

# **HIGH SPEED UK : J02**

**Journey Time/Connectivity Comparisons between HSUK/TartanTrax and official proposals for Scottish rail network**

**J02A Modelling of Scottish network**

**J02B Assessment Methodology and Results**

**J02C Comparison of Direct Connectivity**

**J02D Improvement of Intercity Journey Times**

**J02E Comparison with Journey Times by Road**

**April 2024 Update**

**HSUK/TARTAN TRAX  
CONNECTIVITY STUDY  
OF SCOTTISH NETWORK**

**J02A**

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**NOTE**  
Existing railway network illustrated  
Connectivity analysis between same centres applied to official proposals and HSUK/TartanTrax scheme as set out in Document I02

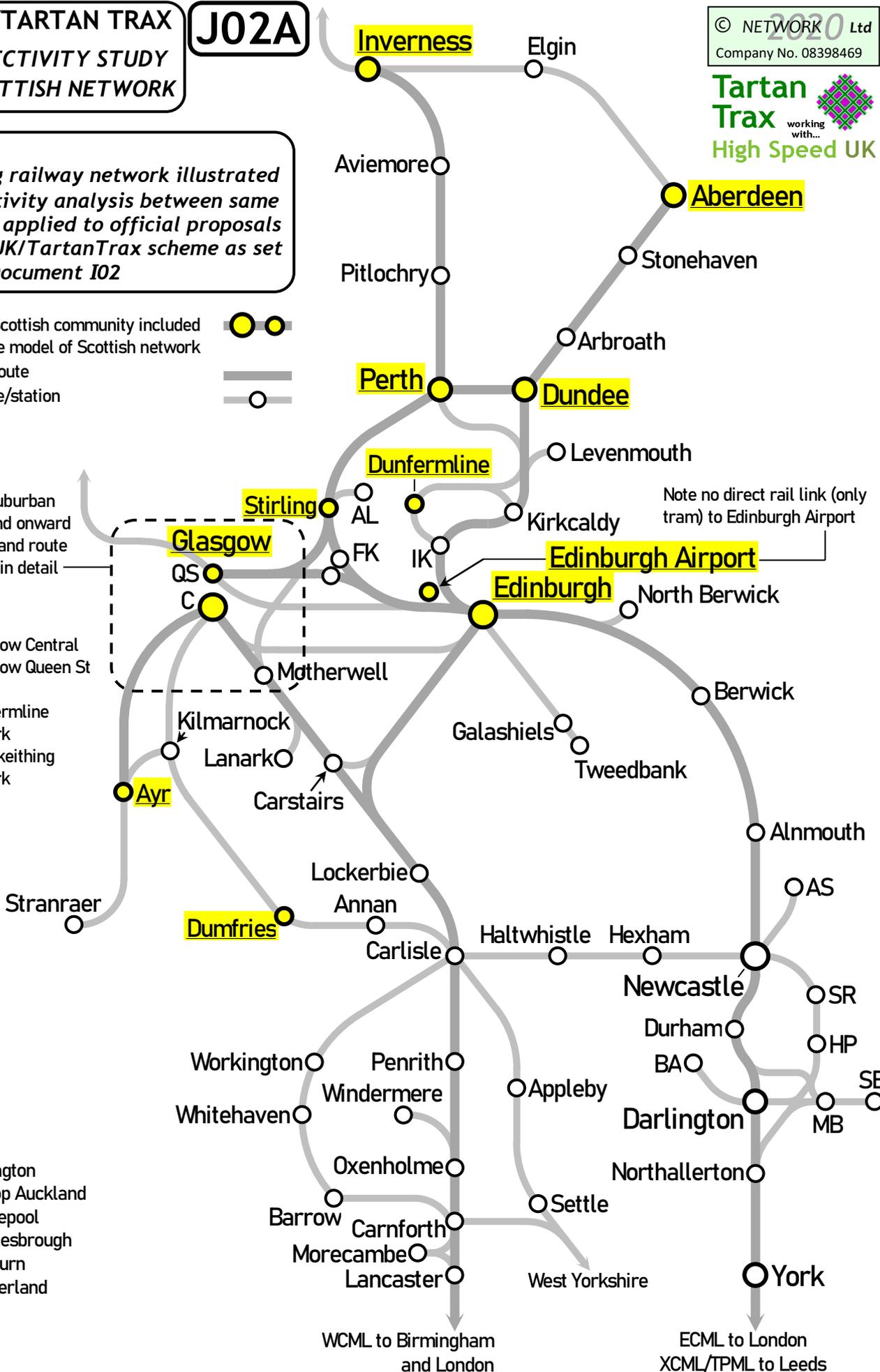
Principal Scottish community included in 11-centre model of Scottish network    
Principal route   
Other route/station  

