Transport for the North Strategic Transport Plan

Integrated Sustainability Appraisal Report - Executive Summary

Transport for the North

January 2018

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Abbreviations

AONB	Area of Outstanding Natural Beauty
BaU	Business as Usual
CAV	Connected and Autonomous Vehicles
CfBT	Campaign for Better Transport
CPRE	Campaign to Protect Rural England
CSA	Community Safety Assessment
DCLG	Department for Communities and Local Government
DfT	Department for Transport
EqIA	Equality Impact Assessment
ER	Environmental Report
EV	Electric Vehicle
GHG	Greenhouse Gas
GVA	Gross Value Added
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HRA	Habitats Regulation Assessment
HS2	High Speed Two
ISA	Integrated Sustainability Appraisal
LEP	Local Enterprise Partnership
LZEV	Low / Zero Emission Vehicle
NGO	Non-Governmental Organisation
NPIER	Northern Powerhouse Independent Economic Review
NPPF	National Planning Policy Framework
ODPM	Office of the Deputy Prime Minister
PCG	Protected Characteristic Group
PPPs	Plans, Policies and Programmes
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
cSAC	Candidate Special Area of Conservation
SDC	Strategic Development Corridor
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STB	Statutory Transport Body
STP	Strategic Transport Plan
SuDS	Sustainable Drainage Systems
TAG	Transport Analysis Guidance
TfN	Transport for the North
WHS	World Heritage Site

Executive summary

This is the Executive Summary of the Integrated Sustainability Appraisal (ISA) Report of the Transport for the North (TfN) Strategic Transport Plan for the North of England. The purpose of this Executive Summary is to set out the ISA process and the outcomes derived from this and is intended to inform people who have a general interest in the Transport Strategy, but who are not concerned with its detailed technical assessment. Readers are advised to read the full contents of the ISA Report for more detailed information if required.

TfN is empowered by a pan-Northern Partnership representing political and business leaders from all parts of Northern England, to develop a Strategic Transport Plan (STP) for the North to prioritise investments to improve the capacity, frequency, speed and reliability of the region's transport network. This will be a multi-modal plan for passengers, businesses and freight, which will set out integrated transport connectivity priorities to 2050. It is anticipated that the STP will allow the fulfilment of the vision for "A thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life".

Four objectives have been set for the STP. These are:

1. Transforming economic performance
2. Promote and support the built and natural environment
3. Improve opportunities across the north
4. Increase efficiency, reliability and resilience in the transport system.

All these objectives carry equal weight under the STP, with no objective greater or lesser than any other objective and the STP provides detail on how the vision and the aims of the objectives will be met. This detail is set out in a series of Strategic Components as follows:

- Connecting people
- Connecting businesses
- Moving goods
- Ensuring a sustainable investment programme
- Rail North Long Term Strategy
- Northern Powerhouse Rail
- Integrated and Smart Travel

The STP also sets out a series of Strategic Development Corridors (SDCs):

- **SDC 1 – Connecting the Energy Coasts**: Improving connectivity for people and goods between the nationally significant non-carbon energy and research assets located in Cumbria, Lancashire, North Yorks, North East and Tees Valley
- **SDC 2 - West and Wales:** Improving connectivity for people and goods, to, from and through the important economic centres and assets of Cheshire, Liverpool City Region and Greater Manchester, with strategic connectivity in to North Wales and the Midlands.
- **SDC 3 – Central Pennines:** Improving strategic east-west connectivity for some of the North's important economic centres and assets in North Yorks, West Yorks, Hull and Humber through to Greater Manchester, Lancashire and Liverpool City Region.
- **SDC 4 – Southern Pennines:** Improving the strategic east-west, multi-modal connectivity between the important economic centres, assets and ports within Liverpool City Region, Greater Manchester, Sheffield City Region, Hull and Humber as well as cross border to the Midlands.
- **SDC 5 - North West to Sheffield City Region:** Strengthening rail connectivity between the advanced manufacturing clusters and assets in Cumbria, Lancashire, Greater Manchester and Sheffield City Region

- **SDC 6 – East Coast to Scotland:** Strengthening rail connectivity along the East Coast Main Line and other parallel rail lines, such as Durham Coast Line, to provide enhanced strategic and local connectivity in the North East, Tees Valley and North Yorks.
- **SDC 7 – Yorkshire to Scotland:** Strengthening road connectivity between Midlands, South Yorks, West Yorks, North Yorks, Tees Valley and North East and Scotland, building on existing road investment commitments.

1.1. The purpose of the ISA

Whilst it is important that the STP delivers the vision for a thriving north of England, it is also important that this is done is a way which protects the environment, protects the human health and allows as many different people as possible the same opportunities for accessing the facilities and services they require whilst promoting sustainable economic growth. Therefore, the STP has been subjected to a series of assessments that cover the topics of Sustainability and Strategic Environmental Assessment (SA/SEA), Health Impact Assessment (HIA) and Equality Impact Assessment (EqIA) and Community Safety Assessment (CSA). It is also important to note that as there is a potential that the Transport Strategy could lead to a direct or indirect effect on sites which have been designated at the European level for nature conservation purposes (such as Special Areas of Conservation), a Habitats Regulation Assessment (HRA) was also carried out. Taken together these various assessments are described as an 'Integrated Sustainability Appraisal' (ISA).

The new STP is not starting with 'a blank sheet of paper'. There is a current transport network across the north of England that has been developed over many years and is the result of previous strategies and investment decisions. This transport network already has an effect on the environment, on people's health and their equality of opportunity. The ongoing investment in and maintenance of this current existing network has been defined as the 'Business as Usual' scenario under this STP.

