6 *Other flood losses:* Utility, schools, hospitals, transportation networks and emergency costs

Tables and figures

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Introduction: Prioritisation of losses for inclusion in project appraisal

Figure 6.1 Prioritisation process for selecting those assets to quantify potential losses

STEP 1

Identify those assets at risk of flooding

This first step is simply to identify those assets at risk of flooding and thereby the scale of the issue.

There are a number of ways in which to enumerate assets depending on the type of asset (e.g. km of network, or numbers of assets) but mapping of these is preferable.

Use GIS tools

Utility and transport organisations have been developing risk registers since 2007.

These should be accessed where possible as for many assets Steps 1 to 3 may have already been undertaken

STEP 2

Determine the likelihood of flooding of assets

Utilise flood threshold information to identify on a simple scale (e.g. low, moderate, significant) the likelihood of flooding and include the probability of a particular asset being affected.

STEP 3

Determine the criticality of the assets to flooding

Categorise the affected asset using a criticality scale (e.g. such as a Risk Matrix or a variant)

This should take into account the scale of the loss or disruption and the joint and the joint effect of *susceptibility*, *dependency* and *transferability* within the system.

STEP 4

Utilise total risk matrix for prioritisation

A risk matrix approach should be adopted obtain an estimation of the total risk of assets to induced losses. This combines the scales in Steps 2 and 3 to identify the significant assets.

FIRST DEGREE OF PRIORITISATION

At this stage those assets which will have a significant impact upon induced losses to flooding will be identified.

STEP 5

Assess the impact of resistance and resilience

Identify those assets where resistance and resilience measures are implemented and/or planned and where the impact of flooding is mitigated.

These should be excluded from the assessment and quantification of induced losses.

SECOND DEGREE OF PRIORITISATION

Update the likelihood and/or impact categories to account for resistance and resilience measures.

STEP 6

Quantify losses for ‘high’ and ‘very high risk’ assets

Judgement is required about which risk categories should be quantified. However, it is suggested that only those high or very high risk assets should be considered.

Assets which are in lower risk categories should be included but described qualitatively in the project appraisal.

Table 6.1 Enumeration, descriptors and valuation measures to gauge the scale of the infrastructural risk

Infrastructure type	Enumerator/ Descriptor	Valuation Measures
Roads	Length (in km) of motorways, A, B, minor within the floodplain; flood thresholds	User numbers (cars, HGV, LGV, PSV) Flood free alternatives
Railways	Length (in km) of intercity, regional, local, commuters tracks; flood thresholds	No. of passengers of different types (commuter, business, other), trains per day,
Electricity transmission	KV, lengths, thresholds of flooding of plinth	Supply catchment, population served
Electricity distribution	Size of substations; threshold of flooding	Supply catchment, population served
Gas pressure, pumping stations [1]	Type and number	Supply catchment, population served
Water treatment works	Type and number (pumping station, booster station etc); thresholds of flooding	Supply catchment, population served
Sewage treatment works	Type and number (biological filter, activated sludge, pumping station etc); thresholds of flooding	Drainage catchment, population served
Telecommunications [2]	Exchanges, cabinets, pillars, threshold of flooding	Population served
[1] Water distribution and supply mains, trunk sewers and gas lines can all but be ignored unless likelihood of fracture is high (e.g. on exposed river crossing or where it might be threatened by the ground around it becoming saturated so that it floats and threatened the pipe work joints).		
[2] Redundancy is now high with universal application of mobile telephony. Telecommunication losses and disruption can all but be ignored unless physical damage is likely with high probability within an exchange.		

Table 6.2 Risk Matrix

IMPACT**	*Significant*	Medium Risk	**High Risk**	**Very High Risk**
	Moderate	Low Risk	Medium Risk	**High Risk**
	Low	Negligible Risk	Low Risk	Medium Risk
		Very Low	*Low*	*Medium/High*
			LIKELIHOOD*	

* These follow the Environment Agency's Risk of Flooding from Rivers and Sea likelihood bands.
** The significant, moderate and low impact categories are defined for each receptor type.

***Table 6.3 Summary of impacts for utility and infrastructure assets assuming that there are no flood resilience measures or actions taken to increase* redundancy**

