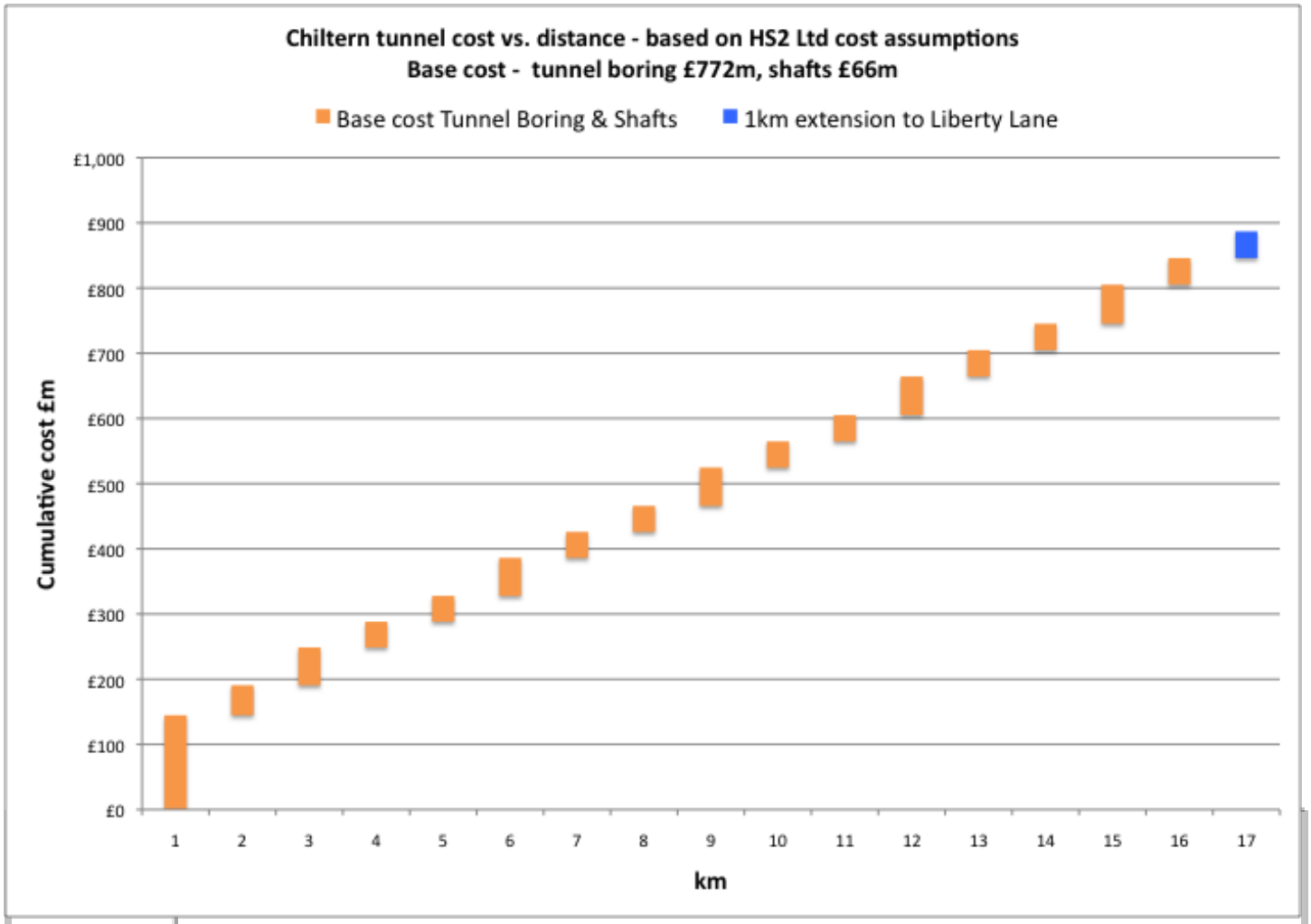
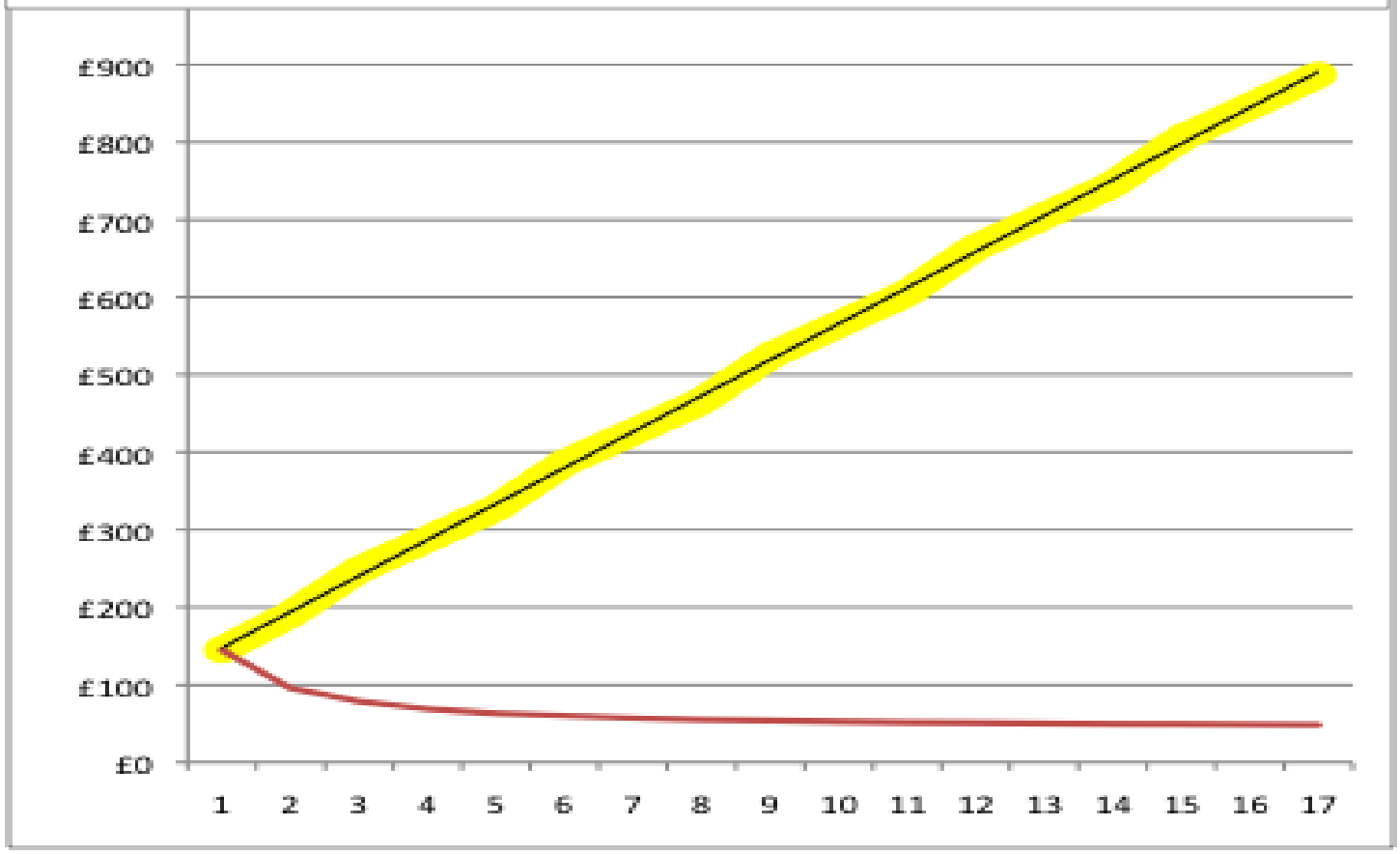
The following Graphs have been prepared by Mr Griffiths to help explain the cost vs distance if required.





