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

Tables and figures

Introduction: Prioritisation of losses for inclusion in project appraisal

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

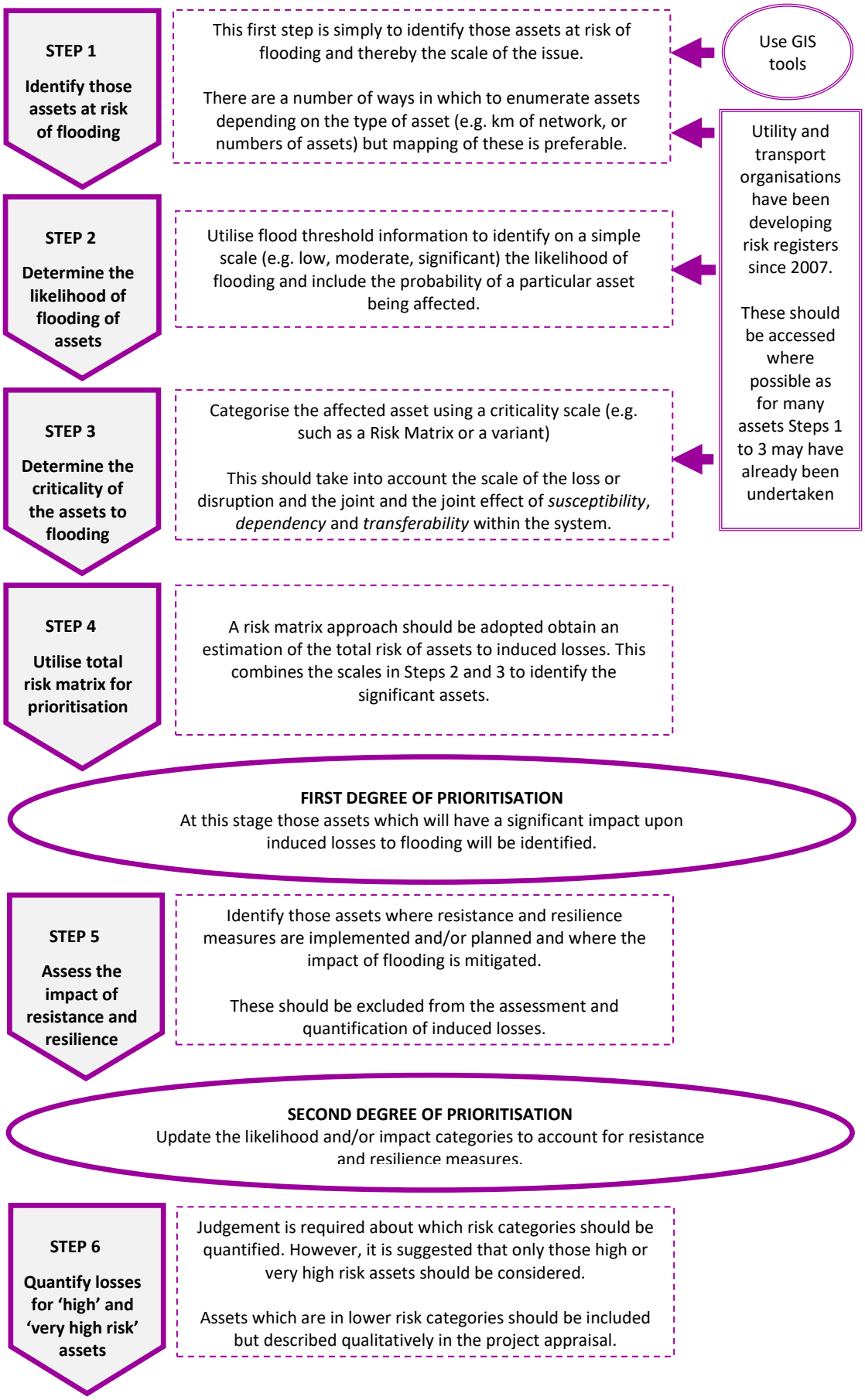

Table 6.1 Enumeration, descriptors and valuation measures to gauge the scale of the infrastructural risk