Utility/ infrastructure	Susceptibility	Dependency	Redundancy/ Transferability	Scale 1 = few 2 = many 3 = very many	Total likely impact
Electricity transmission and distribution					
> 132 kV (fluvial)	Low	High	Low	3	Low
>132 kV (tidal) [1]	High	High	Low	3	High
<132 kV (fluvial)	Low	High	Low	2	Low
<132 kV (tidal)	High	High	Low	2	Medium
Grid (Super grid) substation	High	High	High	3	Medium [2]
Grid (Bulk Supply Point) substation	High	High	Medium	3	Medium [2]
Primary substation	High	High	Medium	2	Medium[2]
Distribution substation	High	High	Low	1	Medium/ Low [3]
Gas transmission					
Gas pressure stations	Medium	Medium	Low	1	Low
Gas pressure stations	Medium	Medium	Low	2	Medium
Water and waste water treatment					
Sewage treatment	Medium	High [4]	Low [5]	1	Medium
Sewage treatment	Medium	High [4]	Low	2	Medium
Water treatment	High	High	Medium [6]	1	Medium
Water treatment	High	High	Medium [6]	2	High
Water pump stations	High	High	Low	1 and 2	Medium
Telecommunication systems					
Connection points – cabinet	Low	Medium	High	2	Low
Telecoms connection points – pillars	Low	Medium	High	1	Low [7]
[1] Transmission lines across a coastal floodplain are likely to collapse during a severe tidal inundation. Also if a transmission line is within an area flooded for any considerable period of time, then maintenance of that structure will be difficult and the integrity of the asset threatened.					
[2] The absolute impact will depend upon the specific site plan and the location of equipment within it; in particular the positioning and height of the switching gear and transformers.					
[3] This is 'low' in the situations whereby the properties the substation is servicing are also flooded as the substation will be repaired before the houses. It is 'medium' in situations where the substation is servicing properties which remain dry (i.e. 'unflooded' properties).					
[4] Environmental damage through treatment bypass might be as important as physical damage.					
[5] A reminder that in this circumstance the redundancy remains low – unless measures have been taken as a consequence of the Pitt Review to increase the transferability of the service.					
[6] Depends upon locality.					
[7] Redundancy of landline facilities is extremely high with saturation coverage of mobile telephones.					

NB. This is Table 6.14 in the MCM 2013

Infrastructure

Table 6.4 Types of electricity substations (ENA, 2009)

Substation type	Typical Voltage transformation levels	Approximate number in UK	Typical size	Typical numbers of customers supplied
Grid (Super grid)	400kV to 132kV	377	250m x 250m	200,000 to 500,000
Grid (Bulk Supply Point)	132kV to 33kV	1,000	75m x 75m	50,000 to 125,000
Primary	33kV to 11kV	4,800	25m x 25m	5,000 to 30,000
Distribution	11/kV to 400/230V	230,000	4m x 5m	1 to 500

NB. This is Table 6.6 in the MCM 2013

Energy Networks Association (ENA) (2009) 'Resilience to flooding of grid and primary substations', Engineering Technical Report (ETR 138), issue 1, Energy Networks Association, London.

Table 6.5 Risk matrix for electricity substations

IMPACT	Sig: Grid substations with serving a population of > 125 000	Medium Risk	**High Risk**	**Very High Risk**
	High: Primary substations those with > 10000 *population supplied*	Medium Risk	**High Risk**	**High Risk**
	Mod: Primary substations with 5,000 to 10,000 population supplied	Low Risk	Medium Risk	**High Risk**
	Low: Distribution substations with fewer than 500 people supplied.	Negligible Risk	Low Risk	Medium Risk
		Very Low	*Low*	*Medium/High*
		LIKELIHOOD		

NB. This is a revised version of Table 6.7 in the MCM 2013

Figure 6.2 List of Approved Designated Services eligible to apply for the Protected Sites List

Tier	Designated Service	Lead Government Department/Devolved Administration
0 (Z)	Licensed electricity generators, and licensed network operators' key operational facilities	DESNZ
	Gas reception terminals; storage installations including boosting and compression equipment; gas compressor stations and principal development and control sites for the control of gas supply systems and emergency procedures	DESNZ
1	Hospitals as agreed with Department for Health/Scottish & Welsh Government. This includes major trauma centres, burns centres, acute hospitals with A&E and intensive care units	Department for Health and Social Care/Devolved Administration
2	Emergency services of regional significance, including: • Ambulance Control Centres • Fire Control Rooms • Critical Police sites • Coastguard rescue coordination centres	Home Office, Ministry of Housing, Communities and Local Government, Department for Transport, Department for Health & Social Care/Devolved Administration
	Vital Health Organisations as agreed with Department for Health and Scottish Government, which could include: • UKHSA - core laboratories • NHS blood and transplant manufacturing sites • Large residential care homes	Department for Health and Social Care/Devolved Administration
	Sites, as agreed with the Ministry of Defence, where the security of the United Kingdom that cannot be reasonably mitigated (i.e., Atomic Weapons Establishment)	Ministry of Defence
	Digital and telecommunication services where there is a national need for continued operation, such as critical broadcast infrastructure	Department for Culture Media and Sport and Department of Science, Innovation and Technology
	Data centres which are vital to the operation of Essential Services	Department for Science Innovation and Technology
	Prisons as agreed with MoJ/Devolved Administration	Ministry of Justice/Devolved Administration
	Nuclear decommissioning, waste process sites and nuclear fuel manufacturers.	DESNZ
	Oil refineries and vital oil pumping stations import/storage/distribution terminals	DESNZ
	Essential drinking water (i.e., abstraction, treatment and distribution sites) and sewerage installations	Department for the Environment, Food & Rural Affairs/Devolved Administration
	A major location for essential food manufacture as agreed with the Department of Environment, Food and Rural Affairs	Department for the Environment, Food & Rural Affairs/Devolved Administration
	Critical transport sites as agreed with the Department of Transport, such as: • Major airports and associated control facilities • Significant railway operations • Ports which have a national infrastructure significance	Department for Transport/Devolved Administration
3	Financial services where there is a national need for continued operation	His Majesty's Treasury
	Chemical suppliers as agreed with the Department of Business and Trade	Department for Business & Trade
	Energy intensive industries (i.e., ceramics, glass, paper, steel and metals)	Department for Business & Trade