An ISA Framework has been defined, consisting of a series of objectives, against which the sustainability performance of the STP has been assessed. These ISA Objectives are:

1. Reduce greenhouse gas emissions from transport overall, with particular emphasis on road transport
2. Protect and enhance biodiversity, geodiversity and the green infrastructure network
3. Conserve and enhance the international sites (HRA specific objective)
4. Protect and enhance air quality
5. Increase resilience of the transport network to extreme weather events and a changing climate
6. Protect and enhance the inland and coastal water environment
7. Protect and conserve soil and remediate / avoid land contamination
8. Support the conservation and enhancement of the quality and distinctiveness of historic assets, industrial and cultural heritage and their settings
9. Protect and enhance the character and quality of landscapes and townscapes
10. Promote the prudent use of natural resources, minimise the production of waste and support re-use and recycling
11. Enhance lower carbon, affordable transport choice
12. Enhance long term economic prosperity and promote economic transformation
13. Coordinate land use and strategic transport planning across the region
14. Promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society (EqIA specific objective)
15. Improve health and well-being for all citizens and reduce inequalities in health (HIA specific objective)
16. Promote community safety and reduce crime and fear of crime for all citizens (CSA specific objective)

In addition to the above ISA Objectives, a series of sub-objectives relating to HIA, EqIA and CSA have also been defined. These are:

EqIA

- Improve accessibility to services, facilities and amenities for all
- Improve affordability of transport
- Improve road safety and reduce the number of accidents and other incidents
- Reduce severance
- Reduce environmental impacts of transport – air and noise pollution

HIA

- Improve accessibility to services, facilities and amenities for all
- Improve affordability of transport
- Improve road safety and reduce the number of accidents and other incidents
- Reduce severance
- Reduce environmental impacts of transport – vibration and air, noise and light pollution

CSA

- Improve road safety and reduce the number of accidents and other incidents
- Improve actual and perceived safety and security issues

A series of questions to help aid the assessment and the interpretation of each Objective were also identified. These questions and the ISA Objectives together make up the ISA Framework against which the STP was assessed.

2. Compatibility between STP Objectives and ISA Objectives

In the early stages of the development of the STP, it was important to ensure that the four objectives of the Plan were well aligned with the ISA Objectives and therefore an assessment of their compatibility was carried out.

The results of the initial assessment of compatibility indicated that while there were several areas where there was a degree of compatibility between the two sets of objectives, overall it was concluded that there was a considerable level of uncertainty / unclear outcomes relating to overall compatibility. It was therefore recommended that there were a number of areas where the STP Objectives could be strengthened to ensure sustainability was more comprehensively established. In particular, it was noted that the STP could be strengthened significantly in relation to GHG emissions, air quality and protection of the natural and built environment. Overall, it was proposed that the STP would benefit strongly from more detail, or a more focused commitment, on how it is intended that each STP Objective will address issues of sustainability.

Following further development of the STP and consideration of the ISA findings, greater clarification was introduced in the draft STP as to how the plan would ensure that each STP Objective was fulfilled. The results of assessment of the updated draft STP indicated that there was a substantial degree of compatibility between the two sets of objectives, with only a very small number of areas of potential conflict indicated. There were still areas where there was some degree of uncertainty as to the compatibility of the objectives. These areas offered the potential to be compatible dependent upon the implementation measures proposed through development of the STP Strategic Components and other elements of the plan.

The main areas of uncertainty identified in the assessment, as well as areas of potential conflict, related to the STP Objective to ‘Transform Economic Performance’. This was not entirely surprising as probable interventions arising from implementation of this objective have the potential for both negative and positive environmental outcomes. However, the updated STP included a strengthened Objective to ‘Promote and support built and natural environment’ which, as noted above, carries equal weight to the other STP Objectives. This ‘cross cutting’ Objective should help to ensure that areas of uncertainty, or areas of potential conflict, can be addressed as further implementation details are set out in the developing STP. In short, implementation of this ‘cross cutting’ Objective provides a strong imperative in the STP for maximising sustainable outcomes. The compatibility assessment therefore concluded that the revised STP Objectives

provided a firm underpinning to help ensure that the sustainability performance of the plan could be maximised.

3. Assessment of Strategic Alternatives

The STP contains a set of four Strategic Alternatives, termed scenarios. These scenarios were developed through a foresighting approach to explicitly capture the uncertainty surrounding future outcomes, with the future scenarios representing the potential variation in the key assumptions that drive travel demand. The assumptions have been grouped so that each scenario represents a coherent and plausible future. No one scenario is more likely than another, but taken together they represent the likely range of outcomes in travel demand in the North. It should be noted that TfN's Partners can help shape these scenarios through their land use and transport plans, as well as the digital infrastructure they provide. However, it should also be recognised that these are not totally within their control. The four scenarios are:

- Scenario 1 – Compact and Digital
- Scenario 2 – Compact and Travel Friendly
- Scenario 3 – Dispersed and Digital
- Scenario 4 – Dispersed and Travel Friendly

In addition to the above scenarios, a Business as Usual scenario was developed to allow comparison to be made in the assessment with the anticipated evolution of the environment in the absence of the STP. An overview of the assessment results is as follows:

Plan Element	ISA Objective															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Alternative Scenarios																
Business as Usual	+	+	?	++	--	-	+/-	+	-	+	-	+	-	+	+	-
Transformational Scenario 1 – Compact & Digital	++	+	?	++	+	++	+	+	+	++	++	++	+	++	++	++
Transformational Scenario 2 – Compact & Travel Friendly	+	+	?	+	+	+	+	+	+/-	+	++	++ +	+	++	++	+
Transformational Scenario 3 – Dispersed and Digital	++	+/-	?	++	+/-	+/-	-	+/-	+/-	-	+/-	+/-	+	+	+	+
Transformational Scenario 4 – Dispersed & Travel Friendly	+	+/-	?	-	-	-	--	+/-	--	--	--	+/-.	+	+	+	+

Key:

Scale	Category
+++	Large beneficial
++	Moderate beneficial
+	Slight beneficial
0	Neutral
-	Slight adverse
--	Moderate adverse
---	Strong adverse
?	Uncertain
+/-	Combination of beneficial and adverse

From an overall sustainability perspective it was found that Scenario 1 (Compact & Digital) performed best.

