Transport for the North Strategic Transport Plan
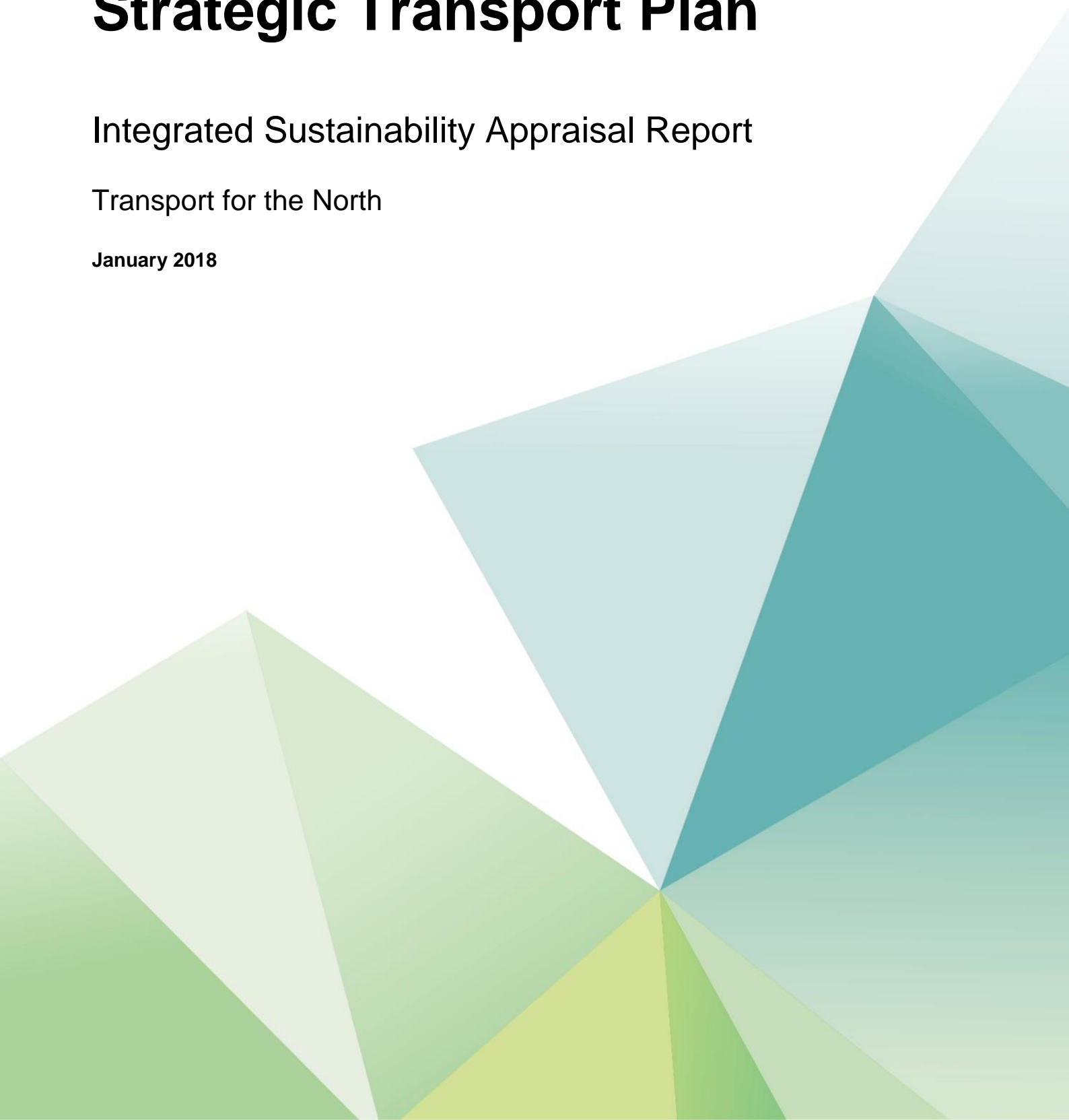
Integrated Sustainability Appraisal Report

Transport for the North

January 2018

ATKINS

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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

Scale	Category
---	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).

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.

The cross-cutting element of the 'Ensuring a sustainable investment programme' Strategic Component clearly sets out how TfN proposes to address such issues and also how it is intended that opportunities for enhancement are to be realised. For example, the Component sets out the intention to encourage new and / or upgraded infrastructure to be undertaken using sustainable procurement procedures and be resource efficient, including promoting the circular economy, through exploring opportunities that can reduce the consumption of natural resources, such as soil, materials, energy and water in construction, operation and maintenance.

It is recognised that a major element of the STP is the development of new roads or upgrading of existing roads. In terms of sustainability performance, these have the potential for the greatest adverse effects. The STP does state that implementation of any interventions will be subject to further consideration and assessment. 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.

Road schemes also currently have major adverse effects in terms of GHG emissions and air pollutant emissions. These issues are anticipated to continue into the short term (up to 2025). However, over the medium to long term (2025 to 2050) it is anticipated that there would likely be substantial uptake of LZEVs. GHG emissions per travel kilometre are expected to drop substantially, with an overall marked decrease in overall emissions, despite growing road movement. Air pollutant emissions from road vehicles are also expected to decline significantly, associated with the anticipated substantial increase in the proportion of LZEVs. Overall, therefore, performance against the ISA Objectives relating to GHG emissions and air quality shows marked improvement in the long term with overall beneficial effects over the timeframe of STP implementation.

In addition to the road schemes, it is also the case that the STP support significant growth in other modes, particularly rail. The two Strategic Components Northern Powerhouse Rail and the Rail North Long Term Strategy form key elements of this.

The STP sets out a number of approaches to supporting a modal shift from road to rail. These include the development of 'Integrated and Smart Travel'. This Strategic Component should act in a 'cross cutting' fashion to help ensure that modal shift takes place and that a greater amount of travel movement is by more sustainable modes, including via smart mobility technology such as CAVs.

In terms of impact 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 common theme across the STP. 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 impacts 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.