Source: Department for Energy Security and Net (2026; Table 2).

Department for Energy Security and Net Zero (DESNZ) (2026) Electricity Supply Emergency Code (ESEC), Updated 13 April 2026, https://www.gov.uk/government/publications/electricity-supply-emergency-code?1777966822, accessed 5 May 2026.

Table 6.6 Estimations of population served based on the perimeter fence length (after Energy Networks Association, 2018b)

Sub station type	Average Perimeter Fence	Ratio customers to metres of perimeter
Grid (Super grid)	1000m	225:1
Grid (Bulk Supply Point)	300m	183:1
Primary	100m	150:1

NB. This is Table 6.8 in the MCM 2013

Energy Networks Association (ENA) (2018b) 'Resilience to flooding of grid and primary substations: Annex', Engineering Technical Report (ETR 138 Annex), Issue 1, 2018, Energy Networks Association (ENA): London, , https://www.ena-eng.org/ena-docs/D0C3XTRACT/ENA_ET_138_-_Annex_Extract_180902050351.pdf, accessed 15 April 2026.

Table 6.7 Resilience levels for electricity substations*

Flood type	Protection level			Allowance for climate change rises	Freeboard
	Grid Substation	Primary Substations† > 10,000 unrecoverable connections	Primary Substation† < 10,000 unrecoverable connections		
Fluvial	1:1000 Flood level	1:1000 Flood level	1:100 Flood level	Flood Depth x 20% or use of EA CC factored levels	300mm
Tidal	1:1000 Flood level	1:1000 Flood level	1:200 Flood level	105 mm or use of EA CC factored levels	300mm
Surface	1:1000 Flood level	1:1000 Flood level	1:100 Flood level	Flood Depth x20%	300mm

Source: UK Power Networks (2024, 10); ENA (2018a, 20).

* Please note that critical infrastructure resilience is a priority area following recent floods and storms and the *National Flood Resilience Review* (HM Government, 2016) and so the resilience levels may be subject to change. Furthermore, some DNOs have issued guidance recommending additional safety factors are applied (e.g. Electricity North West, 2017). In particular, the updated ENA (2018a) suggests that Network Operators should ensure that they utilise the most recent guidance available. It is recommended that appraisers also check for updated information. The third and fourth round of Climate Change Adaptation Reporting accordance with the Climate Change Act 2008, provides the updated information on climate resilience for each supplier (Defra, 2023; 2025).

† ENA (2018a) suggests that network operators should focus on the resilience of service provision to sites supplying significant local communities (SLCs) (which are defined as those comprising at least 10,000 customers/connections) and to the level of the EA's Extreme Flood Outline (i.e. 1/1,000 flood risk). Therefore, those primary substations which are likely to serve a customer population of over 10,000 should have the same protection level (1:1000) as grid substations.

Department for Environment, Food and Rural Affairs (2023) Climate change adaptation reporting: third round reports, Reports from organisations invited to report under the third round of the climate change Adaptation Reporting Power, Latest update 9 August 2023, https://www.gov.uk/government/collections/climate-change-adaptation-reporting-third-round-reports#energy-companies, accessed 15 April 2026.

Department for Environment, Food and Rural Affairs (2025) Climate change adaptation reporting: fourth round reports, Reports from organisations invited to report under the fourth round of the climate change adaptation reporting power, Energy, https://www.gov.uk/government/publications/climate-adaption-reporting-fourth-round-energy, accessed 15 April 2026.

Electricity North West (2017) Substation Flood Protection, Electricity Policy Document 355, Issue 3, April 2017, https://www.enwl.co.uk/globalassets/get-connected/cic/icpsidnos/g81-policy/policy-library-documents/substation/epd355---substation-flood-protection.pdf, accessed 15 April 2026.

Energy Networks Association (ENA) (2018) 'Resilience to flooding of grid and primary substations', Engineering Technical Report (ETR 138), Issue 3, June 2018, Energy Networks Association, London.