In this Scenario, as with all the other scenarios, there is one key area of uncertainty which relates to the need to protect sites designated for nature conservation. This uncertainty relates to the fact that at this stage of Plan development, in the absence of more detailed information, it was not possible to ascertain the nature of potential effects, as this will depend upon the type and location of interventions. Performance against all other ISA Objectives under Scenario 1 is anticipated to be either slight beneficial or moderate beneficial.

Environmentally, Scenario 1 benefits particularly from the compact urban form which allows greater opportunities for walking and cycling, an expected uptake of Low/Zero Emission Vehicles (LZEVs), reduced greenfield land take (and therefore less disturbance to habitats, soils, the water environment, etc.), and the minimisation of waste and use of resources, and allows easier enhancement of lower carbon, affordable transport choices.

This Scenario also benefits socially and economically with, for example, an increase in Connected and Autonomous Vehicles (CAVs) benefitting those who cannot drive, especially for medical reasons such as visual impairments. Increased opportunities for walking and cycling should improve access to services including healthcare for all groups. Digital connections would also improve access to some services, replacing the need to travel, and this reduced need to travel will also have a beneficial effect in reducing travel impacts such as severance. Reduced traffic and congestion due to mode shift should also have a beneficial effect on road safety and severance. An increase in CAVs may also improve road safety, avoiding human error. An increase in use of LZEVs should help to mitigate the impact of road traffic, with reduced air pollution and noise pollution which would have a particular impact on the health of children and people with breathing conditions. Improved interchanges should make multi-stage journeys easier and should also have an impact on the perception of security with improved lighting and surveillance, which would have a particular impact for women, children, the elderly and minority ethnic groups.

The worst performing alternative, in overall sustainability terms, is Scenario 4 (Dispersed and Travel Friendly). In this Scenario, the dispersed urban form means that there are likely moderate adverse effects on landscapes, due to the increased need for cross country transport interventions, with additional potential for congestion in urban centres. This scenario would also have implications for the use of resources and waste generation and would make enhancing lower carbon, affordable transport choice more difficult. There would also be an increased amount of greenfield land take under this scenario, with adverse implications for soil (including a potential for contamination), as well as the water environment. It is also anticipated that, long term, this scenario will be subject to the worst effects of a changing climate in terms of resilience of the transport network.

It is not the purpose of the ISA to decide the alternative to be pursued. This is the role of the decision makers who will consider the precise strategy to be taken forward. The ISA provides information on the relative sustainability performance of the strategic alternatives and helps enhance the transparency of the decision making process. It should also be noted that TfN in itself cannot prescribe the future scenario, though the STP will be expected to influence and inform future planning decisions. It is also the case that while TfN and Partners can help shape future scenarios, for example through land use and transport plans and the provision of digital infrastructure, external influencing factors mean that these future scenarios are not totally within their control.

4. Assessment of Strategic Components

The STP contains a series of seven Strategic Components, each of which was subject to assessment. The Strategic Components are:

- Connecting People – improving access to work opportunities, giving businesses access to a wider labour market and improving access to leisure and tourism assets.
- Connecting businesses – improving connections to collaborators, clients and competitors, including those within the prime and enabling capabilities
- Moving goods – supporting businesses to move freight and goods in efficient, multi-modal ways.
- Ensuring a sustainable investment programme – working toward delivery of sustainable transport in the North
- Integrated and Smart Travel
- Northern Powerhouse Rail
- Rail North – Long Term Strategy

In undertaking the assessments of the Strategic Components, it was important to understand the types of intervention which could result from implementation of each. The full list of assumed potential intervention types is listed below. Not all of these intervention types are relevant to every Strategic Component.

Highways

- New highway links
- Highway infrastructure improvements
- Smart highways / adaptive network

Railways

- New rail links
- Rail infrastructure improvements
- New stations
- Station upgrades (including Park & Ride)

Public transport (excluding rail)

- Park and ride schemes
- Station and interchange works

Enabling infrastructure

- EV facilitating
- Smart / adaptive roads
- Digital connectivity

Waterways

- Inland and coastal port upgrades
- Use of canals

An overview of the assessment results is as follows:

Plan Element	ISA Objective															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Strategic Components																
Connecting People	-	+/-	?	+	+	-	+/-	+/-	--	-	+++	+++	+++	++	++	++
Connecting Business	-	+/-	?	-	+	-	+/-	+/-	--	-	-	+++	++	++	++	+
Moving Goods	-	+/-	?	-	+	-	+/-	+/-	+/-	++	++	++	+	+	++	?
Ensuring a sustainable investment programme	+++	+	+	+++	+++	++	++	+	+	++	+++	++	+++	++	++	++
Integrated and Smart Travel	++	+	+	++	++	+	+	+	+/-	+	+++	++	+	+	+	+
Northern Powerhouse Rail	++	+	?	++	--	-	+	+	+	+	+	+++	++	++	++	+
Rail North	++	+	?	++	--	+	+	+	+	+	++	+++	+++	++	++	++