Overall, it is considered that the STP represents a well-balanced approach in terms of sustainability performance across the full range of potential key effects delineated in the ISA Framework, and should help

ensure that the vision for 'A thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life' can be achieved in a sustainable and integrated fashion.

1. Introduction

1.1. Purpose of this Report

This is the Integrated Sustainability Appraisal (ISA) Report of the Transport for the North Strategic Transport Plan, which has been prepared to fulfil the requirements for Sustainability Appraisal / Strategic Environmental Assessment (SA/SEA), Health Impact Assessment (HIA), Equality Impact Assessment (EqIA) and Community Safety Assessment (CSA). In addition, Habitats Regulation Assessment (HRA) has been undertaken as a parallel process to the ISA and is reported separately.

The ISA Report identifies the likely sustainability effects of implementing the Strategic Transport Plan (STP) and reports on the process of developing the STP from a sustainability perspective. The ISA and HRA Reports have been produced by Atkins on behalf of Transport for the North (TfN).

An overview of the STP is presented in the following section.

1.2. Background to Transport for the North (TfN)

TfN is empowered by a pan-Northern Partnership representing political and business leaders from all areas of Northern England, working together with Highways England, Network Rail, HS2Ltd. and DfT. Partner organisations have an equal say in TfN's democratic Partnership Board.

The success of the UK in the global marketplace will be dependent on the transformation of the Northern economy that businesses and local leaders are primed to deliver. The Northern Powerhouse Independent Economic Review (NPIER), published in June 2016, mapped out a clear opportunity for ambitious growth aimed at delivering £97 billion in real terms of economic benefit to the UK, 850,000 new jobs, and a 4% increase in productivity by 2050.

The Review identified that improving connectivity is essential to seizing the economic prize, identifying that co-ordinated planning and investment, across the North will create a more attractive and buoyant marketplace. The recommendation was the transformation of connectivity between and within the economic centres of the North through a long term investment programme; a programme that people and businesses can see as a firm commitment to create a stronger, more diverse and resilient place to live and do business.

Together, with the support of business, industry, and academic communities, TfN has developed the STP to prioritise investments to improve the capacity, frequency, speed and reliability of the North's transport network. This is a multi-modal plan for passengers, businesses and freight, which sets out integrated transport connectivity priorities to 2050.

TFN's role is to add value by ensuring that funding and strategy decisions about transport in the North are informed by local knowledge and requirements. This fits with the wider devolution agenda, set out within the 2016 Cities & Local Government Devolution Act. When it becomes a Statutory Transport Body (STB) TfN will draw powers down from central government, rather than up from local government and it will not replace or replicate the work of existing transport authorities.

In building the case for investment TfN will draw upon evidence presented in the Northern Powerhouse Independent Economic Review (NPIER), further research examining the relationship between transport demand and NPIER economic growth across different geographies, plus evidence on the existing performance of, and constraints on the current strategic transport network.

Evidence informing the development of the STP included TfN led work programmes on Freight, International Connectivity, Integrated Strategic Roads and Integrated Rail Reports, TfN's Integrated Travel & Smart Ticketing programme; plus policies and evidence from Government and national agencies' (e.g. Highways England and Network Rail) and from TfN partners, including Strategic Economic Plans, Growth Deals and Transport Strategies (see Figure 1-1).

The TfN STP is the first of its kind and represents a business case for change - a change in relationships with Government and delivery agencies, a change in working with Partners and businesses, a change in the

way that growth can be encouraged and supported, and, above all, a change in the economy and productivity of the North of England.

The STP is a multi-modal plan that sets out an evidence-led and compelling case for investment. It focuses on investment in smart ticketing and integrated travel, major highways, pan-Northern rail, strategic access for freight and logistics, and opportunities to support international connectivity. Priorities for Local Connectivity, Active Modes, Local Planning or primarily urban road and rail networks are not considered as these fall under the remit of TfN's Partners at a local level.

The STP is complementary to the policy documents of TfN's Partners including their Strategic Economic Plans, Single Transport Plans and Local Transport Plans, and also seeks to influence the strategies and policy documents of TfN's Development Partners including Department for Transport (DfT), Highways England, Network Rail and High Speed Two (HS2) Ltd.

The majority of strategic transport interventions identified in the STP will be delivered by TfN partners, national transport agencies, combined authorities or local transport authorities.

The STP is the statutory document for TfN, defining the priorities of TfN as a Statutory Transport Body. The STP and supporting evidence will be used as a platform with which to agree how Government, Network Rail, Highways England and HS2 Ltd work with Northern Partners deliver investment that can transform the economy of the North.

Figure 1-1   Evidence supporting development of the Strategic Transport Plan, Roads and Rail Reports

1.3.   The need for the Strategic Transport Plan

The Government's Northern Powerhouse Strategy noted that the North's economy was worth £304bn in 2014, similar to the whole of Belgium, and accounting for 19% of UK output. The region produces 19% of UK goods exports. In the three months to August 2016, the North reached a record high employment rate of 72.6%, with 429,000 more people in work than in 2010. Combined with existing Devolution agreements, City Deals and funding investments, progress is being made. However, as identified in the recently published NPIER, closing the North's productivity gap with the rest of the UK would achieve an additional £97bn GVA and 850,000 extra jobs, benefiting both the North and the rest of the UK.

An integrated, multi-modal strategic transport plan, owned and developed by the North, is critical to delivering the functioning economic geography required to fully realise the North's potential.

1.4.   Strategic Transport Plan Overview

The North of England hosts some of the most iconic places in the UK, is home to more people than London and almost as many as the Netherlands. It has a wealth of high-profile and growing UK-wide and international businesses, and a rich and diverse set of assets and talent. As the birthplace of the industrial revolution, the North has a long history of innovation and driving national growth.

The North's economic centres already have many strengths, and are increasingly being given the tools to become even stronger through more powers and devolved funding in city deals, devolution deals and growth deals. The quality of life in the North underpins its economic capabilities: in particular, it provides more affordable housing than London and the South East, varied sport and culture, and access to spectacular coastlines and countryside.