Applicant's assessment

5.42 The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.

Decision making

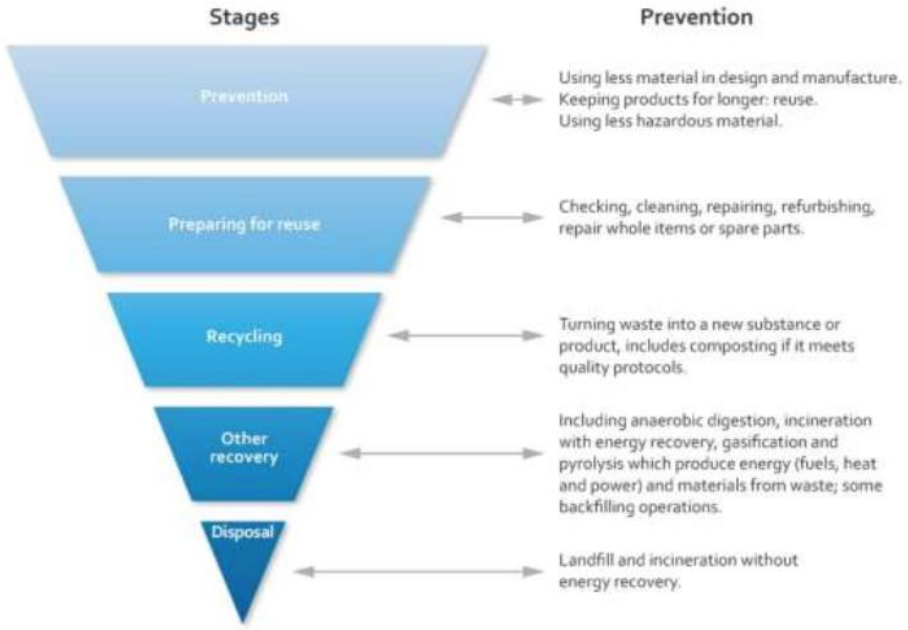
5.43 The Secretary of State should consider the extent to which the applicant has proposed an effective process that will be followed to ensure effective management of hazardous and non-hazardous waste arising from the construction and operation of the proposed development. The Secretary of State should be satisfied that the process sets out:

- any such waste will be properly managed, both on-site and off-site;
- the waste from the proposed facility can be dealt with appropriately by the waste infrastructure which is, or is likely to be, available. Such waste arisings should not have an adverse effect on the capacity of existing waste management facilities to deal with other waste arisings in the area; and
- adequate steps have been taken to minimise the volume of waste arisings, and of the volume of waste arisings sent to disposal, except where an alternative is the most sustainable outcome overall.

5.44 Where necessary, the Secretary of State should use requirements or planning obligations to ensure that appropriate measures for waste management are applied.

3.4 All waste generated from the design, construction and operation of the Proposed Scheme will be managed in accordance with the waste hierarchy. This places waste prevention as the preferred option at the top, followed by reuse, recycling and other recovery, with landfill disposal at the bottom as the last resort.

Figure 1: Waste hierarchy



4.4 Where the transportation of excavated material would result in significant environmental effects, sustainable placement will be used. Sustainable placement is the local on-site placement of excavated material to avoid causing environmental effects associated with the transportation of that material. Local sites for sustainable placement have been selected on the basis of their suitability for the disposal of excavated material.

Likely significant environmental effects

Inert waste landfill capacity

19.6.50 Subject to waste acceptance criteria set out in the Landfill Directive[39] and the Proposal for a Council Decision Establishing Criteria and Procedures for the Acceptance of Waste at Landfills[40], the total quantity of inert waste (i.e. surplus excavated material) that will require off-site disposal to landfill during the construction period 2017 to 2025 is approximately 12,573,420 tonnes (see Table 17). This represents an increase of approximately three times (8,812,483 tonnes) the quantity reported for the original scheme, and an increase of 11% (1,262,169 tonnes) over the quantity reported for the AP2 revised scheme. Inert waste will account for approximately 90% of the total CDEW requiring off-site disposal to landfill.

Table 17: Quantity of waste requiring off-site disposal to inert waste landfill for the original scheme, AP2 revised scheme and AP4 revised scheme, 2017 to 2025

Waste source	Total quantity original scheme (tonnes)	Total quantity AP2 revised scheme (tonnes)	Total quantity AP4 revised scheme (tonnes)	Proportion of AP4 revised scheme quantity
Excavation	3,760,937	11,311,251	12,573,420	100%
Demolition	0	0	0	0%
Construction	0	0	0	0%
Worker accommodation sites	0	0	0	0%
Total	3,760,937	11,311,251	12,573,420	100%

19.6.51 Off-site disposal of inert surplus excavated material to landfill will result in an overall reduction of inert waste landfill capacity of 12,573,420 tonnes throughout the nine-year construction period.

19.6.52 This will be equivalent to an 11% reduction in inert waste landfill capacity across the aggregated five regions according to the amount of capacity projected to be available at the end of construction in 2025 (approximately 119 million tonnes)[41].

19.6.53 Further to this, Table 18 shows that the majority (approximately 97%) of inert surplus excavated material will be disposed off-site to inert waste landfill in the South East.

Table 18: Locations (by regional and local area) for the off-site disposal to landfill of inert surplus excavated material, 2017 to 2025

Regional area for off-site disposal to landfill	Local area for off-site disposal to landfill	Quantity (tonnes)	Proportion
Greater London	N/A	0.00	0%
South East	Surrey, Buckinghamshire	12,143,374	97%
East of England	Hertfordshire	0.00	0%
East Midlands	Northamptonshire	430,046	3%
West Midlands	Warwickshire	0.00	0%
Total	-	12,573,420	100%

19.6.54 On this basis, it is considered that there will be sufficient inert waste landfill capacity available in the aggregated five regions to accept the forecast quantity of inert surplus excavated material for off-site disposal to landfill.

