Report to Maidstone Borough Council and Homes England

Outline assessment of case for a station at Heathlands Garden Community

May 2021

JRC · Bridge House · Wanstrow BA4 4TE · jrc@jrc.org.uk · 07545 641204
A Registered Company in England & Northern Ireland. Registration Number 6870225. VAT 974 1904 00

Contents

Introduction

1 Maidstone Borough Council and Homes England are the joint clients for a proposed Garden Community between Lenham and Charing in Kent. The community would be located between the A20 and M20, and would straddle the Ashford-Maidstone East railway. To achieve a high level of sustainability, it is proposed that there should be a specific railway station to serve the new community, which is envisaged as having about 5,000 homes. There is a possibility that Ashford District Council might also wish to participate in an enlarged community, and consideration of a station should take this into account.

2 Jonathan Roberts Consulting Ltd (JRC) has been appointed to advise on the high level case for a station, and to engage with Network Rail. The underlying objective is to ensure that there are no 'show stoppers', and that Network Rail has no 'in principle' objections to a new station, or is willing to work with the project team and with other potential partners, on a range of initial business case options which extend from a single station to serve the entire catchment, to having two stations, one at Lenham and one at Heathlands. Work could then proceed towards a Strategic Outline Business Case. JRC has a specialist team of advisers: Mike Dyson of *White Stone 55 Ltd*, for rail engineering and operations, and Michael Byng of *mbpc* Ltd, for project costs.

Scope

3 The primary topic to be considered whether, in outline, a new station can be justified in-between existing stations? This requires answers to the following questions:

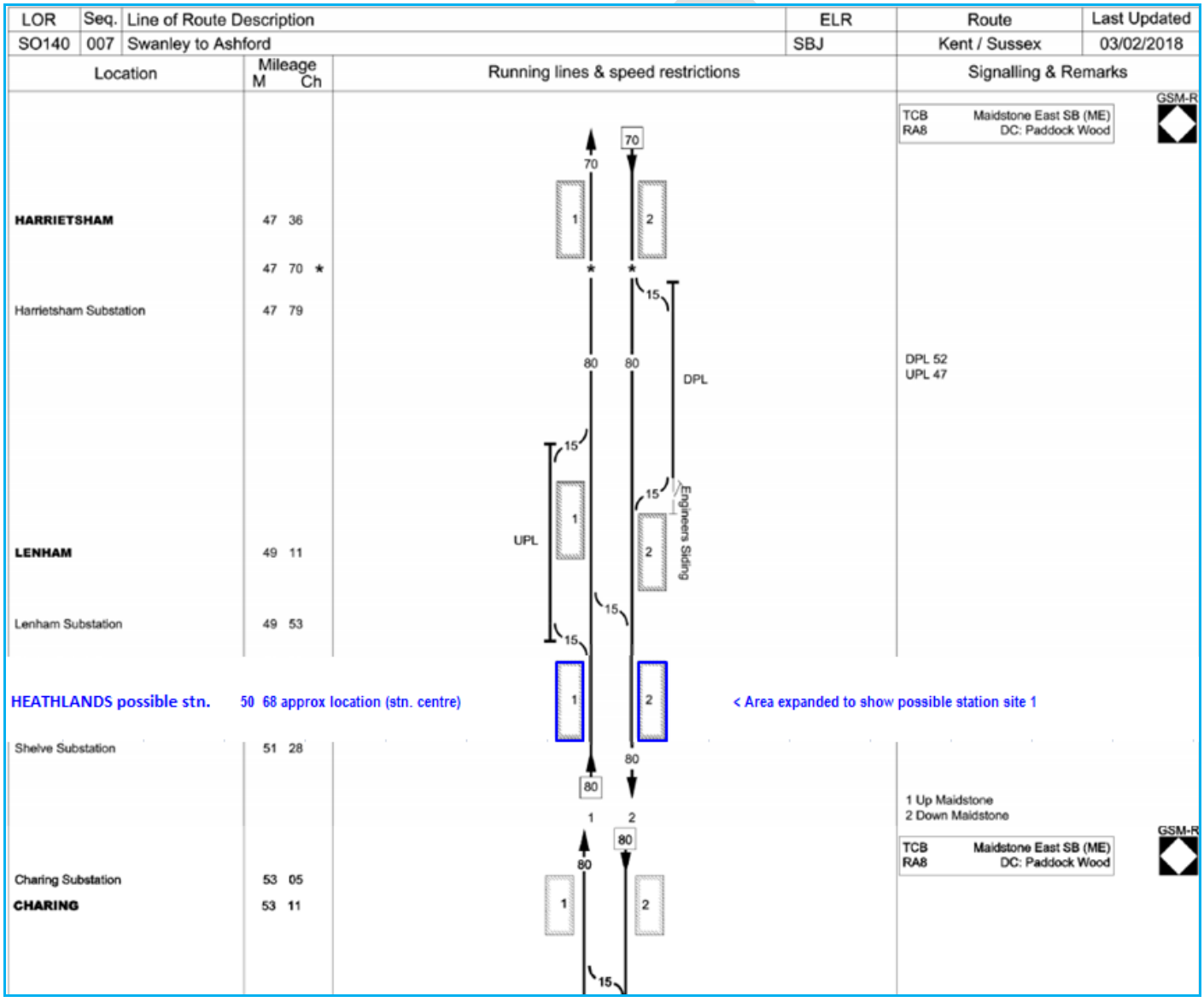
- Are there any **station options** available for a new location?
- Could **existing or relocated stations** be adequate for potential needs?
- What **rail operational topics** could need to be addressed and technical matters solved?
- What **rail engineering topics** could need to be addressed and technical matters solved?
- Is there an **outline commercial case** for a station? What are the outline **demand, revenues and costs**? Or would it require capital and/or operating **cost support**?
- Are there **other in-principle issues** to be taken into account?

Existing and possible new stations

Possible stations within Heathlands

4 There are two nearby existing stations on the 3rd-rail electrified, double-track Ashford-Maidstone East railway, at Charing in Ashford District Council, and Lenham in Maidstone Borough Council. An extract below from the Network Rail sectional appendix shows the diagrammatic position of stations and substations on the Charing-Lenham sector. A possible preferred new station location is shown.

Extract from Network Rail sectional appendix, showing possible railway location for a station at Site 1



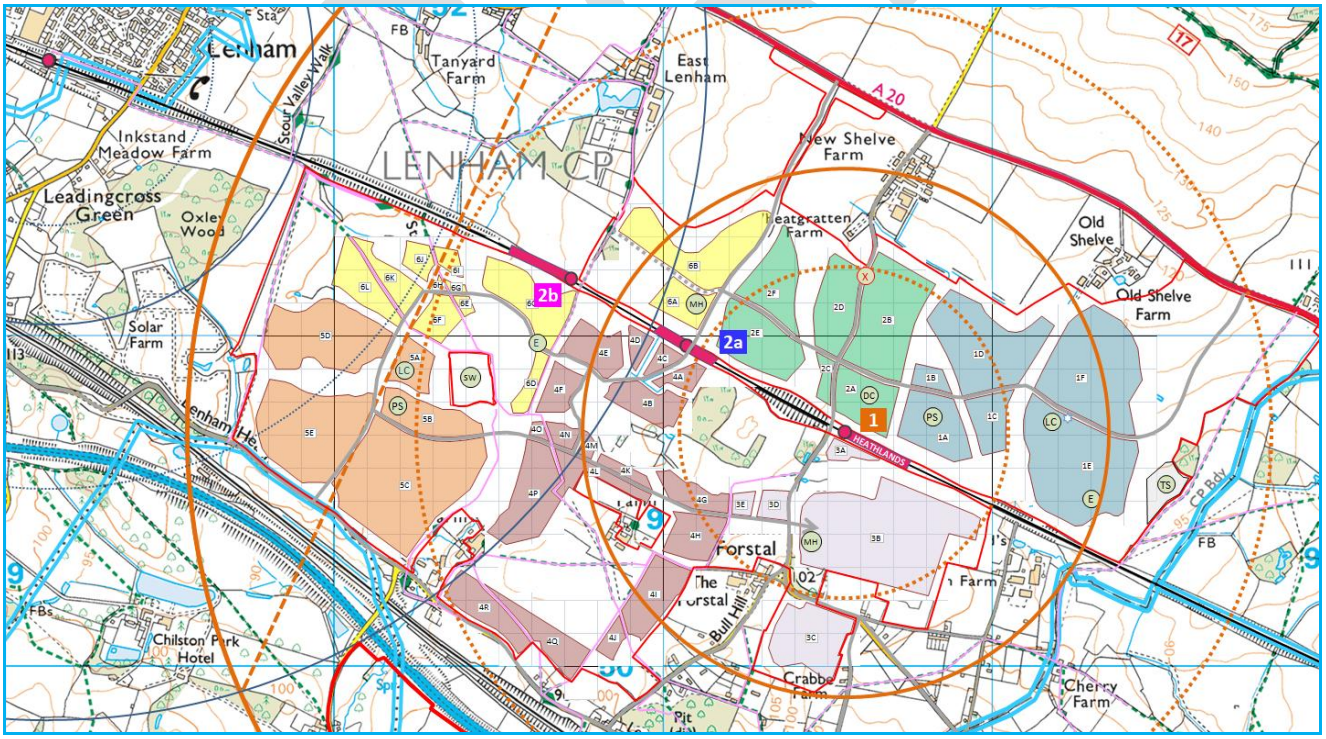
5 In discussions with the project team, Mike Dyson at White Stone 55 has identified three possible locations for a new Heathlands station, looking east to west, at:

- **Site 1**: east of Maylum bridge (Forstal Road), 2.62 km (1.63 miles) from the centre point of Lenham station. Station platforms would extend to ~2.85 km if platforms were built for 8 car x 20m trains. Access could be from a bridge adjoining and parallel to Forstal Road.

- **Site 2a**: between the farm crossing (Powells bridge) and Maylum bridge (Forstal Road), with platforms centred about 2.06 km from the centre point of Lenham station. There would be slightly staggered platforms, to avoid ancient woodland and fit within existing signalling. A new Garden Community distributor road could cross the railway over the station, and passenger access would be taken from that point. As with Site 1, platforms are assumed for 8 car x 20m trains.

- **Site 2b**: the westernmost location, just west of the farm crossing (Powells bridge), with station access at the eastern end, around 1.75 km from the centre point of Lenham station, and the platforms' centre point at around 1.61 km (1 mile) from Lenham. As with Site 1, platforms are assumed for 8 car x 20m trains.

6 **The site locations are shown here** on a reduced scale map of the proposed Garden Community, with the 3.3.2021 masterplan shown as background. The existing Lenham station is at the top left. Each of the large squares is a kilometre in extent.



7 **Annex B** discusses in more detail the technical factors for each location for a Heathlands station. All Sites are considered operable and capable of construction.

8 For reasons set out from **para. 75** onwards, JRC's recommendation is that Site 1 is the preferred station site for strategic and tactical reasons, if there were to be a second station. Sites 2a and 2b would be possible, but do not have the full range of benefits available with Site 1. The latter is also the furthest from the existing Lenham station, and is a similar distance away on the east as Harrietsham station is on the west, so incurs less catchment overlap.

Existing and possible station options to be assessed

9 Having addressed the first question, that there *are* station options available for a new location, we must now consider to what extent the existing station might be adequate for potential travel needs arising with Heathlands.

10 This also responds to an request by Network Rail, that options for using the existing Lenham station should be investigated, with no preferential assumption that there could or should be a second station. Keeping to a single station is easiest from the point of view of railway operability, as the Ashford International-Maidstone East line (as well as the Tonbridge main line) is a route for Kent and Channel Tunnel rail freight. It is also a diversionary route when the Tonbridge line is closed for engineering.

11 The project team has defined a sequence of options that responds to the Network Rail request. It proposes that each option is explored in a Business Case, to be commissioned jointly by Network Rail and the Heathlands project team.

12 The proposed options, with three offering single stations, are:

(1) Upgrade of Lenham station, with a transport interchange adequate to accommodate passenger access to/from Heathlands.

(2) New 'Parkway' station between Lenham and Heathlands.

(3) New station at Heathlands in addition to Lenham (a two-station option).

(4) New station at Heathlands, with closure of Lenham station.

13 There might in practice be sub-options within headings 1 and 2, as the narrative below indicates that the existing station at Lenham might not easily be adjusted to accommodate a transport interchange satisfactory for Heathlands' transport needs. There are also various possible sites between Lenham and Heathlands.

Defining an outline case for the options

14 The options essentially pose do-something or do-maximum choices, in comparison with a do-nothing choice of just keeping Lenham as it is. A full Strategic Outline

Business Case should be worth undertaking once the options have been winnowed down to the best performing rail choices and also several non-rail options such as reliance on buses for initial public transport.

15 The tests will be similar for all options, and are likely to address:

- Could the option be operated satisfactorily, in terms of existing and foreseen services? (And for rail options, particularly to understand the impact elsewhere along the rail network)
- What would be the whole-life capital and operating costs of the option, after allowing for all relevant expenditures?
- What would be the net additional revenues compared to a do-nothing situation?
- What would be the wider benefits and disbenefits to be considered, including socio-economic, environmental and policy objectives?
- What are the best performing options?

16 This report does not aim to answer all these questions. However it needs to:

- Understand how the existing Lenham station performs, and how it might be affected by other single station options.
- Define the types of additional features required at any single station if this were to be a valid solution for Heathlands.
- Set out a cogent initial case for a Heathlands station in addition to the existing Lenham station, for this to be a benchmark to compare with single station options.

How Lenham station performs (pre-Covid)

Basic data about Lenham

17 Lenham is an intermediate station between Ashford International and Maidstone East, which has side platforms with stopping space for 8-car trains. Longer trains would need to be capable of 'Selective Door Opening'. There are engineering/freight loops close to the station in each direction, which restrict options to change signalling without high cost.

18 Other than Bearsted station which is on the eastern side of the Maidstone urban area, Lenham is the next busiest intermediate station on this section of line, with an

estimated ~124,000 entries and exits in the year preceding the Covid pandemic. JRC has compiled a table of local station usage, including other nearby lines, and converted this into rail passenger journeys annually per head of population. This is set out below from Office of Rail and Road (ORR), Census and local government data.

Comparison rail rides (Entry plus Exit) per head of population, Census 2011 and mid-2019

NLC	TLC	Station Name		Census was on 26 Mar 2011 Rail usage = 2010-11 + 2011-12 Rail yr. avge	Parish pop 2011 Census 2011	Built up area (BUA) pop 2011 Census 2011	Parish rail rides per head 2011	BUA rail rides per head 2011	Rail usage Mar19-Feb20 Pre-Covid 1920 En+Ex	Parish pop mid-2019 2019	Built up area (BUA) pop mid-2019 2019	Parish rail rides per head 2019	BUA rail rides per head 2019
5133	BMG	Barming	full usage>	125,062					176,906				
5133	BMG	Barming	1/3 of usage>	41,687					58,969				
5115	MDE	Maidstone East		1,822,448					1,506,782				
5237	MDB	Maidstone Barracks		139,069					300,218				
5222	MDW	Maidstone West		443,821					935,412				
5091	BSD	Bearsted		394,822					396,364				
		GREATER MAIDSTONE TOTAL		2,841,846		107,627		26	3,197,745		119,905		27
5234	EFL	East Farleigh		26,641					35,474				
5241	WTR	Wateringbury		53,502	2,104	2,396	25	22	58,644	2,069	2,254	28	26
5232	YAL	Yalding		25,601	2,418	1,365	11	19	38,388	2,541	1,366	15	28
5227	BEG	Beltring		13,638					13,552				
5224	PDW	Paddock Wood		1,117,547	8,253	7,840	135	143	1,228,322	8,121	7,719	151	159
5223	MRN	Marden		378,639	3,724	2,265	102	167	587,212	4,549	2,984	129	197
5228	SPU	Staplehurst		889,875	5,947	5,051	150	176	886,896	6,239	5,204	142	170
5220	HCN	Headcorn		592,950	3,387	2,505	175	237	635,592	4,070	2,984	156	213
5225	PLC	Pluckley		99,935	1,069	-	93	-	127,820	1,064	-	120	-
5091	BSD	Bearsted		394,822	-	9,405	-	42	396,364	-	9,589	-	41
5141	HBN	Hollingbourne		36,479	949	-	38	-	73,532	953	-	77	-
5140	HRM	Harrietsham		74,913	2,113	1,442	35	52	106,820	3,156	1,855	34	58
5111	LEN	Lenham		121,224	3,370	2,197	36	55	123,798	3,562	2,330	35	53
5097	CHG	Charing		77,615	2,766	1,841	28	42	92,696	3,116	2,091	30	44
5004	AFK	Ashford International		3,216,952	75,128	67,528	43	48	4,170,778	83,867	75,262	50	55
		Ashford has Agglom data			Agglomeration	BUA	Agglom	BUA		Agglomeration	BUA	Agglom	BUA
		Sum Bearsted-Charing Parishes:		310,231	9,198	-	34	-	396,846	10,787	-	37	-
		Sum Bearsted-Charing BUAs:		668,574	-	14,885	-	45	719,678	-	15,865	-	45
		Lenham %			37%	15%	107%	122%		33%	15%	95%	117%

NB: Assignment of total rail demand to either a Parish or a Built-Up Area is an incomplete proxy, where urban and rural rail demands are different. However it shows trends from 2011 to 2019.
Bearsted parish is large and doesn't represent the practical station catchment. Bearsted BUA is compiled from LSOA details: Maidstone 5A, 5B, 5C, 5D, 7C, and 50% of 7A and 7D.
Bearsted mid-2019 data is scaled pro-rata from the change in parish population between 2011 and mid-2019.
Hollingbourne shows a significant growth in recent years' usage, but from a low base. There may be particular reasons for this growth, e.g. housing developments.

19 The table shows that Lenham Parish has not seen much population change since the 2011 Census, nor has use of the station changed much. There is a large contrast with rides per head on the Ashford-Tonbridge line, which is noticeably faster to London.

20 Rail usage at Lenham and other local stations is also set out in ORR statistics since 1997. The reliability of some years' data is suspect, however Lenham's results since 2011-12 have broadly shown annual passenger entries and exits in the 95,000-125,000 range. This is a DfT Category E station, with part-time station staffing, and justification for only basic passenger facilities. The station has not yet been upgraded for step-free access. Network Rail confirmed on 29th April 2021 that "we have no plans for any works at the station in our current programme".

Lenham train service levels

21 Train service levels have been stable in recent decades since electrification in 1962. A summary of service levels every decade since then is set out below:

LOCAL RAILWAY SERVICES		TRAIN SERVICE VIA MAIDSTONE - ASHFORD															
London area destinations: C = City (Blackfriars/Holborn Viaduct/Cannon St), **V** = Victoria (West End), **P** = St Pancras, **X** = Charing X, **T** = **Thameslink** - City via Blackfriars, City Thameslink and on to Farringdon (Crossrail), St Pancras, etc.																	
Data expressed as trains per hour except for M-F peak periods.																	
Monday-Friday peaks have extended over the decades, with earlier AM passenger volumes now common in London, and later PM departures.																	
There has also been a trend to non-9-5 office working and more flexitime - a situation likely to increase post-Covid, accentuated by passengers wishing to avoid peak fares pricing.																	
To provide a consistent comparison between the decades, Monday-Friday peak train counts have been taken as all London arrivals before 11AM, and all London departures from 15:30 to ~20:00.																	
Country-centric AM peak frequency defined from Maidstone East, from start of service to ~10:30AM departure, as shorter journey times. Country-centric PM peak frequency also adopts 15:30 to ~20:00, from Ashford.																	
Timetables as for March 1971 etc, to be similar to Census dates																	
March 2020 before-Covid, for current decade		**Maidstone East**		**Bearsted**		**Hollingbourne**		**Harrietsham**		**Lenham**		**Heathlands**		**Charing**		**Ashford**	
		<London>	**<Ashford>**	**<London>**	**<Ashford>**	**<London>**	**<Ashford>**	**<London>**	**<Ashford>**	**<London>**	**<Ashford>**	**<London>**	**<Ashford>**	**<London>**	**<Ashford>**	**< London**	**Cant/Dvr>**
	# trains in box, # tph outside box																
1971	**MF AM arr pk**	8V* + 2C	7	6V* + 1C	7	5V*	7	5V* + 1C	7	6V* + 1C	7			6V* + 1C	7	6V* + 1C	
	MF PM dep pk (15½-~20-Lon/ME>)	9V* + 1C	7	8V* + 0C	7	8V* + 0C	6	8V* + 0C	6	8V* + 0C	7			8V* + 0C	7	8V* + 0C	
	Weekday offpeak	2V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
	Saturdays	2V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
	Sundays	2V	1-2	1-2V	1-2	1-2V	1-2	1-2V	1-2	1-2V	1-2			1-2V	1-2	1-2V	
1981	**MF AM arr pk (>~11am Lon)**	10V^ + 1C	7	8V^ + 0C	7	6V^ + 0C	7	7V^ + 0C	7	8V^ + 0C	7			8V^ + 0C	7	8V^ + 0C	
	MF PM dep pk (15½-~20-Lon>)	13V +1C	7	10V+ 0C	7	7V + 0C	6	7V + 0C	6	10V + 0C	7			10V + 0C	7	10V + 0C	
	Weekday offpeak	2V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
	Saturdays	2V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
	Sundays	2V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
1991	**MF AM arr pk (>~11am Lon)**	9V,2X,1C	9	9V + 1C	8	8V + 1C	6	8V + 1C	6	9V + 1C	8			8V + 1C	6	9V,2X,1C	
	MF PM dep pk (15½-~20-Lon>)	10V,3X,1C	10	10V + 1C	7	8V + 1C	7	8V + 1C	7	10V + 1C	7			9V + 1C	7	10V + 1C	
	Weekday offpeak	2V + 1X	3	2V	2	1V	1	1V	1	2V	2			1V	1	2V + 1X	
	Saturdays	1V + 1X	2	1V	1	1V	1	1V	1	1V	1			1V	1	1V + 1X	
	Sundays	1V + 1X	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V + 1X	
2001	**MF AM arr pk (>~11am Lon)**	9V,1X,2C	8	8V, 1X,2C	8	8V + 1C	7	8V + 1C	7	8V + 1C	7			8V + 1C	7	8V,1X,2C	
	MF PM dep pk (15½-~20-Lon>)	11V + 3C	10	9V + 3C	8	8V + 1C	8	8V + 1C	8	8V + 1C	8			8V + 1C	8	9V + 3C	
	Weekday offpeak	1V + 1C	2"	1V + 1C	2"	1V	1	1V	1	1V	1			1V	1	1V + 1C	
	Saturdays	1V + 1C	2"	1V + 1C	2"	1V	1	1V	1	1V	1			1V	1	1V + 1C	
	Sundays	1V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
2011 +HS	**MF AM arr pk (>~11am Lon)**	11V + 2C	8	11V + 2C	8	10V + 2C	7	10V + 2C	7	10V + 2C	7			10V + 2C	7	11V + 2C	
	MF PM dep pk (15½-~20-Lon>)	12V + 1C	8	11V + 1C	8	11V + 1C	8	11V + 1C	8	11V + 1C	8			11V + 1C	8	11V + 1C	
	Weekday offpeak	2V	2	2V	2	1V	1	1V	1	1V	1			1V	1	2V	
	Saturdays	2V	2	2V	2	1V	1	1V	1	1V	1			1V	1	2V	
	Sundays	1V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
2020 BC +HS	**MF AM arr pk (>~11am Lon)**	10V + 3C	8	9V + 2C	8	9V + 2C	7	9V + 2C	7	9V + 2C	7			9V + 2C	7	9V + 2C	
	MF PM dep pk (15½-~20-Lon>)	10V + 2C	9	9V + 1C	9	9V + 1C	9	9V + 1C	9	9V + 1C	9			9V + 1C	9	9V + 1C	
	Weekday offpeak	2V	2	2V	2	1V	1	1V	1	1V	1			1V	1	2V	
	Saturdays	2V	2	2V	2	1V	1	1V	1	1V	1			1V	1	2V	
	Sundays	1V	1	1V	1	1V	1	1V	1	1V	1			1V	1	1V	
	* Some trains join another at Swanley in AM peak inbound, and separate in PM peak outbound, only 1 train counted at preceding stations. Also other trains terminate with connection at Maidstone East.																
	^ Some trains connect at Maidstone East.																
	" Lumpy not regular interval service (eg 2 tph ~ 15/45 mins gaps or 20/40).																
	1991 and 2001 supplementary Express service routed via Maidstone East - Ashford, counted where relevant. Supplementary services generally fewer or none in AM peak and mid-late evening.																
	+HS = Southeastern High Speed services at Ashford International, to/from Stratford and St. Pancras. Not shown in his table.																
	BC = Before Covid.																