Despite the North's clear economic and social opportunities, there remain persistent differences in its GVA per capita and productivity performance compared to the rest of the England. For the last 30 years, the North's economic value per person (measured as GVA) has been consistently around 25% below the average for the rest of England, and 10-15% below the average for England excluding London. In 2015, there was a significant gap increase in income between the North and the rest of the UK.

An economic gap persists, and closing it will require a radical change in the economy of the North. While closing this gap will require advances in a wide range of factors, one key element will be to ensure that the North of England has a transport network which will allow agglomeration effects arising from faster connections between areas of employment and economic activity.

While it is recognised that transport plays a crucial role in the economy of towns cities, regions and even country's, it is also clearly an important component of everyday life, through connecting homes, businesses, jobs, health and education facilities and leisure opportunities. A transport system that is fit for purpose, considering long term economic, social and environmental benefits, will be the backbone of a strong economy for the North and for the UK. It is this requirement that has driven the vision for the STP for '*A thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life'*.

How this vision will be achieved is detailed in the STP, which sets out the case for connectivity priorities for transport infrastructure for the next thirty years (up to 2050). A key component of the STP is the series of transport objectives, which set out the aims of the STP and which will apply across the North of England. These transport objectives are all of equal standing and as such, a key focus is on ensuring that sustainability is embedded throughout the STP. These objectives are:

<p align="center">Table 1-1   Objectives of the Strategic Transport Plan</p>

Objective	Aims
Transforming economic performance	To secure investment in transport between economic centres and assets to support transformation of the North's economic performance. This objective focuses on addressing the challenges identified in the NPIER and securing investment in transport interventions that improve productivity across the North and delivers agglomeration benefits between the North's important economic centres and assets, both rural and urban. The STP will: - Clearly articulate, prioritise and sequence strategic transport investment between important economic centres and assets, to our important ports and airports, to support the transformation of economic performance across the North; and - Ensure TfN's long term Investment Programme aligns with and complements the development and delivery of local transport, development and economic plans and policies.
Promote and support the built and natural environment	To ensure that transport interventions across the strategic transport system protect and enhance the natural and built environment, ensuring that the north's strategic transport system is as sustainable as possible. It covers a range of issues, including the need to provide sustainable travel choices for the movement of people and goods across the North; reducing emissions from transport; making best use of our existing transport

Objective	Aims
	infrastructure before investing in new capacity; and ensuring that new infrastructure is designed to minimise the negative impacts on both the natural and built environment. The STP will: • Promote measures that improve sustainable travel options and make best use of the North's existing strategic transport networks • Promote and support the use of solutions that reduce emissions across the strategic road and rail networks • Ensure that environmental and sustainability impacts are a key consideration in option selection for new strategic transport infrastructure interventions; and • Ensure that improvements to the strategic transport network align with local environmental objectives.
Improve opportunities across the North	To ensure that the STP improves access to opportunities for all across the North. Ultimately transport is a means to an end. To ensure that ecomomic growth in the North is as inclusive as possible, investment in the strategic transport network should enable better access to key opportunities, including employment, healthcare, social activities and education, for all, regardless of their age, income-level and mobility. This will require a carefully co-ordinated approach to ensure that strategic and local transport investment programmes and policies are aligned and complimentary. The STP will: • Ensure that improvements to our strategic transport networks support the inclusive growth and provide affordable access to key opportunities across the North, aligning strategic proposals carefully with local aspirations.
Increase efficiency, reliability and resilience in the transport system	To improve the performance of the North's strategic transport network by making the case for interventions that improve its efficiency, reliability and resilience. This will ensure that the North's strategic transport networks meet the needs of its users, whether they are residents, businesses or visitors. The management of these networks will need to be able to adapt to changing demands over the period to 2050, such as shifting commuter patterns, changing leisure aspirations, more extreme weather conditions as a result of climate change and the emergence of new disruptive technologies, such as connected and autonomous vehicles. TfN will also identify opportunities to improve travel choices for the movement of both people and freight, to boost the resilience and sustainability of our pan-Northern networks, with a particular focus on making more sustainable travel options as attractive as possible. TfN will also promote measures that help to make the best of our existing networks, exploring new technologies and demand management tools that help to maximise network efficiency. The STP will: • Promote measures that will make the best use of the North's existing strategic transport networks and improve their performance, including through the use of best practice measures or new innovations; • Improve travel choices and user experience for the movement of people and goods across the North; and • Ensure that improvements to the performance of strategic transport networks are developed in a co-ordinated and integrated way with local networks.

Supporting these transport objectives within the STP, a series of main roles that can help to drive the economy and help to drive associated agglomeration benefits for the North have been identified:

• 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.
• Northern Powerhouse Rail – sets out to significantly improve capacity, frequency and services between the North's main economic centres

- Rail North Long Term Rail Strategy – sets out to improve train services, stations and lines on the wider rail network
- Ensuring a sustainable investment programme.

In terms of this ISA, this last role is fundamental as it commits TfN and its Delivery Partners to ensure that strategic transport infrastructure is designed and constructed in a sustainable way. The principles set out in the STP build on the pan-Northern transport objectives, and will be developed over time to ensure TfN's Investment Programme becomes an exemplar in how it:

- Defines a broad set of infrastructure requirements that will seek to deliver high quality travel with associated high quality environmental mitigation, to create an attractive, inclusive, and accessible environment to live, work and invest, for a healthier, safer, more inclusive strategic transport network across the North;
- Acts as a catalyst for future transport technologies that will enable environmentally and efficient travel, contributing to the Government's target to reduce carbon emissions;
- Promotes confidence in businesses to invest in a skilled labour market to deliver the transport infrastructure required, as well as supporting wider opportunities; and
- Explores opportunities for 'green' and 'blue' infrastructure to enhance landscapes and habitats, and support a net gain in biodiversity where possible.