19.6.55 Furthermore, the draw-down of inert waste landfill capacity as a result of the AP4 revised scheme will occur over a period of several years, starting initially with enabling works followed by earthworks such as tunnelling. It is unlikely that the AP4 revised scheme will draw-down projected capacity to an extent where there is an immediate, significant need for additional inert waste landfill capacity to be made available in the aggregated five regions.

Summary of likely residual significant effects

19.6.84 On the basis of the other mitigation measures proposed, the likely residual significant effects from construction will be:

- minor adverse in relation to inert waste landfill capacity;
- moderate adverse in relation to non-hazardous waste landfill capacity; and
- moderate adverse in relation to hazardous waste landfill capacity.

Environment Agency -Waste report England 2014

South East - Landfill Capacity Trends 1998/99 - 2014

All figures are provided in 000s cubic metres

Year	Site Type	Sub Region									SOUTH EAST
		Berkshire	Buckinghamshire	East Sussex	Hampshire	Isle of Wight	Kent	Oxfordshire	Surrey	West Sussex	
1998/99	Inert	150	1,065	375	1,981	668	5,762	223	7,901	581	18,706
	Non-Inert	6,961	24,442	3,245	11,204	1,480	10,310	16,252	15,180	7,649	96,723
	Restricted User	-	-	10	230	9	6,381	220	-	-	6,850
		7,111	**25,507**	**3,630**	**13,415**	**2,157**	**22,453**	**16,695**	**23,081**	**8,230**	**122,279**
2000/01	Inert	1,116	1,063	-	1,940	750	5,290	35	793	1,690	12,677
	Non-Inert	6,291	40,367	2,813	10,599	1,897	8,252	19,553	14,355	6,476	110,603
	Restricted User	-	-	31	156	-	4,381	-	-	-	4,568
		7,407	**41,430**	**2,844**	**12,695**	**2,647**	**17,923**	**19,588**	**15,148**	**8,166**	**127,848**
2004	Inert	64	889	-	1,366	761	3,411	13,999	2,938	847	24,275
	Non-Inert	3,883	45,902	2,185	5,128	1,051	10,242	9,912	15,682	2,803	96,787
	Restricted User	-	-	-	-	-	364	-	-	-	364
		3,946	**46,790**	**2,185**	**6,494**	**1,813**	**14,017**	**23,911**	**18,620**	**3,650**	**121,426**
2005	Inert	71	779	-	1,527	626	3,359	2,058	4,677	715	13,812
	Non-Inert	3,128	38,803	1,726	4,231	939	8,547	15,340	19,502	2,171	94,387
	Restricted User	-	-	-	-	-	1,781	-	-	-	1,781
		3,199	**39,582**	**1,726**	**5,758**	**1,566**	**13,686**	**17,398**	**24,179**	**2,886**	**109,980**
2006	Inert	286	1,431	-	1,823	624	2,288	2,951	5,114	509	15,026
	Non-Inert	2,590	36,414	1,198	3,826	881	8,351	13,779	9,922	1,927	78,887
	Restricted User	-	-	-	-	-	2,092	-	-	-	2,092
		2,875	**37,845**	**1,198**	**5,649**	**1,505**	**12,731**	**16,730**	**15,035**	**2,436**	**96,005**
2007	Inert	439	909	-	1,550	435	13,221	2,598	3,881	1	23,034
	Non-Inert	1,334	36,081	840	4,185	735	8,280	13,474	8,028	2,619	75,577
	Restricted User	-	-	-	-	-	1,906	-	-	-	1,906
		1,773	**36,989**	**840**	**5,735**	**1,170**	**23,408**	**16,072**	**11,910**	**2,620**	**100,517**
2008	Inert	105	711	-	1,258	294	17,724	2,095	6,191	-	28,378
	Non-Inert	1,007	40,005	364	3,697	845	6,131	13,511	8,167	2,323	76,052
	Restricted User	-	-	-	-	-	1,877	-	-	-	1,877
		1,112	**40,716**	**364**	**4,955**	**1,139**	**25,732**	**15,606**	**14,358**	**2,323**	**106,306**
2009	Inert	85	792	-	1,204	601	15,907	3,726	6,763	-	29,077
	Non-Inert	738	31,097	45	3,275	774	5,076	12,143	7,456	1,752	62,355
	Restricted User	-	-	-	-	-	1,817	-	-	-	1,817
		823	**31,890**	**45**	**4,479**	**1,374**	**22,799**	**15,868**	**14,218**	**1,752**	**93,249**
2010	Inert	1,754	536	-	1,152	363	14,266	4,199	6,957	-	29,228
	Non-Inert	485	41,592	347	2,870	717	4,518	11,433	6,875	2,195	71,031
	Restricted User	-	-	-	-	-	1,784	-	-	-	1,784
		2,239	**42,128**	**347**	**4,022**	**1,080**	**20,568**	**15,632**	**13,832**	**2,195**	**102,043**
2011	Inert	1,519	504	-	2,194	573	13,057	4,136	5,905	-	27,888
	Non-Inert	260	40,431	208	2,364	654	4,846	10,064	7,015	1,303	67,145
	Restricted User	-	-	-	-	-	1,000	-	-	-	1,000
		1,779	**40,935**	**208**	**4,558**	**1,226**	**18,903**	**14,200**	**12,920**	**1,303**	**96,033**
2012	Inert	1,119	475	-	2,877	514	6,618	4,713	5,885	-	22,200
	Non-Inert	203	38,160	45	1,749	621	3,839	9,346	6,543	1,531	62,039
	Restricted User	-	-	-	-	-	873	-	-	-	873
		1,322	**38,635**	**45**	**4,626**	**1,135**	**11,331**	**14,059**	**12,428**	**1,531**	**85,112**
2013	Inert	1,144	180	-	2,855	499	5,109	3,574	5,641	-	19,002
	Non-Inert	169	35,758	-	1,861	558	3,773	7,944	6,052	1,148	57,263
	Restricted User	-	-	-	-	-	426	-	-	-	426
		1,313	**35,938**	**-**	**4,716**	**1,057**	**9,309**	**11,518**	**11,693**	**1,148**	**76,692**
2014	Inert	996	2,049		2,154	487	5,202	4,091	6,119		21,097
	Non-Inert	152	34,834	-	1,544	510	3,359	6,448	5,817	1,071	53,734
	Restricted User	-	-	-	-	-	358	-	-	-	358
		1,148	**36,883**	**-**	**3,698**	**996**	**8,919**	**10,539**	**11,936**	**1,071**	**75,189**

3.3.11 In Table 13, the published inert waste landfill capacity for 2013 has been converted to tonnes using an inert waste landfill density conversion factor of 1.5 tonnes per cubic metre.[53] The purpose of this is to provide comparable information for use in this assessment (i.e. landfill void space and quantity of waste requiring off-site disposal to landfill are both expressed in tonnes).

