for example, the Worcester–Birmingham journey time, already slow via Kidderminster, would be extended further). For these reasons, the option of stopping the Worcester trains at the proposed station as part of a regular timetable pattern has been discounted. The analysis below therefore considers whether an additional call can be inserted into the two services per hour that terminate at or start from Kidderminster.

Figure 5 shows the current Working Timetable³ (December 2019) amended to incorporate a call at the suggested station, entitled 'Kidderminster East' for these purposes. The following assumptions have been used:

- All times north of Blakedown to remain unchanged
- Times between Blakedown and Kidderminster extended by 2 minutes to include station call
- Times of Worcester services remain unchanged
- The small number of freight trains can be flexibly timed to account for the changes

³ The Working Timetable (WTT) includes more detail than the public timetable, including passing times, station dwell time and empty train movements.



UP		A	B	C	D	A
From		Whitlocks End	Whitlocks End	Dorridge	Dorridge	Whitlocks End
Blakedown	d	11/14½	11.36	11/43	12.06	12/14½
Kidderminster East	d		11.39		12.09	
Kidderminster	a	11.17½	11.42	11.46	12.12	12.18
	d	11.18½	11+44	11.47	12+14	12.19
Siding	a		11+46		12+16	
Hartlebury	d	11/22½		11.52		12/23
To		Worcester Shrub Hill	Terminates	Worcester Foregate St	Terminates	Worcester Shrub Hill
DOWN		E	F	G	H	E
From		Worcester Foregate St	Starts	Great Malvern	Starts	Worcester Foregate St
Hartlebury	d	11.32½		12/06		12.32½
Siding	d		11+49		12+19	
Kidderminster	a	11.37	11+51	12.09½	12+21	12.37
	d	11.38	11.53	12.10½	12.23	12.38
Kidderminster East	d		11.56½		12.26½	
Blakedown	d	11/41½	11.59½	12/14	12.29½	12/41½
To		Dorridge	Dorridge	Whitlocks End	Whitlocks End	Dorridge
Key						
/	Passing time (train does not stop)					
+	Empty train movement					
	New station inserted					
	Retimed					

Figure 5 - Existing standard pattern with proposed new station

Considering Figure 5, the turnrounds of the two affected trains at Kidderminster are greater than the minimum of 10 minutes required by the Timetable Planning Rules. Between train B arriving and F departing is 11 minutes, and the same between train D and H. However, there are some non-compliant issues:

- Train C is too close behind train B at Kidderminster
- Train A is too close behind train D at Kidderminster

It may be possible to make minor adjustments to the timings of train C and A to resolve this issue, but this could only be established by a full timetabling exercise with a wider geography. It is assumed that the other alternative – removing a station call (eg Blakedown) in order to achieve compliance would be politically unacceptable.

3.2. Peak Services

The peak services vary somewhat from the standard pattern in the December 2019 timetable. The tables below identify, simply on the basis of the minimum turnround allowed at Kidderminster, which trains could or could not accommodate a call at the suggested new station. At this stage we have not sought to identify conflicts between through services and shunting moves at Kidderminster. The tables only include trains starting from or terminating at Kidderminster.

Morning Peak Service	Action Needed/Comment	Can Call at proposed new station?
06.09 to London Marylebone	Leave Stourbridge Depot earlier	YES
06.19 to Whitlocks Ends	Comes from Tyseley Depot	YES
07.10 to London Marylebone	Comes from Stourbridge Depot	YES
07.30 to London Marylebone	Comes from Stourbridge Depot	YES
07.49 to Stratford-upon-Avon	Arrives 07.37. 10 minute minimum turnround would be required	YES
08.09 to London Marylebone	Come from Stourbridge Depot	YES
08.57 to Dorridge	Arrives 08.42	YES
09.36 to Dorridge	Arrives 09.13	YES

Figure 6 - Morning Peak services

Evening Peak Service (Times from Birmingham)	Action Needed/Comment	Can Call at proposed new station?
17.03 Birmingham Snow Hill	Arrives Kidderminster 17.40. Departs 18.00	YES
17.44 Birmingham Snow Hill	Arrives Kidderminster 18.25. Would get caught up by following Worcester train	NO
17.59 Birmingham Snow Hill	From London Marylebone. Arrives Kidderminster 18.39. Returns to Stourbridge Depot	YES
18.23 Birmingham Snow Hill	Arrives Kidderminster 19.05. Departs 19.45	YES

Figure 7 - Evening Peak services

Leaving Birmingham Snow Hill between 17.00 and 18.30 there are a further four trains that call at Kidderminster and proceed to Worcester and beyond. At least one of these would need to call at the proposed station to fill the gap between 17.03 and 17.59 departures. For example, there are departures for Kidderminster and Worcester from Snow Hill at 17.13 and 17.36. Further review of the Worcester area timetable would be required to establish whether there was a solution that could allow one or both of these to call.