Another important element to sustainability is efforts being developed to make public transport more accessible, affordable and efficient. For example, across the Pan-Northern public transport network an Integrated and Smart Travel programme is being developed and implemented which will build on existing systems to develop smart ticketing, payment and information technologies to transform public travel across the whole region. For example, it will make it easier for passengers to travel seamlessly using their preferred payment method, confident that they have paid the best possible on the day fare for their journey. It is anticipated that this Integrated and Smart Travel system will help deliver:

- Enabling economic growth in the North – Increasing public transport use, freeing capacity on road networks and providing customers with access to a wider jobs market;
- Improving customer experience – Allowing seamless multi-modal travel, reducing queuing times, improving journey and pricing information and ensuring value for money;
- Increasing efficiency across the transport network – Improving accuracy and timeliness of travel information, reducing operational costs, reducing fraud and easing congestion on roads; and
- Providing a consistent and familiar travel experience throughout the North – TfN can work with transport operators and local transport authorities to simplify fare structures and ticket types across the North.

As noted in the STP, a fundamental outcome will be a long term Investment Programme, which will define the major, strategic interventions which will be delivered during the lifetime of the Plan. This long term Investment Programme will enable TfN to develop a pipeline of investment so that TfN and its Partners can work with Government and Delivery Partners to secure funding and delivery of the right schemes at the right time, providing certainty for local transport authorities to plan complementary investment.

The long term Investment Programme will be split into three periods according to when the intervention is needed and should be operational. The three time periods are:

- Up to 2025
- 2026-2035
- 2036-2050

It is clearly acknowledged within the STP that the long-term Investment Programme is still in development and will be refined as further studies are undertaken and a greater understanding of needs is developed. As such, precise details of potential Interventions are not known at this stage. However, it is still possible to develop some key assumptions of likely interventions. These assumptions of likely interventions can be outlined as follows:

Table 1-2   Likely Intervention types

Likely type of Intervention	Likely type of scheme
Highways	New highway links
	Highway infrastructure improvements
	Smart highways / adaptive network
Railways	New rail links
	Rail infrastructure improvements
	New stations
	Station upgrades (including park and ride)
Public transport (excl. 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

In relation to likely interventions, the STP sets out a series of Strategic Development Corridors (SDCs), which will 'host' the major strategic interventions required to drive transformational economic growth. These SDCs are as follows:

- **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.

By 2050, it is anticipated that implementation of the STP would help result in transformational economic growth compared to the 'Business as Usual' baseline. A range of potential scenarios has been identified and outlined in the STP. It is to be noted that no one scenario is more likely than another, but taken together they represent the likely range of outcomes in travel demand in the North. These scenarios are as follows:

Table 1-3   Alternative Scenarios

Scenarios				
Business as Usual	This assumes the future will be like the past, reflecting both historical experience and substantial levels of previous policy intervention and investment, as well as expected UK trends. It is to be noted that this is distinct from a 'Do-Nothing' Scenario.			
Transformational	This assumes the North's performance is transformed, relative to the past, and that progress is made in tackling the range of factors responsible for the performance gap. Four different future scenarios have been identified in a transformational scenario.			
	Scenario 1 **Compact & Digital**	**Scenario 2** **Compact & Travel Friendly**	**Scenario 3** **Dispersed & Digital**	**Scenario 4** **Dispersed & Travel Friendly**
	• Urban areas are 'Compact' with brownfield development in cores • Local transport system focus on serving radial movements • Technological development has led to a preference for 'Digital' rather than physical connectivity • Energy costs and therefore travel costs are high • Anticipated 192% Rail growth • Anticipated 26% Road growth	• Urban areas are 'Compact' with brownfield development in the cores • Local transport systems focus on serving radial movements • Technological development has led to advances in 'Travel Friendly' connectivity options • Energy costs and therefore travel costs are low • Anticipated 327% Rail growth • Anticipated 52% Road growth	• Urban areas are 'Dispersed' with mixed greenfield and brownfield development in the suburbs and urban fringes • Local transport systems provide for all types of cross-district movement • Technological development has led to preference for 'Digital' rather than physical connectivity • Energy costs and therefore travel costs are high • Anticipated 60% Rail growth • Anticipated 27% Road growth	• Urban areas are 'Dispersed', with mixed greenfield and brownfield development in the suburbs and urban fringes • Local transport systems provide for all types of cross-district movement • Technological development has led to advances in 'Travel Friendly' connectivity options • Energy costs and therefore travel costs are low • Anticipated 136% Rail growth • Anticipated 54% Road growth

2. Approach to Integrated Sustainability Appraisal

2.1. Introduction

TfN is a new body empowered by a pan-Northern Transport Partnership Board representing civic and business leaders from all 11 Local Enterprise Partnerships across the North. TfN are tasked with setting out the requirements of the transport network across the North of England and have therefore produced a first iteration of a STP. It is the intention that this STP will evolve over the coming years and decades, with appropriate stakeholder engagement on any plans, projects and programmes subsequently derived.

In relation to this ISA, the umbrella process of SA/SEA has been followed to cover the requirement for HIA, EqIA and CSA to be undertaken. SA/SEA is a process which in the UK was originally was primarily focused on assessment of plans in the land use sector but which has become widely accepted as a way of covering environment, social and economic dimensions of sustainable development, rather than just environmental as in a traditional SEA, across a broad range of sectors.

2.2. Sustainability Appraisal / Strategic Environmental Assessment

Due to the potential for the STP to lead to schemes which will require an Environmental Impact Assessment, it is a statutory requirement that SEA is undertaken under the European Directive 2001/42/EC 'on the assessment of certain plans and programmes on the environment' (the 'SEA Directive').

Although the requirements to carry out SA and SEA are distinct, DCLG (Department for Communities and Local Government, formerly the ODPM (Office of the Deputy Prime Minister)) proposed that both can be satisfied through a single appraisal process. It has produced guidance (see Section 4 Methodology) to ensure SAs meet the requirements of the SEA Directive whilst widening the Directive's approach to include economic and social issues as well as environmental ones.