22 There are proposals for Thameslink services to be extended at 2tph to Maidstone East line in future years, with initial services around 2022-23 starting and finishing at Blackfriars (replacing the present City trains). Peak-time trains might start at Ashford in the morning and return there in the evening, using stabling sidings which are currently being reconstructed. Because of Thameslink resourcing issues, a service across Central London might not be run for several years.

Comparative rail times to London

23 An analysis has been undertaken of average peak and off-peak journey times from Lenham and neighbouring lines to London, by multiple routes, and also from the Tonbridge main line and from Ashford via HS1. Summary data is shown below, for pre-Covid services:

- The core **Lenham-Victoria AM peak service** timing averages 1 hr 25 min (1:25), with 9 trains departing during 05:32-08:43. Off-peak is hourly with a 1:20 timing.
- The **peaks-only City (Blackfriars) trains** average 1:32, with 2 direct trains and one changing at Maidstone East, during 05:44-06:36. There are no off-peak trains.
- **Lenham via Ashford and HS1 to St. Pancras**, *with 35% higher fares*, is available on 4 AM peak trains during 06:39-07:45, averaging 1:00 timing including interchange. This may be attractive for work destinations near St. Pancras or (via Stratford) at Canary Wharf, or for interchange to other UK cities via St. Pancras or King's Cross. There is an hourly off-peak interchange via Ashford, with a wait, so 1:16 in total.
- From catchment stations **on the Tonbridge main line, at Pluckley and Headcorn**, there are higher service frequencies direct to London Bridge, and (sometimes changing there) to Cannon Street, Waterloo East and Charing Cross.
- Average **AM peak journey times (including interchange) from Headcorn** are 0:59 to London Bridge, 1:08 to Cannon Street, 1:05 to Waterloo East and 1:12 to Charing Cross. There are 13 AM peak trains from **Headcorn** between 05:43 to 08:45, with 8 to Charing Cross and 5 to Cannon Street, and 12 from **Pluckle**y 7 minutes earlier (1 fewer to Charing Cross).

24 Overall, Lenham passengers via Maidstone East have less choice and less frequency than the stations on the Tonbridge main line, except by paying higher fares via Ashford. If the London train doesn't get you generally where you want within Central London, then you must use the Underground. Home to destination journey times are mostly in the 1½-1¾ hour range from Lenham, even to reach a London terminus. A Heathlands station would be about 3 minutes longer via Maidstone East, 2 minutes shorter via Ashford.

Shape of future travel demand at Lenham post-Covid?

25 This is not a strong proposition to resume high volume commuting post-Covid. It is possible that there will be interest in a different work-life balance where the job permits that, with some travel expectations re-focused on fewer core days commuting

to Central London, with more optional days working from home. To retain travel volume, the railway would need to market its role in serving regional travel corridors (eg Maidstone, London outer ring [Sevenoaks, Bromley], Ashford, Canterbury, Thanet), and in fulfilling more travel desires during off-peak and weekends.

26 The extent of rail rides per head of population is explored further in this report, below 'as is' for Lenham (to draw a distinction between the differential scales of rail demand from the rural and urban parts of Lenham Parish), and, in a following chapter on future demand, for Heathlands.

Lenham accessibility and rail demand values using zoning scores

27 For the purpose of estimating demand geared to accessibility to stations, JRC has adopted a sequence of zoning scores, to identify proximity (or not) to a railway station. Highest score is taken as 4, within 500 metres of a station entrance, 3 then up to 800 metres, then 2 and 1, for bands up to 1,300 metres and 2 km. This is measured by hectare (100m x 100m). This defines a geographical sequence, for which housing density and railway demand estimates can be developed.

28 The original estimates are set out in the Heathlands demand section, later in this report. They provide a test of the ability to have a positive consequences for sustainability, with better proximity being a cause of higher housing densities, and those in turn assisting people's ability to make greater use of public transport.

29 Within the ONS-defined Lenham Built-Up Area, and in the absence of Heathlands, the actual hectares that have housing are counted, and then converted by JRC methodology to a split between rail travel generated by the Built Up Area, and rail travel generated by the rest of the Parish. This derives from housing density linked to proximity to Lenham station, matched by a hectare count and sample dwelling density within concentric zones from the station.

30 The evidence is clear, that the bulk of rail travel in 2019-20 (~92-95,000 annual entries and exits) comes from the Built Up Area, which is a total of 72 hectares including lands not built on within this ONS area. A quarter or less of rail travel (~29,000 annual entries and exits) comes from the rest of Lenham Parish, which is a total of 2,277 hectares. In 2019 pre-Covid, the effective annual rides per head of population amounted to 40.8 per person from the Built Up Area, and only 12.7 from the rest of the Parish.

Lenham catchment population and indicative rail demand

Based on 2011 Census	Population	Hectares	Residential Households	Population density/ha	Household density/ha
Overall Parish	3,370	2,349	1,424	1.43	0.61
Main Built Up Area	2,197	72	968	30.51	13.44
Rest of Parish	1,173	2,277	456	0.52	0.20
of which					
Lenham Heath BUA	196	26	79	7.47	3.01

Updated to mid-2019 population and March 2019-Feb 2020 rail usage (pre-Covid)	Population	Hectares	Residential Households	Population density/ha	Household density/ha
			assumed in proportion		
Overall Parish	3,562	2,349	***1,505***	1.52	0.64
Main Built Up Area	2,330	72	***1,027***	32.36	14.26
Rest of Parish	1,232	2,277	*479*	0.54	0.21
of which					
Lenham Heath BUA	n/a				

Main analysis continues with Lenham Built Up Area:

Actual hectares in Lenham Built Up Area with any dwelling on them:
(based on JRC mapping): 62

Spread of hectares in JRC station catchment zones 1-4:

	Outer 1	Middle 2	Inner 3	Core 4
Assumed similar 2011	0	14	18	30

Assumption of extent of hectares developed (10 ha already excluded - 14%): 90%

Adjusted to 90% of above:		12.6	16.2	27
Approx. spread of households/built-up hectare:	-	20%	30%	50%
Approx. spread of population per zone: (average household size 2.3 persons) (total 2197 people)	-	384	494	824

2010-12 rail rides per head per annum if skewed by built-up proximity to station:
(Based on separate analysis, and with zone Middle 2 as starting point):
Pre-Covid, was average 36 rides per head in whole Parish in 2010-2012:

Proximity factor:	36	43	69	Total
Indicative rides pa, Built Up Area:	13,841	21,218	57,037	**92,097**
Average rides per annum from the Built up Area:				76%

Average rides per head of population from Lenham Built Up Area: 41.9

Averaged 2010/11 + 2011/12 station usage incl. BUA and rest of Parish: **121,224**

Implication is that rest of Parish used Lenham station **29,127**
at an average rate of 12.8 **rides per annum** 24%

Main analysis continues with Lenham Built Up Area:

Actual hectares in Lenham Built Up Area with any dwelling on them:
(based on JRC mapping): 62

Spread of hectares in JRC station catchment zones 1-4:

	Outer 1	Middle 2	Inner 3	Core 4
Assessment 2021	0	14	18	30

Assumption of extent of hectares developed (10 ha already excluded - 14%): 90%

Adjusted to 90% of above:		12.6	16.2	27
Approx. spread of households/built-up hectare:	-	20%	30%	50%
Approx. spread of population per zone: (average household size 2.3 persons) (total 2330 people)	-	408	524	874

2019 rail rides per head per annum if skewed by built-up proximity to station:
(Based on separate analysis, and with zone Middle 2 as starting point):
Pre-Covid, was average 35 rides per head in whole Parish in 2019:

Proximity factor:	35	42	67	Total
Indicative rides pa, Built Up Area:	14,271	21,877	58,810	**94,959**
Average rides per annum from the Built up Area:				77%

Average rides per head of population from Lenham Built Up Area: 40.8

March 2019 - February 2020 station usage incl. BUA and rest of Parish: **123,798**

Implication is that rest of Parish used Lenham station **28,839**
at an average rate of 12.7 **rides per annum** 23%

31 Part of the travel proposition is the scope for higher density development areas closer to a Heathlands station, to be both cause and consequence of a viable railway station explicitly planned to attract public transport usage. Heathlands Garden Community would explicitly aim to be a sustainable settlement, so that public transport (buses and trains) should be encouraged to provide a good regional capability, supplemented locally by active modes.

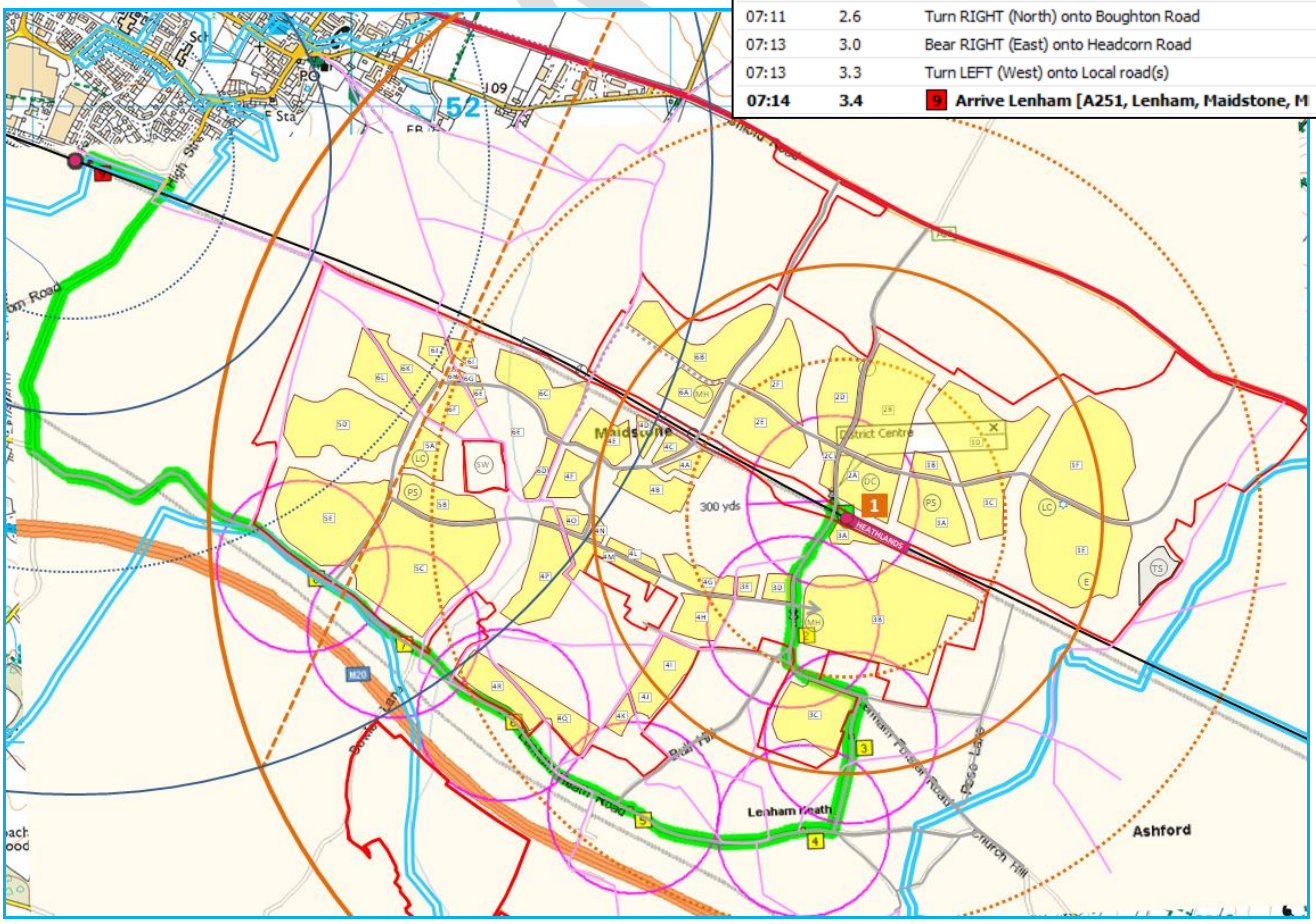
Lenham station access by other modes

32 To rely on Lenham would put the new development lands in a range of 1 to 3½ kilometres distance from that station – and that is a straight line distance whereas

the currently available routes from different parts of Heathlands are indirect, as illustrated in the map below, via the A20 or Lenham Heath Road. Buses would be a key part of the travel offering, whether conventional or demand-responsive.

33 The map and table show one example of a nominal local bus route, from the proposed Heathlands District Centre, via The Forstal and Lenham Heath Road, to Lenham Station. It would be about 3.4 miles distance (just under 5.5 km). Even with just one minute per bus stop (which would require fast 'click-in' boarding rates, not slow manual ticket selling), and stops close to individual estates so notionally a 300 yard/275 metre stop catchment, this would be a journey time of 14 minutes. It would take longer with more passengers and 20 mph local speed limits.

Time	Mile	Instruction	For
Summary: 3.4 miles (14 minutes)			
07:00	**0.0**	**1 Depart District Centre on Local road(s) (Sout**	**0.3 mi**
07:00	**0.3**	**2 Arrive The Forstal**	
07:01	**0.3**	**Depart The Forstal on Local road(s) (South)**	**120 yds**
07:01	0.3	Bear LEFT (South) onto Local road(s)	0.1 mi
07:01	0.5	Bear RIGHT (South-East) onto Local road(s)	10 yds
07:01	0.5	Turn RIGHT (South) onto Crabtree Lane	153 yds
07:02	**0.6**	**3 Arrive Crabtree Lane, Lenham Heath, Maidst**	
07:03	**0.6**	**Depart Crabtree Lane, Lenham Heath, Maidstone**	**0.2 mi**
07:03	0.8	Turn RIGHT (West) onto Lenham Heath Road	98 yds
07:04	**0.8**	**4 Arrive Lenham Heath Rd, Lenham Heath, Mai**	
07:05	**0.8**	**Depart Lenham Heath Rd, Lenham Heath, Maidst**	**0.4 mi**
07:05	**1.2**	**5 Arrive Lenham Heath Rd, Lenham Heath, Mai**	
07:06	**1.2**	**Depart Lenham Heath Rd, Lenham Heath, Maidst**	**0.3 mi**
07:07	**1.5**	**6 Arrive Lenham Heath Rd, Lenham Heath, Mai**	
07:08	**1.5**	**Depart Lenham Heath Rd, Lenham Heath, Maidst**	**0.3 mi**
07:08	**1.8**	**7 Arrive Lenham Heath Rd, Sandway, Maidston**	
07:09	**1.8**	**Depart Lenham Heath Rd, Sandway, Maidstone M**	**0.3 mi**
07:10	**2.0**	**8 Arrive Lenham Heath Rd, Sandway, Maidston**	
07:11	**2.0**	**Depart Lenham Heath Rd, Sandway, Maidstone M**	**0.6 mi**
07:11	2.6	Turn RIGHT (North) onto Boughton Road	0.4 mi
07:13	3.0	Bear RIGHT (East) onto Headcorn Road	0.3 mi
07:13	3.3	Turn LEFT (West) onto Local road(s)	0.2 mi
07:14	**3.4**	**9 Arrive Lenham [A251, Lenham, Maidstone, M**	



34 An effective bus route network would require to be defined and assessed, along with comparative journey times allowing for factors such as walking and waiting, in contrast to other modes (car and active travel), and to provision of a Heathlands station.

35 In outline, a 3 / 4 route network might be required with present roads and scale of development parcels, based on bus stop catchments about every 300 yards for adequate bus access to Lenham from the heart of most proposed estates. Thought should also be given to a more direct link road, to improve access and speed-up travel.

36 There would be judgements, at this stage broad brush, about how general demand for rail travel might vary in future years compared with a pre-Covid norm. Assessment would be required, of the extent to which rail rides could be greater at Heathlands, derived from a higher population and a denser development there. Travel preferences will be influenced by proximity and ease of access to the station, and by foreseen significant changes to service patterns, destinations, etc.

37 In some options, including if Lenham were the single point of rail access, there could be a view of the extent to which a station distant from Heathlands would lose potential rail passengers, in both absolute terms and in the extent to which active mode access (eg, walking, cycling, e-scooters) were diminished.

38 The scale of alternatives to be examined also depends to an extent on what are desired as key outcomes with Heathlands, since this *is* intended to be a sustainable community. To site a new community on a railway line with scope for a local station being at its heart, and with population and development densities reinforcing the logic of a station, but then not to build that station, might not be seen as the best outcome, and could require multiple palliatives.

39 Greater use of other modes, particularly as car driver or passenger in a shire context, and scope for feeder bus access, could pose a requirement for significant replacement passenger interchange capacity at locations such as Lenham, for those proportion of journeys where rail was still the preferred 'main mode' for London and regional travel.

40 Linked to this, there should be a specific requirement for a study of if and how Lenham station could be adapted to fulfil that transport interchange role, compared to remaining as a village station just geared to that locality's requirements.

Relocation of Lenham station – a local variation?

41 There is the possibility of relocating an existing station. Charing is too far, as it is 3.6 km (2¼ miles) distant even from station Site 1 on the eastern part of the proposed Garden Community. This leaves the prospect of relocating Lenham station.

42 Why would this be a possible requirement? For two different reasons:

- To be able to accommodate, close-by to the existing station, the additional passenger numbers and travel modes for access from Heathlands. A relocated station might be east of the Headcorn Road bridge so 400 metres away.
- To provide a single station intermediately between Lenham and Heathlands, on a 'Parkway' basis, with feeder facilities including active modes, buses and car parking, from both Lenham and Heathlands. There are several sites available for that.

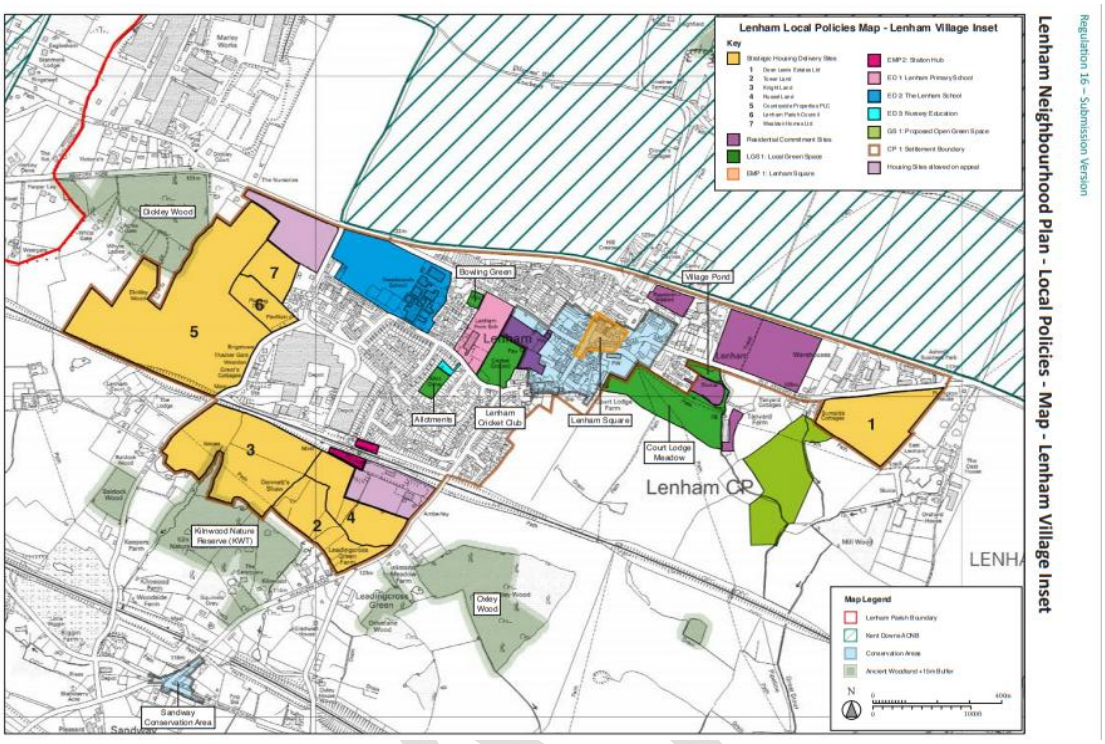
43 To expand the first reason, the scale of influx from Heathlands (into Lenham station in the morning, and back again in the evening), might not be possible to be handled physically on local access roads, without changes. For example, 3-4 bus routes at what frequency into the Station Approach? Greater active mode access and especially more car access for 'kiss and ride' and for parking? Detailed modelling of demand would be required.

44 Such an assessment would also address an earlier point (see **para. 16)**, about a requirement to define the types of additional features required at any single station if this were to be a valid solution for Heathlands.

45 The draft Lenham Neighbourhood Plan also proposes to build more housing close by the station to the south and west, on land parcels otherwise notionally available for an enlarged interchange, while the former station goods yard has now been allowed for housing, in a planning appeal. While planning and land agreement interventions might be exercisable, they are not a guarantee for an adequate interchange.

46 So relocation of the station to the east side of Headcorn Road is a possibility, to allow more space for interchange and greater passenger numbers, than the apparent limitations that might arise at the existing station. If required, this would be a new station at substantial cost, and require lifts or ramps as well as a station footbridge and transport interchange facilities. An assessment would be required, to see if it were more economical and greater benefit to build a Heathlands station plus small changes to Lenham, all subject to railway operability.

Draft Lenham Neighbourhood Plan (new housing yellow)



Relocation of Lenham station – a new 'Parkway'?

47 Provision of the platforms anywhere between this location and station Site 2b would be possible, but would require new access roads to be built either across the fields, or alongside the railway between Headcorn Road and the Heathlands road system. The latter might also be desired for more direct bus and active modes access.

48 This access, and possible difficulties in providing utilities at the site, would increase the cost of the station. In addition the station would be built explicitly in the green buffer zone between Lenham and the Heathlands development, so might raise new planning issues.

49 The locality which might be most practicable for station relocation, is at the railway cutting ends, and as Stour Valley Walk and Heathlands yellow and orange land parcels are approached, just under midway between the existing Lenham station and station Site 2b. An indicative 800m catchment circle is shown below for both the existing Lenham station and a possible relocated one.