Glasgow suburban network and onward West Highland route not shown in detail

- C Glasgow Central
- QS Glasgow Queen St
- AL Alloa
- DF Dunfermline
- FK Falkirk
- IK Inverkeithing
- LK Lanark

Note no direct rail link (only tram) to Edinburgh Airport

- AS Ashington
- BA Bishop Auckland
- HP Hartlepool
- MB Middlesbrough
- SB Saltburn
- SR Sunderland



WCML to Birmingham and London

ECML to London  
XCML/TPML to Leeds

# Methodology for Assessment of Connectivity

**J02B**

Connectivity is assessed according to 3 fundamental criteria:

1. Availability of direct, no change of trains, links between key cities;
2. Achievement of major journey time reductions across network;
3. Achievement of journey times similar to or superior to equivalent road journey.

## Direct Links between Key Cities - see Figure J02C

For the existing network, and for the proposed HS2 and HSUK interventions (and all subsidiary projects), all possible journeys (55 journeys for an 11-centre network) are categorised by the number of changes required, and are scored as follows:

- 3 points for a direct journey - either existing or through the proposed intervention;
- 1 point for a journey requiring a single change of trains;
- 0 points for a journey requiring 2 or more changes (or a tram link to Edinburgh Airport)

## Journey Times between Key Cities - see Figure J02D

Journey times are derived as follows:

- For existing journeys: from national rail website ([www.nationalrail.co.uk](http://www.nationalrail.co.uk));
- For HS2 and subsidiary projects (i.e. Northern Powerhouse Rail & Midlands Rail Hub): either from official publicity or from HSUK assessment of proposed HS2 (et al) routes;
- For HSUK and subsidiary projects (i.e. TartanTrax, Network North & Midland Ring): from HSUK assessments of proposed HSUK routes, using bespoke software validated against HS2 proposed routes and claimed journey times.

Journey times are adjusted to allow for change of trains (20 minutes added for each change) and for frequency of service (30 minutes added for 2-hourly services, 1 hour for 3-hourly etc).

## Comparison with Equivalent Road Journey - see Figure J02E

Journey times by road are obtained from Google Maps which automatically selects the quickest available route. These are measured between central railway stations in the origin and destination cities.

## Results of Connectivity Assessment

Criteria	Case	Scotland	North	Midlands	UK-wide
Direct Connectivity (Figure J02C)	Existing Network	79 o/o 165 (48%)	70%	67%	72%
	HS2	79 o/o 165 (48%)	76%	70%	73%
	HSUK/TartanTrax	145 o/o 165 (88%)	94%	100%	95%
Journey Time Reductions (Figure J02D)	HS2	0% ave. JTR	17%	9%	6%
	HSUK/TartanTrax	43% ave. JTR	44%	58%	43%
Road Journey Comparisons (Figure J02E)	Existing Network	55 mins <b>SLOWER</b>	14 mins	21 mins	11 mins
	HS2	55 mins <b>SLOWER</b>	2 mins	16 mins	16 mins
	HSUK/TartanTrax	1 min <b>FASTER</b>	28 mins	20 mins	74 mins

Existing	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH								23	3	69	EH
Glasgow		GL							10	1	10	GL
Aberdeen			AB						22	0	0	AB
Dundee				DD								DD
Stirling					SG							SG
Perth						PH						PH
Dunfermline							DF					DF
Dumfries								DM				DM
Inverness									IV			IV
Ayr										AY		AY
EDI Airport												EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	