HM Government (2016) National Flood Resilience Review, September 2016, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/551137/national-flood-resilience-review.pdf, accessed 15 April 2026.

UK Power Networks (2024) Substation Flood Protection, Engineering Design Standard EDS, EDS 07-0106, version 4.1, https://g81.ukpowernetworks.co.uk/library/design-and-planning/substations-major/general/eds-07-0106-substation-flood-protection, accessed 15 April 2026.

Table 6.8 ***Potential intervention measures for electricity infrastructure with their advantages and disadvantages***

Intervention Measure		Advantages	Disadvantages
Permanent	EA intervention measure (wall or embankment)	Removes flood risk to design flood level	High cost solution and long 'solution' lead time
Permanent	Buildings and Critical assets protected 365 days per year	Access maintained and all apertures sealed with site not requiring to be manned during flood	Protection generally only effective to a height of 1 metre above ground level. Medium cost solution
Permanent	Barriers and gates at critical openings in perimeter	Access to critical pant maintained	Site needs to be manned during flood incident. Medium cost solution
Permanent	Substation critical assets raised	Removes risk of flooding to new design threshold	High cost solution with long construction lead time
Permanent	Substation relocation outside floodplain	Wholly removes flood risk	Very high cost solution and disruptive to customers during construction
Demountable	Buildings and critical assets where supports are permanent and panels etc stored on site	Removes flood risk to design flood level	Medium to high cost solution and resource intensive during flooding with potential for operational failure.
Demountable	Site protection where supports are permanent and panels etc stored on site	Removes flood risk to design flood level	Medium to high cost solution and resource intensive during flooding with potential for operational failure.
Temporary	Site protection measures installed following flood warning	Low cost solution	High deployment and training costs for erection etc.

Source: Adapted from Energy Networks Association (2009)

NB. This is Table 6.10 in the MCM 2013

Energy Networks Association (ENA) (2009) 'Resilience to flooding of grid and primary substations', Engineering Technical Report (ETR 138), Issue 1, October 2009. Energy Networks Association, London.

Figure 6.3 Indicative figures for average energy and gas consumption and willingness to pay to avoid a power outage

Average electricity consumption† – 2023 estimates

Annual Energy Consumption per household (Ofgem, 2023)	Daily Energy Consumption per household
2,700 kWh	7.4 kWh

Average gas consumption – 2023 estimates

Annual Gas Consumption per household (Ofgem, 2023)	Daily Gas Consumption per household
11,500 kWh	31.5 kWh

Willingness-to-pay* to avoid disconnection of supply for electricity (2026 values)

Willingness to pay to avoid disconnection – Domestic users (BERR, 2007)***	Willingness to pay to avoid disconnection – Business users** (BERR, 2007)
£16.57 per kWh	£58.01 per kWh

The annual consumption per household figure is the medium Typical Domestic Consumption Value calculated by Ofgem (2023) – the higher or lower values might be used to provide a more conservative or maximum estimate and where more information is known about the type of property. TDCVs are industry standard values and are those recommended by the industry. The latest update was published on 23rd May 2023 and so the presented values are correct as of April 2026.

†TDCV Electricity Profile Class 1 has been used (i.e. those not on an Economy 7 tariff) the assumption being that households are not only reliant on electricity for power and this will provide a more conservative estimate. For a maximum estimate, TDCV Profile Class 2 can be used and accessed from Ofgem (2020).
*****These values have been generated in relation to electricity supply. However, this might also be used in the case of the disruption to a gas supply in the absence of other appropriate estimates.
******This is an average value and there is likely to be significant variation amongst business owners depending upon the type of business and its dependency upon water.
*** New data commissioned by the Energy Networks Association (ENA) concerning the willingness of energy customers to pay to avoid electricity disruption was published in 2025 (NERA, 2025). These new values may be integrated into an updated version of Chapter 6, however need review by Environment Agency economist prior to adoption.

Department of Business, Enterprise and Regulatory Reform (BERR) (2007) Electricity Priority Users Arrangements, Department for Business, Enterprise and Regulatory Reform, https://webarchive.nationalarchives.gov.uk/ukgwa/20090609003228/http://www.berr.gov.uk/files/file40466.pdf, accessed 05 April 2026.

NERA (2025) Value of lost load study in Great Britain: Work Package 2 report, Prepared for the Energy Networks Association, 17 October 2025, https://www.energynetworks.org/publications/value-of-lost-load-study-in-great-britain, 05 April 2026.

Ofgem (2023) 'Typical Domestic Energy Consumption Values', https://www.ofgem.gov.uk/information-consumers/energy-advice-households/average-gas-and-electricity-use-explained, revised 25th May 2023, accessed 05 April 2026.