Key:

Scale	Category
+++	Large beneficial
++	Moderate beneficial
+	Slight beneficial
0	Neutral
-	Slight adverse
--	Moderate adverse
---	Strong adverse
?	Uncertain
+/-	Combination of beneficial and adverse

The assessment results identify a number of areas of strength, in terms of sustainability performance, for each of the Strategic Components. This is particularly the case for those ISA Objectives related more to the issues of economy, equality, health and community safety, and is to be expected due to the nature of the STP. The plan has a key aim to help drive transformational economic growth across the North. The Strategic Components are designed to support this transformation by facilitating and enhancing movement of people and goods across all transport modes. This is reflected in the scores relating to the above mentioned ISA Objectives.

At the same time, it is also inherent in the nature of the STP that it will result in a series of transport infrastructure interventions, which in many cases will require considerable civil and other engineering works across large areas. The nature of these works has environmental implications in particular. For example, new roads could involve a direct loss of wildlife habitat, or could have an adverse effect on the water environment through pollution incidents during construction or through polluted runoff during operation and would also result in new features in the landscape. The nature of this type of potential effect has, not unexpectedly, resulted in some of the Strategic Components scoring adversely against certain ISA Objectives.

Greenhouse gas (GHG) emissions, alongside poor air quality, are areas of particular concern in relation to any transport plan. However, the assessment found that the STP, while recognising the need for continued and expanded road transportation (which currently accounts for a substantial proportion of transport related GHG and other air pollutant emissions), also recognises that there is a need to encourage passengers to choose rail over cars for shorter and longer journeys, and that improvements can also be made at a local level to connect bus and cycle provision with the wider transport network. The measures outlined to achieve this modal shift, including those set out in the Strategic Component ‘Integrated and Smart Travel’, should help to result in lower overall GHG emissions per travel kilometre as well as improvements in air quality across the region in the medium/long term, with absolute reductions in GHG emissions in the long term. The expected uptake of Low / Zero Emission Vehicles (LZEVs), over the life of the plan, should also result in significant reductions in GHG and other air pollutant emissions.

Both Northern Powerhouse Rail and Rail North’s Long Term Rail Strategy Strategic Components, on the whole, perform better in the environmental elements of the ISA than the Strategic Components Connecting People, Connecting Business and Moving Goods. This is to be expected given their focus on rail, as opposed to the large road components which are a feature of the latter components, though it is noted that these rail components perform less well (moderate adverse) in terms of resilience to a changing climate.

Negative impacts on biodiversity are another key area of concern in relation to any transport plan. New transport interventions have the potential to impact on designated and non-designated sites of ecological or geological value and more generally on the network of linked multi-functional green spaces, comprising the local green infrastructure. These impacts could occur through direct land take for infrastructure (which may also cause fragmentation of habitats and/or notable and protected species populations), construction and operational disturbance (noise, vibration, light pollution, etc.) and emissions / contamination (air, water and soil). However, opportunities could be provided for enhancement of biodiversity, for example through planting of native species as part of any screening of infrastructure. Anticipated effects across all Strategic Components are a mix of beneficial and adverse and are dependent upon the nature and location of interventions.

One important aspect to note is that in relation to sites designated for nature conservation (including those at the International level such as SPA, SAC and Ramsar sites), it is not possible at this stage of plan development to ascertain effects on these. Therefore, anticipated effects on these sites, across all Strategic Components, were noted as uncertain.

In terms of impacts on health, equalities and safety, it is anticipated that enhanced infrastructure to increase connectivity for people and goods across the North should have overall beneficial effects, in terms of accessibility to jobs and services. This forms a theme across all the Strategic Components. Services could include health, community and social care services. There is no specific fare structure mentioned in any of the Strategic Components, but simplifying, integrating and enhancing the ticketing system as well as enhancing choice of travel is likely to have some beneficial effects on affordability, as mentioned in the Smart

and Integrated Travel Component. This would be particularly important for those with lower incomes or living in more deprived areas.

Any enhancements to rail infrastructure could support a mode shift from road to rail, and therefore help reduce severance, air and noise pollution on certain road corridors. This is particularly important in the Northern Powerhouse Rail and Rail North Long Term Strategy Strategic Components. However, any enhancements in road connections which could attract increased amounts of road traffic, particularly Heavy Goods Vehicles (HGVs), to more densely populated areas or areas with higher levels of vulnerable populations, could increase air and noise pollution, as well as severance, effects in local areas. This could particularly affect those with mobility limiting health problems such as asthma and disabilities.

Improved levels of perceived community safety could be brought about by enhancements in interchanges. It is important that these are well lit and have good visibility to ensure those more susceptible to fear of crime feel safe. This is important for all the Strategic Components.

The Strategic Component ‘Ensuring a sustainable investment programme’ has the effect of acting in a ‘cross cutting’ fashion in that the elements of this Component apply across all aspects of the STP. This Strategic Component scored for the most part either moderate beneficial or large beneficial against ISA Objectives, and this would act to address many of the issues which resulted in other Strategic Components scoring less well. For example, the Strategic Component ‘Ensuring a sustainable investment programme’ specifically notes that TfN wish to encourage design, construction, repair and maintenance of transport infrastructure that respects and enhances the North’s landscape character and townscapes. This Component also states that TfN will seek to ensure that design principles are implemented in the development process for interventions on the Major Road Network and across the North’s rail network that will address the full range of ISA Objectives.