The EU Directive 2001/42/EC on assessment of effects of certain plans and programmes on the environment (the "SEA Directive") came into force in the UK through the Environmental Assessment of Plans and Programmes Regulations 2004 (the "SEA Regulations"). The SEA Regulations apply to a wide range of plans and programmes, including transport plans, and modifications to them.

The overarching objective of the SEA Directive is:

> *"To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans… with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans… which are likely to have significant effects on the environment."* (Article 1)

The main requirements introduced by the SEA Regulations are that:

- the findings of the SEA are published in an Environmental Report (ER), which sets out the significant effects of the draft plan;
- consultation is undertaken on the plan and the ER;
- the results of consultation are taken into account in decision-making relating to the adoption of the plan; and
- information on how the results of the SEA have been taken into account is made available to the public.

In this ISA process, the ISA Report incorporates the SEA requirement for an Environmental Report.

2.3. Health Impact Assessment (HIA)

While there is no statutory requirement to undertake an HIA in relation to the STP, it was recognised that it provides a useful way to support efforts to improve health of individuals and communities and help address health inequalities. In short, it was recognised that the STP policies and proposals have the potential to impact on factors influencing the health of communities and individuals such as noise and air quality, access to key services and facilities, as well as the design of transport infrastructure. Undertaking an HIA ensured that potential impacts of the STP on health and health inequalities have been considered as advised in National Planning Policy Framework (NPPF).

The incorporation of HIA is also in keeping with good practice. It is also the case that the Department for Transport (DfT) Transport Analysis guidance indicates that consideration of 'Human Health' is a legal requirement in an SEA and that an HIA is an integral part of an SEA to identify and inform health issues in Plans.

2.4. Equality Impact Assessment (EqIA)

An EqIA has been undertaken as it fulfils the statutory duties of public bodies to ensure the promotion of equalities under the Equality Act 2010 and subsequent Public Sector Equality Duty.

The purpose of an EqIA is to ensure plans and programmes do not discriminate against any individual or community and where possible promotes equality. An EqIA considers impacts on a variety of groups, mainly focussing upon the 'protected characteristic groups' (PCGs) established under the Act, namely:

- Age
- Disability
- Gender
- Gender reassignment
- Marriage
- Civil Partnership
- Pregnancy and maternity
- Religion or belief
- Race
- Sexual Orientation

The Act also makes explicit the concept of 'dual discrimination', where someone may be discriminated against or treated unfairly on the basis of a combination of two of the protected characteristics.

DfT Transport Analysis guidance 2009 requires an evidence-led EqIA to be completed to help inform the development of the transport plan, ensuring it addresses any equality issues identified and takes account any impacts the plan may have on the local communities. Although not defined in the Equality Act, it is also the case that the issue of 'low income' and the implications of this were considered in the assessment.

The EqIA process is fully reported in this ISA Report.

2.5. Community Safety Assessment (CSA)

A further key component fully considered and reported in the ISA is a Community Safety Assessment (CSA). The purpose of undertaking the CSA was to ensure that a scheme, strategy or policy does not have a detrimental impact on community safety (including crime and road safety) and where possible improves the existing situation.

This CSA was undertaken in accordance with the requirements of the Crime and Disorder Act 1998 and fulfils the requirement to carry out a review of the levels and patterns of crime, disorder and community safety in the area when developing a strategy or plan. Reported crime statistics are the most tangible measure to understand community safety and were analysed against the population profile of the area.

2.6.   Habitat Regulation Assessment (HRA)

HRA is required under Article 6 of the Habitats Directive and Regulation 61 of the Conservation of Habitats and Species 2010 (as amended) (the Habitats Regulations), for all plans and projects which may have likely significant effects on a European site (either alone or in combination with other plans or projects) and are not directly connected with, or necessary to, the management of the site.

European sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA). HRA is also required, as a matter of UK Government policy for potential SPAs (pSPA), candidate SACs (cSAC), Wetlands of European importance (Ramsar sites), and proposed Ramsar sites (pRamsar) for the purposes of considering plans and projects, which may affect them.

The HRA Stage 1 - Screening assessed whether the STP (and associated Delivery Plan 1) is likely to lead to significant effects on the range of European sites across the north of England (with reference to the conservation objectives of the qualifying feature(s) of each of the sites). See Appendices C and D for details of these sites.

At this stage, due to the high level strategic nature of the STP, only broad details of future development possibly arising from the policies are given. As such the STP will commit to conducting HRAs for any future infrastructure project which might have likely effects on European sites. In addition, the STP acknowledges that there may be a requirement for HRA as part of the scheme appraisal process that schemes will undergo prior to funding being sought.

Future infrastructure projects will need to be in-line with the STP and will need to satisfy the relevant proposing bodies and Natural England that there will be no adverse effect on the integrity of the European sites. Any adverse effects on site integrity must be effectively mitigated and, as a last resort, compensated for.

The HRA Stage 1 Screening Report has concluded that the STP is not likely to have likely significant effects on any of the European sites included within this assessment. The HRA Stage 1 Screening Report is being published separately from the ISA Report.

2.7.   Reporting and consultation as part of the ISA process

Key consultation requirements are those set in the SEA Regulations which identify three organisations (in England) to act as statutory consultation authorities in the SEA process: the Environment Agency, Natural England (formerly English Nature and the Countryside Agency) and Historic England (formerly English Heritage).

Two consultation periods involving the statutory consultation authorities and, in the latter period, the public are also set in the SEA Regulations. The consultation periods relate to:

- Scoping. The responsible authority is required to send details of the plan or programme to each consultation authority so that they may form a view on the scope, level of detail and appropriate consultation period of the Environmental Report. The consultation authorities are required to give their views within five weeks.
- The Environmental Report. The responsible authority is required to invite the consultation authorities and the public to express their opinions on the Environmental Report and the plan or programme to which it relates.