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 which are able to be considered to be added to the Protected Site List*

- 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;
- Licensed electricity generators, and licensed network operators;
- Oil refineries and vital oil pumping stations;
- Sites with a continuous manufacturing process, not sustainable through standby generation, where regular shutdown for 3-hour periods is not possible and would cause significant financial damage;
- Major airports and associated control facilities;
- Significant railway operations;
- Ports and docks which have a national infrastructure significance;
- Essential water and sewerage installations;
- A major location for essential food manufacture, processing or storing;
- Hospitals as agreed with NHS Foundation Trusts, Primary Care Trusts, Acute Trusts, Local Health Boards (in Wales), Welsh NHS Trusts and NHS Health Scotland;
- Digital and telecommunication services where there is a national need for continued operation
- Emergency services of regional significance;
- Armed forces sites that provide civil protection support;
- Financial services where there is a national need for continued operation.

Source: Department for Business, Energy and Industrial Strategy (2019; Table 1).

Department for Business, Energy and Industrial Strategy (2019) Electricity Supply Emergency Code (ESEC), Revised November 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/845221/electricity-supply-emergency-code-nov-2019-rev.pdf, accessed 30 April 2025.

* PSL has replaced 'V' list customers.

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 30 April 2025.

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 30 April 2025.

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 30 April 2025.

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 30 April 2025.

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 30 April 2025.

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 30 April 2025.

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 (2025 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 2025.
†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.

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 30 April 2025.

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 2024, accessed 30 April 2025.

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 2024 values)

Total resource costs (pence per km)								
Speed (km/hr)	**5**	**10**	**20**	**40**	**50**	**80**	**100**	**120**
Car average p/km	353	179	94	52	44	30	27	24
LGV average p/km	414	215	114	64	55	42	39	36
OGV1 p/km	455	242	132	75	64	50	-	-
OGV2 p/km	581	316	177	107	93	74	-	-
PSV p/km	2616	1340	702	380	316	-	-	-

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 14 April 2025.

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 2023-2024 (millions)	Passenger Journeys per 24 hours 2023-24 (averaged by dividing by 365)	Passenger kilometres 2023-2024 (millions)	Passenger train kilometres 2023-2024 (millions)	Route Kilometres operated 2023-2024
Avanti West Coast	32.8	89,739	6,306.9	28.1	1,310.0
c2c	35.8	98,046	834.6	6.1	125.5
Caledonian Sleeper	0.3	838	203.7	1.4	1,470.9
Chiltern Railways	21.1	57,728	1,125.2	8.8	349.2
CrossCountry	32.8	89,760	2,792.4	23.3	2,710.1
East Midlands Railway	28.9	79,291	2,402.7	23.8	1,490.3
Elizabeth line	220.3	603,486	2,158.6	11.8	118.0
Govia Thameslink Railway	279.0	764,267	7,604.6	54.8	1,146.0
Grand Central	1.8	4,825	472.2	2.6	518.0
Great Western Railway	82.6	226,321	5,840.6	44.5	1,997.0
Greater Anglia	76.4	209,202	3,336.0	26.3	511.0
Heathrow Express	4.5	12,432	116.8	1.4	29.0
Hull Trains	1.4	3,920	322.4	1.6	344.4
London North Eastern Railway	24.2	66,221	5,641.2	22.4	1,514.5
London Overground	181.4	496,957	1,252.8	11.3	173.7
Lumo	1.3	3,449	586.0	2.1	629.6
Merseyrail	28.3	77,493	511.0	6.2	122.0
Northern Trains	85.1	233,066	2,767.9	49.3	3,180.0
ScotRail	81.1	222,325	2,533.0	43.7	3,120.5
South Western Railway	153.2	419,860	4,523.4	33.3	997.8
Southeastern	128.4	351,712	3,496.1	30.6	748.3
TfW Rail	26.2	71,907	1,067.3	22.9	1,826.6
TransPennine Express	23.4	64,095	1,763.3	16.9	1,358.7
West Midlands Trains	61.8	169,369	2,485.0	22.7	899.6