Direct existing journeys: 23  
 1 change: 10  
 2 changes/tram: 22  
 Aggregate Score: 79  
 Max possible: 165  
 %age: 48%

**Existing Connectivity Score : 79 out of 165 possible = 48%**

HS2	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH								0	3	0	EH
Glasgow		GL							23	3	69	GL
Aberdeen			AB						10	1	10	AB
Dundee				DD					22	0	0	DD
Stirling					SG							SG
Perth						PH						PH
Dunfermline							DF					DF
Dumfries								DM				DM
Inverness									IV			IV
Ayr										AY		AY
EDI Airport												EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	

Direct HS2 journeys: 0  
 Direct existing journeys: 23  
 1 change: 10  
 2 changes/tram: 22  
 Aggregate Score: 79  
 Max possible: 165  
 %age: 48%

**HS2 Connectivity Score : 79 out of 165 possible = 48%**

HSUK/TT	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH								34	3	102	EH
Glasgow		GL							11	3	33	GL
Aberdeen			AB						10	1	10	AB
Dundee				DD					0	0	0	DD
Stirling					SG							SG
Perth						PH						PH
Dunfermline							DF					DF
Dumfries								DM				DM
Inverness									IV			IV
Ayr										AY		AY
EDI Airport												EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	

Direct HSUK journeys: 34  
 Direct existing journeys: 11  
 1 change: 10  
 2 changes: 0  
 Aggregate Score: 145  
 Max possible: 165  
 %age: 88%

**HSUK/TT Connectivity Score : 145 out of 165 possible = 88%**

HS2	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	EH
Glasgow	1.00	GL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	GL
Aberdeen	1.00	1.00	AB	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	AB
Dundee	1.00	1.00	1.00	DD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	DD
Stirling	1.00	1.00	1.00	1.00	SG	1.00	1.00	1.00	1.00	1.00	1.00	SG
Perth	1.00	1.00	1.00	1.00	1.00	PH	1.00	1.00	1.00	1.00	1.00	PH
Dunfermline	1.00	1.00	1.00	1.00	1.00	1.00	DF	1.00	1.00	1.00	1.00	DF
Dumfries	1.00	1.00	1.00	1.00	1.00	1.00	1.00	DM	1.00	1.00	1.00	DM
Inverness	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IV	1.00	1.00	IV
Ayr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	AY	1.00	AY
EDI Airport	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	EDI	EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

Global Average Average

Average

**HS2 Average Acceleration Factor = 1.00**  
**Equivalent to Journey Time Reduction = 0%**

HSUK/TT	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH	2.51	1.38	1.14	1.14	2.01	1.00	1.73	1.45	2.10	2.91	EH
Glasgow	2.51	GL	1.30	1.00	1.00	1.30	3.24	1.28	1.19	1.00	4.26	GL
Aberdeen	1.38	1.30	AB	1.00	1.00	1.47	1.54	1.70	1.21	1.50	2.05	AB
Dundee	1.14	1.00	1.00	DD	1.00	1.00	2.15	1.61	1.34	1.33	2.29	DD
Stirling	1.14	1.00	1.00	1.00	SG	1.00	1.32	1.39	1.13	1.34	2.28	SG
Perth	2.01	1.30	1.47	1.00	1.00	PH	3.64	1.68	1.13	1.41	4.30	PH
Dunfermline	1.00	3.24	1.54	2.15	1.32	3.64	DF	1.87	1.63	1.84	3.97	DF
Dumfries	1.73	1.28	1.70	1.61	1.39	1.68	1.87	DM	1.49	1.51	1.92	DM
Inverness	1.45	1.19	1.21	1.34	1.13	1.13	1.63	1.49	IV	1.33	1.70	IV
Ayr	2.10	1.00	1.50	1.33	1.34	1.41	1.84	1.51	1.33	AY	3.01	AY
EDI Airport	2.91	4.26	2.05	2.29	2.28	4.30	3.97	1.92	1.70	3.01	EDI	EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
1.75	1.74	1.81	1.42	1.39	1.26	1.89	2.22	1.62	1.36	1.64	2.87	