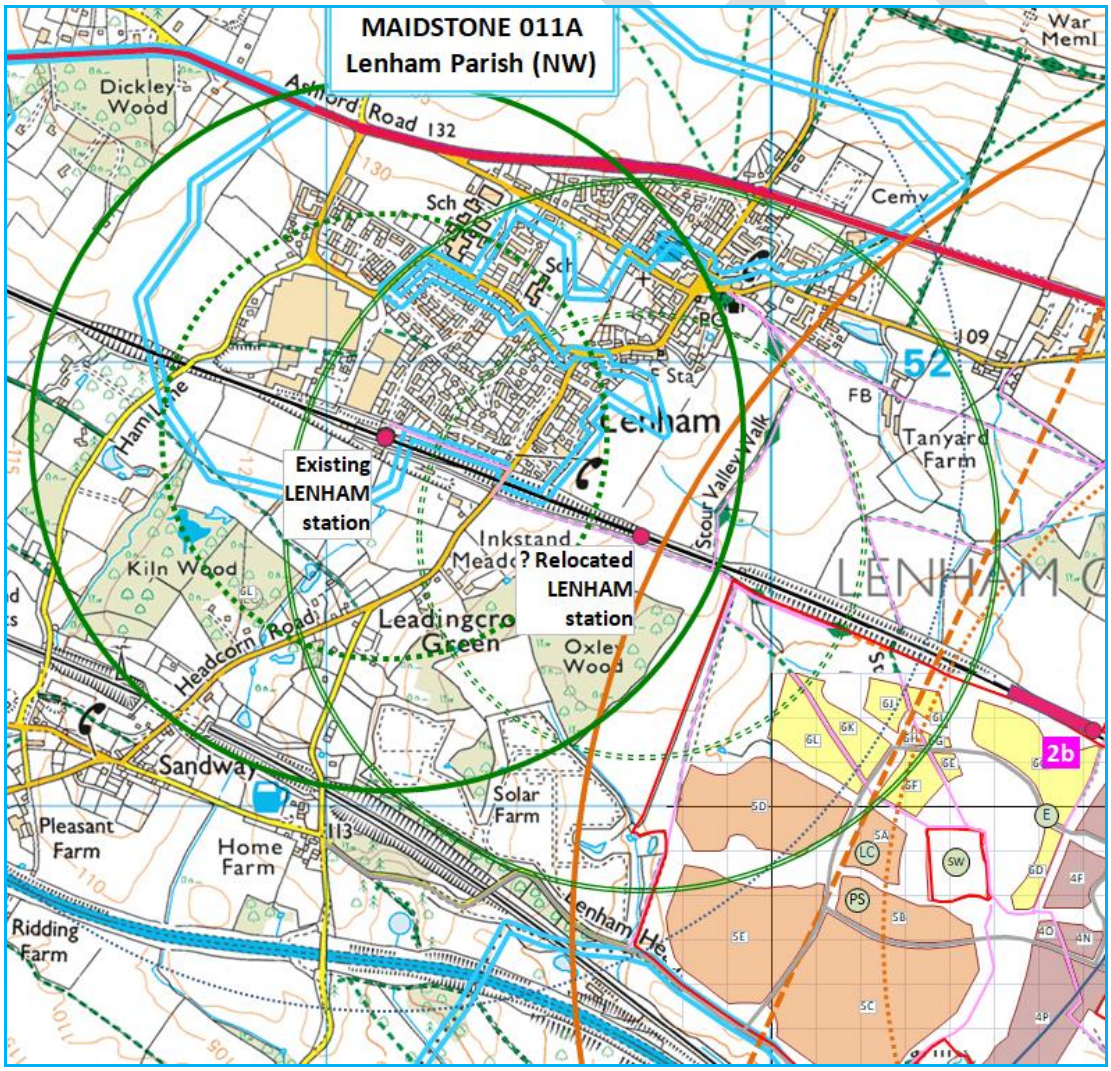
50 There is also a closer-in 500m catchment circle which shows where existing station access is very convenient, and can highlight potential viability of rail access in cases

where a station project relies on commercial developments rather than new residential communities.

51 It is evident that recent local housing estates have grown symbiotically around the existing station, and that existing passengers living close to the station would, overall, be inconvenienced by relocation of the station. Part of Lenham's built-up area, on the north-west side, would lose its 500m accessibility and be 800m-1 km. distant. Equally, it should be noted that more of north-east Lenham would then be within 800m of a relocated station. All this could be quantified, if required, for a Strategic Outline Business Case (SOBC) looking at different station options.

52 As shown above, the Neighbourhood Plan also proposes that the bulk of additional housing would be to the south and west of the existing station, so would be further from a 'Parkway' type of station.

A 'Parkway' relocation option for Lenham station



Other factors for consideration with station relocation

53 The whole life costs, revenues and wider economic and environmental effects for any relocated station would clearly require consideration in a SOBC, in comparison with the existing station. Equally, if a relocated station were proposed as an alternative to having an additional station plus the existing one, then comparable analyses would be required, to test the outcome with a combination of stations.

54 If bus accessibility were to be considered as a support for a relocated station, or as a substitute for an additional station, then passenger perception of accessibility and service quality should be taken into account. This is different for bus and rail. **Footnote 1** describes this, based on Transport for London standards where 500m radius is roughly equivalent to a practical bus stop catchment as measured by TfL. It is also common outside London to use a guide of 400m local accessibility for bus stops, in contrast to 800m for stations. In the case of the land parcels foreseen for Heathlands, a tighter accessibility criterion, of roundly 300 yards/275 metres catchment for each stop, might be required in order to achieve adequate access for the heart of most development parcels. [1]

[1] TfL uses catchment circles based on X minutes' worth of walking time to measure Public Transport Accessibility Levels. Time is adopted at an average of 80 metres per minute, with 12 minutes allowed for access to a station entrance, and 8 minutes to a bus stop. This implies a 960 metre catchment for a station, and a 640 metre catchment for a bus stop.

It is not often possible to walk in an entirely straight line between origin / destination and the public transport point. Based on frequent modelling experience, a reliable average basis for measurement of a catchment is roundly 800 metres to a station entrance, and, on a proportionate basis, about 530 metres to a bus stop.

Additionally, TfL levies a standard unreliability risk, measured as time, of ¾ min for a train, and a further 1¼ minutes (2 minutes in total) for a bus service. While TfL normally uses this additional factor within its detailed calculation of service levels at each public transport point, it can also be used illustratively as a distrust factor which inhibits the willingness of potential passengers to commit to public transport choices in the first instance.

On the buses, a 2 minute loss of access because of service unreliability is a big bite to absorb out of an available total of 8 minutes. Clearly the effective bus stop catchment reduces, just for unreliability, to the equivalent of 6 minutes access time. The modelled catchment loss is 47% of the total potential area, as this is an area measurement not a linear one, which is a severe penalty. The 'round the corner' ratio experienced for access to a stop is a further 30% loss of the remaining catchment – down to roundly 40% of the original starting volume! This poses challenges if buses are to achieve the same level of accessibility as rail.

JRC has also modelled in a 2015 research paper the density of bus stop and service provision which may be relevant in new estate developments which require convenient bus services. There is a link to this paper here: https://www.jrc.org.uk/theoretical-ptal-values-for-combinations-of-local-rail-and-bus-services.html

Nearby Heathlands housing densities and phasing

55 In the case of the existing or relocated Lenham station being mooted as a substitute for a Heathlands station, a further factor is that the Heathlands land parcels closest to Lenham (colour-coded orange and yellow by JRC) are the last sectors proposed for development of the Garden Community. This is potentially up to and during the 2040s after mineral rights have been used up. The locality is also foreseen as relatively low density, so not providing a high volume of passengers. The net impact of relocating Lenham station should include this factor.

56 In the initial work, JRC has assessed this housing catchment volume in the current Heathlands density modelling work, in relation to the existing Lenham station location. Outputs suggest a potential catchment better served by Lenham, of just over 18 hectares, and (with low development density because of distance from a station), an indicative population of 1,340-1,530 people depending on the overall densities adopted for Heathlands.

57 This is just 12-13% of the forecast Heathlands population in both density scenarios, and fewer (8-10%) in passenger numbers because of the distance from the station. It is marginal to the viability of a station for Heathlands, as this part of the development is for a distant timescale, so that the Present Value (PV) of relocating a station will be low, if just with close-by Heathlands land parcels in mind.

Implications for Heathlands without a second station

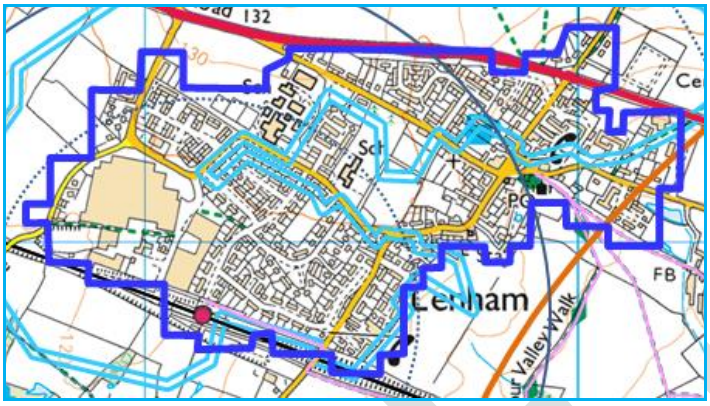
58 This analysis for the Pre-Covid situation at Lenham, raises underlying questions about potential rail opportunities and demand forecasts at Heathlands.

- Masterplanning proposed for Heathlands is an urbanised context, with built-up dwelling densities per hectare (DPH) 2.8 times greater at Heathlands (at ~40 DPH) than at Lenham Built-Up Area. JRC has modelled a cautious volume at Heathlands, ~4,800 units, averaging 2.4 persons per unit, rather than an upper 5,000.

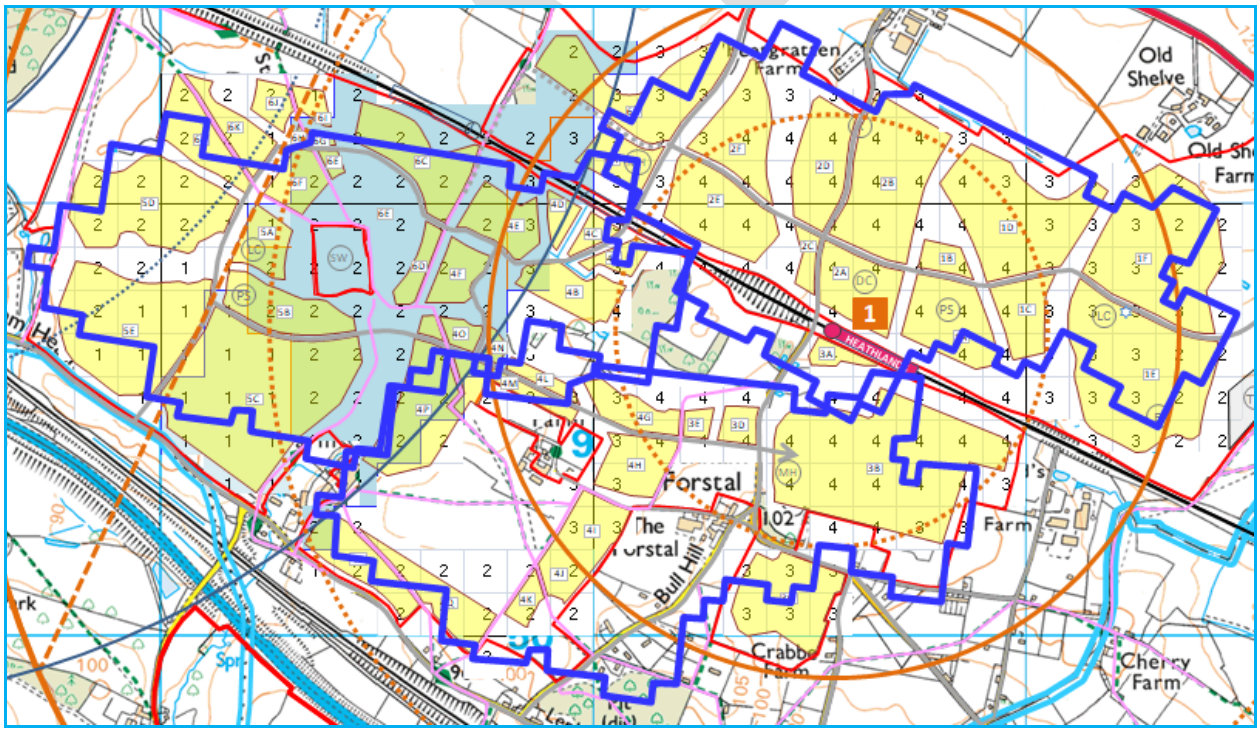
- The population volume is also higher in absolute terms at Heathlands, after subtracting that part of the new catchment population which would be closer to Lenham. In direct comparison between the *whole* population of Lenham Parish in 2019 and Heathlands local catchment when fully built up, the population ratio is twice as large at Heathlands after taking into account Lenham's possible share of Heathlands' population (~9,950-10,200 for Heathlands' effective station catchment, vs ~4,870-5,060 for Lenham). Some of Lenham's parish population south of Lenham village will prefer to use stations on the Tonbridge line.

- Comparing the Lenham Built-Up Area with Heathlands zones 4, 3 and 2 – a relevant standard as those should achieve relatively good passenger generation – the accessible population is 2.8-2.9 times greater at Heathlands (9,200-9,500, vs. 3,260-3,330 at Lenham including some population from Heathlands).

Lenham Built-Up Area



Heathlands Garden Community on the same scale (3x Lenham Built-Up Area)



59 A community planned on this scale would normally anticipate that, if adjoining a passenger railway, a new station would be considered very seriously. In this case, it is also desired that the community is station-centric, with the District Centre and a community hub to adjoin the station. This can maximise rail passenger use.

60 Broad parity in population between Lenham and Heathlands would be achieved quickly, using various tests. This is relevant for when a new Heathlands station could be expected to be at least as viable as Lenham's (if station capital costs were funded by Homes England):

- Comparing the present Lenham BUA population and Heathlands, population parity would almost be achieved with development in Sector 1, with a projected 2,100-2,170 people compared to Lenham' BUA's current 2,330. Passenger usage from Heathlands Sector 1 would be similar to Lenham as a whole, because of the higher population density close to the station.

- Comparing the whole of Lenham Parish and Heathlands, population parity would be *exceeded* by an early stage of Sector 2 at Heathlands, when elements 2A and 2B had been built (another 1,030-1,110 residents on current projections). By then, the rail demand at Heathlands, with an 80% post-Covid cap, could already be 35%-44% greater than Lenham's was pre-Covid, because of the urban high-density focus on rail trip generation at Heathlands compared to Lenham Parish.

61 In the case of a solo station centred on Lenham, it must be questioned how sustainable the travel patterns generated by a development could be, given that the bulk of the population would be some distance from the station, causing rail access disincentives, and being a stimulus to use other modes including car, which is a predominant feature of rural Kent.

62 Housing densities currently envisaged at Heathlands could, overall, generate significant transport access problems and imply a requirement for lower densities to avoid traffic-related issues, if no station were built there. This situation might arise also if there were to be no additional station provided for the early developments, with proposals to rely on a bus shuttle to Lenham – with journey time penalties in actual and perceptual terms, which could inhibit a community preference to use sustainable travel modes in an effective way.

63 There is a further option which must then be considered – that a station may be merited at Heathlands with its larger population, and that the merits and demerits of closing Lenham and arranging rail access east to Harrietsham and west to Heathlands, should also be a candidate for consideration.

A four-way Strategic Outline Business Case is required

– Lenham existing or relocated or closed, with options for Heathlands

64 The Heathlands team offers to work through what is the best case for a 'solo Lenham station' option jointly with Network Rail and the Southeastern train operator, and a relocation or closure option, to ensure clarity about what is the best value business case which can continue to support the overall viability and sustainability of the Heathlands project.

65 The team is proposing a *Memorandum of Understanding* to be offered to Network Rail and Southeastern, to work together with no legal commitment between the parties, in order to assess the options.

66 As set out in para. 12, the four options which are suggested for review, with three offering single stations), are:

(1) Upgrade of Lenham station, with a transport interchange adequate to accommodate passenger access to/from Heathlands.

(2) New 'Parkway' station between Lenham and Heathlands.

(3) New station at Heathlands in addition to Lenham (a two-station option).

(4) New station at Heathlands, with closure of Lenham station.

67 With neither 'push' nor 'pull' providing an immediate case for a relocated station at this moment, since the bulk of current demand at Lenham is evidently from its built-up area and new development proposals there favour the existing station, it is recommended that the possibility of relocating the existing Lenham station is reviewed as part of this more broadly-based range of business cases.

68 The costs and practical difficulties of potentially having to enhance access to Lenham's existing station should also be taken into account – which might however help to improve the case for a relocation option. Relocation would bring more of Heathlands' development catchment within Lenham station's ambit, albeit late in the day.

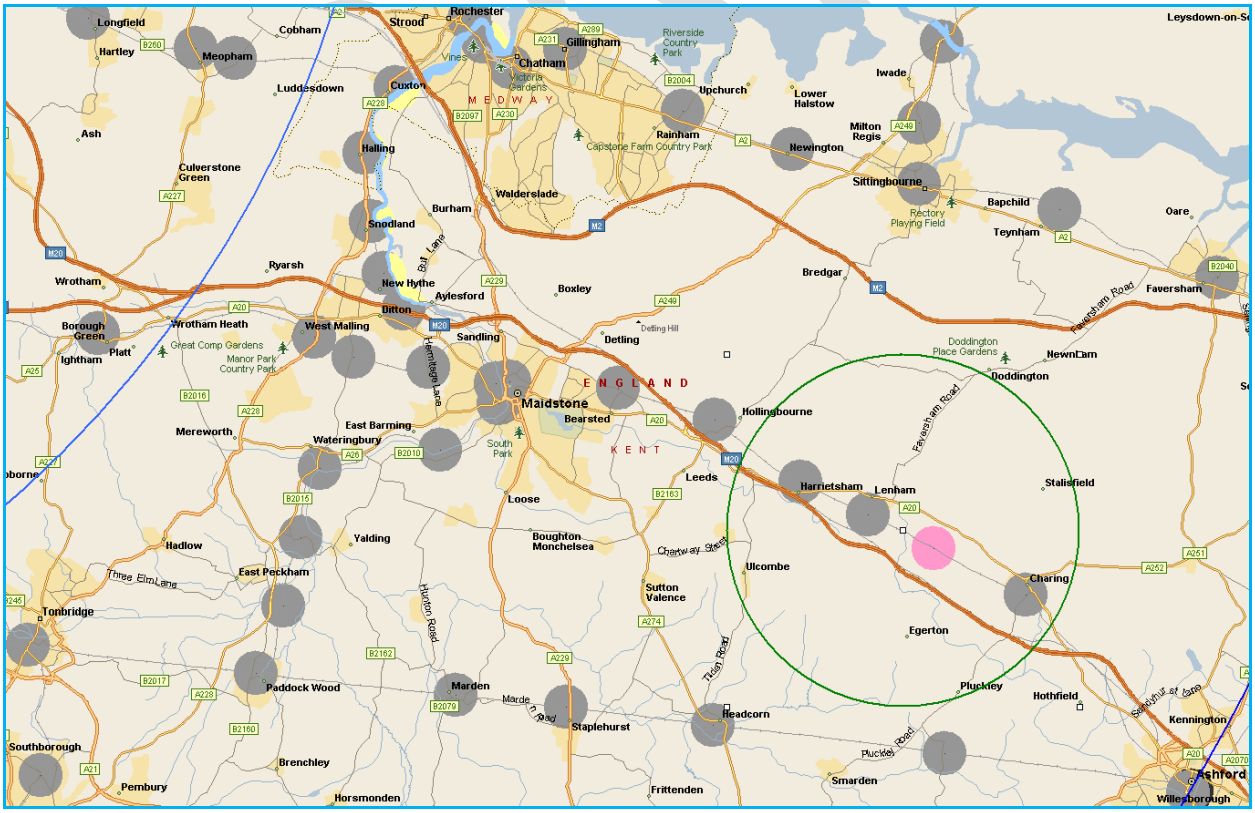
69 Net costs of a new station relocated east of Lenham, or to Heathlands, will require review compared to the other options. They could be a neutral factor, after allowing for the higher overall housing densities foreseen at a sustainable Heathlands. If Ashford DC became involved, the effective population catchment of a core Heathlands station could be in the range of 15-20,000.

70 There will be other factors to taken into account. For example car parking shortfall would be an issue (there are currently few spaces at Lenham) if average access distances from the new community were over a mile to Lenham or a relocated station.

71 With the estimated population at Heathlands at broadly 11,500 (based on 40 DPH), even a moderate share of journeys by rail would test the ability to offer an intensive local bus service trusted in the same way as close-by walking and two-wheeler access direct to a local railway station. The implications for total road traffic and the underlying impact on sustainability require answers to questions. In a post-Covid world, the scale of types of rail journey purposes (and travel patterns at times of day) need a better level of understanding, and development of a range of options.

72 JRC sees this as helping to assemble a parallel case to see how two stations, with various scenarios, might work together in partnership for the combined benefit of the entire catchment, in between the North Kent 'Medway' corridor, and the Tonbridge-Ashford 'main line' corridor. Mapping below illustrates this wider scope. For example, Lenham station itself might benefit from supportive investment to serve the Neighbourhood Plan's suggested new strategic housing delivery sites.

Mid-Kent and Medway stations, and 4 miles around Lenham and Heathlands



73 The current 'field-standard' (not 'semi-urbanised') footpath approach to Lenham from the Heathlands direction raises questions about cycle route design, and whether a wholly new alignment(s) would be preferable. JRC has worries about user safety with the current pedestrian dog-leg over the Headcorn Road railway bridge at Lenham, which has a narrow pavement.

See Google Street map photos here:

Looking north to Lenham, footpath from Heathlands on right, south of railway bridge

Looking south from Lenham over Headcorn Road railway bridge, station in distance on right

74 In general, further research should also drill down on the whole-life sustainability case for a second station compared to the alternatives, and identify wider environmental and socio-economic elements, and what an assessment of whole journey travel times could mean for the relative business case for each option.

Choices between possible new stations in the Heathlands area

75 **Site 1** is preferred for the following reasons:

- The proposed development sequence is intended to start in the NE Sector and progress sequentially NE > N > SE > S > SW > W, partly influenced by when lands could be released from mineral extraction. (JRC has mapped these sectors as numbers 1-6.) This favours station Sites 1 or 2a, not 2b. So there would be about 1¾-2 miles distance to the existing Lenham station, for many early homeowners.

- The location of a District Centre is intended to be close to a proposed station, to reinforce the sustainability of the community in practice as well as in theory. Again this favours Sites 1 or 2a.

- Protected locations are frequent in the central zone and to the south, with ancient woodland, archaeological features and other reserved sites, and with a design requirement for protected corridors. These inhibit maximum development density in the central land parcels, and on balance support an eastern orientation for high density. This favours Site 1 rather than 2a.