3.3.12 For ease of reference, inert waste landfill capacity projections are shown for:

- 2013 (latest available published data converted to tonnes);
- 2015, 2020 and 2025 (five year intervals and end of construction in 2025);
- 2017 (start of construction); and
- 2026 (first year of operation).

Table 13: National and regional inert waste landfill capacity projections to 2026 (tonnes)

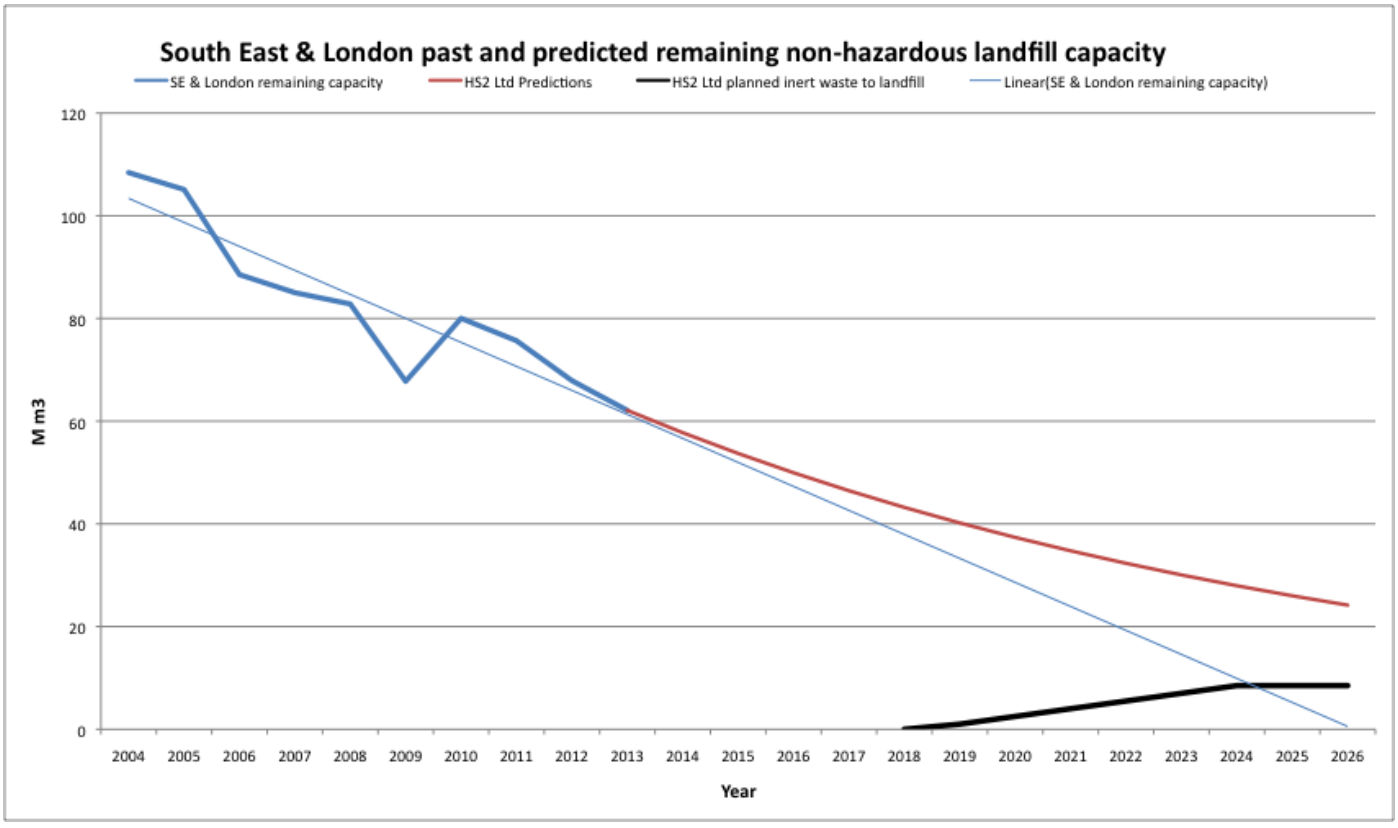
Regional area	2013	2015	2017	2020	2025	2026
Greater London	2,413,137	1,428,979	846,193	385,599	104,051	80,069
South East	28,503,510	24,923,630	21,793,363	17,819,425	12,740,195	11,913,313
East of England	24,161,018	27,161,899	30,535,501	36,397,573	48,773,589	51,713,886
East Midlands	40,026,045	39,306,136	38,599,175	37,562,503	35,896,219	35,571,939
West Midlands	23,922,977	23,461,688	23,009,294	22,347,007	21,285,285	21,079,072
Total of five regions	119,026,686	116,282,332	114,783,527	114,512,107	118,799,339	120,358,280
England	196,589,835	206,026,470	215,916,078	231,647,665	260,455,080	266,632,948

3.3.19 For ease of reference, non-hazardous landfill capacity projections are shown for:

- 2013 (latest available published data converted to tonnes);
- 2015, 2020 and 2025 (five year intervals and end of construction in 2025);
- 2017 (start of construction); and
- 2026 (first year of operation).

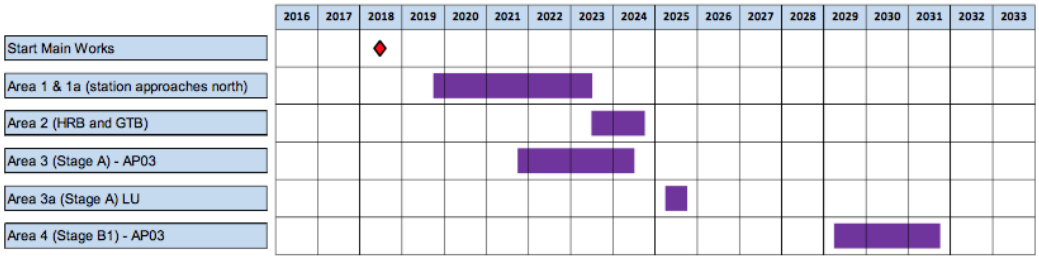
Table 16: National and regional non-hazardous waste landfill capacity projections to 2026 (tonnes)

Regional area	2013	2015	2017	2020	2025	2026
Greater London	4,360,857	3,246,526	2,416,941	1,552,519	742,429	640,587
South East	47,164,513	41,211,593	36,010,027	29,412,336	20,991,315	19,621,928
East of England	38,276,158	35,656,082	33,215,355	29,863,920	25,012,667	24,141,411
East Midlands	39,375,422	37,563,465	35,834,889	33,390,022	29,680,265	28,989,317
West Midlands	40,313,994	37,944,655	35,714,567	32,612,760	28,030,091	27,193,925
Total of five regions	169,490,943	155,622,320	143,191,779	126,831,557	104,456,766	100,587,167
England	299,662,826	273,673,034	249,937,339	218,137,256	173,871,213	166,160,294


South East & London past and predicted remaining non-hazardous landfill capacity
SE & London remaining capacity
HS2 Ltd Predictions
HS2 Ltd planned inert waste to landfill
Linear(SE & London remaining capacity)
M m3
120
100
80
60
40
20
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Year

6.4.29 The construction vehicle routes that have been assumed for the purposes of the highway modelling are shown on Map TR-03-001 and described in Table 6-43. It is envisaged that the A41 and M1 motorway will be used as the HGV access and egress routes for transferring excavated material and contaminated waste to/from sites to the north of London. Smaller numbers of HGVs would access and egress the site from the east along the A13 (demolition material and concrete), the west along the A40 (demolition and concrete), the south (concrete) along A4200 Upper Woburn Place or A400 Gower Street, the far south (concrete) along the A501 Euston Road and A40 Westway (towards A3220 West Cross Route), and from A5200 York Way (concrete).