In addition to acting to address many of the identified adverse elements of the STP, the Strategic Component ‘Ensuring a sustainable investment programme’, through its cross cutting nature, will also act to bolster already well performing areas. This is a major feature of the STP that should influence potential effects throughout the plan period to ensure that benefits are maximised where possible and adverse effects addressed as appropriate.

A key element of the ‘Ensuring a sustainable investment programme’ Strategic Component is the emphasis given to the number and extent of statutory and non-statutory sites that are protected due to their importance for nature conservation. This importance is specifically recognised in the Component which also states that TfN have committed to work with partners to avoid and / or minimise any adverse effects on important nature conservation sites as far as possible. The Component also states that any potential direct or indirect impacts on these sites that arise from new and or upgraded transport interventions will be appropriately assessed, mitigated and / or compensated for, in line with existing best practice and relevant legislation across the lifespan of the Plan. This would include for European designated sites where necessary and Habitats Regulation Assessment if required.

Although not specifically noted under any of the Strategic Components, it is also important to recognise that the STP does note that any interventions which come about through the implementation of the STP will be subject to further consideration and assessment (see Page 85 of the STP). Alongside that for technical and financial issues, the Plan recognises that it will be a key aim to minimise the impact of transport on the built and natural environment, as well as the health and wellbeing of residents, workers and visitors to the North. The STP states that in the development of any intervention, the environmental, health and social aspects will be assessed at an appropriate level for that stage of the design or planning. It is also noted that assessments could include Environmental Impact Assessment, environmental considerations, or in the case of European Sites, Habitat Regulation Assessment. It can also be seen that environmental issues will be addressed through construction and operation of interventions, through the effective implementation of Environmental Management Plans. It is recommended that these assessments and plans are informed by the list of generic mitigation measures that have been noted for each intervention type and which are listed in Appendix I.

5. Assessment of Strategic Development Corridors (SDCs)

The assessment results identify a number of areas across the SDCs where anticipated effects are likely to be similar. In particular, it is important to note in relation to sites designated for nature conservation, that there is a high level of uncertainty relating to how interventions within the SDCs may affect these sites. This issue will be addressed within the Habitats Regulation Assessment.

Other areas of similarity across the SDC assessments relate to economic development and coordination of land use and strategic transport planning across the region. These similarities are to be expected as a core thrust of all the SDCs is to help ensure a transformational scenario develops and the approach to land use planning will also be similar across the corridors. There are variations in the land use planning coordination scores as it is recognised that, in some instances, effective coordination could be made more difficult due to the size of the SDC and the number of local authorities within the corridor. In relation to three of the SDCs, there will also be a need for cross border coordination with authorities in Scotland and Wales.

The analysis of projected movement showed that, for both road and rail, within most SDCs there was a moderate or high increase in movement by 2050, relative to today. Road movement represents by far the largest modal share across all SDCs, and in particular for SDC 1 Connecting the Energy Coasts.

For all SDCs, GHG emissions from road movement are anticipated to grow in the short term, up to 15% in the case of SDC 1, relative to today. By the medium term, for most of the SDCs there was an overall (small) drop in GHG emissions relative to today, or a declining trend in emissions relative to the short term. By 2050, however, for all SDCs a large overall reduction in GHG emissions from road movement is anticipated, relative to current conditions. This is due in large part to the anticipated uptake of LZEVs, along with concurrent continuing decarbonisation of the electrical grid.

The supporting analyses showed that, while as a percentage of overall movement rail travel is small, overall medium to high level growth in rail movement is anticipated by the 2050s. SDC 1 Connecting the Energy Coasts and SDC 2 West and Wales are anticipated to see the lowest growth in rail movement, relative to the other SDCs.

The very considerable growth in rail movement across a number of the SDCs is reflected in the anticipated overall increase in GHG emissions from rail movement over the period to 2050, particularly for SDC 6 East Coast to Scotland and SDC 7 Yorkshire to Scotland which are anticipated to have the highest growth in GHG emissions relative to the other SDCs. This growth in emissions is anticipated despite continuing rail efficiency improvements, electrification and grid decarbonisation, which should result in considerably lower emissions per passenger kilometre.

The growth in movement for both road and rail across the time period 2035 to 2050 has implications across a number of the environmental ISA Objectives for all of the SDCs. For example, an increase in road based travel can make protecting the water environment more difficult, or it may lead to a requirement for more roads, or upgraded roads which can have implications for landscape and townscape, or there may a loss of soil resources and a greater chance of contamination. These potential adverse effects are reflected in the performance of the SDCs against the ISA Objectives related to these aspects. It will thus be important to ensure that mitigation or other measures to protect the environment set out in in the STP are implemented. In particular, the measures outlined in the STP Strategic Component ‘Ensuring a sustainable investment programme’, and the need for additional studies as noted in the STP, will be key to ensuring sustainable development of potential interventions.

In terms of equalities, the SDCs are anticipated to be likely to result in improved accessibility to jobs and services throughout the North for a wide range of groups. This is particularly important for those in low income areas (such as Liverpool, Manchester, Tees Valley and the North East), or for other groups with constrained access to jobs and services. Actual impacts are dependent on the specific road and public transport corridor improvements.