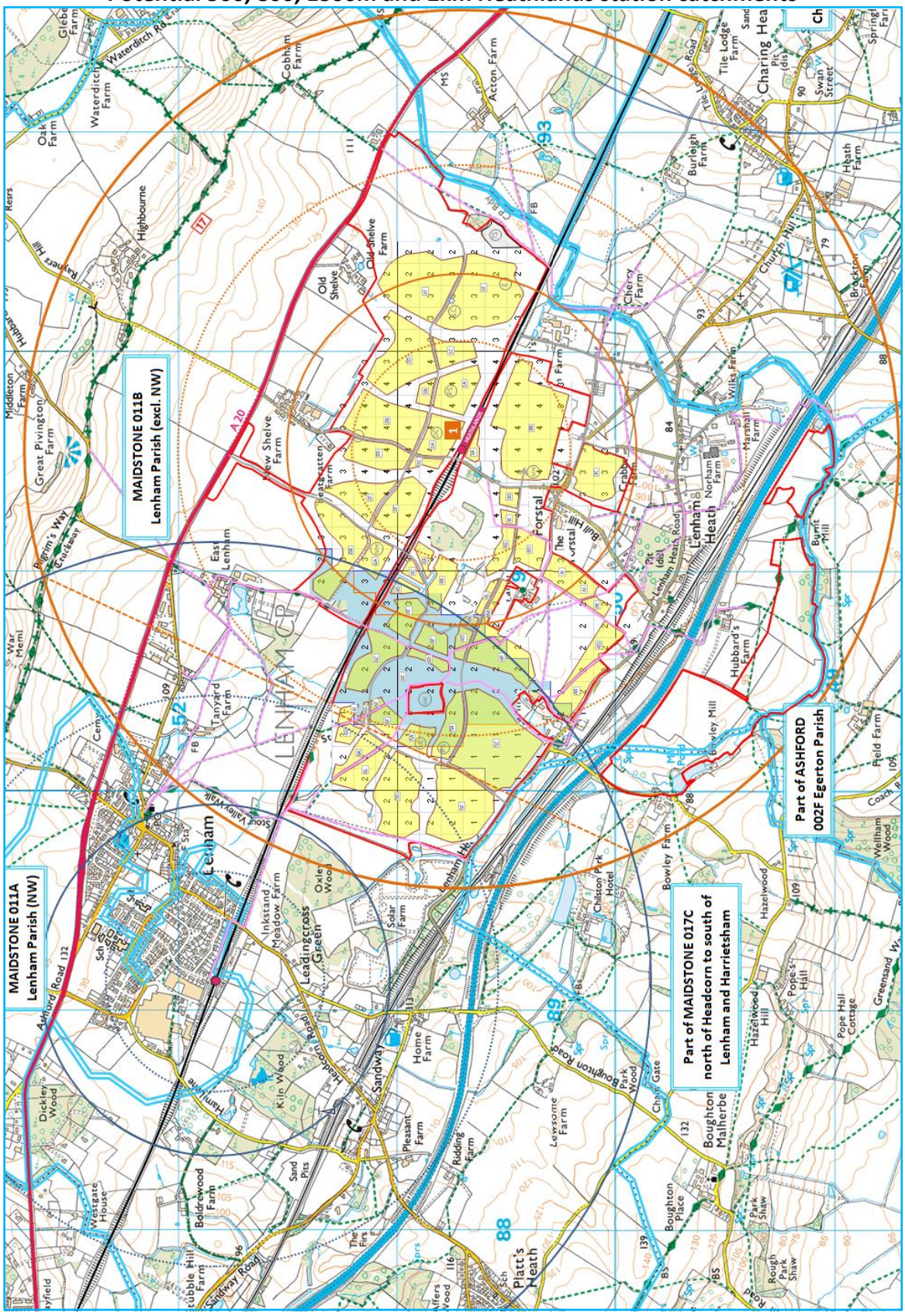
- Lower density and late development are anticipated in the western land parcels. This militates against Site 2b and, to a lesser extent, 2a.

- Finally, there is a medium to longer-term potential for Ashford District Council to propose an eastern Garden Community, possibly starting within 1 km of Site 1.

76 Overall, if a second station were justified, the development strategy and tactical opportunities favour a Site 1 station, to be located east of the Forstal Road railway bridge. This would also align with the *prima facie* desire for a sustainable community built with high quality local accessibility in mind. While a cycleway is proposed, its early priority use is until a new station is constructed, and for schoolchildren to reach existing schools in Lenham. A train service can also support that function once a station were built.

77 The preferred station location is shown overleaf, with outline catchments of 500, 800, 1300 metre and 2 km distances from a station entrance, from which the majority of passengers would be expected to originate. There is small overlap at the 2km level between the existing Lenham station and Heathlands station Site 1. Some homes in the later, western catchments are more accessible from Lenham, as discussed above. There would be additional overlap if a relocated Lenham station were preferred, but would still serve late land parcels, not early ones.

Potential 500, 800, 1300m and 2km Heathlands station catchments



78 A Heathlands station would not be expected to offer a Parkway capability from a wider catchment, as journey times to London aren't quick via Maidstone East, and will still be over an hour with a Thameslink service (ca. 75 minutes to London Bridge, eventually). Parkway capability is available at Ashford, for the HighSpeed Southeastern services to Stratford and St. Pancras, and at Headcorn (via Tonbridge).

79 Local car access to the railway is not well catered for unless for 'kiss-and-ride', though there could be parking expansion if approval were given on adjoining lands. Lenham offers only ~27 car parking spaces including for disabled, Harrietsham 26, Hollingbourne 10, Charing 34. Bearsted has 50.

80 As discussed earlier, any parking expansion might be difficult at Lenham if the Neighbourhood Plan housing sites 3 and 5 were built on, while the former railway lands south of the station have been mandated for housing rather than, say, transport interchange uses, in a recent planning appeal.

81 Some locations between Lenham / Heathlands and (to the south) Pluckley / Headcorn might choose which railway route to use, depending on their final destination along the railway or within different parts of London, e.g. to Maidstone or Victoria via Lenham, or to Sevenoaks, Waterloo or London Bridge via the Tonbridge main line. Services on the Tonbridge main line are faster if you aren't fussy about the London terminus.

Rail operational topics

82 It is important to understand the impact of a new station on the operation of the railway system. This includes changes to journey times, impacts on junctions and impacts on turn-round times. The proposed operational solution is given in the next paragraph, with the key points of the analysis following on. There is a special focus on Ashford station and junctions. The detailed analysis is contained in **Annex C**.

83 The proposed operational solution is as follows:

- All passenger services on the Maidstone East line should call at all stations between Maidstone East and Ashford International. The one exception to this is that one of the Up services must miss a call at one of the stations (possibly Hollingbourne) to protect junction margins at Ashford B Junction.
- All Down services should use platforms 5 and 6 at Ashford to provide cross platform interchange.
- All Up services should use platforms 1 and 2 at Ashford to provide cross platform interchange.
- The services via Maidstone East which terminate at Ashford International draw forward into the Down Sidings (Washer Road) to reverse.

84 The analysis in Annex C is based on the December 2020 to May 2021 Working Timetable, which is the latest timetable publicly available. It does not, however, reflect the service being run currently, which is a special timetable due to the COVID 19 pandemic. Additionally, the times between Maidstone East and London Victoria and Ashford International and Charing Cross via Tonbridge are assumed to be fixed so that the congested areas towards central London do not get changed, which would be a large-scale and disruptive process.

85 The current basic service pattern through Lenham is a two trains per hour (tph) service from London Victoria to Ashford, with some services being extended to/from Canterbury, Minster or Ramsgate. In the peak, all current services call at all stations between Bearsted and Ashford International, in the off-peak only one of the two services call at these stations.

86 The timetable reflects a service that is very London-centred with commuting journeys to London being of prime concern. Looking forwards, there is likely to be lesser demand per person for commuting into London as the pandemic has shown

that many people can successfully work from home for at least part of the week. However they may be replaced over time by total increases in population.

87 The average commute has been gradually reducing over the last few years with a typical commuter doing about 9.2 journeys per week prior to the pandemic with an expectation over time of this dropping to nearer 8 journeys per week. Post pandemic, there is an expectation that even the 8 might be optimistic, with personal preferences about which are the core days to commute and which to flex optionally.

88 Conversely, greater free time and the push towards decarbonisation to meet environmental goals will mean that there is the opportunity to get more people to make off-peak and contra-peak journeys, increasing the importance of a regular service to make this more attractive. A sustainability objective should also be a stimulus for the railway to become attractive and relevant for more types of journeys, and for a more extensive range of regional journeys.

89 It is proposed, therefore, that the service frequency at the intermediate stations is increased to two trains per hour for all stations except, perhaps, Hollingbourne which as the least used intermediate station might retain one train per hour (see **para 98** for the rationale behind this).

90 There are six operational considerations to examine in this report and each is dealt with in turn below and in more detail in **Annex C**.

- Platform dwell times.
- Journey time changes from an additional station stop.
- The impact of doubling the service frequency at Charing, Harrietsham and Lenham.
- Turnround times at Ashford International for those services which terminate there.
- Crossing move conflicts for trains getting to or from Platforms 1 and 2 at Ashford.
- Turnround times at Canterbury West for those services which terminate there.

Platform dwell times

91 Platform dwell times (the time that a train is stationary in the platform) on the route are generally between 30 seconds and 60 seconds. Whilst longer dwell times might be expected for Peak services for London commuters, the current timetable does

not always reflect this. The opportunity has been taken to rationalise platform dwell times to 30 seconds throughout, which on some services will allow an extra stop at Heathlands without changing times at Ashford International and Maidstone East.

92 For a new station at Heathlands a dwell time of 30 seconds should be planned for.

Journey time changes from an additional station stop

93 The booked journey time between Charing and Lenham is 4½ minutes in each direction. The introduction of a Heathlands station will add 1 minute to the running times plus 30 seconds for the station stop, making a journey time extension of 1½ minutes in each direction, 3 minutes for a round trip.

Doubling stopping service frequency – impact at Ashford

94 Trains which terminate at Ashford today (generally those that do not stop at Lenham and Charing) do so by crossing the layout to use platform 1 on the southern edge of the station. The turnround times are between 24 and 42 minutes.

95 If all the trains that do not stop at Lenham and Charing were to stop at all stations between Maidstone East and Ashford International in both directions, the turnround times would be between 24 and 39 minutes.

96 One of the consequences of doubling the service frequency, however, is that the connection between the Canterbury West to Charing Cross service and the Ashford International to Victoria service is lost as the Victoria train has to depart before the Charing Cross train arrives.

97 On the opposite half hour, a later arrival of the terminating service from Victoria in Platform 1 brings conflicts with the through service to Charing Cross from Platform 2 and the through service from Charing Cross using Platform 6. It is proposed that the arrival from Victoria should use platform 6 and the arrival from Charing Cross use platform 5 with the service to Victoria using platform 2 and the service to Charing Cross using Platform 1. This removes the conflict AND provides cross platform interchange in both directions.

98 Unfortunately, the departure to Victoria is now too close to the arrival from Charing Cross, so the Victoria service must keep to its current booked departure time. In order to maintain the times at Maidstone East with an additional stop at Heathlands, one of the existing station stops has to be dropped. It is suggested that this be Hollingbourne which currently has the lowest usage on the route, however a

different station could be considered. This station would retain its current hourly service from Ashford International to Victoria.

99 Doubling the service frequency is a practical step, and would make a real difference to the attractiveness of the off-peak train service at communities such as Lenham and also at Heathlands. This is likely to be a benefit of Heathlands new development, by stimulating the business case for a better service.

Turnround times at Ashford

100 The introduction of an additional station stop, with adjustments to platform dwell times and reduction or removal of certain timetable allowances would reduce the turnround times at Ashford to being between 23 and 36 minutes. Only three services come down to 23 minutes from the existing 24 minutes.

101 The additional stop at Heathlands does not compromise Ashford turnround times.

Cross platform interchange

102 For through services, there is often a significant dwell time at Ashford. This appears to be to permit interchange with services from Charing Cross that are heading towards Dover. At times this is achieved with cross-platform interchange, using platforms 5 and 6, however sometimes it means crossing the footbridge between platform 2 and platforms 5/6. Thus, while in some instances it should be possible to reduce the dwell time of the Maidstone East to Canterbury West services at Ashford International, this is not always possible.

103 In the Down (eastbound) direction, the layout permits parallel arrivals into Platform 6 from the Maidstone direction and Platform 5 from the Tonbridge direction. Similarly parallel departures are possible to Canterbury West from Platform 6 and Dover from Platform 5.

104 In the Up (westbound) direction, it is harder to achieve cross platform interchange today as Platform 1 is almost fully occupied by the Victoria via Maidstone East terminating trains and the Hastings to Ashford terminating trains. Thus the footbridge is necessary for interchange and dwell times need to recognise the time taken to cross the bridge.

105 Some of the early morning trains already cross from the Down Sidings to Platforms 1 and 2 to enter service. In the evening there is one train which terminates in Platform 6, draws forward into the depot area to allow another service to use Platform 6, then returns to Platform 6 to form the departure to London Victoria. If

all terminating trains were to use this depot area to reverse and then cross to Platform 2 for departure, this will make cross-platform interchange easier and may permit dwell times at Ashford to be reduced.

106 This arrangement also frees up platform space in Platforms 1 and 2 for any future HS1 services to Hastings.

Turnround times at Canterbury West

107 If we were to assume that we could not change the Ashford International dwell times for through services (even though in practice this may be possible), we must consider the turnround times at Canterbury West. The current WTT turnround times are between 35 and 39 minutes.

108 Curiously, the Working Timetable only shows one service time for transferring from one platform to the other, and this is for the one service with a turnround time of 35 minutes.

09:30 train arrives at Canterbury West and unloads.
09:33 train draws forward to Shunt signal.
09:35 driver changes ends (standard 7 minutes).
09:42 train moves to Up Siding, crossing the Up line.
09:44 train in Up Siding.
09:52½ 08:16 Charing Cross to Ramsgate arrives in Down platform.
09:54 08:16 Charing Cross to Ramsgate leaves Down platform.
09:54½ 09:36 Ramsgate to St Pancras International arrives in Up platform.
09:55½ 09:36 Ramsgate to St Pancras International leaves Up platform.
09:56 train departs Up Siding.
09:58 train arrives in Up platform.
10:05 train departs to Ashford International and London Victoria.

109 There is a 10 minute window after the train clears the Down line before the following service departs, there is a 10½ minute window between the train crossing the Up line and the next Up service arriving in the platform, there is a 12 minute stand in the Up Siding and a 7 minute stand in the platform before departure. Therefore, should the train need to arrive 1½ minutes later and depart 1½ minutes earlier, there is still no clash with other services and 16 minutes of stationary time (instead of 19 minutes) for service recovery. Hence there are unlikely to be any issues at Canterbury West.

Crossing moves at Ashford to Platforms 1 and 2

110 There is only one service which currently crosses the east throat at Ashford, which comes from the Down Sidings and sits in Platform 2 between 20:56 and 21:05. Should this departure be brought forward to 20:55½, it would need to leave the Down sidings earlier, with no consequences.

111 Under the service alterations proposed, all Victoria services that terminate at Ashford International will cross the east junction to reach platform 2. Should there be any conflicting services, the time at which this service crosses the layout can be flexed within the existing turnround time to remove any conflicts.

112 As has been highlighted above (para 63), there is an hourly conflict at the west end of the station between the Canterbury West to Victoria service and the Charing Cross to Ramsgate via Canterbury West service. This conflict precludes the Victoria service from being retimed to depart 1½ minutes earlier forcing one of the existing station stops to be dropped to accommodate a call at Heathlands station.

Summary

113 There are two disbenefits of the revised service pattern.

- In the Up direction, cross platform interchange between Charing Cross and Victoria services is maintained once an hour and lost on the second occasion each hour. All Down services create cross-platform interchange;
- One train per hour must sacrifice a station stop (in other words, keep the frequency at one intermediate station at the current service level) in order to call at Heathlands because of conflicts that would otherwise occur at the west end of the station.

114 However there are other benefits to compensate:

- A doubling of off-peak frequency at most stations between Bearsted and Ashford International;
- Improved cross platform interchange without having to cross the footbridge;
- Capacity in Platforms 1 and 2 freed up for future increases to HS1 service levels, e.g. to Hastings.

Rail engineering costs

Station procurement and construction costs

115 Michael Byng has reported on the outline foreseen capital cost for a new station at Heathlands based on the preferred Site 1. In his costings, the station has been assumed to have two 10-car platforms (8-car is now probable), each accessed from the foot and cycle bridge being delivered as part of the development by stairs and ramp. The ramps require some earthworks to the cutting slopes. Each platform includes two waiting rooms together with all the electrical and telecoms equipment you would expect on a station. There is also opportunity to increase sustainability if photo-voltaic cells could be placed on platform canopies etc.

116 Some other costs, e.g. access bridging over the railway, are assumed to be part of place-making costs and not a charge on the railway. He was instructed on the specification by Mike Dyson, the details being derived from internal assessments shared between Mike Dyson and the client team. The preferred location for a Heathlands station is Site 1, by Forstal Lane bridge, as described above.

I have considered the content of Mike Dyson's email dated 23rd March 2021 and the specification notes sent to me to be read in conjunction with the sketch.

From the sketch and the notes, I prepared an estimate for the capital cost of the building the station.

1. I estimate the cost, at the prices ruling at 4th Quarter 2020 (31st December 2020), to be £10,040,000 (ten million and forty thousand pounds)
    a. The estimate includes construction, design and project management fees and the costs of two intrusive possession and isolations for which I have included an allowance for their cost in the estimate.
    b. I have assumed that the station will be built during midweek nights and at weekends by taking advantage of "Rules of the Route" possessions at weekends between 01:55 Sunday to 04:55 Monday (27 hours) and Overnight possessions of 3-3 ½ hours for each weekday night.
    c. The estimate is based on a construction period of 39 weeks.
2. Procurement Strategy
    a. The estimate assumes that the contract to build the station will be let after single stage selective competitive tender on a "design and build" form of contract.
3. There is no allowance in the estimate for:-
    a. Passenger dispersal bridge , which will be provide separately by the developer.
    b. The acquisition, temporarily or permanently, of any land for the station.
4. Risk
    a. I have made allowance for risk in two ways, one by applying the principles of the Rail method of Measurement Volume 1, Order of Cost Estimating, Cost Planning and Detailed Measurement – RMM 1
    b. The second alternative way by applying an allowance for Optimum Bias of 40% of the costs before inflation in accordance with current practice adopted by the Department for Transport and HM Treasury.
5. Inflation
    a. The estimate makes no allowance for future inflation
    b. The Office for National Statistics "All Construction Index for December 2020 is 112.20.

Other relevant railway costs

117 There may be other capital costs arising, and certainly in any comparison with improvements at Lenham station or with a relocated station east of Lenham, discussed earlier.

118 These would require estimation if there is to be a four-way comparison between a new Heathlands station and the other options. Further design consideration would be needed to form the basis of any such estimate.

Additional investment and operating costs at Lenham

119 The potential scale of additional requirements at Lenham includes:

- Additional car railheading because of the distance of the bulk of population, both 'kiss-and-ride' and car parking, also potentially car e-charge points.
- Capital and / or operational and leasing / procurement costs for a frequent bus service.
- Bus facilities including turnround and parking / stand spaces, though space for that is not obvious within the Neighbourhood Plan. The potential shortfall in land availability close to the existing station, for buses and a more extensive transport interchange, has been highlighted already.
- Road safety improvements around Headcorn Road for pedestrian / cycle / e-scooter access; also provision of cycle, e-scooter etc parking facilities.
- Potential acquisition powers and costs of south-side land formerly in railway ownership and now an industrial site / business park (*if possible, as site now granted housing approval, in a recent appeal).*
- Expansion of platforms and / or station facilities, platform canopies etc, as additional passenger volumes may require additional platform and safe circulation space for the numbers, with additional canopies to aid dispersion along the platforms. Platform lengthening might be difficult without track and signalling changes as there is pointwork close-by in both directions, and implications for layout design and safety considerations will be mandatory.
- Consideration of additional dwell time at Lenham, to 1 minute rather than 30 seconds, to mitigate passenger boarding and alighting delay risks, noting that 1 minute is allowed at times in today's timetable.

- Raising platform heights to meet modern standards, also to minimise dwell times and alighting times with reduced stepping distances.
- Provision of step-free facilities to each platforms, whether lifts or ramps.
- Additional station staffing costs to handle transfer volumes and ensure punctual departure times. More booking office staffing for longer operational periods
- Updated passenger information systems including real time interface with bus services scheduled to enable guaranteed rail / bus connections.
- Taxi facilities.

Costs relevant for a relocated station

120 A relocated station might require:

- Most of the list above, plus also:
- New bus / footpath / cycleway / road links where no road currently exists.
- Replacement bus feeder links to connect Lenham built-up area to the new station site (possibly also to Harrietsham), with possibly further operational and capital costs.
- Procurement of acquisition powers and costs of land and construction costs varied to suit site requirements, in proximity to the River Stour valley (potentially incurring additional stabilisation costs).
- Capital and operational costs for new utility connections, to service a new station location.

121 It is possible that Network Rail might also prefer or require that several public footpath crossings of the railway between Lenham and beyond Heathlands were closed and replaced by either footbridges or subways, given that train drivers would be pre-occupied with station operations and then on preparing for the following station stop.

122 Operational and capital costs would require to be discounted to present values over a 60-80 year timescale. This would apply to all options. There would be long term standing maintenance charges once a new or enhanced station were added to the Network Rail estate portfolio.

123 Discounted train operating costs would be estimated for Network Rail's and Southeastern's operational and maintenance charges applied to additional station stops, the maintenance costs of the additional or replacement stations and trains, and other overheads normally levied on enhancements.

124 In general, the scale of foreseen revenues arising from demand modelling (discussed below), provides a degree of assurance about operating costs being covered once the development is fully built-up, with remaining underlying questions being:

(1) How soon could a station complete payback on capital advanced for station construction, if it were not financed through Homes England?

(2) Given the sequencing of development sites across the Garden Community proposal, how soon would a station appear to be operationally viable from its forecast (cautious) revenues, when there would be a gradual build out at early site locations?

(3) Should Homes England offer some initial operational and / or capital grants to Network Rail, until that break-even cross-over year, so that new residents would have a station from the beginning and be stimulated early on to make a lifestyle point of using the station and the rail service?

(4) Even with a Heathlands station, would there be some capital and operational costs to be incurred at Lenham station, to accommodate some of the Heathlands passengers from the western land parcels, and to upgrade Lenham station to an equivalent standard so that both stations provided an equal quality of offer for existing and new residents and businesses?

(5) Might improvements at Lenham also be needed to accommodate additional usage foreseen from other developments within that village, such as those suggested in the Neighbourhood Plan? Such improvements could be attributable to those developments, not to Heathlands. Some additional rail revenues might also be available from the proposed increase in off-peak and Saturday service frequency attracting more existing and future Lenham residents to rail travel.

125 There could be a significant scale of offsetting income from a Heathlands station – and possibly a surplus – in that a station should increase the sales value per land parcel and housing unit. This could reward Homes England for having invested in a station in the first instance. For example, a station capital cost of £10 million would need an average levy of only £2,100 per unit to recoup the investment.