Excavation programme (general)



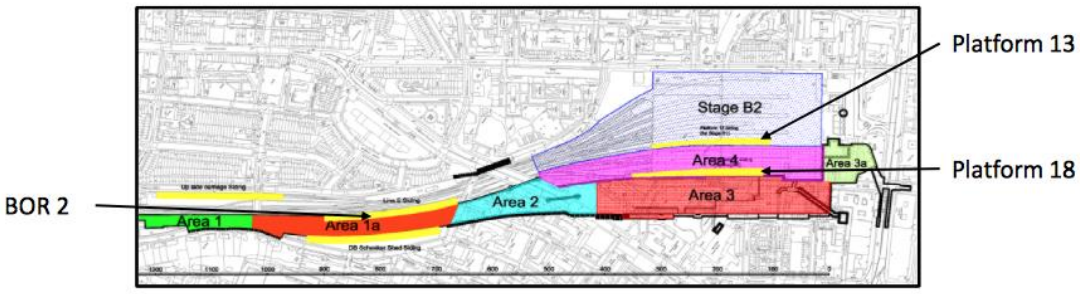
Volume of Excavated Material
Area 1 & 1a – 229,000m³
Area 2 – 103,000m³
Area 3 – 388,000m
Area 3a – 66,000m³ (not removable by rail)
Area 4 – 234,000m³
Total – 1,020,000m³

4

P2257 (4)

HOL/10018/0005

Transport of excavated materials by rail options plan



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P2257 (8)

HOL/10018/0009

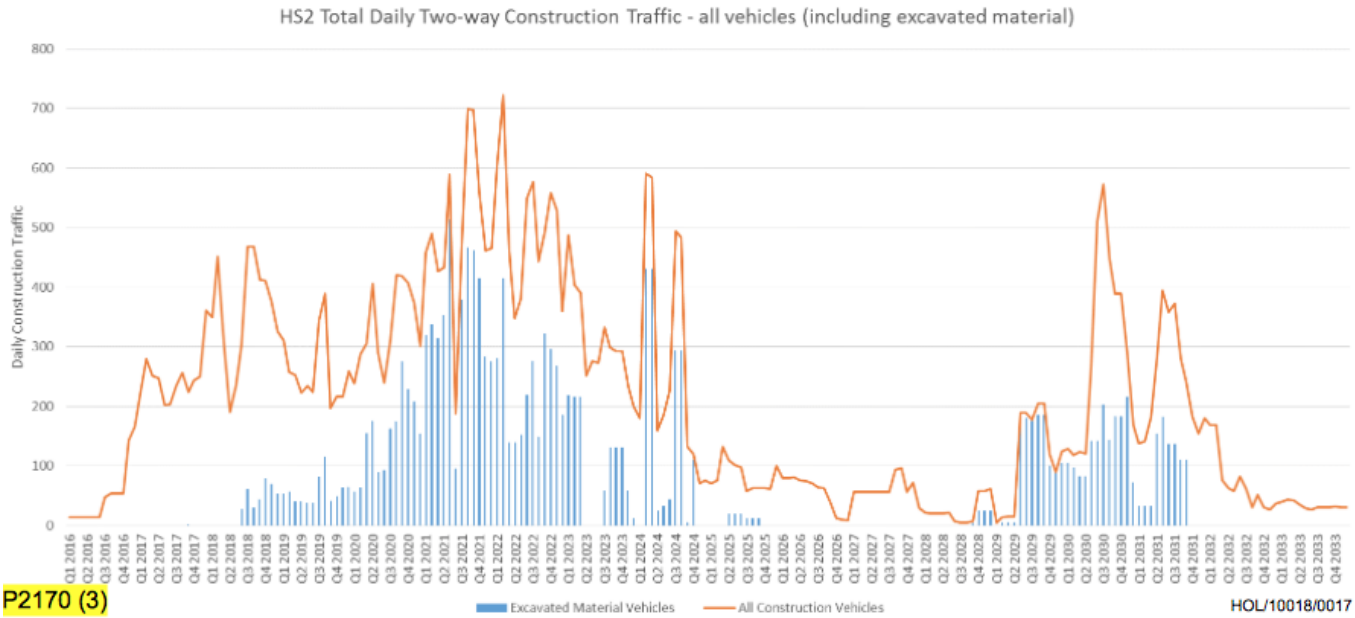
A638 (10)

HOL/00186/0061

Transport of excavated materials by rail options table

Option	Total 1 way vehicle trips removed	Excavated material out (m^3 (% of total))	Percentage of total 1 way vehicle trips removed	Construction cost (Including: prelims, design, management. Excluding: risk and contingency)
Backing Out Road 2	6,648	56,510 (4.8%)	1.8%	£14m
Platform 18 siding	40,828	253,540 (21.6%)	11.1%	£9.5m
Platform 13 siding	14,091	77,280 (6.6%)	3.8%	£9.5m

The figures in this table assume that the options are pursued in isolation and therefore it should not be assumed that they can be aggregated