Public transport improvements are likely to have beneficial effects on severance, air and noise pollution and overall road safety, with relevance to all SDCs except SDC 7. This is because increasing the attractiveness of public transport could encourage a mode shift from private motorised to public transport. This is particularly important for vulnerable populations, such as children, the elderly and those with disabilities and mobility limiting health problems. Areas in the North such as Greater Manchester, Liverpool City Region, Tees Valley and North East have high health deprivation and disability levels. However, any road improvements, whilst improving connectivity to jobs and services for a range of groups could also result in increased severance, noise and air pollution, as well as potentially detrimental effects on safety. This is especially relevant for SDC 7, which is a road improvement corridor, but could also be relevant to SDCs 1 - 4 as they are multi-modal. It will be important to ensure, when enhancing or developing local transport links, full assessment and mitigation for potential air and noise pollution and severance effects.

Improving and modernising interchanges and public transport facilities, in line with national standards (e.g. lighting, CCTV), is likely to reduce perceived fear of crime. Potential interventions including interchange improvements are relevant to all SDCs. It is also important to consider the road safety surrounding of any interchanges. Whilst enhancement of public transport may reduce the number of road vehicles on certain road corridors, enhanced interchanges may attract a larger number of road vehicles to the local area, therefore likely increasing local air and noise pollution and severance.

An overview of the assessment results is as follows:

Plan Element	ISA Objective															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SDC 1 – Connecting the Energy Coasts	+	-	?	-	-	-	-	-	-	+	--	+	++	+	+/-	+
SDC 2 – West and Wales	++	+/-	?	++	+	+	-	+	+	+	++	++	+++	+	+/-	+
SDC 3 – Central Pennines	+	-	?	-	-	-	-	+/-	--	+/-	+	++	+	+	+/-	+
SDC 4 – Southern Pennines	+	-	?	+	-	-	--	+	+/-	+	+	+++	++	+	+/-	+
SDC 5 – North West to Sheffield City Region	+	+/-	?	+	-	-	--	+/-	-	+/-	+	++	++	+	++	+
SDC 6 – East Coast to Scotland	-	+/-	?	-	-	-	-	-	--	+/-	-	+++	+	+	++	+
SDC 7 – Yorkshire to Scotland	-	+/-	?	-	-	-	-	-	-	+/-	--	+++	+	+	++	+/-

Key:

Scale	Category
+++	Large beneficial
++	Moderate beneficial
+	Slight beneficial
0	Neutral
-	Slight adverse
--	Moderate adverse
---	Strong adverse
?	Uncertain
+/-	Combination of beneficial and adverse

6. Mitigation and Recommendations

As part of the assessment process, a series of mitigation measures are identified and recommendations are made. A key recommendation from the ISA is that there is adequate cross referencing made in the STP between the various Strategic Components. In particular, it is recommended that extensive cross referencing

is made to the 'cross cutting' Strategic Component 'Ensuring a sustainable investment programme', as this Component provides a solid basis upon which the sustainability of other elements of the STP can be built.

Numerous mitigation measures are reported as part of the detailed assessment tables, but the following is an overview of what has been proposed for each ISA Objective.

ISA Objective	Overview of Mitigation
1. Reduce greenhouse gas emissions from transport overall, with particular emphasis on road transport	Due to the potential threats posed by a changing climate and in order to meet Government commitments to reducing carbon emissions, measures should be taken to reduce the amount of carbon from our transport system. Reductions would mainly be from vehicles and can be found in many of the measures suggested to reduce air pollution emissions, but further reductions to the carbon footprint can be found in the construction and operation of transport network assets – for example by using more energy efficient lights. The carbon footprint can be readily measured at construction and operation by use of an appropriate carbon calculator.
2. Protect and enhance biodiversity, geodiversity and the green infrastructure network	Opportunities to enhance biodiversity and green infrastructure exist, through designing in biodiversity into schemes. These opportunities include, for example, the development of wildflower meadows along linear features such as roads and railway lines, which will look attractive and also provide opportunities for pollinators, or could include simple measures such as bird / bat boxes. More complex measures such as animal over or under passes can be considered. Similarly, biodiversity can be enhanced by the planting of suitable / native species of trees and hedgerows. Properly planned maintenance schemes can also enhance biodiversity, for example from the active control of invasive species. Particular consideration needs to be made to protection measures in relation to any scheme which may impact directly, or indirectly, on any site designated for nature conservation purposes
3. Conserve and enhance the international sites (HRA specific objective)	Particular consideration needs to be made to protection measures in relation to any scheme which may impact directly, or indirectly, on any site designated for nature conservation purposes – particularly those designated as SSSI or Natura 2000.
4. Protect and enhance air quality	It will be important to reduce emissions and protect air quality as much as possible. Mitigation measures may affect the project design, layout, construction, operation and/or may comprise measures to improve air quality in pollution hotspots beyond the immediate locality of the scheme. Measures could include, but are not limited to, changes to the route of the new scheme, changes to the proximity of vehicles to local receptors in the existing route, physical means including barriers to trap or better disperse emissions, and speed control. The implementation of mitigation measures may require working with partners to support their delivery.
5. Increase resilience of the transport network to extreme weather events and a changing climate	Flooding poses a particular risk to the transport network and this situation is likely to get worse with a changing climate. However, new infrastructure developments or improvements to existing infrastructure can also contribute to an additional flood risk elsewhere. Opportunities can be taken to lower flood risk by considering flood protection measures, improving flow routes, flood storage capacity and using Sustainable Drainage Systems (SuDS). The appropriate use of SuDS will be critical and it should be the intention that site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts. Infrastructure should only be located in flood zones when there is no other option.
6. Protect and enhance the inland and coastal water environment	Impact on local water resources can be addressed through planning and design for the efficient use of water, including water recycling. Consideration should be given to the use of SuDS (including permeable paving), but it is also recognised that conventional drainage will play an important role. Protection and good pollution control measures are to be utilised during both construction and operation of transport schemes.
7. Protect and conserve soil and remediate /	Protection of soil resources, particularly those of higher quality / areas of better agricultural lands should always be considered – this could be done during scheme planning by careful route selection. If areas of good quality soil cannot be