Demand, revenues and costs

Estimating demand

126 This is a complex assessment. The requirement is to estimate **net passenger demand**, discounting any use of existing stations. The rate of travel demand will depend on multiple factors:

- Rate and scale of recovery of post-Covid conventional demand.
- Judgement about medium and longer term permanent changes in conventional travel flows.
- Actions to align future rail services, facilities and investment, to help achieve decarbonisation and sustainability as top policy objectives now and in the future.
- Definition of opportunities to re-stimulate rail travel demand for new or modified travel patterns and priorities. These may be strategic responses led by policy changes, and / or tactical and practical opportunities to make the regional rail network and its services more relevant and attractive for more users and for more travel purposes.
- Implementation of the 'Williams Shapps' *Plan for Rail*, including new policy objectives, new forms of railway marketing and pricing, and potentially more of a 'digital' ease of use (eg, ticketing changes) with contactless availability and e-information on integrated travel scope between bus and rail services, co-ordinated timetables etc.
- Identification of related opportunities to benefit Lenham station, and possibly other stations on the Ashford-Maidstone East line where this is practicable and makes sense.
- Outcomes of a joint review with Network Rail and the Southeastern train operator, if supported by the rail industry, of the four station options:
  - ❖ improve Lenham
  - ❖ relocate Lenham station
  - ❖ close Lenham and focus on Harrietsham and Heathlands
  - ❖ have a second station at Heathlands in partnership with Lenham, and promote both stations to benefit the area communities and a wider catchment).

Pre-Covid and planned service development

Current passenger services at Lenham

127 The current (December 2020 to May 2021) Working Timetable has an hourly stopping service from/to London Victoria calling at all stations between Maidstone East and Ashford International.

128 Most of these services go on to Canterbury West, though some terminate at Ashford. The first service in the morning goes to Minster.

129 There is a second train each hour calling at all stations between Ashford and Maidstone East in the peaks, but only at Bearsted in the off-peak.

130 There are also several other passenger train movements. At peak times, there are two morning peak services to London Blackfriars (and a third starting at Maidstone East), one return evening peak service from London Blackfriars to Ashford and a return also to Maidstone East (these should be replaced by an interim Thameslink service in 2022-23).

131 There is an off-peak non-stop path in each direction that appears to allow charter operation.

132 As a result of the coronavirus pandemic, there is currently a temporary timetable in place with one train per hour stopping at all stations between Maidstone East and Ashford International which runs from Victoria to Ramsgate via Canterbury West.

Current freight operations

133 There is a reasonable freight volume on the route, but this is mainly at night and especially when the route via Tonbridge is closed for maintenance. (Conversely, when the route via Maidstone East is closed for maintenance, trains divert via Tonbridge.)

134 There are up to 24 down freight paths between 05:30 and 23:00, some of which don't run every day plus some engine-only movements. Only between 21:10 and 21:49 are there four trains in any one hour, the norm is only one or two. Four hours have no freight paths.

135 Most freight trains 'run as required' so in practice there are fewer than shown in the timetable. Much freight traffic is to and from Dollands Moor exchange sidings

and the Channel Tunnel, while there is an aggregate terminal at Hothfield, north of Ashford, which has up to 3 train paths per day in each direction.

136 In practice, between 16/03/2021 and 23/03/2021 there were never more than 3 'up' trains per day (towards London and beyond) and 2 'down' trains per day which actually ran on the Ashford-Maidstone East line. On Sunday there were no freights at all.

Planned service developments

137 From 2022-23, it is expected that there should be an interim Thameslink service to replace the Blackfriars-only Southeastern trains via Bromley South. Blackfriars would remain as a temporary terminus. This is subject to final decisions post-Covid.

138 There will be some through running from Ashford and local stations in the morning peak, returning in the evening with those trains stabled overnight at Ashford's Chart Leacon sidings, which are now being rebuilt for this purpose. This may add a few extra trains to the route between Ashford International and Maidstone East.

139 Passengers from any new station should be able to change at Maidstone East or Bromley South outside peak times, to reach the City, once these trains run all-day. In later years, it is hoped to reroute and extend these trains, via London Bridge, Blackfriars, City Thameslink, Farringdon (for Crossrail) and St Pancras, and then on to Cambridge. However this must await more reliable operations on Thameslink and north of Kings Cross, and better train availability.

140 The following maps on pp. 43-44 show London and Kent lines and how services might change.

Existing Mid-Kent travel options

Towards London

141 The Ashford-Maidstone East railway is a secondary, electrified main line, which has local and semi-fast passenger services between East Kent, Ashford, Maidstone and Central London.

142 The main all-day terminus is Victoria, while some trains peak-time run to Blackfriars on the fringe of the City, and connect there with Thameslink, or connect to Blackfriars and Thameslink at Bromley South interchange. The Underground can of course be used to reach the heart of Central London.

143 It is also possible to reach Stratford and Canary Wharf, and St. Pancras, by catching a train in the reverse direct to Ashford and change there for the HighSpeed Southeastern service on HS1.

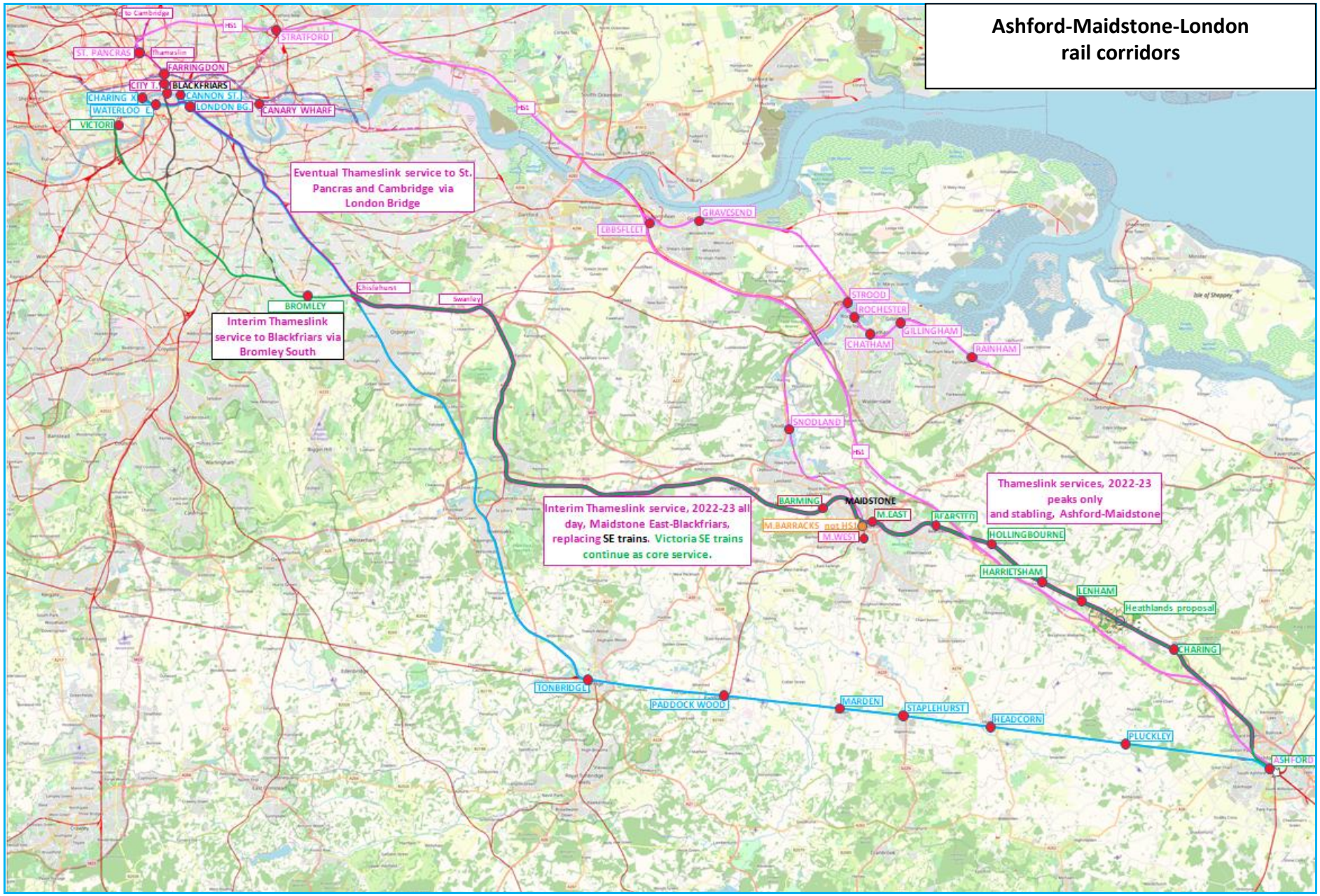
144 This is a costlier journey but notably quicker to the north side of Central London, and to Canary Wharf. Thameslink stations can be reached by changing at St. Pancras, and there are also Underground options to the heart of Central London.

145 The Tonbridge main line is also within driving distance, and this offers direct and quick trains to a different suite of London interchanges and termini: London Bridge, Cannon Street, Waterloo East and Charing Cross. Using this route, Thameslink is accessible via London Bridge interchange, and there are Underground interchanges.

146 There is no easy interchange, however, between the Maidstone East line services and those on the Tonbridge main line, so that passengers have to pre-select which London terminus to adopt as their preferred mode. People resident between Lenham and Headcorn / Pluckley have the choice of which way to travel.

147 Finally there is an option to travel from Lenham via Maidstone East, and change there to Maidstone Barracks station, an ~8 minute walk away, on the Medway Valley Line.

148 Unfortunately the HS1 services on the Medway Valley Line do not call at Maidstone Barracks, so that a further change of train is needed at Strood. Overall this is not an attractive journey option. The poor interchange also discourages local and regional travel between the Ashford line and Medway or Redhill / Gatwick.


Ashford-Maidstone-London rail corridors
Eventual Thameslink service to St. Pancras and Cambridge via London Bridge
Interim Thameslink service to Blackfriars via Bromley South
Interim Thameslink service, 2022-23 all day, Maidstone East-Blackfriars, replacing SE trains. Victoria SE trains continue as core service.
Thameslink services, 2022-23 peaks only and stabling, Ashford-Maidstone
Heathlands proposal
ST. PANCRAS
FARRINGDON
CITY T.
BLACKFRIARS
CHARING X
CANNON ST.
LONDON BG
CANARY WHARF
WATERLOO
VICTORIA
STRATFORD
BROMLEY
Chislehurst
Swanley
GRAVESEND
STROOD
ROCHESTER
CHATHAM
GILLINGHAM
RAINHAM
SNODLAND
BARMING
MAIDSTONE
M.EAST
M.BARRACKS not HSL
M.WEST
BEARSTED
HOLLINGBOURNE
HARRIETSHAM
LENHAM
CHARING
TONBRIDGE
PADDOCK WOOD
MARDEN
STAPLEHURST
HEADCORN
PLUCKLEY
ASHFORD


Mid and East Kent area rail network
(continuation of previous map)
STROOD
ROCHESTER
GILLINGHAM
CHATHAM
RAINHAM
GNODLAND
A20
BARMING
MAIDSTONE
M.EAST
M.BARRACKS not HS1
M.WEST
BEARSTED
HOLLINGBOURNE
HARRIETSHAM
LENHAM
Heathlands proposal
CHARING
MARDEN
STAPLEHURST
HEADCORN
PLUCKLEY
ASHFORD
Thameslink services, 2022-23
peaks only
and stabling, Ashford-Maidstone

Rail across Kent

149 A Mid and East Kent rail map precedes this page. Whilst there are good services between Maidstone, Tonbridge, Ashford, Folkestone, Dover, Canterbury, Ramsgate and Margate using either High Speed trains (east of Ashford) or 'classic' services, intermediate stations are less well served. Much of the timetable appears to be written round passengers who have commuted daily to London.

150 The impact of the coronavirus pandemic has meant that commuting levels have dropped considerably. There is an expectation that there will be a substantial recovery of such traffic by late 2022 (estimates appear to range between 60% and 80% of pre-pandemic commuter traffic levels).

151 However it may take more time to reach 2019 levels again, and possibly be dependent on population growth and economic growth over a decade or more, if general per-person travel becomes more diverse and/or more constrained on the number of days used for commuting.

152 Equally there is expected to be a rise in leisure travel, making off-peak services possibly busier than in 2019, providing there is confidence in using rail safely.

153 The government has set a target to reduce the country's carbon footprint and part of the achievement of this, alongside the use of electric cars, needs to be a greater use of sustainable transport.

154 The railway network of Kent is mostly electrified already and provides a nearly zero-carbon transport network (at point of use) that deserves to be exploited to its fullest extent.

155 **A minimum half hourly '*Kent Metro*' service at all stations between the towns mentioned above** could be a first target to encourage passengers to choose the train for journeys to and between urban centres. Increasing the service level at stations between Bearsted and Ashford International should be seen in this context and be an all-day occurrence, not just aimed at the commuter market.

156 We have already identified that there is a scheduled train resource that can be used to help achieve this objective, which can benefit Heathlands (to be easily the largest intermediate community between Ashford and Maidstone East), and potentially other local stations.

Policy and practical opportunities to recover and grow rail travel

157 Demand analysis is summarised further below and accompanies a large-scale spreadsheet modelling process which JRC has undertaken to define an outline business case setting out the potential for a new station at Heathlands.

158 While Covid has knocked back railway demand levels, the expectation as stated above is that rail travel can and will recover, but not necessarily in the same way as before.

159 There are many opportunities existing or emerging, which demonstrate that the Ashford-Maidstone East railway can be busier, more productive and more sustainable for communities, passengers, businesses, and the rail economy, and be better for the rail industry and the environment, than in previous decades.

160 A summary assessment is set out below. This should inform the extent to which the demand modelling is considered cautious, and that more should be anticipated and planned for. So first the headlines and then the details.

Policy changes

- Changes in operational and customer-friendly practices.
- Changing transport funding post-Covid.
- Changing travel patterns post-Covid.
- Future roles of the passenger railway in London and the South East.
- 'Build back better' post-Covid – and the role of regional and local transport organisations.
- Marketing, pricing and travel costs.

Practical opportunities

- Rail service changes.
- Better rail-rail interchanges.
- Bus and other green mode interchanges.
- Community-friendly stations and local hubs.
- Station accessibility for local communities.

Policy changes in close-up

Changes in operational and customer-friendly practices

161 There is a common starting point that post-Covid there is a vital need to encourage passengers back, even if they don't do what they did before. In a decarbonising world it is also essential to attract many more new faces and young people to rail and out of other less environmentally-friendly modes.

162 Merely stating the topic this way round is however industry-centric, and not setting out the issues and asking the questions from the user / public perspective – what can rail do for me, my priorities, travel patterns and more widely my community, and offer much more of what we desire and are likely to want to do going forwards?

163 Furthermore, the travelling environment, having been 'dissed' for the past year by government, has now to be re-validated and public perceptions improved radically.

164 Full consumer and council engagement and consultation is vital now and for the future. So a post-Covid world should been seen as a challenge for the railway to take a 360 degree view of itself with new environmental priorities and practical outcomes, towards 2050 and beyond.

Changing transport funding post-Covid

165 The current disruption to society and its priorities is evident, however what this presages is less clear. While rail planning has been normative, and big authorised projects continue, £1bn has already been taken out of Network Rail's enhancement budget. There will be less new money for all public sector industries and a requirement for better use of what already exists. Hence better use of existing road and rail in cases where a choice exists about new spending.

166 Ashford-Maidstone East will shortly benefit from some interim improvements with Thameslink, but is unlikely to see more early, large-scale new investment. Since government ultimately controls the purse-strings, and everyone faces immense spending demands post-Covid, it should be sensible to envisage what medium cost high-value rail investment and operating cost gains could achieve, and be of benefit across Kent and its neighbours. Transport for the South East should assist during and after its corridor studies.

Changing travel patterns post-Covid

167 In general there may be less desire to return to Central London offices at the rate people were previously accustomed to. More working from home or decentralised office suites is a distinct possibility. Some of this will be at the discretion of companies, in other cases employees might have a greater input.

168 The geographical prospect of more diverse travel patterns at more times of day and week will place an onus on operators and engineers to think out of the box, when it has historically been a low risk solution to do more or better what you did before.

169 The rail industry will want to refill its spare capacity and also examine if all previous or planned capacity is now needed, or could be reprioritised.

170 After Covid, a more versatile response will be needed. New communities such as Heathlands, placed astride a main line with explicit objectives for sustainability, should be assessed as offering opportunities for rail, not difficulties.

Future roles of the passenger railway in London and the South East

171 There is a combination of political pressures and rail analyses. With 'levelling up' being a key government priority, and recently supported mega schemes such as Crossrail 2 now on the back burner, the priorities for how rail can serve regions such as the South East more effectively without very high expenditure must come to the fore and be articulated in policy, political and practical ways.

172 It should be a policy priority to see how rail can do more, more diversely and cost effectively, to help rebuild regional economies. Kent is mostly a well connected county, where it should be possible for new initiatives such as Heathlands to add value and stimulate more cost-effective use of the rail network. This is separate to operational factors which are discussed below.

'Build back better' post-Covid:

173 Network Rail had already foreseen strong growing demand in its long term market share analyses published in the early 'teens'. Understanding existing and future demographic trends is vital. [2]

[2] Link here to Network Rail Long Term Planning Process suite of documents: http://www.networkrail.co.uk/Long-Term-Planning-Process/

174 There is a clear sequence to planning within this. First consider what the communities need, what the growth and socio-economic requirements are, among different population and economic activity segments, and how the railway might be adapted to support them. These are called Market Studies. Then there will be Route Studies, to see what is feasible and possibly worth doing on specific corridors. So a helicopter view first of all.

175 In the case of the Long Term Planning Process market study for the London & South East rail system, Network Rail recognises that making best use of the railway for inter-urban journeys of 30-100 minutes could be a very worthwhile process, along with a greater focus on modern travel requirements such as 24/7 lifestyles, especially among the coming generation of economically-active. [3]

176 Reducing journey times for principal flows, to 60 minutes or less, is seen as a 'conditional output' [i.e., conditional upon feasibility and affordability] with potentially strong benefits for local and regional economies and environmental quality.

177 The assessments then are in many respects still relevant, and can guide what the key regional priorities are, where rail can provide an improved travel solution – basically it will be to strengthen inter-urban flows and serve new and busy communities.

178 This can include a new range of Garden Villages where those are located adjoining existing railways, including Heathlands. If planned sustainably, they should also increase the rail ridership from medium sized and high density settlements where travel by green modes is stimulated.

179 Transport for the South East has now begun strategic studies on various radial corridors, and also on two orbital corridors, inner between Medway, Maidstone, Redhill/Gatwick and beyond, and an outer corridor via the South Coast. Work is expected to begin shortly on a SE radial corridor study including Ashford-Maidstone-Swanley, and also on freight flows. Input and influence into these will be essential.

Marketing, pricing and travel costs

180 Underlying any effective recovery, and promotion of existing and new rail services and facilities, is a requirement for strong marketing and pricing, and potentially

[3] http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064786452 The conditional outputs foreseen for the LSE area are described in detail in section 7.4, pp.47-53. Outputs relating to non-London travel are described in pp.50-53.

some 'destination directed' publicity which sets out to show how rail serves much more of Kent (and Surrey and Sussex as well as London) than you have believed.

181 This sort of promotion information is second nature to Londoners familiar with the ubiquitous tube map. There is less awareness in the shires, and less still with the partial absence of integrated ticketing, whether Oyster-style or contactless.

182 The new 'Williams Shapps' *Plan for Rail* published on 20th May proposes a mandate for *Great British Railways* to serve the interests of passengers, freight customers and taxpayers and growing rail usage. New partnerships "will give towns, cities and regions greater control over local ticketing, services and stations". "Opportunities to better unlock housing, local economic growth and social value will be explored".

183 The *Plan for Rail* promises a new deal for passengers, with expansion of London-style Pay-As-You-Go ticketing, simplified fares, and new flexible season tickets to reflect changing working patterns. Time will tell how all this is delivered. Underpinning this should be the importance of selling the railway in a consumer-led way which leads to better outcomes for more users and communities (and addresses passenger safety concerns in the wake of Covid).

Practical opportunities in close-up

Service changes

184 A separate analysis was prepared for this report, and is summarised in **para. 23**, on the present main journey options and overall timings from the Lenham area towards London. This choice will be increased (and Blackfriars terminus substituted by through Thameslink trains via London Bridge), when the full Thameslink service is commissioned, though this appears to be some years' away. Target times of around 75 minutes look achievable for Heathlands to London Bridge, depending on stopping patterns. Farringdon (for Crossrail) could be reached in 85 minutes, and St. Pancras in 90.

185 With interim Thameslink services, Blackfriars will remain as the City terminus and London Bridge will not be accessible, except in the event (currently not offered) of an interchange at Swanley with fast North Kent-London Bridge-Cannon Street trains.

186 In the medium to longer term, there could be greater propensity to use stations on the Ashford-Maidstone East line to reach the City, with a future direct Thameslink service which will be more regular than the existing occasional encounter with Blackfriars.

187 The locally big but low cost opportunities are to use the marginal train resources more efficiently. The apparently excess and not wholly marginal waiting times at Ashford and elsewhere, suggest that there is some timetable flexibility to offer a better off-peak service and enable half-hourly regular interval connections via Ashford, between the Maidstone East line and much of East Kent.

188 This is reported on in detail, in the section on rail operational topics (**para. 82** onwards). This also references the ability to put the hourly limited-stop off-peak trains on Ashford-Maidstone East to wider practical use.

Better rail-rail interchanges

189 Mike Dyson has already discussed how to get Ashford International interchange to work more simply, to facilitate and improve train to train interchanges there – preferably helping rail operations and with scope to underpin a 'Kent Metro' regular-interval network.

190 There is also the opportunity to improve rail interchange between Maidstone East and Barracks stations, ~8 minutes apart along a constrained footpath over the River Medway. A more direct and passenger-friendly link off the western end of Maidstone East platforms would stimulate new travel flows benefiting many communities – e.g. to access Medway towns and Tonbridge, Redhill, Gatwick [4] Airport and Crawley from the Maidstone-Ashford corridor, including from Lenham and Heathlands. This project merits a strategic business case, and can benefit rail travel demand locally and regionally.

191 The lack of access to Medway from communities along the Ashford-Maidstone East railway is one of its larger failings, given that Medway comprises an agglomeration of over 250,000 people and is a large employment zone, within 10-15 miles of Lenham and Heathlands. Maidstone Barracks station might require improvement to enable HS1 trains from Maidstone West to call there.

192 It would probably require a further direct rail link near Strood to avoid congesting the existing Strood railway junctions and permit direct rail services between

[4] Jonathan Roberts interviewed personally the then BAA Chairman, Sir John Egan, in 1999, as part of stakeholder consultation for a proposed railway franchise. The Chairman was adamant that Gatwick's worst surface transport shortcoming, both for air passengers and for staffing at Gatwick Airport and for airlines, was the lack of a trusted rail link from the largest mega-town in the South East (Medway) outside those already served by rail. Gatwick was facing employment supply problems, where Maidstone and Medway would be well placed to assist if only there were a decent direct rail service.

Maidstone and the Medway towns. JRC has already defined an outline basis which could be a first phase of a Medway-Maidstone-Redhill-Gatwick corridor.

Green-mode interchanges, community friendly stations, and station accessibility

193 These require several parallel actions, in addition to (possibly) top-slicing funds:

- Identification of possible locations to achieve targeted results benefiting a stated percentage of total population within each effective station catchment.
- Definition of what should be scored as good results, and a prioritised list.

Towards a commercial case

Demand estimation

194 A comprehensive spreadsheet has been developed by JRC to address the potential net growth in demand arising from a Heathlands Garden Community development on the scale envisaged.

195 Conventional rail demand methodology has historically been poor at estimating the scale of change in demand arising with a new facility – measuring the 'delta' of changes tends to be more reliable with small scale alterations.