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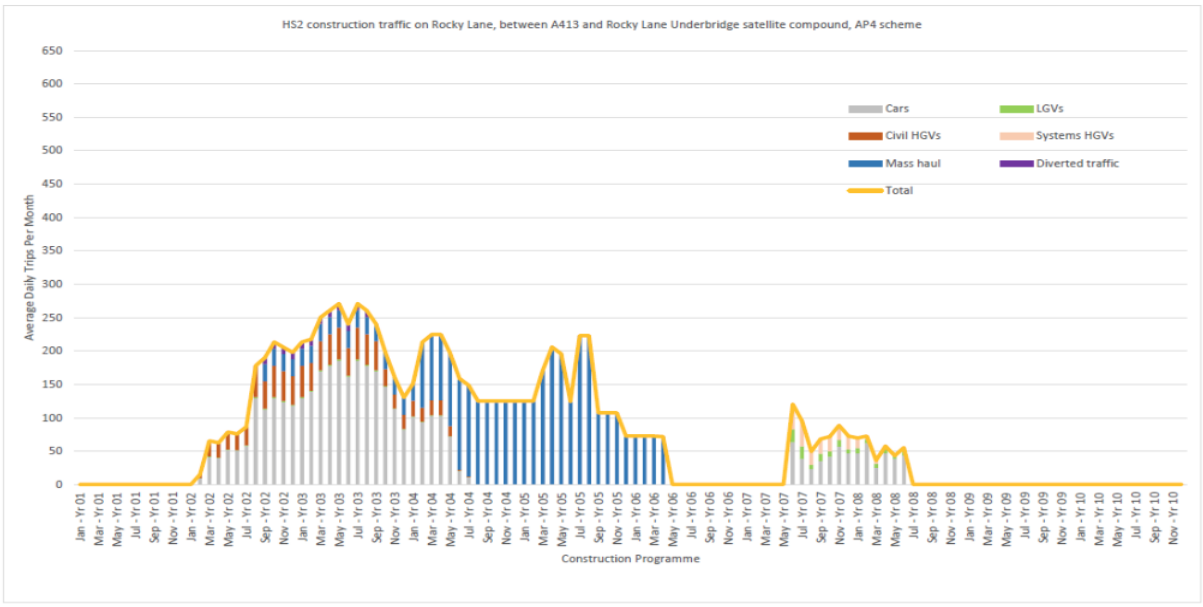

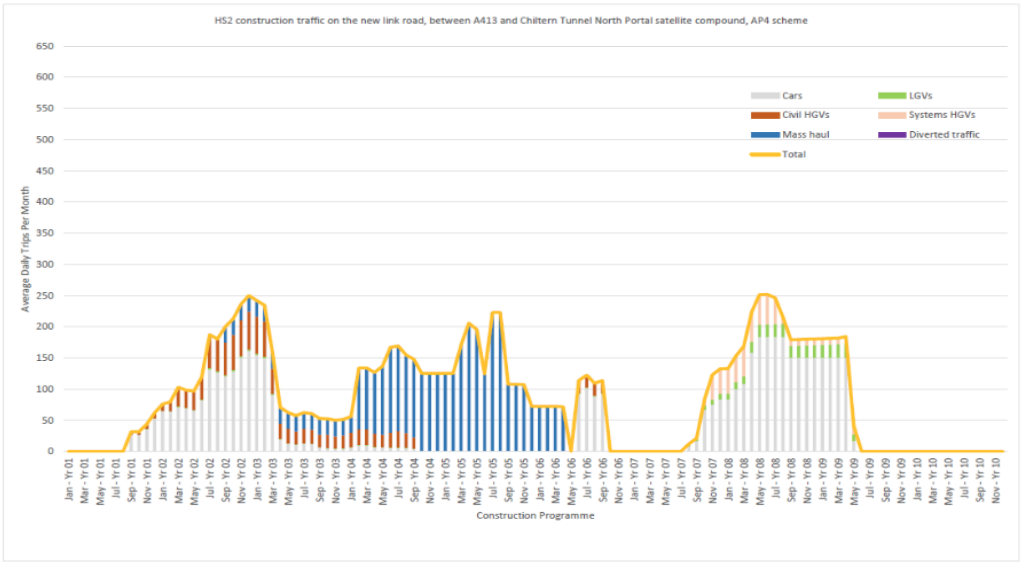

A638 (12)

HOL/00186/0063

107. MR STRACHAN QC (DfT): So it would give a higher rate. If you actually use the true amounts that are in our schedules, it comes to about £22 per cubic metre.

108. MR SMART: That's correct.

109. MR STRACHAN QC (DfT): Fine. Taking that figure, I think Mr Bridger's point was that SPONS gives a higher rate for excavation than the £22 per cubic metre which has gone into our calculations. Can I just get you to respond to that, Mr Smart, as to how we go about our calculations and whether they are robust and realistic?

110. MR SMART: Yes. SPONS is a well-established industry standard. It's a 'look-up table', if you like, for establishing costs. It's more applicable to smaller scale projects. For a project the size of High Speed 2, I would not say it's the most applicable way of looking at it. What I think it does do, which I think is on Mr Bridger's slide, is it does actually demonstrate that there are different rates for different levels of cutting, and in fact we assume that that 22 metres is an average rate, but also it assumes a different type of plant, I think – backactors, etc – than we would have. We would generally have bigger plant. I suppose, most importantly, it doesn't really take account of location, the volume, procurement method and the type of plant we actually have and the construction methods. So it could only be that as a very high level guide, whereas we've done the pricing on what we believe to be the construction methodology that will be employed.

Engineering Review of the 'HS2 Tunnel Extension' Proposal by LBH for a Tunnel through the Colne Valley

3.8 Excavated Material Management

3.8.1 The PBA proposal for the CVT makes two statements about the excavations arising from the tunnel:

- The excavation arising would be only 900,000 tonnes and,
- The only cost for disposal would be transport costs.

3.8.2 The volume of excavation arisings from twin tunnels forming the CVT would be approximately 975,000m^3. Hard chalk is 2.5 tonnes/m^3. Assuming the chalk is quite porous and weathered (1.5 tonnes/m^3), excavations arisings from the tunnel alone would be approximately 1,500,000 tonnes.

3.16.15 The disposal of excavated material adding only a further £5m to PBA's Option B2 estimate, assuming it only being a transport cost, is not justifiable. At this stage it could only represent an aspiration or opportunity and should not form the basis of the estimate. If that material needed to be disposed of commercially to off-site pits/landfill, the cost of its disposal is likely to be in the order of £20-25 million.

HIGH SPEED TWO INFORMATION PAPER
D1: DESIGN POLICY

3. Design Policy

3.1 The Promoter and the nominated undertaker will seek to ensure that:
the design is safe, efficient, and meets with the requirements of whole life operation and maintenance alongside initial buildability;

4. Promoter's requirements

4.1 The principles support the requirements defined by the Department of Transport (the Promoter) to their Agent, HS2 Ltd. The key requirements are noted below and are not repeated in the design policy:
to provide an efficient high speed rail network capable of safe construction and operation;

FOI16-1507 Abstracts

3) **Could you please provide any information that HS2 holds that quantifies the variation in the consequence (e.g. anticipated % of passenger fatalities expected) of any derailment that occurs at 200km/h, 300km/h and 360km/h. Could you also provide information on any work that assesses whether the consequence of derailment in deep cuttings is greater than where there are flat run offs. Again I would expect a significant variation for speed and cuttings."**

I can confirm that we do hold information relevant to this part of your request however we are withholding this information under regulation 12(4)(d).

Public interest test (Abstracts)

"While we are aware that we can contextualise such information to highlight any potential inaccuracies we are not confident that this will be sufficient to correct any misleading impressions or confusion that could be created publically if this information were released and used in the national debate surrounding HS2,"

"When the derailment risk assessment is complete (i.e. When we know what our infrastructure is, how our rail systems will work, how crashworthy the train is and how we will manage it operationally) we will then have a final assessment available to release."