Table 6.9 Risk matrix for sewage treatment works

IMPACT	*Sig: > 30,000 cumecs effluent dry weather flow*	Medium Risk	**High Risk**	**Very High Risk**
	Mod: 5,000 to 30,000 cumecs effluent dry weather flow	Low Risk	Medium Risk	**High Risk**
	Low: < 5,000 cumecs effluent dry weather flow	Negligible Risk	Low Risk	Medium Risk
		Very Low	*Low*	*Medium/High*
		LIKELIHOOD		

NB. This is Table 6.12 in the MCM 2013

Table 6.10 Risk matrix for water supply

IMPACT	*Sig: > 20,000 population supplied or PSL customers*	Medium Risk	**High Risk**	**Very High Risk**
	Mod: 5,000 to 20,000 population supplied	Low Risk	Medium Risk	**High Risk**
	Low: < 5,000 population supplied	Negligible Risk	Low Risk	Medium Risk
		Very Low	*Low*	*Medium/High*
		LIKELIHOOD		

NB. This is Table 6.13 in the MCM 2013

Transport

Table 6.11 Total resource costs of travel as a function of speed (pence/km) (updated to 2025 values)

Total resource costs (pence per km)								
Speed (km/hr)	**5**	**10**	**20**	**40**	**50**	**80**	**100**	**120**
Car average p/km	366	185	98	54	46	31	28	25
LGV average p/km	429	223	118	67	57	43	40	38
OGV1 p/km	472	251	137	78	67	52	-	-
OGV2 p/km	603	327	184	111	96	77	-	-
PSV p/km	2715	1391	729	394	327	-	-	-

Data supplied by the Department for Transport (2012)

This is Table 6.15 in the MCM 2013

Department for Transport (2012) ‘UNIT 3.5.6: Values of Time and Vehicle Operating Costs’, Transport Analysis Guidance (TAG), October 2012, Department for Transport, London. This is now restructured into the following TAG guidance, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102785/tag-unit-a1.3-user-and-provider-impacts.pdf, accessed 1 April 2026.

Table 6.12 Indicative delay durations at different return periods

Likelihood of flooding	Delay duration (Hours)
Up to and including the 5-year return period (0.2%)	6
Up to and including the 10-year return period (0.1%)	6
Up to and including the 25-year return period (0.04%)	12
Up to and including the 50-year return period (0.02%)	24
Up to and including the 100-year return period (0.01%)	48
Up to and including the 200-year return period (0.005%)	96

This is Table 6.17 in the MCM 2013

Table 6.13 Speed-flow relations

Road type	**Free Flow speed (kph)**	**Free Flow limit (pcu/h/lane)**	**Limiting capacity (pcu/h/lane)**	**Speed at Limiting Capacity (kph)**
	VC	QC	QM	VM
	Free flow speed	Speed falls linearly over this range		
Rural motorway	90	1800	2600	76
Rural dual carriageway	79	1600	2400	70
Rural all purpose road	70	400	1800	57
Rural all purpose road – poorly aligned	50		600	50
Urban motorway	80	1700	1400	66
Urban dual carriageway				
With limited access and 80 kph limit	65	1400	2200	56
65 kph speed limit	50	600	1100	30
Urban single carriageway road				
outer area	45	500	1000	25
intermediate area	35	350	600	25
central business area	25	250	500	15
Suburban – major radial or outer ring roads				
No major intersections	Speed limit		2000	47
< 1 major intersection per km			1700	27
1-2 major intersection per km			1200	20

Source: Department for Transport (1981)
Department for Transport has confirmed that these 1981 values are still applicable.

NB. This is revised Table 6.16 in the MCM 2013

Department for Transport (DfT) (1981) Traffic Appraisal Manual, Department for Transport, London

NB: This has been corrected for the 2019 MCH. A formatting error was present for the final three rows and additionally the limiting capacity of an 80 kph limited urban dual carriageway was corrected to read 2200pcu/h/lane.

Table 6.14 Passenger numbers and statistics by Train Operating Company (Franchised companies only)