196 In this case the scale of impacts is also heightened by:

- The objective of Heathlands to be a sustainable community, with local travel and access enabling and encouraging walking, cycling, e-scooters etc.
- The intention to allow some variable density across the development site.
- The ability for development density to take account of where an early station might be built.
- The sequencing of development across the site, starting in the NE area and moving west then in a semi-circle towards the south and west.
- The areas closest to the existing Lenham station are the last scheduled to be built, possibly in the 2040s.

197 JRC has therefore adopted Barton Willmore's masterplanning mapping and schedule dated 3.3.2021, and undertaken the following modelling:

- Detailed estimation of net developable volume in each hectare across the site, sorted by sector and sub-sector and hectare.
- Exclusion of main distributor roads, wildlife corridors, watercourses, known footpaths etc.
- Explicit inclusion of site features such as Employment, Primary Schools, Local and District centres.
- Mapping of each hectare into four concentric catchment circles radiating from a proposed Heathlands station and the existing Lenham station.
- These circles are at 500, 800, 1,300 metres and 2 km. The mapping is derived from TfL standards for station accessibility, where the norm for railway accessibility is 960 metres at 80 metres / minute (i.e. 12 minutes walk time). Because it is rare to find a direct, straight line to a station, the 'round the corner' effect is covered by taking an 800 metre average catchment instead.
- 500 metres is often used to assess proximity for commercial property development, while 2 km is adopted for some rural station projects as a practical catchment limit for reliable estimates. 1,300 metres is a 'round the corner' and rounded equivalent of a 1 mile/1,600 metres straight line.
- JRC has modelled a spread of housing densities across the four concentric circles, with the weighted average density (based on distance from station x the number of hectares) summing to a scheme average of approx 40 dwellings per hectare (DPH). There is a choice about the extent of spread of densities across the proposed development site: either a narrow spread (illustratively between 32 and 48 DPH), or a wider spread (25-~54 DPH). The densities are correlated with their proximity to the proposed station.
- Based on the population occupancy rates chosen by Barton Willmore, it is then possible to assign populations to each hectare, by locality, timescale of sector development, and distance from the stations. The localities closer to Lenham station have been identified and counted separately.
- On the rail demand side, top-down and bottom-up estimates have been adopted – based on rail rides per head of population on the top-down basis and to provide a monitoring limit on the range of modelling values and achieve credible/cautious outputs on a bottom-up basis. Detailed explanations are included in the spreadsheets.

198 Similar inputs with localised data estimates have been used earlier in this report, to assess the rail demand for Lenham Parish as a whole, and from Lenham Built-Up Area.

199 The spread of rail demand has been calculated from the differences in perceived journey times allowing for catchment access to stations, waiting time for services and then a flat rate access time at the destination end, plus non-weighted in-vehicle travel. The catchment access times are most significant, resulting from the different concentric circles. The best result, with the lowest perceived time and highest demand, is unsurprisingly found within the 500 metre circle (Zone 4).

200 It would be possible to base all demand on the outermost circle (Zone 1) and scale up from there, and that is shown as option 1 for demand. However the evidence from the Lenham research is that there is a large zone beyond the proximity of a built-up area, where demand is proportionately even lower and rail travel is only marginally relevant per head of population (hence the results stated earlier for the 'rest of Lenham' compared to its built-up area).

201 JRC has therefore included a more cautious scaling-up of demand than was expected. Zone 2 is now taken as a further baseline option for scaling-up, where there are only two upwards stages in demand escalation to reach Zone 4. Equally there is now a reverse escalation (i.e. descent) to reach Zone 1's demand level, where this is relevant.

Summary demand estimates

202 **Overall, the extra passenger volume (split between Heathlands and Lenham) is estimated with full build-out to be in the range of 406,000 to 566,000 passengers entry + exit per year (median 485,000) with ~40 DPH and a narrow spread of development density, and 416,000 to 585,000 passengers entry + exit per year (median 495,000) with a wider spread.**

203 **Excluding people from Heathlands who would find Lenham station closer, the passenger range at Heathlands would be 367,000-515,000 passengers with narrow density spread, and 382,000-540,000 passengers with a wider spread. This is likely to be the busiest intermediate station on the Ashford to Maidstone East line, and would well justify the second hourly off-peak service calling there.**

204 **The JRC estimates for Heathlands allow for an 80% travel recovery but no higher, post-Covid, so a true rail industry comparison which allowed for Heathlands'**

total rail passenger generation, should look at comparator stations pre-Covid with a median range of 605,000 to 620,000 passengers.

205 **Kent stations with comparable pre-Covid annual passenger entry and exit volumes are Deal, Hildenborough and Longfield, and with the total Heathlands passenger generation almost as busy as Headcorn.**

Potential demand not taken into account

206 It remains to list some of the factors not incorporated into these estimates.

- All the policy and practical possibilities to stimulate use of rail and make it more relevant to future travel aspirations, discussed at length above, have not been counted in, e.g. journey opportunities with Thameslink trains to Cambridge, and Farringdon's Crossrail interchange for the Thames Valley.
- Practical on-train quality features could make a difference, with better phone coverage, tables that accommodate a computer (possibly very important post-Covid with higher computer usage), and power supplies in all coaches to power electronic media.
- The possibility that incomers to Heathlands will have different priorities for travel than existing local residents familiar with a relatively low frequency service.
- Ability to build on the scope of Heathlands station to attract a higher modal share through the adjoining District Centre and community hub, and the intended active travel corridors to the centre and station.
- Impact of a better off-peak service pattern and the new Thameslink peak service, to attract more users. Also estimates of rail travel originating elsewhere, coming to Heathlands for work, social or leisure purposes.
- Better accessibility to neighbouring communities within the wider station catchment, such as Lenham Heath and Charing Heath. Those are not counted in the initial estimates but some additional travel would be attributable to Heathlands either directly, or indirectly through the better rail services and maybe through familiarity with the District Centre for shopping.
- Development of a 'Kent Metro' concept into a county-scale reality, bringing greater trust and reliance on rail to modern lifestyles and particularly for easy inter-urban travel.

- As noted earlier, there is outline scope for early opening of a station, based on population and travel demand levels quickly reaching the equivalent of Lenham's numbers by the end of construction of Sector 1 and shortly after the start of Sector 2.

- So consideration of a short-term operating subsidy (if required) to enable station opening with the arrival of Sector 1 development, would ensure that rail travel habits are there from the start.

Revenue estimation

207 A table showing various discount offers for adult season tickets for local and London travel illustrates that local discounted travel is likely to maintain a low average revenue per journey. There are other forms of discounted travel and concessionary fare travellers also to be included.

208 Consequently, very cautious assumptions on rail revenue have been made, to allow for a significant growth in local and sub-regional journeys from this sustainable community. This implies much lower revenue yield per average journey compared to Kent-London fares. Even Lenham's current relatively low rail volume will comprise travel to all destinations, locally and nationally. In future a more sustainable community might not wish to travel so much to London, irrespective of Covid topics, and with more local and regional travel instead. An average revenue per journey of £5 has been adopted, after netting discounted, child, railcard and other concessionary fares.

Discounted, adult season ticket prices at Lenham for a variety of journeys

Standard class fares, 4 days/week (= 8 single journeys), 16.2 days per month (32.4 single journeys), 44 weeks x 4 days per year (352 single journeys)										
							- NOT now 5 days per week volume post-Covid			
Adult season ticket prices:-	Weekly	Monthly	Annual	*Rail*	Miles	Direct	£/mile expressed as fare per direct distance			
Lenham to Maistone East	£27.60	£106.00	£1,104.00	*9¾*		8.6	Weekly	Monthly	Annual	
Per journey rate	£3.45	£3.27	£3.14	Per mile:			£0.40	£0.38	£0.36	
Lenham to Ashford Intl.	£30.50	£117.20	£1,220.00	*10*		9.6	Weekly	Monthly	Annual	
Per journey rate	£3.81	£3.62	£3.47	Per mile:			£0.40	£0.38	£0.36	
Lenham to Canterbury	£62.30	£239.30	£2,492.00	*20*		16.2	Weekly	Monthly	Annual	
Per journey rate	£7.79	£7.39	£7.08	Per mile:			£0.48	£0.46	£0.44	
Lenham to London Victoria	£128.50	£493.50	£5,140.00	*49¼*		40.9	Weekly	Monthly	Annual	~£1 per day more to go to St.Pancras
NOT HS1 Per journey rate	£16.06	£15.23	£14.60	Per mile:			£0.39	£0.37	£0.36	on classic services via Thameslink
Lenham via HS1 to St. Pancras	£175.50	£674.00	£7,020.00	*66*		41.4	Weekly	Monthly	Annual	
Per journey rate	£21.94	£20.80	£19.94	Per mile:			£0.53	£0.50	£0.48	
Premium charge via HS1	£5.88	£5.57	£5.34				+35%	+35%	+35%	

209 Screen shots are set out in **Annex A** which follows, of the build up of Heathlands population estimates, rail demand, and revenue (cash, not PV), based on the two primary options of ~40 dwellings per hectare in Heathlands, and a wide or narrow spread of housing densities between outer zone 1 and core zone 4. The geographical allocation of dwellings, population and travel to the Lenham and

Heathlands rail catchment is also illustrated. No allowance has been made for use of rail to travel *into* Heathlands for work, leisure or social purposes – rail travel has been modelled on a residential out-and-back basis.

Summary revenue estimates

210 **Indicative station revenues have been made on this pessimistic basis, and suggest gross rail industry income prior to costs of at least £2m per annum, when the development is fully built up. Higher average revenue, closer to £2.4m per annum, would arise if more favourable assumptions were adopted.**

211 **The split of revenue would be roundly 8-10% to Lenham, and 90-92% to Heathlands, based on proximity to each station, assuming that there were two stations to serve the expanded catchments. The extra revenue would be a benefit to Lenham station as well as more than covering operating costs at Heathlands station, with a positive cash flow into the rail industry.**

212 **44-47% of the rail passenger numbers are forecast to originate from core zone 4, within an average 500 metres of Heathlands station, while 71-75% would originate from core zone 4 and inner zone 3, within an average 800 metres. For outer zone 1 and middle zone 2, over 800 metres from a station, the proportions would be 17-19% of Heathlands passenger volume, with the remaining 8-10% heading via Lenham.**

Overall summary

213 **Heathlands can be expected to be a busy and worthwhile station, whichever analytical basis is used. Demand and revenue estimates are on a cautious basis.**

214 **The project team is keen to engage with Network Rail and Southeastern, and define best value among the four options identified in this initial report, then to submit the short listed options to an SOBC process. See paras 64-66 at page 23.**

Please note there is no page 58

Annex A: Screen shots of modelling outputs

Screen shot 1: Summary dwelling numbers, population, rail travel data @ ~40 DPH with narrow range of housing densities

RESTATEMENT OF HEATHLANDS AND LENHAM NEW CATCHMENT POPULATIONS WHEN FULLY BUILT

	Population average via HEATHLANDS					Population average via LENHAM					Total population at 2.4 persons/unit				
	Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4	
	748	2,155	3,086	3,967	9,956	532	1,003	0	0	1,534	1,280	3,157	3,086	3,967	11,490

BOTTOM-UP NOTIONAL RAIL VOLUME AND REVENUE

Starting point is **35 rides per head** per year at Lenham parish scale, based on station usage in March 2019-February 2020, and mid-2019 population estimate.
Modelling assumption after several post-Covid years to reduce 'classic' rail travel volume to 80% of pre-Covid rides per head.
Of course, other new travel demands to refill rail capacity may emerge. **Reduction to 80% = rides per head estimated as** 28
Then this starting point is scaled up in rail travel accessibility per Heathlands zone, **with the starting base here being (Option B), Middle 2 as baseline.**

When Heathlands development is fully built-up

Option A = Outer 1 as baseline	via HEATHLANDS				% share: 91%	via LENHAM				% share: 9%	Total annual worth to RAIL INDUSTRY pre COSTS				
Annual rail	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys
Passenger volume	20,952	78,429	138,254	277,678	515,313	14,886	36,501	0	0	51,387	35,838	114,930	138,254	277,678	566,700
Including demand scaling ratio from above	1	1.3	1.6	2.5		1	1.3	1.6	2.5						
Notional revenue at £5 per average journey	£104,759	£392,144	£691,270	£1,388,390	£2,576,563	£74,432	£182,506	£0	£0	£256,937	£179,191	£574,650	£691,270	£1,388,390	£2,833,500

Option B = Middle 2 baseline (less high demand in Core 4)	via HEATHLANDS				% share: 90%	via LENHAM				% share: 10%	to RAIL INDUSTRY pre COSTS				
	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys
	16,117	60,330	112,331	177,714	366,492	11,451	28,078	0	0	39,529	27,568	88,408	112,331	177,714	406,021
Reverse engineer ratio for Outer 1 to 0.77	0.77	1	1.3	1.6		0.77	1	1.3	1.6						
	£80,584	£301,649	£561,657	£888,569	£1,832,460	£57,255	£140,389	£0	£0	£197,644	£137,839	£442,038	£561,657	£888,569	£2,030,104

OVERALL RANGE OF ESTIMATED ANNUAL RAIL PASSENGER VOLUMES AND NOTIONAL REVENUES, when Heathlands is fully built-up

	Annual passenger volume		Rounded	Annual notional revenues pre costs	
Top-down estimates	Broad-brush averages	482,589	**482,000**	£2,412,943	**£2,412,000**
Bottom-up estimates	Outer 1 as demand baseline	566,700	**566,000**	£2,833,500	**£2,833,000**
	Middle 2 as demand baseline	406,021	**406,000**	£2,030,104	**£2,030,000**
	Averaged central estimate	485,103	**485,000**	£2,425,516	**£2,425,000**

Starting point is 35 rides per head at parish scale = Outer 1 score
Reduced post-Covid to 80% = 28 rides per head

21.56	28.00	36.40	44.80

Fits within banding of outputs seen on Ashford-Maidstone East line.

Note: only new passengers counted.
No transfer estimated from Lenham Parish to Heathlands (eg, from Lenham Heath),
nor for passenger volume growth outside Heathlands new community.

Screen shot 2: Summary dwelling numbers, population, rail travel data @ ~40 DPH with wide range of housing densities

RESTATEMENT OF HEATHLANDS AND LENHAM NEW CATCHMENT POPULATIONS WHEN FULLY BUILT

	Population average via HEATHLANDS					Population average via LENHAM					Total population at 2.4 persons/unit				
	Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4	
	611	2,005	3,195	4,385	10,195	415	929	0	0	1,344	1,026	2,934	3,195	4,385	11,539

BOTTOM-UP NOTIONAL RAIL VOLUME AND REVENUE

Starting point is **35 rides per head** per year at Lenham parish scale, based on station usage in March 2019-February 2020, and mid-2019 population estimate.
Modelling assumption after several post-Covid years to reduce 'classic' rail travel volume to 80% of pre-Covid rides per head.
Of course, other new travel demands to refill rail capacity may emerge. **Reduction to 80% = rides per head estimated as** 28
Then this starting point is scaled up in rail travel accessibility per Heathlands zone, **with the starting base here being (Option B), Middle 2 as baseline.**

When Heathlands development is fully built-up

Option A = Outer 1 as baseline	via HEATHLANDS			% share:	92%	via LENHAM			% share:	8%	Total annual worth to RAIL INDUSTRY pre COSTS				
Annual rail	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys
Passenger volume	17,104	72,973	143,115	306,916	540,108	11,630	33,812	0	0	45,442	28,734	106,786	143,115	306,916	585,550
Including demand scaling ratio from above	1	1.3	1.6	2.5		1	1.3	1.6	2.5						
Notional revenue at £5 per average journey	£85,518	£364,867	£715,573	£1,534,582	£2,700,540	£58,150	£169,062	£0	£0	£227,212	£143,668	£533,929	£715,573	£1,534,582	£2,927,752

Option B = Middle 2 baseline (less high demand in Core 4)	via HEATHLANDS			% share:	92%	via LENHAM			% share:	8%	to RAIL INDUSTRY pre COSTS				
	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys	Outer 1	Middle 2	Inner 3	Core 4	Total jnys
	13,157	56,133	116,281	196,427	381,997	8,946	26,010	0	0	34,956	22,103	82,143	116,281	196,427	416,953
Reverse engineer ratio for Outer 1 to 0.77	0.77	1	1.3	1.6		0.77	1	1.3	1.6						
	£65,783	£280,667	£581,403	£982,133	£1,909,986	£44,731	£130,048	£0	£0	£174,778	£110,514	£410,715	£581,403	£982,133	£2,084,764

OVERALL RANGE OF ESTIMATED ANNUAL RAIL PASSENGER VOLUMES AND NOTIONAL REVENUES, when Heathlands is fully built-up

	Annual passenger volume		Rounded	Annual notional revenues pre costs	
Top-down estimates	Broad-brush averages	484,635	**484,000**	£2,423,173	**£2,423,000**
Bottom-up estimates	Outer 1 as demand baseline	585,550	**585,000**	£2,927,752	**£2,927,000**
	Middle 2 as demand baseline	416,953	**416,000**	£2,084,764	**£2,084,000**
	Averaged central estimate	495,713	**495,000**	£2,478,563	**£2,478,000**

Note: only new passengers counted.
No transfer estimated from Lenham Parish to Heathlands (eg, from Lenham Heath),
nor for passenger volume growth outside Heathlands new community.

Starting point is 35 rides per head at parish scale = Outer 1 score
Reduced post-Covid to 80% = 28 rides per head

21.56	28.00	36.40	44.80

Fits within banding of outputs seen on Ashford-Maidstone East line.

Density, distance mapping, population and rail volume outline estimates for Heathlands Sustainable Community
Gross and net DPH estimates aligned with Barton Willmore 3.3.21 data plus new employment zone near treatment works.
Consequential estimates for population density based on BW's DPH options.
Population densities used to guide annual rail usage and notional revenue estimates once development fully built-up, also linked to indicative densities closer to proposed railway station.
Accessibility to rail based on combination of Lenham and Heathlands stations.
Lenham station catchment from Heathlands community shown in yellow, in tables below.
Accessibility based on nominal direct + (960m/800m) multiplier for 'round the corner' distances to station entrance.

No. of units based on outline density proportioned to actual ha. vol.
(box F83 = control key), or varied as in Barton Willmore note

Screen shot 3:
Dwellings + population by sector at Heathlands at ~40 DPH, narrow range of densities

Locality	Approx Size (ha)	Gross developable hectares				Other features (hectares)				Net housing hectares				Housing unit numbers based on DPH				Population average per unit x 2.4				Total pop.	Population average via HEATHLANDS				Population average via LENHAM			
		Sorted by distance from station					District &			Revised ha. by distance from station				weighted by proximity to stations				weighted by proximity to stations					weighted by proximity to stations				weighted by proximity to stations			
	Total	Outer 1	Middle 2	Inner 3	Core 4	Primary School	Local Centre	Employment	Mobility Hub	Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4
1A	2.90				2.90	2.90							0.00				0				0					0				
1B	0.68				0.68								0.68				33				79					79				
1C	1.80			0.80	1.01							0.80	1.01			34	48			82	116				82	116				
1D	6.56			3.55	3.01							3.55	3.01			152	144			364	347				364	347				
1E	8.92		2.89	6.03			1.02	5.00			0.73	2.17			77	93			185	222				185	222				
1F	7.34		3.83	3.51							3.83	3.51			143	150			343	360				343	360				
	28.21	**0.00**	**6.72**	**13.89**	**7.60**					**0.00**	**4.56**	**10.03**	**4.70**	**0**	**220**	**428**	**226**	**0**	**528**	**1,027**	**542**	**2,097**	**0**	**528**	**1,027**	**542**	**0**	**0**	**0**	**0**
2A	2.67				2.67		2.67						0.00				144				346					346				
2B	5.99			0.44	5.55							0.44	5.55			19	267			45	640				45	640				
2C	0.57				0.57		0.57						0.00				28				67					67				
2D	3.04			0.29	2.75							0.29	2.75			13	132			30	317				30	317				
2E	3.77			0.19	3.58							0.19	3.58			8	172			19	413				19	413				
2F	3.09			1.52	1.58							1.52	1.58			65	76			155	181				155	181				
	19.14	**0.00**	**0.00**	**2.44**	**16.70**					**0.00**	**0.00**	**2.44**	**13.46**	**0**	**0**	**104**	**818**	**0**	**0**	**250**	**1,964**	**2,214**	**0**	**0**	**250**	**1,964**	**0**	**0**	**0**	**0**
3A	0.57				0.57		0.57						0.00				28				67					67				
3B	11.94			0.92	11.02				1.56			0.92	9.46			39	454			94	1,089				94	1,089				
3C	4.04			4.04								4.04				173				414					414				
3D	0.72				0.72								0.72				34				83					83				
3E	0.43				0.43								0.43				21				50					50				
	17.70	**0.00**	**0.00**	**4.96**	**12.74**					**0.00**	**0.00**	**4.96**	**10.61**	**0**	**0**	**212**	**537**	**0**	**0**	**508**	**1,289**	**1,797**	**0**	**0**	**508**	**1,289**	**0**	**0**	**0**	**0**
4A	0.70			0.60	0.10							0.60	0.10			25	5			61	12				61	12				
4B	1.97			1.67	0.30							1.67	0.30			71	14			171	34				171	34				
4C	0.54			0.54								0.54				23				55					55				
4D	0.58			0.58								0.58				25				59					59				
4E	1.94		1.03	0.91							1.03	0.91			39	39			92	93				92	93				
4F	1.26		1.26					1.26			0.00				0				0					0					
4G	1.41			0.82	0.60							0.82	0.60			35	29			84	69				84	69				
4H	2.01			1.51	0.50							1.51	0.50			65	24			155	58				155	58				
4I	2.65		1.06	1.60							1.06	1.60			39	68			95	163				95	163				
4J	0.57		0.57								0.57				21				51					51					
4K	0.53			0.53								0.53				23				54					54				
4L	1.62		1.13	0.50							1.13	0.50			42	21			101	51				101	51				
4M	0.29		0.29								0.29				11				26					26					
4N	0.52		0.52								0.52				19				46					46					
4O	0.24		0.24								0.24				9				21					21					
4P	3.63		3.63								3.63				136				325					325					
4Q	2.01		2.01								2.01				75				180					180					
4R	1.79	0.07	1.72							0.07	1.72			2	64			6	154				6	154					
	24.26	**0.07**	**13.44**	**9.24**	**1.50**					**0.07**	**12.18**	**9.24**	**1.50**	**2**	**455**	**394**	**72**	**6**	**1,092**	**946**	**173**	**2,216**	**6**	**1,092**	**946**	**173**	**0**	**0**	**0**	**0**
5A	1.46	0.94	0.51				0.94			0.00	0.51			50	19			120	46				120	46						
5B	2.30	0.45	1.85			2.30				0.00	0.00			0	0			0	0								0			
5C	11.29	8.51	2.78			0.40				8.11	2.78			259	104			623	249				623	249						
5D	6.05	0.40	5.64							0.40	5.64			13	211			31	506								31	506		
5E	7.37	5.14	2.23							5.14	2.23			165	83			395	200								395	200		
	28.47	**15.45**	**13.02**	**0.00**	**0.00**					**13.65**	**11.17**	**0.00**	**0.00**	**487**	**417**	**0**	**0**	**1,168**	**1,001**	**0**	**0**	**2,169**	**743**	**295**	**0**	**0**	**426**	**705**	**0**	**0**
6A	1.56			1.56					1.56			0.00				0				0					0				
6B	4.78		1.32	3.46							1.32	3.46			49	148			118	354				118	354				
6C	3.35		3.35					3.35			0.00				0				0					0					
6D	0.77		0.77					0.77			0.00				0				0					0					
6E	0.24		0.24								0.24				9				22					22					
6F	1.28	0.39	0.88							0.39	0.88			13	33			30	79					79			30			
6G	0.13		0.13								0.13				5				12					12					
6H	0.09		0.09								0.09				4				8					8					
6I	0.49	0.49								0.49				16				37									37			
6J	0.77		0.77								0.77				29				69									69		
6K	1.23	0.49	0.73							0.49	0.73			16	27			38	66								38	66		
6L	1.82		1.82								1.82				68				163									163		
	16.50	**1.38**	**10.11**	**5.01**	**0.00**					**1.38**	**5.99**	**3.46**	**0.00**	**44**	**224**	**148**	**0**	**106**	**537**	**354**	**0**	**997**	**0**	**239**	**354**	**0**	**106**	**297**	**0**	**0**

Note some western ha. closer to Lenham station. Totals based on Barton Willmore mapping and allocations 3.3.21

TOTALS	Developable hectares	16.90	43.29	35.55	38.54					15.10	33.90	30.14	30.27	533	1,316	1,286	1,653	1,280	3,157	3,086	3,967		748	2,155	3,086	3,967	532	1,003	0	0
		134.28								109.41				4,788				11,490					9,956				1,534			

Actual Gross density excluding special locations

Master control box to change starter input is 'F83'.
Barton Willmore schedule sets average DPH of roundly 40 (implies narrow spread approx 32/37.3/42.7/48 DPH, or greater spread if lower starting point, suggested 25/34.6/44.2/53.8)
Higher average DPH not adopted in this modelling here as ~40 DPH achieves target of ~4,800-5,000 units
JRC has netted off provision for roads, paths etc as shown.