4. Sensitivity with Kidderminster-London Services

The North Cotswold Line Taskforce (NCLTF), of which Worcestershire County Council is a founding member, has presented a Strategic Outline Business Case (SOBC) to the Department for Transport which would see the service between London Paddington and Worcester doubled to two per hour and speeded up. Part of the proposition is the extension of one of these trains each hour to/from Kidderminster.

In the formally submitted SOBC (p50), the timings of these services are:

- London Paddington depart xx.20, arriving Kidderminster at xx.43
- Kidderminster depart xx.05, arriving London Paddington xx.24

In order to assess whether this has any bearing on the ability of Birmingham trains to call at the new station, the proposed London services were added to the timetable analysis in Figure 5. This is shown in Figure 8 below.

UP		A	B	C	X	D	A
From		Whitlocks End	Whitlocks End	Dorridge	Starts	Dorridge	Whitlocks End
Blakedown	d	11/14½	11.36	11/43		12.06	12/14½
Kidderminster East	d		11.39			12.09	
Kidderminster	a	11.17½	11.42	11.46		12.12	12.18
	d	11.18½	11+44	11.47	12.05	12+14	12.19
Siding	a		11+46			12+16	
Hartlebury	d	11/22½		11.52	12/09		12/23
To		Worcester Shrub Hill	Terminates	Worcester Foregate St	London Paddington	Terminates	Worcester Shrub Hill
DOWN		E	Y	F	G	H	E
From		Worcester Foregate St	London Paddington	Starts	Great Malvern	Starts	Worcester Foregate St
Hartlebury	d	11.32½	11/39		12/06		12.32½
Siding	d			11+49		12+19	
Kidderminster	a	11.37	11.43	11+51	12.09½	12+21	12.37
	d	11.38		11.53	12.10½	12.23	12.38
Kidderminster East	d			11.56½		12.26½	
Blakedown	d	11/41½		11.59½	12/14	12.29½	12/41½
To		Dorridge	Terminates	Dorridge	Whitlocks End	Whitlocks End	Dorridge
Key							
/		Passing time (train does not stop)					
+		Empty train movement					
		New station inserted					
		Retimed					
		NCLTF proposed service					

Figure 8 - Standard hour with NCLTF trains



The London services are shown in pink as trains X and Y.

Train Y arriving from London at 11.43 must arrive in the Down platform (platform 1) and shunt to the Turnback Siding or Down Goods Loop before train F emerges at 11.51 to depart at 11.53, which as a Birmingham-bound service it must do from platform 1. This means that both the Siding and the Goods Loop will be occupied for a few minutes each hour. Train Y cannot arrive in the Up platform (platform 2), as this is already occupied by train B, with train C right behind it.

The London train must then come out of the siding into platform 2 to depart as train X toward London at 12.05. It must use platform 2 as platform 1 will shortly be occupied by train G.

We can conclude that there is a solution that includes both 'Kidderminster East' and the London service. However, the re-timing of the Kidderminster-Birmingham trains by 2 minutes in both directions in order to accommodate calls at the suggested station makes for a need for tight operating. Carefully modelling of the performance impact would be required.

5. Conclusions

This short technical report has assessed whether a call at a new station to the east of Kidderminster could be accommodated in the current timetable and on the current infrastructure.

It was assumed that the two trains per hour terminating from Birmingham and starting at Kidderminster towards Birmingham would be the two that would call. This was because retiming services through Worcester is difficult.

In conclusion:

- In the standard pattern hour, the station calls can only be accommodated in the Up, Worcester-bound direction if the Birmingham-Worcester trains are re-timed through Kidderminster to run a couple of minutes later. Further work would be required to establish whether this is possible.
- In the morning peak there appears to be no major problem with providing a reasonable level of service, providing this also includes services to London Marylebone.
- In the evening peak a reasonable spacing of services cannot be achieved unless some Worcester-bound services leaving Birmingham between 17.00 and 18.00 are retimed to call at the proposed station. Further work looking at the Worcester area would be required to establish whether this is possible.

The addition of the NCLTF's proposed hourly London-Kidderminster services makes the situation at Kidderminster tighter, and requires the use of the Turnback Siding and Down Goods Loop at the same time. Whilst the operation could be compliant with the Timetable Planning Rules, it would be tight to operate and performance modelling would be required to assess how much of a problem it would be.

It will be important to minimise the risk that the valuable NCLTF London service does not trigger the need for expensive additional infrastructure at Kidderminster if at all possible. The inclusion of the proposed new station as a call in two Birmingham-Kidderminster services each hour would make the operation tighter and increase that risk.