The ISA Scoping Report was issued for consultation to both the statutory consultation authorities and a range of other stakeholders, with a consultation period running from 20th January to 3rd March 2017. In addition to a statutory request for comment by TfN to the range of formal consultees in England, it was recognised that that there was a potential for cross boundary effects from the implementation of the STP and as such, the following statutory consultation bodies were consulted:

- Scottish Environmental Protection Agency (SEPA)
- Historic Environment Scotland
- Scottish Natural Heritage

- Natural Resources Wales
- CADW (Historic Environment Wales)

As well as the statutory consultation bodies for England, Scotland and Wales, a wide range of other environmental, social and economic stakeholders were contacted by TfN in relation to the Scoping Report and the proposed approach to the ISA to ensure a high level of scrutiny, rigour and comprehensiveness of approach. These bodies included organisations such as Public Health England, National Park authorities, transport organisations, local and combined authorities and Local Enterprise Partnerships. A full list of these bodies is provided in the updated Scoping Report referred to in Appendix A.

TfN also sought the views of environmental and sustainable transport NGOs in a consultation process facilitated by the Campaign for Better Transport (CfBT). The approach of CfBT involved a series of workshops, held in venues across northern England, as well as an online survey which invited comments on the draft ISA objectives and the proposed evaluation questions contained in the ISA Scoping Report. This followed earlier engagement with the same NGO stakeholders on the key challenges and opportunities for the STP. The stakeholder list included over 250 organisations, ranging from national charities, such as the Woodland Trust, CPRE and Cycling UK, to local special interest groups such as rail user groups, and sectoral representatives such as the Community Transport Association and Railfuture.

Responses received from the consultation process were used to inform the ISA and helped to refine the STP. An overview of the comments received, together with how these comments have been addressed in the preparation of this ISA Report, are set out in Appendix A-1 of this report.

Key reporting requirements are those set by the SEA Directive and SEA Regulations:

> *'An Environmental Report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated.'*

As already indicated, the SEA Report has been integrated in this ISA Report. Table 2-1 sets out the way the specific SEA requirements have been met in this report.

Table 2-1   Schedule of SEA Requirements

Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2)		Where covered in ISA Report
1.	An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes	Sections 1 and 3
2.	The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan;	Section 6 and Appendices C and D
3.	The environmental characteristics of areas likely to be significantly affected	Section 6 and Appendices C and D
4.	Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	Section 6 and Appendices C and D
5.	The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation	Appendix B
6.	The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and	Section 11 and Appendices F, G and H

Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2)		Where covered in ISA Report
	secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and archaeological heritage; landscape; the interrelationship between the above factors	
7.	The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan	Appendix I
8.	An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information	Section 15
9.	A description of measures envisaged concerning monitoring in accordance with Regulation 17	Section 14
10.	A non-technical summary of the information provided under paragraphs 1 to 9	Non-technical summary

The ISA Report is thus an important consultation document and likely to be of interest to a wide variety of readers including decision makers, other plan/programme practitioners, statutory consultees, NGOs and members of the public. It accompanies the draft STP on public consultation taking place from early January to March 2018.

3. Scope of the Integrated Sustainability Appraisal

3.1. Introduction

The section describes the spatial, temporal and technical scope of the sustainability studies undertaken as part of the ISA.

3.2. Spatial Scope

The STP applies to an area of the North of England comprising the combined overall geographical extents of the 11 Local Enterprise Partnerships (LEP) areas shown in Figure 3-1 (note some areas overlap). Table 3-1 provides information on the constituent local authorities of the various LEP areas.
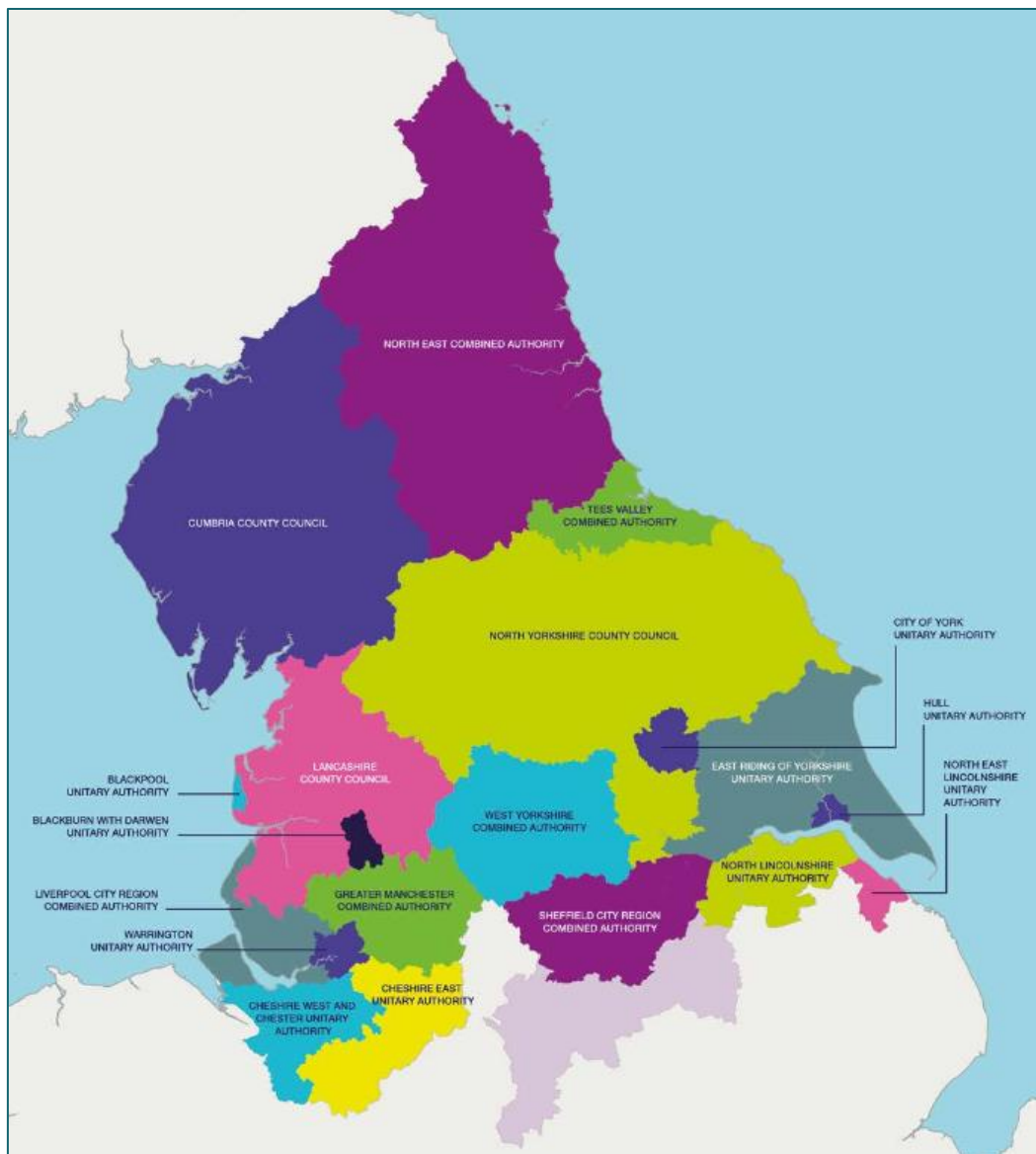
Figure 3-1   Geographical scope of the Plan