Narrow density spread = x 1.5 from base
JRC assumptions on spread
Wide density spread = x 2.15 from base

(straight line)	DPH	32.0	37.3	42.7	48.0	41.02				32.0	37.3	42.7	48.0	483	1,266	1,286	1,453	1,160	3,037	3,086	3,487									
														50	50		200	120	120		480									
Dwellings adjusted for changes in specific zones														533	1,316	1,286	1,653	1,280	3,157	3,086	3,967									
														4,788				11,490												

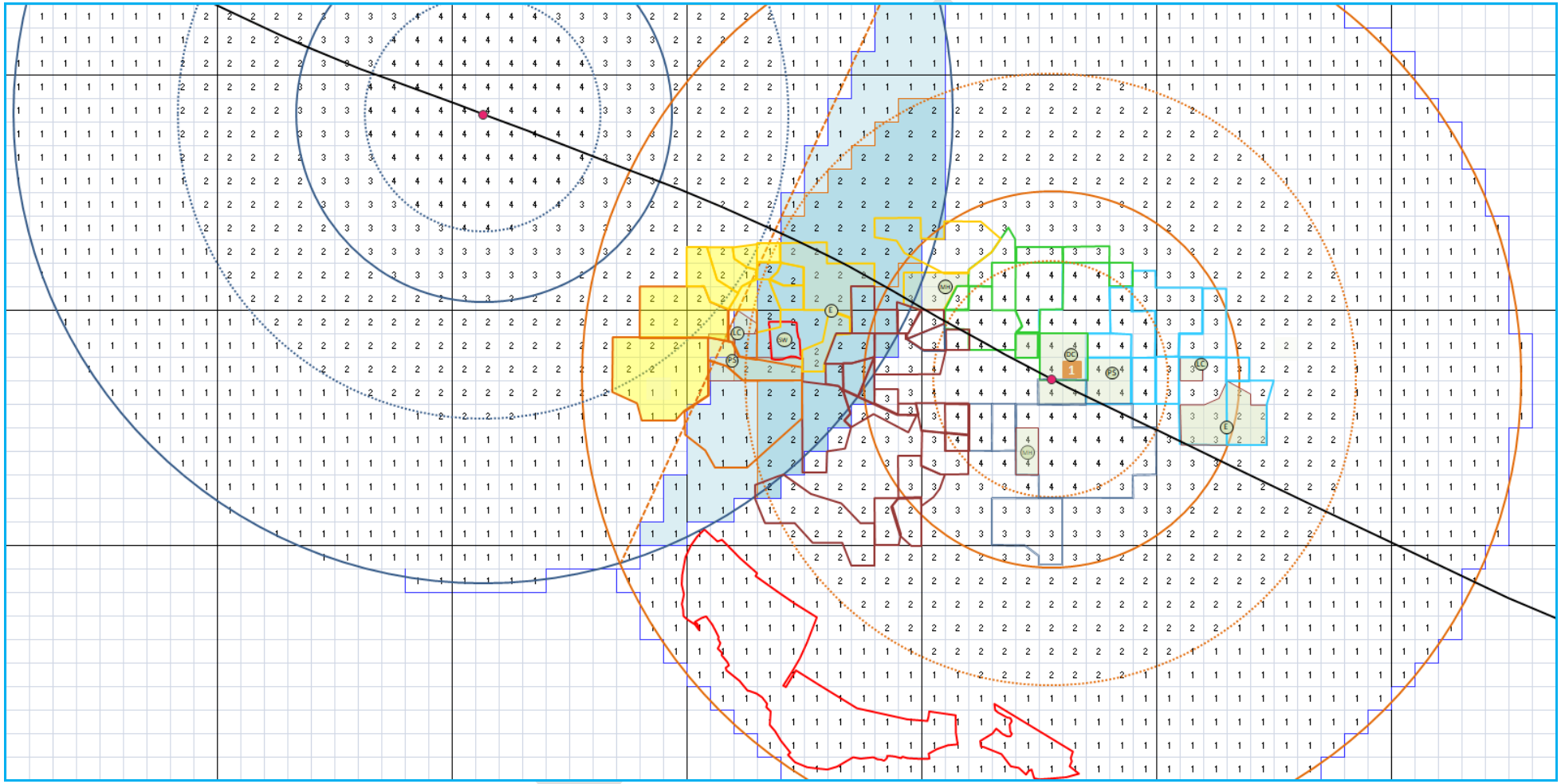
Density, distance mapping, population and rail volume outline estimates for Heathlands Sustainable Community
Gross and net DPH estimates aligned with Barton Willmore 3.3.21 data plus new employment zone near treatment works.
Consequential estimates for population density based on BW's DPH options.
Population densities used to guide annual rail usage and notional revenue estimates once development fully built-up, also linked to indicative densities closer to proposed railway station.
Accessibility to rail based on combination of Lenham and Heathlands stations.
Lenham station catchment from Heathlands community shown in yellow, in tables below.
Accessibility based on nominal direct + (960m/800m) multiplier for 'round the corner' distances to station entrance.

Screen shot 4:
Dwellings + population by sector at Heathlands at ~40 DPH, wide range of densities

No. of units based on outline density proportioned to actual ha. vol.
(box F83 = control key), or varied as in Barton Willmore note

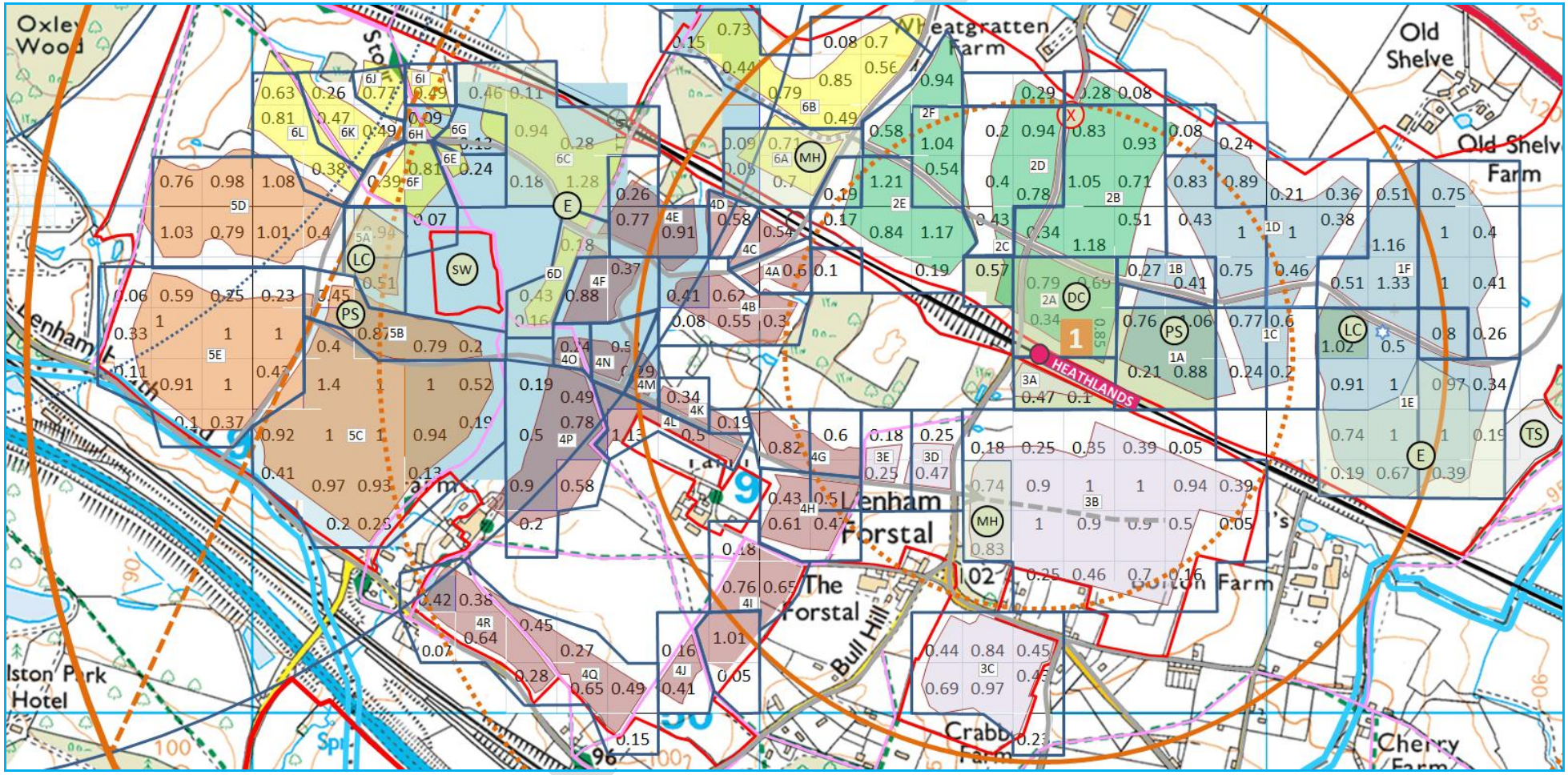
Locality	Approx Size (ha)	Gross developable hectares — Sorted by distance from station				Other features (hectares)				Net housing hectares — Revised ha. by distance from station				Housing unit numbers based on DPH — weighted by proximity to stations				Population average per unit x 2.4 — weighted by proximity to stations				Total pop.	Population average via HEATHLANDS — weighted by proximity to stations				Population average via LENHAM — weighted by proximity to stations			
	Total	Outer 1	Middle 2	Inner 3	Core 4	Primary School	Local Centre	Employment	Mobility Hub	Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4		Outer 1	Middle 2	Inner 3	Core 4	Outer 1	Middle 2	Inner 3	Core 4
1A	2.90				2.90	2.90							0.00				0				0					0				
1B	0.68				0.68								0.68				37				88					88				
1C	1.80			0.80	1.01							0.80	1.01			35	54			84	130				84	130				
1D	6.56			3.55	3.01							3.55	3.01			157	162			376	388				376	388				
1E	8.92		2.89	6.03			1.02	5.00			0.73	2.17			75	96			181	230				181	230				
1F	7.34		3.83	3.51							3.83	3.51			132	155			318	372				318	372				
	28.21	0.00	6.72	13.89	7.60					0.00	4.56	10.03	4.70	0	208	443	253	0	498	1,064	606	2,168	0	498	1,064	606	0	0	0	0
2A	2.67				2.67		2.67						0.00				144				346					346				
2B	5.99			0.44	5.55							0.44	5.55			19	298			47	716				47	716				
2C	0.57				0.57		0.57						0.00				28				67					67				
2D	3.04			0.29	2.75							0.29	2.75			13	148			31	355				31	355				
2E	3.77			0.19	3.58							0.19	3.58			8	193			20	462				20	462				
2F	3.09			1.52	1.58							1.52	1.58			67	85			161	203				161	203				
	19.14	0.00	0.00	2.44	16.70					0.00	0.00	2.44	13.46	0	0	108	896	0	0	259	2,149	2,409	0	0	259	2,149	0	0	0	0
3A	0.57				0.57		0.57						0.00				28				67					67				
3B	11.94			0.92	11.02				1.56			0.92	9.46			40	508			97	1,220				97	1,220				
3C	4.04			4.04								4.04				179				429					429					
3D	0.72				0.72								0.72				39				93					93				
3E	0.43				0.43								0.43				23				56					56				
	17.70	0.00	0.00	4.96	12.74					0.00	0.00	4.96	10.61	0	0	219	598	0	0	526	1,435	1,961	0	0	526	1,435	0	0	0	0
4A	0.70			0.60	0.10							0.60	0.10			26	5			63	13				63	13				
4B	1.97			1.67	0.30							1.67	0.30			74	16			177	39				177	39				
4C	0.54			0.54								0.54				24				57					57					
4D	0.58			0.58								0.58				26				61					61					
4E	1.94		1.03	0.91							1.03	0.91			36	40			86	96				86	96				
4F	1.26		1.26					1.26			0.00				0				0					0					
4G	1.41			0.82	0.60							0.82	0.60			36	32			87	77				87	77				
4H	2.01			1.51	0.50							1.51	0.50			67	27			160	65				160	65				
4I	2.65		1.06	1.60							1.06	1.60			37	70			88	169				88	169				
4J	0.57		0.57								0.57				20				47					47					
4K	0.53			0.53								0.53				23				56					56					
4L	1.62		1.13	0.50							1.13	0.50			39	22			93	53				93	53				
4M	0.29		0.29								0.29				10				24					24					
4N	0.52		0.52								0.52				18				43					43					
4O	0.24		0.24								0.24				8				20					20					
4P	3.63		3.63								3.63				126				302					302					
4Q	2.01		2.01								2.01				70				167					167					
4R	1.79	0.07	1.72							0.07	1.72			2	59			4	143				4	143					
	24.26	0.07	13.44	9.24	1.50					0.07	12.18	9.24	1.50	2	421	408	81	4	1,011	980	193	2,188	4	1,011	980	193	0	0	0	0
5A	1.46	0.94	0.51				0.94			0.00	0.51			50	18			120	43				120	43						
5B	2.30	0.45	1.85			2.30				0.00	0.00			0	0			0	0								0			
5C	11.29	8.51	2.78			0.40				8.11	2.78			203	96			486	231				486	231						
5D	6.05	0.40	5.64							0.40	5.64			10	195			24	468								24	468		
5E	7.37	5.14	2.23							5.14	2.23			129	77			308	185								308	185		
	28.47	15.45	13.02	0.00	0.00					13.65	11.17	0.00	0.00	391	386	0	0	939	927	0	0	1,866	606	274	0	0	333	653	0	0
6A	1.56			1.56					1.56			0.00				0				0					0				
6B	4.78		1.32	3.46							1.32	3.46			46	153			110	367				110	367				
6C	3.35		3.35					3.35			0.00				0				0					0					
6D	0.77		0.77					0.77			0.00				0				0					0					
6E	0.24		0.24								0.24				8				20					20					
6F	1.28	0.39	0.88							0.39	0.88			10	30			24	73					73			24			
6G	0.13		0.13								0.13				5				11					11					
6H	0.09		0.09								0.09				3				8					8					
6I	0.49	0.49								0.49				12				29									29			
6J	0.77		0.77								0.77				27				64									64		
6K	1.23	0.49	0.73							0.49	0.73			12	25			30	61								30	61		
6L	1.82		1.82								1.82				63				151									151		
	16.50	1.38	10.11	5.01	0.00					1.38	5.99	3.46	0.00	34	207	153	0	83	497	367	0	946	0	222	367	0	83	276	0	0
	Note some western ha. closer to Lenham station					Totals based on Barton Willmore mapping and allocations 3.3.21																								
TOTALS	Developable hectares	16.90	43.29	35.55	38.54					15.10	33.90	30.14	30.27	428	1,222	1,331	1,827	1,026	2,934	3,195	4,385		611	2,005	3,195	4,385	415	929	0	0
		134.28								109.41				4,808				11,539					10,195				1,344			
						Actual Gross density excluding special locations	Master control box to change starter input is 'F83'.																								
		Narrow density spread = x 1.5 from base					Barton Willmore schedule sets average DPH of roundly 40 (implies narrow spread approx 32/37.3/42.7/48 DPH, or greater spread if lower starting point, suggested 25/34.6/44.2/53.8)																								
JRC assumptions on spread		Wide density spread = x 2.15 from base					Higher average DPH not adopted in this modelling here as ~40 DPH achieves target of ~4,800-5,000 units																								
(straight line)	DPH	25.0	34.6	44.2	53.8	41.20	JRC has netted off provision for roads, paths etc as shown.																								
										25.0	34.6	44.2	53.8	378	1,172	1,331	1,627	906	2,814	3,195	3,905									
														50	50		200	120	120		480									
							Dwellings adjusted for changes in specific zones							428	1,222	1,331	1,827	1,026	2,934	3,195	4,385									
														4,808				11,539												

Screen shot 5: Compilation of concentric geographical hectares from Lenham and Heathlands stations, showing Heathlands plan Sectors



Specialist locations (e.g. Employment zone) are identified by symbols. JRC has opted for which neighbouring hectares are included in their modelling and circulated this to Barton Willmore. Sub-sectors filled in yellow here are closer to Lenham station than to Heathlands.

Screen shot 6: Extract from geographic estimation of proportion of each hectare which is built-up



Annex B: Heathlands Station Location

Advisable station criteria

215 When looking to site a new station, there are a number of criteria that must be met, but principally the platforms should be on the straight or, where this is not possible, on a curve flatter than 1000m radius. In the area of the development there are no straights suitable for locating a station, so the platform will be on a curve. All curves are flatter than 1000m radius, so platform locations are not constrained by this.

216 The station is not proposed as where trains terminate or traincrew change over, so the platforms are not constrained by track gradient.

217 Access between platforms in this area will be most easily accomplished by a bridge rather than a subway. In the area of the development, there are two existing road bridges crossing the line, one new road bridge proposed and one new foot/cycle bridge proposed. Identification of station sites has centred around these locations.

218 To keep the costs down, it is advisable to leave all signals in their existing positions. It is not advisable to have a signal in the middle of the platform, indeed the best place for platforms is at least 20-25 metres before a signal (so that the driver can see the signal is showing a proceed aspect before leaving the platform) or at least 186m before the platform (so that a train stood in the platform doesn't prevent the signal before this signal showing a proceed aspect). These constraints help maintain the capacity on the route.

219 In the vicinity of the development, there are two areas of ancient woodland. From an ecological perspective, it would be best to avoid construction work close to these areas.

220 The platforms need to be long enough to accommodate the longest trains which use the route. In the worst case this could be a train of 12-cars x 20 metres (250m platform length) for the purposes of the engineering section of the report, although other platforms on the route range between 5-car length (110m) and 8-car length (170m). Most services appear to be 4-car or 8-car

trains. A decision on the final platform length can be made later. If there is space for a 12-car platform, shorter platforms can be more easily accommodated. For cost estimation, 10-car platforms have been assessed. Operationally, 8-car platforms are practical if the trains are no longer than this, or have Selective Door Operation.

221 Three possible platform locations have been identified in the area and each of these is described in the paragraphs below.

Option 1

222 This is the most easterly of the sites and is shown in Figure B 1 below.

Figure B 1 Option 1 Station site

223 The platforms are to the east of Maylum Bridge (carrying Forstal Road over the railway). There is no room on the existing bridge for a footpath or cycle route, so the developer is proposing to add a new dedicated foot and cycle bridge east of the existing bridge. This bridge can be used to give access to both platforms and can be designed so that the station could readily be added at a later date than the bridge, if necessary.

224 The Mobility Hub could be built either north or south of the railway as it is proposed to relocate the traveller's site further east. The Mobility Hub can include a facility for selling tickets as well as providing interchange with buses and taxis, being a safe place to store bicycles/electric scooters and contain a Car Club or vehicle hire depot. Such a Mobility Hub would then put the station at the heart of the local transport infrastructure, maximising its potential usage.

225 The platforms would be located 25m east of the up (London-bound) signal ME212 which is itself east of the existing road bridge. Access to the platforms would be by steps and a ramp suitable for use by Persons of Reduced Mobility (PRM) down from the bridge. However it would be equally possible that the side that the platform that is on the same side of the track as the mobility hub could have steps and a ramp down from the Mobility Hub instead. The diagram above shows the new foot and cycle bridge being located close to the existing road bridge.

226 As designs for the development proceed, it may be possible to locate it further east. This would then move the main access to the platform away from the end of the platform and encourage the passengers to spread out more along the length of the train, which will speed up the time that the train is stationary for boarding and alighting.

227 For shorter platforms, the eastern ends of the platforms would be omitted with the western end maintaining its position relative to the signal.

228 The track alignment here is a curve of approximately 6065m radius and mainly level for about 150m of platform with the track falling away in both directions. This location on a hump will help trains to brake into the station and accelerate away from the platform, reducing the overall energy demand. The site is mainly in a shallow cutting, meaning that the approaches to the new cycle and foot bridge will be very gentle slopes.

Option 2a

229 This is the middle of the three sites and is shown in Figure B 2 below.

Figure B 2 Option 2a Station site

230 The platforms are situated on a shallow embankment and their location is fixed by the position of the ancient woodland on the south side of the railway and the 186m overlap from signal ME211 in the down (eastbound) direction. At 250m long, these constraints mean that the platforms are slightly staggered, at shorter lengths the stagger can be removed, and the platforms kept centred around the new road bridge. There is also an area of ancient woodland on the north of the railway to the west of the station site that may restrict construction activity.

231 The platforms are located either side of a new road bridge to be built over the railway as part of the development. This new bridge will incorporate cycle and footpaths and can be used to gain access to both platforms. As with Option 1 a Mobility Hub could be constructed on either side of the railway to provide convenient transport interchange. Access is much closer to the centre of the platforms, improving passenger distribution along the platform and hence improving alighting and boarding times. In this case the PRM ramp would include a 180^{o} bend to bring the ramp out close to the foot of the staircase.

232 The station platforms would be level with the tracks rising at either end. This is less beneficial than Option 1's arrangement. The track alignment is a very flat radius of about 20,000m. There is a brick culvert under the platforms which would need lengthening but might equally provide a suitable outfall for the platform drainage.