ISA Objective	Overview of Mitigation
avoid land contamination	avoided, care should be taken during construction to store topsoil for later reuse – either on site as landscaping or further afield. Opportunities should also be taken to utilise areas of previously developed land and to remediate contaminated land when possible. This could include the removal / appropriate treatment of any invasive species such as Japanese Knotweed.
8. Support the conservation and enhancement of the quality and distinctiveness of historic assets, industrial and cultural heritage and their settings	The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora. Heritage assets may be buildings, monuments, sites, places, areas or landscapes. Consideration should be made of the character and setting of the heritage asset, its significance (and level of protection afforded to it), the potential for loss or harm and need for conservation. Opportunities should be taken when possible for the enhancement of heritage assets. It should also be noted that due to its nature, not all heritage features may be apparent at the planning / design stage and precautions for unexpected discovery should be taken – perhaps through an archaeological watching brief.
9. Protect and enhance the character and quality of landscapes and townscapes	Projects need to be designed carefully, taking account of the potential impact on the landscape. Reducing the scale of a project or making changes to its operation can help to avoid or mitigate the visual and landscape effects of a proposed project. Consideration during planning should also be given to appropriate siting, design of the scheme (including choice of materials) and landscaping schemes. Note that ideally native species should be used in any planting. Subject to appropriate planning, screening can also take place 'off site' e.g. by planting out gaps in tree lines / hedgerows. Particular consideration is to be given to conserving landscape and scenic beauty in any nationally designated areas, with encouragement given to avoiding these areas if possible. Opportunities for landscape enhancement should be taken when possible.
10. Promote the prudent use of natural resources, minimise the production of waste and support re-use and recycling	Consideration during design and construction of transport schemes should be given to the waste hierarchy of prevention, reuse, recycling and disposal. All waste should be handled in accordance to applicable waste management legislation and the emphasis should be to minimise the volume of waste produced and the volume sent for disposal, unless it can be demonstrated that this is the best environmental outcome. Consideration should be given to the use of Recycled materials in construction.
11. Enhance lower carbon, affordable transport choice	Congestion can be reduced in numerous ways. Examples include new junctions and highway improvements, though these measures often only provide short term fixes. Therefore, it is important that aspects such as Smart Infrastructure and Managed Highways and importantly, the development of more sustainable and active modes (such as cycling and walking) are taken. Improved communities, with better streetscapes and people friendly streets may also encourage people to leave their cars, thereby reducing road traffic / congestion. A further key component will be the full integration of bus and rail services to increase accessibility to the transport system.
12. Enhance long term economic prosperity and promote economic transformation	It is vital that the transport network provides and where possible improves, the access to employment opportunities and effectively connects business areas with residential areas. Connectivity between business and residential centres and key infrastructure such as Airports is a major consideration to be made, as is connectivity between urban centres across the region. Issues such as the attractiveness of the region as a better place to live and work can also influence and enhance inward investment or tourism and thereby increase employment opportunities across the region.
13. Coordinate land use and strategic transport planning across the region	All potential schemes will require adherence to the relevant planning requirements for any development in the region. As such consideration of these requirements will be made at the design stage of all schemes.
14. Promote greater equality of opportunity for	During the planning and design stages of any transport scheme, it is vital that consideration is given to the need for access to key public services such as health, education community and leisure facilities by all members of society. Access

ISA Objective	Overview of Mitigation
all citizens, with the desired outcome of achieving a fairer society (EqIA specific objective)	should be considered in relation to all modes, with an emphasis on more active and sustainable types. Affordability should also be a key consideration, with a particular emphasis placed on effects on lower income groups. It should also be a priority to enhance access to key services for vulnerable groups.
15. Improve health and well-being for all citizens and reduce inequalities in health (HIA specific objective)	The consideration of health, well-being and community safety is critical as part of scheme planning and design and should include the introduction of the most modern and effective safety measures where proportionate. Safety considerations should apply to the construction phase, as well as when the transport infrastructure is operational. It should always be the consideration to minimise the risk of deaths or injury arising from the scheme and contribute to an overall improvement in societal safety levels. Consideration during scheme planning and design also has to be given to reducing emissions and other aspects such as noise, vibration dust, light pollution and severance which potentially effect health and well-being. Access to public services (health, education, community facilities, etc.) is also another key consideration. Where appropriate, there should be an education programme to explain new technologies, digital services and automated vehicles etc. to ensure people feel secure and confident in their use. Liaison with relevant community services, hospitals, education centres etc. should also be undertaken as appropriate. People should also be able to feel secure and safe and design should always consider the need to reduce / prevent crime.
16. Promote community safety and reduce crime and fear of crime for all citizens (CSA specific objective)	As per ISA Objective 15 above.

7. Cumulative, Synergistic and Indirect Effects

There is also a requirement to consider Cumulative, Synergistic and Indirect Effects of the STP. Secondary and Indirect effects are effects that are not a direct result of the plan, but occur away from the original effect or as the result of a complex pathway. Cumulative effects arise where several proposals individually may or may not have significant effects but in-combination have a significant effect due to spatial crowding or temporal overlap. Synergistic effects are when two or more effects act together to create effects greater than the simple sum of the effects acting alone.