Table 3-1   Local authority areas covered by the STP Area

LEP	Local authority areas covered by LEP area
North East	County Durham, Gateshead, Newcastle upon Tyne, North Tyneside, Northumberland, South Tyneside and Sunderland.
Cumbria	County of Cumbria.
Tees Valley	Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland and Stockton-on-Tees. Covers 304 square miles and has a population of over 660,000.
York, North Yorkshire and East Riding	Craven, Hambleton, Harrogate, Richmondshire, Ryedale, Scarborough, Selby, York and East Riding.
Lancashire	Blackburn with Darwen, Blackpool, Burnley, Chorley, Fylde, Hyndburn, Lancaster, Pendle, Preston, Ribble Valley, Rossendale, South Ribble, West Lancashire and Wyre.
Leeds City Region	Barnsley, Bradford, Calderdale, Craven, Harrogate, Kirklees, Leeds, Selby, Wakefield and York, along with North Yorkshire County Council.
Greater Manchester	Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford and Wigan.
Liverpool City Region	Boroughs of Halton, Sefton, Knowsley, Liverpool, St. Helens and Wirral.
Sheffield City Region	Barnsley, Bassetlaw, Bolsover, Chesterfield, Doncaster, Derbyshire Dales, North East Derbyshire, Rotherham and Sheffield.
Humber	Hull, East Riding of Yorkshire, North East Lincolnshire and North Lincolnshire.
Cheshire and Warrington	District areas of Cheshire East, Cheshire West and Chester, and Warrington.

It should be noted that the while the STP relates to a defined area encompassing the combined extents of the 11 LEPs noted above, the STP will have effects outside of this area due to the scale, significance and importance of some elements of the plan.

3.3. Temporal Scope

The temporal scope of the ISA has been aligned with that for the STP, which will apply to the period up to the year 2050.

3.4. Technical Scope

The ISA has a very wide remit and will consider the following topics associated with the various assessment processes it covers.

3.4.1. SA / SEA

The SEA Directive and the SEA regulations require that the likely significant effects on the environment are assessed, considering the following factors and interrelationship between them:

- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors;
- Material assets (covering infrastructure, waste and other assets);

- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

SA guidance requires the consideration of socio-economic factors alongside the environmental factors identified above.

3.4.2. Health Impact Assessment (HIA)

Department of Health guidance recommends that the assessment of transport plans should consider the following topics:

- Transport to work, shops, schools and healthcare
- Walking and cycling
- Community severance
- Frequency and severity of crashes
- Collisions causing injury and fatal accidents
- Air pollution, noise and
- Ageing population and increasing disability

From an HIA perspective, there are vulnerable social groups that need special consideration in transport planning with regards to their health. These groups are likely to experience transport-related exclusion and / or be subject to negative externalities of transport and are as follows:

- Children – who as non-drivers are reliant on others for motorised transport and who suffer the greatest impacts of transport policy on their health, particularly children in low-income families;
- Women – who are more likely not to own a car and find it harder to travel to shops, employment, healthcare and other services;
- Older people – who may feel vulnerable using public transport, who often need to seek health services and who are particularly vulnerable to road crash related injuries. Their continuing independence at home is often dependent upon reliable transport options;
- Disabled and people with other health problems – who may not be able to access many forms of transport or need special arrangements to access those. They are more likely to find it difficult to walk and may also be disadvantaged by the cost of transport;
- Low income groups – who are likely to walk further because they cannot afford public transport or to own a car and whose lack of transport options may limit life opportunities. They suffer the most from injuries, noise pollution and air pollution.

3.4.3. EqIA

The EqIA process focuses on the consideration of the potential STP effects on nine protected characteristic groups (PCGs) identified in the Equality Act 2010 that are relevant to the transport agenda:

- Age;
- Disability;
- Gender;
- Gender reassignment;
- Marriage and Civil Partnerships;
- Pregnancy and maternity;
- Race;
- Religion or belief; and
- Sexual orientation.

A degree of overlap between the HIA vulnerable social groups and the EqIA protected characteristics has been acknowledged by both HIA and EqIA processes. Consistency between the two assessments has been ensured, where appropriate, particularly in terms of assumptions, analysing techniques and findings.

4. ISA Methodology

4.1. Introduction

The ISA started as the preparation of the STP began and it has progressed concurrently in an iterative fashion in order to integrate sustainability considerations into the plan making process. The ISA has been used as a tool for improving the STP's sustainability performance. Specifically, this has been achieved through allowing sustainability objectives to be considered throughout the plan's formulation process: from inception through development of Objectives, Strategic Alternatives, Strategic Components and Strategic Development Corridors.