Train Operating Company	Passenger Journeys per year 2024-2025 (millions)	Passenger Journeys per 24 hours 2024-25 (averaged by dividing by 365)	Passenger kilometres 2024-2025 (millions)	Passenger train kilometres 2024-2025 (millions)	Route Kilometres operated 2024-2025
Avanti West Coast	34.9	95,620	6,608.6	30.5	1,310.0
c2c	37.3	102,154	872.1	6.7	125.5
Caledonian Sleeper	0.3	813	196.6	1.4	1,470.9
Chiltern Railways	22.9	62,771	1,218.2	9.4	349.2
CrossCountry	37.8	103,476	3,272.7	24.9	2,710.1
East Midlands Railway	31.5	86,336	2,515.4	24.8	1,490.3
Elizabeth line	242.9	665,388	2,379.8	12.0	118.0
Govia Thameslink Railway	298.0	816,322	8,085.6	59.2	1,149.0
Grand Central	1.7	4,701	455.6	2.8	518.0
Great Western Railway	89.0	243,912	6,209.1	46.8	1,997.0
Greater Anglia	81.8	224,133	3,612.9	28.0	511.0
Heathrow Express	4.3	11,736	110.3	1.4	29.0
Hull Trains	1.6	4,305	354.9	1.6	344.4
London North Eastern Railway	26.6	72,975	6,154.4	23.6	1,404.4
London Overground	180.4	494,150	1,247.6	11.4	173.7
Lumo	1.4	3,790	606.1	2.1	629.6
Merseyrail	29.9	81,886	542.4	6.3	122.0
Northern Trains	91.8	251,446	2,701.6	51.0	3,180.0
ScotRail	84.7	232,069	2,630.0	42.4	3,129.9
South Western Railway	165.6	453,759	4,889.8	35.3	997.8
Southeastern	137.9	377,837	3,779.2	32.4	748.3
TfW Rail	31.3	85,781	1,207.5	25.6	1,826.6
TransPennine Express	27.5	75,407	2,106.1	19.6	1,358.7
West Midlands Trains	67.7	185,409	2,811.1	24.3	899.6

Source: Data downloaded from the ORR National Rail Trends Portal (2026)

NB: Train operating companies change as franchises generally operate over a fixed period. * These data have also changed since the MCM (2013) as the ORR National Rail Trends Portal no longer provide data on 'timetabled train kms', but rather on 'passenger train kms.'

These data have been updated to the most recently available figures (2024/2025). The rail usage data reporting no longer discusses the impact of the pandemic and it is assumed that rail data is now reflective of altered working and travel patterns.

As these data were collected for the 2024/2025 period and operators may since have changed, it is suggested that users access the Rail Trends Portal at time of use.

Office of Rail Regulation (ORR) (2026) 'The National Rail Trends (NRT) Portal', http://dataportal.orr.gov.uk/, accessed 01 April 2026.

Table 6.15 Percentage delay/cancellation due to flooding (Posford Duvivier et al., 2002)

Rail Service	Delay %	Cancellation %
Passenger service	40	60
Freight service	45	55

NB. This is Table 6.19 in the MCM 2013

Table 6.16 ***Indicative compensation values for performance delays and cancelled services (data from Network Rail)***

Actual compensation values for each of the Train Operating Companies (TOCs) and Freight Operating Companies (FOCs), as agreed in the Track Access Agreements, are restricted information. Therefore, these indicative values are based on data of the actual delay costs and cancelled services between 2011 and 2013.

	Delay compensation value £s per minute per service *			**Cancellation compensation value £s per service cancelled****		
	Low value (£)	Medium value (£)	High value (£)	Low value (£)	Medium value (£)	High value (£)
Passenger services	40	71	97	673	2034	2591
Freight services	-	18	-	-	1900	0

NB. This is Table 6.20 in the MCM 2013

* Including a delay multiplier of 3
** Including a cancellation multiplier of 3

These delay multipliers have been applied according to the Department for Transport (2009) which Burr (2008, 46) argues is “used by the rail industry to recognise that unexpected delays are more costly to passengers”.

Burr, T. (2008) *Reducing passenger rail delays by better management of incidents*, report by the comptroller and auditor general, HC 308, Session 2007-2008, 14 March 2008, National Audit Office, The Stationary Office, London, https://webarchive.nationalarchives.gov.uk/ukgwa/20170207052351/https://www.nao.org.uk/wp-content/uploads/2008/03/0708308es.pdf, accessed 15 April 2026.

Department for Transport (2009) ‘Unit 3.5.7: The Reliability Sub-Objective’, *Transport Analysis Guidance (TAG),* April 2009, Department for Transport, London. This is now restructured into the following TAG guidance https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102785/tag-unit-a1.3-user-and-provider-impacts.pdf, accessed 15 April 2026.

Table 6.17 Values of Time - based on the willingness to pay of each type of passenger per hour (2026 values)

	Value of time* (VoT) £ per hour		
	Business passenger	Commuter	Other passenger
Original values per hour	£57.97	£7.98	£7.02
Uplifted to account for an unexpected delay**	£173.92	£23.95	£21.07

NB. This is Table 6.21 in the MCM 2013

*The resource cost estimate has been utilised in this instance as these values net of indirect taxation. Department for Transport (2012) have been updated utilising HM Treasury (2026) GDP Deflator (March 2026).

** The values have been uplifted by applying the 'delay multiplier' factor of 3.0 (Department for Transport, 2009) which Burr (2008, 46) argues is "used by the rail industry to recognise that unexpected delays are more costly to passengers".