Option 2b

233 This is the site which is closest to Lenham station and is shown in Figure B 3 below.

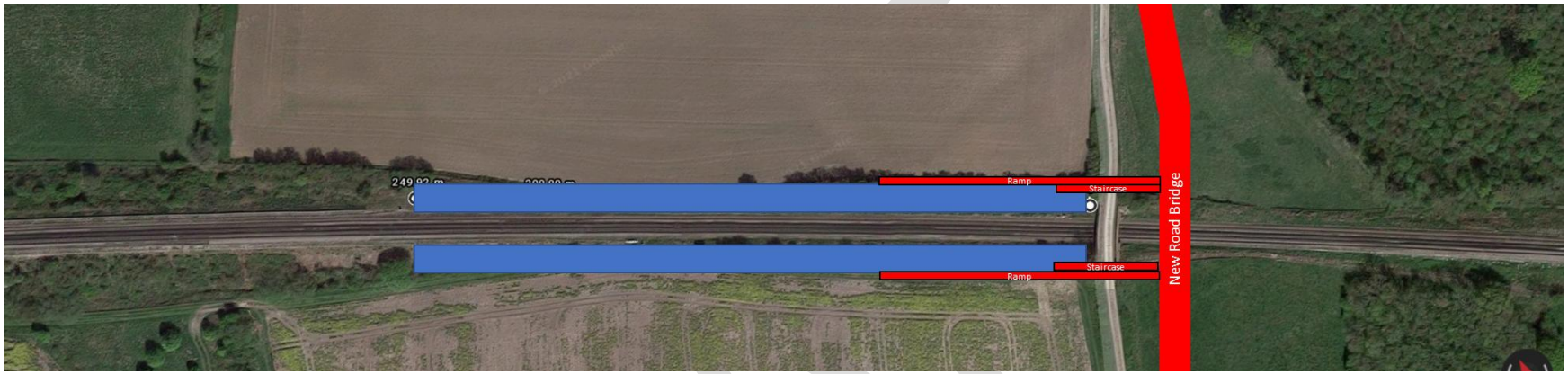


Figure B 3 Option 2b Station Site

234 The platform is in a shallow cutting at its eastern end changing to a shallow embankment at the western end. The platform positions are dictated by its proximity to the existing farm track bridge (Powells Bridge). A replacement bridge has been assumed in the figure above, however if the bridge is downgraded to a foot and cycle bridge, then a new bridge may not be necessary and the stirs and ramps can be accessed from the existing bridge. Without a new bridge, access for buses is more difficult and the mobility hub may need to be located further from the station. Should shorter platforms be built, the east end of the platforms would remain where they are.

235 The track alignment is a flat curve of approximately 8089m radius on a 1 in 100 gradient falling to the east. The PRM compliant ramp could form part of the public footpath to Lenham, especially if the footpath could be relocated along the north side of the railway so that the current foot crossing could be removed.

Please note there is no page 70

Annex C: Operational Analysis

Assumptions

236 The first assumption being used for the initial analysis is that it will be based on the December 2020 to May 2021 Working Timetable, which is the latest timetable publicly available. It does not, however, reflect the service being run currently, which is a special timetable due to the COVID 19 pandemic. This temporary timetable will be referenced, should it put forward solutions to the issues raised by the Working Timetable.

237 The second assumption is that because the timetable gets more constrained the nearer you get to London, services will remain running to the current timetable between London and Maidstone East in both directions.

238 The current service pattern through Lenham is a two trains per hour (tph) service from London Victoria to Ashford, with some services being extend to/from Canterbury, Minster or Ramsgate. In the peak, all services call at all stations between Bearsted and Ashford International, in the off-peak only one of the two services call at these stations.

239 There are six operational considerations to examine in this report and each is dealt with in turn below.

a) Platform Dwell Time;

b) Journey time changes from the additional station stop;

c) The impact of doubling service frequency at Charing, Heathlands and Lenham;

d) Turnround times at Ashford International for those services terminating there;

e) Crossing move conflicts for trains getting to or from Platforms 1 and 2; and

f) Turnround times at Canterbury West for those services which terminate there.

Platform dwell times

240 Platform dwell times (the time that a train is stationary in the platform) varies by time of day and direction. At Lenham, all but one train to London have a 30 second dwell time, but trains from London have a 60 second dwell time, reducing to 30 seconds for two services between 19:00 and 19:30, where other allowances are introduced. These are generally counter-intuitive, as it would be expected, for

London-bound commuters, that boarding times in the morning to London would be longer as more people use these trains, and trains away from London could have a 30 second dwell time as the evening commuter peak is spread out more than the morning peak.

241 The platform dwell times at Charing are even more complicated. In general, they are 30 second dwell times off-peak and 60 second dwell times in the peak. However, there are two services to London which have at least 180 second dwell times at Charing. This would appear to be because of the train needing to be cleared out of Ashford International station to allow another train to use Platform 5 or 6.

242 A dwell time of 30 seconds should be planned for a new station at Heathlands.

Journey time

243 The booked journey time between Charing and Lenham is 4½ minutes in each direction. Trains are able to reach the line speed of 80mph between these stations. The introduction of a Heathlands station will add 1 minute to the running times plus 30 seconds for the station stop, making a journey time extension of 1½ minutes in each direction. Between Lenham and Heathlands trains will not reach the 80mph line speed as the distance between stations is too short (about 2750m). They will achieve 80mph between Charing and Heathlands.

244 A train from Heathlands to Ashford will, therefore, arrive at Ashford 1½ minutes later than is the case today and also need to leave Ashford International 1½ minutes earlier in the opposite direction.

245 Trains which terminate at Ashford today (generally those that do not stop at stations between Bearsted and Ashford International) do so by crossing the layout to use platform 1 on the southern edge of the station. The turnround times are between 24 and 42 minutes as indicated below.

Ashford International arrive	**Ashford International depart**	**Current Turn round time (minutes)**
07:31	07:57	26
08:31	09:05	34
09:30	10:05	35
10:23	11:05	42
11:23	12:05	42

Ashford International arrive	Ashford International depart	Current Turn round time (minutes)
12:23	13:05	42
13:23	14:05	42
14:23	15:05	42
15:28	15:57	29
16:29	16:53	24
17:29	17:57	28
18:57	19:34	37
19:55	20:34	39

246 If all the trains were to stop at all stations between Maidstone East and Ashford International in both directions, the above table would look like this:

Ashford International arrive	Ashford International depart	Current Turn round time (minutes)
07:31	07:57	26
08:31	09:05 → 08:57	34 → 26
09:30	10:05 → 09:57	35 → 27
10:23 → 10:30	11:05 → 10:57	42 → 27
11:23 → 11:30	12:05 → 11:57	42 → 26
12:23 → 12:30	13:05 → 12:57	42 → 27
13:23 → 13:30	14:05 → 13:57	42 → 27
14:23 → 14:30	15:05 → 14:57	42 → 27
15:28 → 15:30	15:57	29 → 27
16:29	16:53	24
17:29	17:57	28
18:57	19:34	37
19:55	20:34	39

247 The impact of stopping the current “fast” services at all stations between Maidstone East and Ashford International in both directions still gives acceptable turnround times at Ashford.

Turnround times at Ashford

248 If we then add the additional stop at Heathlands we get the following table:

Ashford International arrive	Ashford International depart	Current Turn round time (minutes)
07:31→ 07:32:30	07:57→ 07:55:30	26→ 23
08:31→ 08:32:30	09:05 → 08:57→ 08:55:30	34 → 26→ 23
09:30→ 09:31:30	10:05 → 09:57→ 09:55:30	35 → 27→ 24
10:23 → 10:30→ 10:31:30	11:05 → 10:57→ 10:55:30	42 → 27→ 24
11:23 → 11:30→ 11:31:30	12:05 → 11:57→ 11:55:30	42 → 26→ 23
12:23 → 12:30→ 12:31:30	13:05 → 12:57→ 12:55:30	42 → 27→ 24
13:23 → 13:30→ 13:30	14:05 → 13:57→ 13:55:30	42 → 27→ 24
14:23 → 14:30→ 14:31:30	15:05 → 14:57→ 14:55:30	42 → 27→ 24
15:28 → 15:30→ 15:31:30 Note 1	15:57→ 15:55:30	29 → 27→ 24
16:29→ 16:30:30	16:53→ 16:51:30	24→ 21 Note 2
17:29→ 17:30:30	17:57→ 17:55:30	28→ 25
18:30 Note 3	18:57 → 18:56:00	27 → 26 Note 4
18:57→ 18:58:30	19:34→ 19:32:30 Note 5	37→ 34
19:55→ 19:56:30	20:34→ 20:32:30 Note 5	39→ 36

Notes

Note 1 The 15:28 arrival currently has a 5 minute pathing allowance approaching Ashford, this has been absorbed into the revised arrival time.

Note 2 The 16:53 departure has 60 second dwell times at all stations to Maidstone East, extending journey times by 2 minutes over other services. This could be clawed back to extend the turnround time for this service to 23 minutes.

Note 3 This service has 2 minutes pathing time approaching Ashford, which has been absorbed by the additional station call.

Note 4 This service transfers to the Washer Road to turn back then returns to Platform 6 today.

Note 5 It may not be possible to achieve earlier departure times on these services due to conflicts with services from Charing Cross. In which case, one of the existing station stops may have to be omitted to keep Maidstone East times unchanged.

249 Thus the minimum turnround time is reduced from 24 minutes today to 23 minutes with all trains stopping on the line through Heathlands and with an additional stop at the new station. This is still acceptable.

250 The table above demonstrates that the current xx:05 departures to Victoria become xx:55 ½ departures. The regular pattern of services from Ramsgate to Charing Cross via Tonbridge has it arriving at Ashford International between xx:55 and xx:59 for an xx:02/xx:03 departure. So unless this service can be retimed, the connection at Ashford International is broken.

251 The service which terminate at Ashford International today then uses the washer road to turn back has the following WTT timings:

	today	proposed
Ashford International arrive	18:30 Plat 6	18:31 Plat 6
Depart	18:36	18:36
Washer Road arrive	18:41	18:41
Washer Road depart	18:48	18:48
Ashford International arrive	18:53 Plat 6	18:53 Plat 2
Depart	18:57	18:56

252 The proposed timings above, show that turnrounds in the Washer Road do not compromise recovery time.

253 Below is a table of all WTT Up services through Ashford International that pass the site of Heathlands station. (Freight not complete)

Ashford International arrive	**From**	**Ashford International depart**	**Plat**	**To**	**Notes**
05:10	Sidings	05:18	5	Victoria	
05:28	Sidings	05:30	2	Blackfriars	

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
	Sidings	05:36	5	Maidstone East	ECS
05:43	Sidings	05:47	6	Victoria	
05:55	Sidings	06:02	6	Victoria	
		06:22	6	Blackfriars	No arrival seen in WTT
06:34	Sidings	06:39	2	Victoria	
06:50	Sidings	06:56	5	Victoria	3mins dwell at Charing
-	Dollands Moor	07:04 pass	-	Daventry	Freight
07:20	Sidings	07:27	5	Victoria	
07:31	Victoria	07:57	1	Victoria	26 min dwell
-	Dollands Moor	08:04 pass	-	Dagenham Dock	Freight WThFO
-	Dollands Moor	08:23 pass	-	Scunthorpe	Freight
08:26	Minster	08:30	6	Victoria	
08:31	Victoria	09:05	1	Victoria	34 min dwell Fast service
09:27	Ramsgate	09:30	6	Victoria	3½ min dwell at Charing
	Dollands Moor	09:45 pass	UML	London Gateway	Freight
	Dollands Moor	09:52 pass	UML	Wembley	Freight MO
09:30	Victoria	10:05	1	Victoria	35 min dwell Fast service
10:27	Canterbury West	10:33	5	Victoria	
10:23	Victoria	11:05	1	Victoria	42 min dwell Fast service

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
11:27½	Canterbury West	11:33	5	Victoria	
-	Dollands Moor	11:54 pass	UML	Ferme Park or Eastleigh	Freight
11:23	Victoria	12:05	1	Victoria	42 min dwell Fast service
12:30	Canterbury West	12:33	5	Victoria	
12:23	Victoria	13:05	1	Victoria	42 min dwell Fast Service
13:27	Canterbury West	13:33	5	Victoria	
13:23	Victoria	14:05	1	Victoria	42 min dwell Fast service
14:27	Canterbury West	14:33	6	Victoria	
14:23	Victoria	15:05	1	Victoria	42 min dwell Fast service
15:27	Canterbury West	15:33	6	Victoria	
-	Folkestone West	15:44½ pass	-	Victoria	ThO Charter?
15:28	Victoria	15:57	1	Victoria	29 min dwell
16:27	Canterbury West	16:33	6	Victoria	
16:29	Victoria	16:53	1	Victoria (extra dwell time 2½ mins)	24 min dwell
17:28	Canterbury West	17:33	5	Victoria	
17:29	Victoria	17:57	1	Victoria	28 min dwell
18:27	Canterbury West	18:34	2	Victoria	

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
18:53	Washer Road	18:57	6	Victoria	
18:57	Victoria	19:34	1	Victoria	37 min dwell
20:02	Washer Road	20:05	6	Victoria	Fast service
19:55	Victoria	20:34	1	Victoria	39 min dwell
20:56	Washer Road	21:05	2	Victoria	Fast service
21:31	East Berthing Sidings	21:34	1	Victoria	
21:59	East Berthing Sidings	22:05	1	Victoria	Fast service
22:27	Canterbury West (Fast)	22:40	6	Victoria	

254 Below is a table of all WTT Down services through Ashford International that pass the site of Heathlands station (excluding freight).

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
06:53	Maidstone East	07:04½	6	Minster	
07:31	Victoria	07:57	1	Victoria	26 min dwell
08:00	Victoria	08:06	1	Canterbury West	
08:31	Victoria	09:05	1	Victoria	34 Min dwell
09:30	Victoria	10:05	1	Victoria	35 min dwell
09:53	Victoria	10:03	6	Canterbury West	

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
10:23	Victoria	11:05	1	Victoria	42 min dwell Fast service
10:53	Victoria	11:05	6	Canterbury West	
11:23	Victoria	12:05	1	Victoria	42 min dwell Fast service
11:53	Victoria	12:05	6	Canterbury West	
12:23	Victoria	13:05	1	Victoria	42 min dwell Fast Service
12:53	Victoria	13:05	6	Canterbury West	
13:05	Victoria	13:09	5	Gillingham (Kent)	Runs as required
13:23	Victoria	14:05	1	Victoria	42 min dwell Fast service
13:53	Victoria	14:05	6	Canterbury West	
14:23	Victoria	15:05	1	Victoria	42 min dwell Fast service
14:52	Victoria	15:05	6	Canterbury West	
15:28	Victoria	15:57	1	Victoria	29 min dwell Fast service
15:53	Victoria	16:05	6	Canterbury West	
16:29	Victoria	16:53	1	Victoria	24 min dwell
16:53	Victoria	17:05	5	Canterbury West	
17:29	Victoria	17:57	1	Victoria	28 min dwell
17:54	Victoria	17:59	6	Down Sidings	
18:30	Victoria	18:36	6	Washer Road	

Ashford International arrive	From	Ashford International depart	Plat	To	Notes
18:57	Victoria	19:34	1	Victoria	37 min dwell
19:22	Blackfriars	19:30	6	Down Sidings	
19:32	Victoria	19:37	6	Washer Road	
19:55	Victoria	20:34	1	Victoria	39 min dwell
20:30	Victoria	20:33	6	Washer Road	
20:56	Victoria	21:05	6	Canterbury West	
21:29	Victoria	21:35	6	Down Sidings	
21:54	Victoria	21:58	6	Down Sidings	
22:29	Victoria	22:37	1	East Berthing Sidings	
22:53	Victoria	22:58	1	Up sidings	
23:29	Victoria	23:37	6	Down Sidings	
23:53	Victoria	23:59	6	Down Sidings	
00:29	Victoria	00:37	6	Down Sidings	
00:53	Victoria	00:57	1	Down Sidings	

Cross platform Interchange

255 For through services, there is often a significant dwell time at Ashford. This appears to be to permit interchange with services from Charing Cross that are heading towards Dover. At times this is achieved with cross-platform interchange, using platforms 5 and 6, however sometimes it means crossing the footbridge between platform 2 and platforms 5/6. Thus, while in some instances it should be possible to reduce the dwell time of the Maidstone East to Canterbury West services at Ashford International, this is not always possible.

256 In the Down (eastbound) direction, the layout permits parallel arrivals into Platform 6 from the Maidstone direction and Platform 5 from the Tonbridge direction. Similarly parallel departures are possible to Canterbury West from Platform 6 and Dover from Platform 5.

257 In the Up (westbound) direction, it is harder to achieve cross platform interchange as Platform 1 is almost fully occupied by the Victoria via Maidstone East terminating trains and the Hastings to Ashford terminating trains. Thus the footbridge is necessary for interchange.

Turnround times at Canterbury West

258 If we were to assume that we could not change the Ashford International dwell times for through services, we must consider the turnround times at Canterbury West. The current WTT times are shown in the table below.

Canterbury West arrive	**Canterbury West depart**	**Current Turn round time (minutes)**
08:28	9:04	36 mins
09:30	10:05	35 mins. Via shunt signal and Up siding
10:26	11:05	39 mins
11:27	12:05	38 mins
12:27	13:05	38 mins
13:27	14:05	38 mins
14:27	15:05	38 mins
15:27	16:05	38 mins
16:27	17:05	38 mins
17:27	18:05	38 mins
21:27	22:08 Fast	41 mins

259 In order to reverse at Canterbury West, the train must arrive in Platform 2 and unload. It then draws forward beyond the crossovers north of the station. The driver then changes ends before the train crosses to the Up Siding where it can wait to allow other up services to pass before entering the platform well before its due departure time.

260 The one timed reversal in the Working Timetable has the following sequence and timings: -

09:30 train arrives at Canterbury West and unloads.
09:33 train draws forward to Shunt signal.
09:35 driver changes ends (standard 7 minutes).

09:42 train moves to Up Siding, crossing the Up line.
09:44 train in Up Siding.
09:52½ 08:16 Charing Cross to Ramsgate arrives in Down platform.
09:54 08:16 Charing Cross to Ramsgate leaves Down platform.
09:54½ 09:36 Ramsgate to St Pancras International arrives in Up platform.
09:55½ 09:36 Ramsgate to St Pancras International leaves Up platform.
09:56 train departs Up Siding.
09:58 train arrives in Up platform.
10:05 train departs to Ashford International and London Victoria.

261 There is a 10 minute window after the train clears the Down line before the following service departs, there is a 10 ½ minute window between the train crossing the Up line and the next Up service arriving in the platform, there is a 12 minute stand in the Up Siding and a 7 minute stand in the platform before departure. Therefore, should the train need to arrive 1½ minutes later and depart 1½ minutes earlier, there is still no clash with other services and 16 minutes of stationary time (instead of 19 minutes) for service recovery. Hence there are unlikely to be any issues at Canterbury West.

Crossing moves to Platforms 1 and 2

262 The majority of Victoria services use Platforms 5 and 6 with three services that come out of the sidings using Platform 2 and all the terminating services using Platform 1. This creates the possibility of conflicting moves across both ends of Ashford International. Any changes to the proposed timings open up the possibility of such conflicts and these are considered in the paragraphs below.

263 There is only one service which currently crosses the east throat at Ashford, which comes from the Down Sidings and sits in Platform 2 between 20:56 and 21:05. Should this departure be brought forward to 20:55½, it would need to leave the Down sidings earlier, with no consequences.

264 Assuming that the hour between 11:00 and 12:00 is typical, we find the following:

a. The train from Victoria via Maidstone East would have arrived in Platform 6 at 10:54 ½ instead of 10:53. It is waiting for the 11:00 arrival from Charing Cross in Platform 5 for cross platform interchange. These trains depart at 11:05 to Canterbury West and 11:02 to Dover Priory. The later arrival of the Victoria service has no impact on the departure times and there are no conflicting moves. A 5 minute interchange time is also provided.

b. On the other side of the station, the service from Ramsgate via Canterbury West to Charing Cross arrives in Platform 2 with the Victoria service already sat in Platform 1. The Charing Cross service leaves at 11:02 followed by the Victoria Service at 11:05, again providing a 5 minute cross-platform interchange from the Canterbury West service to the Victoria via Maidstone East service. An earlier departure to Victoria to call at all stations to Bearsted including the new Heathlands station would need to depart at 10:55½, 4½ minutes before the train from Canterbury arrives, breaking the connection.

c. Trains then arrive from St Pancras International in Platforms 5 (11:14½) and 6 (11:14) from opposite directions, one continuing on to St Pancras International and the other running to Ramsgate and Margate. Both of these services run via Dover serving all stations except Sandling and Westenhanger.

d. The semi-fast service from Victoria via Maidstone East then arrives in Platform 1 at 11:23. If it called at all stations between Bearsted and Ashford International, including Heathlands, it would not arrive until 11:31 ½ by which time it would conflict with the 11:32 departure to Charing Cross from Platform 2 and the 11:33 departure to Victoria from Platform 1. Further delaying arrival to 11:37 would reduce turnround time to 18 ½ minutes but of course the 5 ½ minutes added to the journey time is still available for service recovery and the service only needs seven minutes in the platform for the driver to change ends, so this would be practical. The extra 5 ½ minutes could be added as pathing time or the dwell times at the stations between Maidstone East and Charing could be extended to absorb some of this additional time. An alternative solution would be for the service from Victoria to arrive in Platform 6 and the service from Charing Cross to move across to Platform 5. This then displaces the service to Victoria to Platform 2 and the service to Charing Cross into Platform 1. The arrival from Victoria then uses the Washer Road to reverse before crossing to Platform 1 or 2 for departure back to Victoria. This is the preferred solution.

e. The service from Canterbury West to Victoria then arrives in Platform 5 at 11:27½ almost in parallel with the 11:28 from Dover to Charing Cross in Platform 2. Interchange between these two services requires passengers to cross the footbridge with connection times of 5½ and 4½ minutes. If the Canterbury service was to arrive 1½ minutes earlier, it could arrive in Platform 2, with the Dover service using platform 1. The departure to Victoria would then be 3 ½ minutes after the Dover arrival but would be cross-platform as opposed to being across the bridge. A retiming of the Dover service one minute earlier, with the

parallel move available at Ashford D Junction would restore the 4½ minute connection time if thought necessary. The 11:31½ departure to Victoria is close to the 11:30 arrival from Charing Cross, probably too close, so another solution needs to be found. If the station stop at Heathlands was a substitute for a stop at another station on the route, possibly Hollingbourne (the least used station on the route today), whichever station was chosen would still have an hourly service (as today), but on the opposite half hour to today's timetable.

f. As mentioned in the paragraph above, the next movement is the 11:30 arrival from Charing Cross, departing at 11:35 to Canterbury West. Today the 11 23 arrival from Victoria which terminates here would connect into this service with a 12 minute connection time. If this arrival was delayed to allow station calls at all stations between Bearsted and Ashford International, including Heathlands, it would arrive at 11:31 ½, providing a 3 ½ minute connection. Again non-stopping the service at one of the stations between Maidstone East and Ashford International would put it's arrival time as the same as the Charing Cross to Canterbury West service, facilitating interchange and restoring the 5 minute interchange time.

g. The next two services are both HS1 services and both use Platform 5. The 11:41 arrival from Margate departs at 11:43 to St Pancras International and is followed by the 11:50 arrival from St Pancras forming the 11:52 departure to Margate via Canterbury West.

h. Finally the current 11:53 arrival would, with the extra stop at Heathlands arrive into Platform 6 at 11:54 ½, well before the 12:00 arrival from Charing Cross where once again cross platform interchange is possible.

Summary of operational proposals

265 **All services on the Maidstone East line call at all stations between Maidstone East and Ashford International. The one exception to this is that one of the Up services must miss a call at one of the stations (possibly Hollingbourne) to protect junction margins at Ashford B Junction.**

266 **All Down services use platforms 5 and 6 to provide cross platform interchange.**

267 **All Up services use platforms 1 and 2 to provide cross platform interchange.**

268 **The service which terminates at Ashford International draws forward into the Down Sidings to reverse.**