HoL SC 11th July MrTurney

254. Can I pick up what is then said on the safety issues specifically? Mr Griffiths says that he raised the points in the other place, which of course, he did. There has, since then, been quite extensive correspondence with Mr Griffiths which culminated in May this year, in a meeting, attended by Mr Smart, the engineering director, and Mr Griffiths, to discuss the project's approach to safety. The current state of the correspondence is that Mr Griffiths is, I understand, waiting for a response to his most recent letter, and that response will come from Dr McDonald, who is the head of system safety, security and interoperability, at HS2. So, there has been an exchange of correspondence.

255. The short point is that this is a matter of general policy for the railway. HS2 has committed to three things in the way in which it designs, builds and operates this railway, and it's these: that they will meet or better the performance standards of HS1 in terms of safety and security. That they will reduce safety risks to as low as is reasonably

practicable, and that they will do so in line with current best international practice. That is a statement of the general policy of the promoter.

256 In terms of the way in which that risk is regulated, it is regulated in the way in which railway safety is regulated at present. That's through the office of the rail regulator and through the Health and Safety Executive, so far as construction goes. So, it's a general policy regulatory point. There is no special effect on Mr Griffiths, and we say that he shouldn't be granted a locus to raise those points which are evidently part of the design of the railway, and part of the planning for the operation of the railway. He simply doesn't have the Standing to bring that. If those points were to be brought, they should of course, be brought by the regulators, if there was concern, as to what was proposed.

Note - Mr Griffiths has not received a response from Dr McDonald and has been unable to find the Policy statement referred to in 255.

HS2 Ltd cost comparisons of C1 (Liberty Lane), C6 (HS2 Ltd proposal) and other options (17 July 2015)

REPA tunnel options - cost comparison vs HS2 Proposed Scheme: REVISED 17 July 2015

		REPA OPTION C1 (to Liberty Lane)	REPA OPTION C3 (to Liberty Lane)	REPA OPTION C4 (to Liberty Lane)	REPA OPTION C5 (to Leather Lane)	HS2 OPTION C6 (to Green tunnel north portal)	COMMENTARY
1.00	LAND AND PROPERTY	-32.70	-31.90	-31.90	-32.70	-19.60	Excludes any allowance for re-sale of returned or unused land/property
2.00	TUNNELS	115.47	316.82	205.92	134.54	67.78	
	Bored Tunnels	163.34	370.69	252.81	181.76	116.70	
	Fire Fighting Cavern						
	Green Tunnels	-57.14	-57.14	-57.14	-57.14	-57.14	Removal of S Heath green tunnel
	Portals	-10.38	-10.57	-5.89	-10.38	-10.34	
	Portals at "Gap"	0.00	0.00	0.00	0.00	0.00	
	Shafts	14.19	13.84	16.13	14.19	14.74	One additional shaft required
	Additional disposal costs	5.45	0.00	0.00	6.11	3.82	Options 1, 5 and 6 require additional disposal at southern
3.00	CIVIL ENGINEERING	-48.21	-57.48	-56.20	-57.01	-45.46	
	CUTTINGS	-28.65	-28.65	-28.65	-33.33	-24.30	
	Cuttings	-28.65	-28.65	-28.65	-33.33	-24.30	
	EMBANKMENTS	0.00	0.00	0.00	0.00	0.00	
	EARTHWORKS	-2.96	-2.99	-1.86	-3.03	-2.48	
	Landscaping	-2.96	-2.99	-1.86	-3.03	-2.48	
	ENVIRONMENTAL MITIGATION WORKS	-3.89	-3.91	-3.19	-4.26	-3.16	
	Planting	-3.38	-3.41	-2.90	-3.72	-2.88	
	Noise Barriers	-0.50	-0.50	-0.29	-0.54	-0.28	
	RETAINING WALLS						
	BRIDGES	-7.06	-7.11	-7.16	-10.47	-6.61	
	Overbridge	-4.47	-4.52	-4.57	-7.88	-4.02	
	Underbridge	-2.59	-2.59	-2.59	-2.59	-2.59	
	VIADUCTS						
	HIGHWAYS	-7.18	-7.28	-8.01	-7.18	-7.20	
	OTHER	-6.78	-7.54	-7.33	-7.27	-7.60	
	Culverts	-0.51	-0.51	-0.51	-0.51	-0.51	
	Utilities Diversions	-6.37	-7.13	-6.70	-6.86	-7.03	
	Utilities Connections	0.10	0.10	-0.12	0.10	-0.06	
	EXTENDED PRELIMINARIES	8.31	0.00	0.00	8.53	5.89	Options 1 & 5 assume 12month longer tunnel programme; Option 6 assumes 9month longer tunnel programme; Options 3 & 4 assume no programme delay
5.00	DEPOT AND SIDINGS	0.00	0.00	0.00	0.00	0.00	
6.00	RAILWAY SYSTEMS	21.70	21.70	21.70	21.70	18.40	
8.00	INDIRECT COSTS	16.16	51.06	31.15	18.03	7.40	
		72.42	300.20	170.67	84.56	28.52	
	Less ECP/VE	-6.95	-28.82	-16.38	-8.11	-2.74	
	Net total	65.47	271.38	154.29	76.44	25.78	
	E/o for north portal TBM power supply connection	0.00	0.00	7.00	0.00	0.00	
	Adjusted Net total	65.47	271.38	161.29	76.44	25.78	

OPTION NOTES

1

Option C1 would extend the existing bored tunnel from Mantles Wood to a new north portal near Liberty Lane
Option C3 assumes two simple TBMs to construct the bored tunnel from new north portal southwards to Mantles Wood
Option C4 assumes two TBMs to construct the bored tunnel from new north portal southwards to the Little Missenden shaft
Option C5 would extend the existing bored tunnel from Mantles Wood to a new north portal near Leather Lane
Option C6 would extend the existing bored tunnel from Mantles Wood to the Proposed Scheme green tunnel north portal location

COST NOTES

1 Costs are point estimates, based at second quarter 2011 levels and therefore exclude contingency and escalation
2 Land and property costs are figures provided by CBRE. Property costs exclude costs associated with compensation schemes.
3 Construction costs are based on PSC figures as reviewed by the HS2 costs team
4 Railway systems costs are figures provided by Parsons Brinkerhoff and include allowance for tunnel cooling
5 Indirect costs figures have been provided by the HS2 costs team
6 Savings from the Efficiency Challenge Programme and Value Engineering have been provided by the HS2 costs team

HS2 Ltd updated costings between July and 17 September 2015 for C6 (HS2 Ltd proposal)

Chiltern tunnel extension (Option C6) - comparison of cost estimates between July 2015 and September 2015; Updated 17 September 2015