Global Average Average

Average

**HSUK/TT Average Acceleration Factor = 1.75**  
**Equivalent to Journey Time Reduction = 43%**

Existing	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH	8	11	0	1	-23	0	-42	-63	-80	0	EH
Glasgow	8	GL	7	-2	8	4	-65	-52	-51	-5	-26	GL
Aberdeen	11	7	AB	10	14	16	-59	-125	-35	-91	-46	AB
Dundee	0	-2	10	DD	12	9	-69	-123	-79	-82	-56	DD
Stirling	1	8	14	12	SG	12	-91	-141	-18	-80	-52	SG
Perth	-23	4	16	9	12	PH	-87	-138	5	-78	-83	PH
Dunfermline	0	-65	-59	-69	-91	-87	DF	-116	-128	-137	-44	DF
Dumfries	-42	-52	-125	-123	-141	-138	-116	DM	-178	-137	-104	DM
Inverness	-63	-51	-35	-79	-18	5	-128	-178	IV	-123	-93	IV
Ayr	-80	-5	-91	-82	-80	-78	-137	-137	-123	AY	-125	AY
EDI Airport	0	-26	-46	-56	-52	-83	-44	-104	-93	-125	EDI	EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
<b>-54.7</b>	-19	-17	-30	-38	-34	-36	-80	-116	-76	-94	-63	

Global Average Average JOURNEY TIME DIFFERENTIALS (MINUTES) Average

**Existing Average Rail Journey Time 55min slower than by road**

HS2	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH	8	11	0	1	-23	0	-42	-63	-80	0	EH
Glasgow	8	GL	7	-2	8	4	-65	-52	-51	-5	-26	GL
Aberdeen	11	7	AB	10	14	16	-59	-125	-35	-91	-46	AB
Dundee	0	-2	10	DD	12	9	-69	-123	-79	-82	-56	DD
Stirling	1	8	14	12	SG	12	-91	-141	-18	-80	-52	SG
Perth	-23	4	16	9	12	PH	-87	-138	5	-78	-83	PH
Dunfermline	0	-65	-59	-69	-91	-87	DF	-116	-128	-137	-44	DF
Dumfries	-42	-52	-125	-123	-141	-138	-116	DM	-178	-137	-104	DM
Inverness	-63	-51	-35	-79	-18	5	-128	-178	IV	-123	-93	IV
Ayr	-80	-5	-91	-82	-80	-78	-137	-137	-123	AY	-125	AY
EDI Airport	0	-26	-46	-56	-52	-83	-44	-104	-93	-125	EDI	EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
<b>-54.7</b>	-19	-17	-30	-38	-34	-36	-80	-116	-76	-94	-63	

Global Average Average JOURNEY TIME DIFFERENTIALS (MINUTES) Average

**HS2 Average Rail Journey Time 55min slower than by road**

HSUK/TT	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
Edinburgh	EH	38	49	9	7	17	0	25	13	11	14	EH
Glasgow	38	GL	43	-2	8	19	15	-22	-13	-5	30	GL
Aberdeen	49	43	AB	10	14	44	8	24	-5	7	50	AB
Dundee	9	-2	10	DD	12	9	-4	-16	-18	-28	13	DD
Stirling	7	8	14	12	SG	12	-60	-72	4	-40	-3	SG
Perth	17	19	44	9	12	PH	1	-26	20	-22	17	PH
Dunfermline	0	15	8	-4	-60	1	DF	-4	-14	-32	5	DF
Dumfries	25	-22	24	-16	-72	-26	-4	DM	-33	-63	-3	DM
Inverness	13	-13	-5	-18	4	20	-14	-33	IV	-35	18	IV
Ayr	11	-5	7	-28	-40	-22	-32	-63	-35	AY	14	AY
EDI Airport	14	30	50	13	-3	17	5	-3	18	14	EDI	EDI
	EH	GL	AB	DD	SG	PH	DF	DM	IV	AY	EDI	
<b>1.1</b>	18	11	24	-2	-12	9	-9	-19	-6	-19	16	

Global Average Average JOURNEY TIME DIFFERENTIALS (MINUTES) Average

**HSUK/TT Average Rail Journey Time 1min faster than by road**