Source: Data downloaded from the ORR National Rail Trends Portal (2025)

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 (2023/2024). Rail journeys are still slightly below pre-pandemic levels (ORR, 2024 suggests at 97% as for the same period in 2019, although vary regionally). However, data may now be more reflective of altered working and travel patterns. These data were collected for the 2023/2024 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) (2024) Passenger rail usage July to September 2024, 9 December 2024, https://dataportal.orr.gov.uk/media/s5bpixik/passenger-rail-usage-jul-sep-2024.pdf, accessed 17 April 2025.

Office of Rail Regulation (ORR) (2025) 'The National Rail Trends (NRT) Portal', http://dataportal.orr.gov.uk/, accessed 17 April 2025.

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, http://www.nao.org.uk/wp-content/uploads/2008/03/0708308.pdf, accessed 14 April 2025.

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 14 April 2025.

Table 6.17 Values of Time - based on the willingness to pay of each type of passenger per hour (2025 values)

	Value of time* (VoT) £ per hour		
	Business passenger	Commuter	Other passenger
Original values per hour	£55.64	£7.66	£6.74
Uplifted to account for an unexpected delay**	£166.92	£22.98	£20.22

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 (2025) GDP Deflator (March 2025).

** 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".

References

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, http://www.nao.org.uk/wp-content/uploads/2008/03/0708308.pdf, accessed 14 April 2025.

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 14 April 2025.

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 14 April 2025.

HM Treasury (2025) '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-2025-spring-statement-quarterly-national-accounts, accessed 14 April 2025.

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	25	14	61
c2c	48	5	47
Chiltern Railways	27	16	56
CrossCountry	24	14	61
East Midlands Railway	24	11	64
Elizabeth Line	40	5	55
Eurostar	26	13	61
Gatwick Express	22	14	64
Grand Central	39	16	45
Great Northern	28	9	63
Great Western Railway	25	10	65
Greater Anglia	31	9	59
Heathrow Express	46	11	44
Hull Trains	28	12	60
London North Eastern Railway	24	15	62
London Northwestern Railway	45	13	42
London Overground	39	8	53
Lumo	15	0	85
Merseyrail	31	3	67
Northern	29	5	66
ScotRail	34	7	59
South Western Railway	33	7	60
Southeastern	39	8	53
Southern	40	8	52
Thameslink	37	7	56
TransPennine Express	21	11	68
Transport for Wales	33	6	61
West Midlands Railway	34	7	59
Grouped train operators	**Commute**	**Business**	**Personal/Leisure**
Long distance operators	24	13	63
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. Surveys undertaken in the period March 2024 to Feb 2025 (inclusive) was utilised. Users can access the Transport Focus data for more specific information for the ToC or area of interest.

Transport Focus (2025) 'National Passenger Survey data' https://transportfocusdatahub.org.uk/, accessed 14 April 2025.

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 14 April 2025.

Education and Health

Table 6.20 Estimates of the value of a lost day's work – 2025 estimates

Minimum estimate*	Average estimate
£80.36	£106.73

*The minimum estimate is calculated using the £12.21 per hour National Living Wage (April 2025) 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 2024 of £17.03 and a 7.6 hour working day (ONS, 2024).

The minimum estimate has been adjusted from gross pay values using HMRC (2025) to provide economic values net of Income Tax and National Insurance Contributions.

HMRC (2025) 'HMRC Tax Calculator', https://www.gov.uk/estimate-income-tax, accessed 17 April 2025.

Office for National Statistics (ONS) (2024) 'Annual Survey of Hours and Earnings, 2024 Provisional Results' ASHE: Table 6.6a, 29 October 2024, https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/agegroupashetable6, accessed 17 April 2025.

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 (2023/24) 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 30 April 2025.

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 30 April 2025.

Table 6.22 Indicative costs per patient transfer – 2012/13 estimates for mileage and 2023/2024 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	£327	£459
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 2023/24 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%			