		HS2 Option C6	HS2 Option C6	Difference	Commentary on cost changes between July and September estimates
		17-Sep-15	17-Jul-15		
1.00	LAND AND PROPERTY	-19.60	-19.60	0.00	
2.00	TUNNELS	78.02	67.78	10.24	
	Bored Tunnels	126.59	116.70	9.89	Re-assessment of extended tunnel boring programme & associated prelims costs. Supercedes previous separate assessment of extended preliminaries.
	Green Tunnels	-66.57	-57.14	-9.44	Green tunnel portal costs incorporated into green tunnel cost.
	Portals	-1.95	-10.34	8.38	
	Shafts	16.13	14.74	1.40	Changes to vent shaft surface works arising from further rail systems assessments. Includes for retaining wall at Chalfont St Giles vent shaft compound to protect woodland
	Additional disposal costs	3.82	3.82	0.00	
3.00	CIVIL ENGINEERING	-42.36	-45.43	3.07	
	CUTTINGS	-16.61	-24.30	7.69	Reduction in cost saving due to adjustment of hybrid Bill scheme volume/cost and increase in cut volume/cost assessed for Option C6
	EMBANKMENTS	0.00	0.00	0.00	
	EARTHWORKS	-10.89	-2.48	-8.41	
	Landfill & Contaminated Remediation Measures	0.00	0.00	0.00	
	Landscaping	-10.89	-2.48	-8.41	Increased savings to reflect reduced works expected at Hunts Green Farm and reduced volume of excavated material transportation
	ENVIRONMENTAL MITIGATION WORKS	-3.36	-3.17	0.81	
	Planting	-2.88	-2.88	-0.00	
	School protection works	0.00	0.00	0.00	
	Enhanced Planting	0.00	0.00	0.00	
	Noise Barriers	0.53	-0.28	0.81	Option C6 initially assumed no additional noise fence barriers. Following option development, additional barriers and associated costs are now included.
	RETAINING WALLS	0.00	0.00	0.00	
	BRIDGES	-2.73	-6.60	3.87	
	Overbridge	-2.73	-4.02	1.29	Design development identified need for different form of bridge construction across wider cutting.
	Underbridge	0.00	-2.59	2.59	Revised as no underbridges in this section
	VIADUCTS	0.00	0.00	0.00	
	HIGHWAYS	-6.01	-7.16	1.15	Inclusion of additional costs associated with maintenance access road from Frith Hill
	OTHER	-3.76	-7.60	3.85	
	Culverts	-0.51	-0.51	0.00	
	Utilities Diversions	-3.18	-7.03	3.85	Option development has confirmed need for NG 400Kv overhead utility diversion at South Heath
	Utilities Connections	-0.06	-0.06	-0.00	
	EXTENDED PRELIMINARIES	0.00	5.89	-5.89	As the costs now reflect a mitigated scheme, changes to preliminaries are now incorporated into the bored tunnel and rail systems costs respectively
5.00	DEPOT AND SIDINGS	0.00	0.00	0.00	
	Sidings	0.00	0.00	0.00	
	Other Facilities	0.00	0.00	0.00	
	IMD Depot	0.00	0.00	0.00	
	Temporary Railhead	0.00	0.00	0.00	
6.00	RAILWAY SYSTEMS	27.07	18.40	8.67	July figure represented unmitigated scheme. September figure allows for rail systems fit-out from the north portal and includes for additional plant purchases (concrete trains); new north portal compound; programme savings from reduced fit-out period; and minor revisions to rail systems costs.
8.00	INDIRECT COSTS	11.40	7.40	4.00	
		54.52	28.56	25.97	
	Less ECP/VE	-7.11	-2.74	-4.37	ECP/VE figure corrected in September update
	Net total	47.41	25.82	21.59	

HS2 Ltd updated costings between July and 17 September 2015 for C5 (Leather Lane)

REPA proposal (Option C5) - comparison of cost estimates between July 2015 and September 2015; Updated 17 September 2015

		REPA Option C5 17-Sep-15	REPA Option C5 17-Jul-15	Difference	Commentary on cost changes between July and September estimates
1.00	LAND AND PROPERTY	-32.70	-32.70	0.00	Land cost saving reverted to July figure.
2.00	TUNNELS	154.64	134.54	20.10	
	Bored Tunnels	201.02	181.76	19.26	Re-assessment of extended tunnel boring programme & associated prelims costs. Supercedes previous separate assessment of extended preliminaries.
	Green Tunnels	-66.57	-57.14	-9.43	Green tunnel portal costs incorporated into green tunnel cost.
	Portals	-1.99	-10.38	8.39	
	Shafts	16.08	14.19	1.89	Changes to vent shaft surface works arising from further rail systems assessments. Includes for retaining wall at Chalfont St Giles vent shaft compound to protect woodland
	Additional disposal costs	6.11	6.11	-0.00	
3.00	CIVIL ENGINEERING	-74.24	-57.01	-17.23	
	CUTTINGS	-30.86	-33.33	2.47	Reduced cost saving due to adjustment of hybrid Bill scheme volume/cost.
	EMBANKMENTS	0.00	0.00	0.00	
	EARTHWORKS	-16.73	-3.03	-13.70	
	Landfill & Contaminated Remediation Measures	0.00	0.00	0.00	
	Landscaping	-16.73	-3.03	-13.70	Increased savings to reflect reduced works expected at Hunts Green Farm and reduced volume of excavated material transportation
	ENVIRONMENTAL MITIGATION WORKS	-4.69	-4.26	-0.43	
	Planting	-4.15	-3.72	-0.43	Updated
	Noise Barriers	-0.54	-0.54	0.00	
	RETAINING WALLS	0.00	0.00	0.00	
	BRIDGES	-7.87	-10.47	2.60	
	Overbridge	-7.87	-7.88	0.01	
	Underbridge	0.00	-2.59	2.59	Revised as no underbridges in this section
	VIADUCTS	0.00	0.00	0.00	
	HIGHWAYS	-7.18	-7.18	0.00	Sept figure reverted to July estimate..
	OTHER	-6.92	-7.27	0.35	
	Culverts	-0.51	-0.51	-0.00	
	Utilities Diversions	-6.50	-6.86	0.36	Updated
	Utilities Connections	0.10	0.10	0.00	
	EXTENDED PRELIMINARIES	0.00	8.53	-8.53	As the costs now reflect a mitigated scheme, changes to preliminaries are now incorporated into the bored tunnel and rail systems costs respectively
5.00	DEPOT AND SIDINGS	0.00	0.00	0.00	
6.00	RAILWAY SYSTEMS	32.02	21.70	10.32	July figure represented unmitigated scheme. September figure allows for rail systems fit-out from the north portal and includes for additional plant purchases (concrete trains); new north portal compound; programme savings from reduced fit-out period; and minor revisions to rail systems costs.
8.00	INDIRECT COSTS	20.25	18.03	2.22	
		99.97	84.56	15.41	
	Less ECP/VE	-12.64	-8.12	-4.53	ECP/VE figure corrected in September update
	Net total	87.33	76.44	10.88	