Anticipated cumulative, synergistic and indirect effects are as follows:

Effects	Causes	Significance
Air Quality	It is considered that the STP will have a cumulative beneficial effect on air quality. This beneficial effect will be derived from integration of the travel network and delivery of better linkages, as well as the development and increased use of sustainable modes of transport. Uptake of LZEVs is also anticipated to bring major benefits to overall air quality.	Anticipated medium to long term benefits as interventions are developed and uptake of LZEVs develops.

Effects	Causes	Significance
GHG emissions	It is considered that the STP will help to result in a fall in GHG emissions due to integration of the travel network and delivery of better linkages, as well as the development and increased use of sustainable modes of transport. Uptake of LZEVs is also anticipated to bring major benefits.	Anticipated medium to long term benefits as Interventions are developed and uptake of LZEVs develops.
Biodiversity	The STP and interventions derived from it would likely result in a mix of cumulative positive and negative effects on biodiversity.	Anticipated positive and negative effects over the medium to long term as measures are implemented.
Sites designated for nature conservation (European Sites)	The STP and interventions derived from it could result in a mix of cumulative positive and negative effects on sites designated for nature conservation. It is not possible to quantify these at this stage of plan development.	Potential for effects on sites designated for nature conservation (European sites) – requirement for Habitats Regulation Assessment to be undertaken at the appropriate stage.
Landscapes / townscapes	It is anticipated that interventions derived from the STP will result in a mix of adverse and positive effects on landscapes and townscapes across the north of England.	Anticipated positive and negative effects over the medium to long term as interventions are implemented.
Soil, agricultural resources and contaminated land	There will be a range of cumulative positive and negative effects on soil, agricultural resources and contaminated land. For example, the development of the highway network provides an opportunity for positive effects relating to contaminated land, but it may also provide an opportunity for further land to become contaminated and could potentially lead to the loss of soil / agricultural resources. Effects will be experienced across the north of England.	Anticipated positive and negative effects over the medium to long term as measures are implemented.
Economic growth	It is anticipated that the STP will act as a key driver for transformational economic growth across the north of England.	Anticipated positive effects over the medium to long term as measures are implemented.
Health and well-being	It is anticipated that the STP will act to promote health and well-being through providing greater access to services and employment opportunities.	Anticipated positive effects over the medium to long term as measures are implemented.

8. Monitoring

There will be a need to monitor the implementation of the STP. As interventions are developed, it is important that decisions in relation to these are taken with the best information available. Therefore, following the assessments, a monitoring programme was developed to allow the early establishment of a causal link between the implementation of the STP and the likely significant effects (positive or negative). This will provide TfN and other relevant authorities the information to make appropriate and informed decisions and take appropriate action as soon as possible should the monitoring programme be adopted. It is also the purpose of the monitoring programme to help inform future iterations of the STP itself.

9. Next steps

This ISA Report is being published for formal consultation with the Draft STP. The results of the formal public consultation exercise may well result in changes to the Draft STP and these may have implications for the ISA results. In addition, the consultation exercise may result in direct changes to the contents of the ISA Report. These will be reported in the Post Adoption Statement in the next stage of development of the STP and ISA following adoption of the Plan.

10.Conclusions

The ISA process carried out throughout the development of the STP has been thorough and comprehensive. Iterations of the STP have been subject to review by the ISA team and continuous dialogue has taken place with the Plan development team. It is considered that this has resulted in progressively enhanced incorporation of sustainability considerations through the various iterations of the draft STP up to and including the current draft consultation version, particularly in terms of aspects related to environmental protection and enhancement, improvements to health and community safety, and greater equality of opportunity.

Based on the findings of the ISA, it is possible to draw a number of key conclusions with regards to the draft STP. These are outlined as follows.

The STP should act as an important driver to help promote transformational economic growth across the region. This is evidenced by the strong performance throughout the assessment against ISA Objective 12 ‘Enhance long term economic prosperity and promote economic performance transformation’. This is to be expected, as this aspect is a cornerstone of the STP. Transformational economic growth will be particularly supported within the seven SDCs set out under the STP long term Investment Programme.

The STP provides strong support to help ensure transformational economic growth is sustainable. The inclusion within the STP of the Strategic Component ‘Ensuring a sustainable investment programme’ has meant that many of the anticipated potential adverse sustainability effects from STP implementation can be effectively addressed by this Component, which should act as a cross-cutting underpinning for all STP elements.

Ensuring the cross-cutting ‘Ensuring a sustainable investment programme’ Strategic Component is fully implemented will be of critical importance to the overall sustainability of STP outcomes, as it is inherent in the nature of any transport plan that it will result in a series of transport infrastructure interventions, which in many cases will require extensive engineering works across large areas. The nature of these works that there will be environmental implications in particular. For example, new roads could involve a direct loss of wildlife habitat, or could have an adverse effect on the water environment through pollution incidents during construction or through polluted runoff during operation and would also result in new features in the landscape.

Potential effects on landscapes and townscapes is an aspect of the assessment where the STP has consistently performed less well across all Plan elements. This is, again, partly a result of the inherent nature of many transport schemes, i.e. they are significant features across a wide area. It is recommended that greater consideration is given to the need to protect and enhance landscape and townscape in future iterations of the STP.

Similarly, potential adverse effects on biodiversity present another area of concern in relation to any transport plan. New transport interventions have the potential to adversely impact designated and non-designated sites of ecological or geological value and more generally on the network of linked multi-functional green spaces, comprising the local green infrastructure. These impacts could occur through direct land take for infrastructure (which may also cause fragmentation of habitats and / or notable and protected species populations) and construction and operational disturbance (noise, vibration, light pollution, etc.) and emissions / contamination (air, water and soil).

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