Burr, T. (2008) Reducing passenger rail delays by better management of incidents, report by the comptroller and auditor general, HC 308, Session 2007-2008, 14 March 2008, National Audit Office, The Stationary Office, London, https://webarchive.nationalarchives.gov.uk/ukgwa/20170207052351/https://www.nao.org.uk/wp-content/uploads/2008/03/0708308.pdf, accessed 1 April 2026.

Department for Transport (2009) 'Unit 3.5.7: The Reliability Sub-Objective', Transport Analysis Guidance (TAG), April 2009, Department for Transport, London, This is now restructured into the following TAG guidance https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102785/tag-unit-a1.3-user-and-provider-impacts.pdf, accessed 1 April 2026.

Department for Transport (2012) 'UNIT 3.5.6: Values of Time and Vehicle Operating Costs', Transport Analysis Guidance (TAG), October 2012, Department for Transport, London. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102785/tag-unit-a1.3-user-and-provider-impacts.pdf, accessed 1 April 2026.

HM Treasury (2026) 'Latest figures, GDP deflators at market prices, and money GDP', https://www.gov.uk/government/statistics/gdp-deflators-at-market-prices-and-money-gdp-march-2026-quarterly-national-accounts, accessed 1 April 2026.

Table 6.18 ***Percentage breakdown of the journey purpose of rail travellers by Train Operating Company*** [*] ***and grouped train operators in 2025***

Train Company	Commute	Business	Personal/Leisure
Avanti West Coast	28	16	56
c2c	44	6	50
Chiltern Railways	30	14	55
CrossCountry	22	14	64
East Midlands Railway	24	13	63
Elizabeth Line	41	12	46
Eurostar	36	12	52
Gatwick Express	28	11	61
Grand Central	47	10	43
Great Northern	29	8	62
Great Western Railway	24	10	66
Greater Anglia	29	10	61
Heathrow Express	29	26	44
Hull Trains	26	12	62
London North Eastern Railway	26	15	59
London Northwestern Railway	40	13	47
London Overground	42	8	50
Lumo	11	2	87
Merseyrail	28	4	69
Northern	30	5	65
ScotRail	32	8	59
South Western Railway	32	8	60
Southeastern	39	7	54
Southern	38	6	55
Thameslink	36	7	56
TransPennine Express	21	12	67
Transport for Wales	34	5	60
West Midlands Railway	38	6	56
Grouped train operators	**Commute**	**Business**	**Personal/Leisure**
Long distance operators	25	14	61
London and South East operators	35	8	57
Regional operators	31	6	63

Source: Passenger Focus (2025) **NB. This is Table 6.22 in the MCM 2013**

* Please note that where operating franchise companies have changed between the surveys conducted, the data from the old and new operators have been merged to create this annual percentage. Data on journey purpose is also available for some specific routes and can be accessed in the datasets presented in the links below.
** These data have been updated to values provided by the Transport Focus *Rail User Survey* data. The latest available data are surveys undertaken in the period August 2024 to July 2025 (inclusive). In July 2025 the *National Passenger Survey* ceased and was replaced by the *Rail Customer Experience Survey*. However, as of April 2026 a full year's worth of data has not been collected and so as yet is unable to be used to provide average annual values of journey purpose.

Transport Focus (2025) 'National Passenger Survey data' https://transportfocusdatahub.org.uk/, accessed 06 April 2026.

Table 6.19 Percentage breakdown of the journey purpose of rail travellers by region (2010 data)

Region	Commuting	Business	Leisure
Scotland	59	11	30
Wales	50	12	38
North East	40	21	39
North West	53	12	35
Yorkshire and Humberside	54	14	32
East Midlands	49	17	33
West Midlands	55	14	31
East of England	67	12	21
London	69	12	19
South East	63	13	24
South West	46	19	34
Great Britain	63	13	24

NB: the percentages do not equal 100 due to rounding
Source: Department of Transport (2010)

Department for Transport (2010) 'National Rail Travel Survey Overview Report, Updated December 2010 Results from a survey of rail travel across Great Britain' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/73094/national-rail-travel-survey-overview-report.pdf, accessed 30 April 2026.

Education and Health

Table 6.20 Estimates of the value of a lost day's work – 2026 estimates

Minimum estimate*	Average estimate
£83.09	£111.493

*The minimum estimate is calculated using the £12.71 per hour National Living Wage (April 2026) for an adult and a 7.6 hour working day.

The average estimate is calculated using a median hourly wage for a full-time adult (excluding overtime) in April 2025 of £17.90 and a 7.6 hour working day (ONS, 2025).

The minimum estimate has been adjusted from gross pay values using HMRC (2026) to provide economic values net of Income Tax and National Insurance Contributions.

HMRC (2026) 'HMRC Tax Calculator', https://www.gov.uk/estimate-income-tax, accessed 06 April 2026.

Office for National Statistics (ONS) (2025) 'Annual Survey of Hours and Earnings, 2025 Provisional Results' ASHE: Table 6.6a, 23 October 2025, https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/agegroupashetable6, accessed 05 April 2026.

Table 6.21 Average cost(s) of a hospital bed

	Average bed cost in the NHS [1]	Average bed day cost for elective and admissions [2]	Average bed day cost for non-elective admissions [2, 3]	Average bed day cost for critical care [2]
Average cost of a bed per day	£345	£2,349	£901	£1,881

These values have been presented by the Minister of State (Department of Health and Social Care) in a written response to a question raised in Parliament (Quince, 2023). They have been calculated using the 2020/21 NHS cost data.

[1] The standard bed costs the average cost of a bed day excluding any treatment costs.

[2] The figures for critical care and elective and non-elective beds include the cost of treatment.

[3] Patients who are admitted as non-elective admissions often spend longer in hospital (inc. recovery and waiting for discharge), so whilst the total costs for non-elective treatment is higher than elective treatment, the average day cost is reduced as it is spread over many more days.

NB: These data provide the most updated values for average bed cost provided by the NHS reference cost data. The latest updated publicly available National Schedule of NHS Costs data (2024/26) does not provide values for average bed costs. However, users are advised to check recent information to see if these have been updated NHS England https://www.england.nhs.uk/costing-in-the-nhs/national-cost-collection/.

Furthermore, users should refer to these data and the specific services provided by hospitals at risk to identify the potential disruption and associated costs caused by flooding.

2020/2021 NHS National Cost Collection Data https://www.england.nhs.uk/publication/2020-21-national-cost-collection-data-publication/, accessed 05 May 2026.

Quince, W. (2023) Hospital Beds: Costs. Department of Health and Social Care written question – Question for Department of Health and Social Care UIN 165361, tabled on 14 March 2023 and answered on 30 March 2023. UK Parliament 2024 https://questions-statements.parliament.uk/written-questions/detail/2023-03-14/165361#, accessed 05 May 2026.

Table 6.22 Indicative costs per patient transfer – 2012/13 estimates for mileage and 2024/2025 estimates for fixed and time costs.

Ambulance costs vary depending upon whether a journey is made as part of a contract or as a private journey, a cost per hour, the distance travelled and includes a minimum cost. Additionally, there are additional charges for long journeys (over 300 miles return) and on public holidays.

Appraisers will need to identify alternative sites for healthcare provision and the distance (in miles) to that location. It appears that this should also include the return journey as the ambulance will be required to return to its base. This distance should be multiplied by the costs per mile (which is approximately £0.30) to calculate the total mileage costs.

These can then be added to either of the fixed and time costs in the table below. There is a minimum charge for any ambulance transfer which might be used as a minimum indicative cost. However, this would only be applicable for journeys which are undertaken in less than one hour.

Above this minimum, the costs rise according to the circumstances of the transfer, how long it takes and the day on which it occurs. Therefore, a second higher indicative value is presented in the table below which is based on the following assumptions:

- Only NHS patients transferred
- The distance to the alternative supplier is less than 150 miles (and therefore does not incur the additional charge)
- That the transfer does not occur on Statutory Bank holidays
- That the transfer takes a total of 1.5 hours (including waiting time)

Cost type	Minimum value	Higher indicative value
Fixed costs and time costs	£364	£489
Mileage costs	Number of miles x 0.30 per mile	Number of miles x 0.30 per mile

Data provided by the London Ambulance Service NHS Trust in 2012/2013 values for the mileage costs. The Fixed costs and time costs have been updated using the 2024/25 NHS Reference costs (https://www.england.nhs.uk/costing-in-the-nhs/national-cost-collection/) based on the principles provided by the London Ambulance Service NHS Trust.

Local Authority and Emergency Services

Table 6.23 ***Overall emergency costs as applicable to project appraisals (Summer 2007 Floods)***

Emergency costs applicable to project appraisals (based on Summer 2007 Floods - England)			
Cost item	**Amount**	**Allowed* amount (%)**	**Allowed amount**
Total Bellwin and roads:			
Bellwin	£30.20	42.5	£12.84
Roads infrastructure	£175.00	50	£87.50
Environment Agency costs+:			
Emergency repairs**	£14.80	50	£7.40
Emergency response	£2.20	100	£2.20
TOTAL	**£222.20**		**£109.94**
As % of economic property losses of £1,942m = 5.57%			

* Judged to be proper economic costs, not counted elsewhere in Benefit-Cost Analyses. The figure for roads recognizes some betterment after repair (hence the 50% taken).
** As for roads, some element of betterment here, hence 50% taken.
+ England and Wales

Chatterton, J. Viavattene, C., Morris, J., Penning-Rowsell, E., Tapsell, S. (2010) The costs of the summer 2007 floods in England. SC070039/R1. Environment Agency: Bristol.