As has already been stated, the ISA process fully integrates a range of assessment processes: SA/SEA, HIA, EqIA and CSA. HRA has been undertaken in parallel to the ISA and its results incorporated into the ISA as appropriate. Table 4-1 demonstrates how the integration has been planned and achieved throughout all the preparation stages of the ISA and STP.

4.2. Assessment Methodology

The ISA methodology adopted was developed broadly based on a number of published guidance documents:

- Transport Analysis Guidance (TAG) 2.11 Strategic Environmental Assessment for Transport Plans and Programmes, Department for Transport, 'In Draft' Guidance, April 2009;
- Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents - Guidance for Regional Planning Bodies and Local Planning Authorities, by the ODPM, the Scottish Executive, the Welsh Assembly Government and the Northern Ireland Department of the Environment November 2005;
- A Practical Guide to the Strategic Environmental Assessment Directive, by the ODPM, the Scottish Executive, the Welsh Assembly Government and the Northern Ireland Department of the Environment, September 2005;
- Draft Guidance on Health in Strategic Environmental Assessment, Consultation Document, Department of Health, 2007; and
- National Planning Policy Framework, March 2012 and associated Planning Practice Guidance, March 2014.

The work undertaken to-date involved the completion of SA/SEA stages A, B and C and associated tasks (see Table 4-1).

Table 4-1   Integration of the Assessment Process

Transport Planning Stage	Sustainability Appraisal/ Strategic Environmental Assessment		Habitats Regulation Assessment	Health Impact Assessment	Equalities Impact Assessment	Community Safety Assessment
	Stage	Tasks	Tasks	Tasks	Tasks	
Determining the scope of the Strategic Transport Plan clarifying goals; specifying the problems or challenges the authority wants to solve	A. Setting the context and objectives, establishing the baseline and deciding on the scope	Review plans/programmes and identify sustainability themes		Identify related plans/programmes and identify themes (as part of SA/SEA)	Review of relevant policies and strategies and identify themes (as part of SA/SEA)	Review of relevant policies and strategies and identify themes (as part of SA/SEA)
		Review Baseline data and likely future trends	Identify all international sites within and up to 20km around the STP area	Baseline evidence (as part of SA/SEA)	Baseline evidence (as part of SA/SEA)	Baseline evidence (as part of SA/SEA)
		Review Key sustainability issues	Contact Natural England for details of all international sites and consultation purposes	Identify health specific issues (as part of SA/SEA)	Identify equalities specific issues(as part of SA/SEA)	Identify community safety specific issues (as part of SA/SEA)
		Review objectives and decision-making questions (SA/SEA Framework)	Liaise with SA/SEA team to ensure SA/SEA Framework covers international sites appropriately	Ensure inclusion of Health specific objectives in SA/SEA Framework	Ensure inclusion of Equalities specific objectives in SA/SEA Framework	Ensure inclusion of Community Safety specific objectives in SA/SEA Framework
		Prepare Scoping Report	*HRA information incorporated in Scoping Report*	*HIA information incorporated in Scoping Report*	*EqIA information incorporated in Scoping Report*	*Community Safety information incorporated in Scoping Report*
		Formal consultation with SEA Statutory consultees and other relevant social and economic consultees	*Consultation as part of SA/SEA formal consultation*	*Consultation as part of SA/SEA formal consultation*	*Consultation as part of SA/SEA formal consultation*	*Consultation as part of SA/SEA formal consultation*

Generating options for the Strategic Transport Plan to resolve these challenges; appraising the options and predicting their effects	**B. Developing, refining and appraising strategic options**	Assess STP objectives against the SA/SEA Framework Appraise STP strategic options Evaluate/select STP preferred options.	Assess STP objectives against relevant HRA objective Initial advice provided to client in relation to the sensitivities of the international sites and how to avoid significant effects on these sites.	*HIA assessment of STP objectives and strategic options be undertaken within SA/SEA*	*EqIA assessment of STP objectives and strategic options be undertaken within SA/SEA*	*Community Safety assessment of STP objectives and strategic options be undertaken within SA/SEA*
Selecting preferred options for the Strategic Transport Plan and deciding priorities	**B. Assessing the effects of the STP**	Predict and assess effects of options taken forward Propose mitigation measures	HRA review of proposals in draft Propose mitigation measures	*HIA assessment of preferred options to be undertaken within SA/SEA.* *Mitigation measures proposed within SA/SEA*	*EqIA assessment of preferred options to be undertaken within SA/SEA.* *Mitigation measures proposed within SA/SEA*	*Community Safety assessment of preferred options to be undertaken within SA/SEA.* *Mitigation measures proposed within SA/SEA*
Production of the draft Strategic Transport Plan		Propose monitoring programme	*Monitoring as part of SA/SEA*	*Monitoring as part of SA/SEA*	*Monitoring as part of SA/SEA*	*Monitoring as part of SA/SEA*
	C. Prepare ISA Report		Prepare HRA Screening Report (separate output)	HIA fully documented in ISA Report (no separate output but HIA component properly identified)	EqIA fully documented in ISA Report (no separate output but EqIA component properly identified)	Community Safety fully documented in ISA Report (no separate output but Community Safety component properly identified)
Consultation on draft Strategic Transport Plan	**D. Consulting on ISA Report**		**HRA Screening Report sent to Natural England for agreement on findings.**	*HIA Consultation included in ISA Report consultation*	*EqIA Consultation included in ISA Report consultation*	*Community Safety Consultation included in ISA Report consultation*
Production of final Strategic Transport Plan	**D. Assess significant changes**		Assess significant changes	*HIA assessment of significant changes undertaken as part of SA/SEA*	*EqIA assessment of significant changes undertaken as part of SA/SEA*	*Community Safety assessment of significant changes undertaken as part of SA/SEA*
Adoption of Strategic Transport Plan	**D. Prepare Post Adoption Statement**		Prepare updated HRA Screening Report	*Relevant results reported in Post Adoption Statement*	*Relevant results reported in Post Adoption Statement*	*Relevant results reported in Post Adoption Statement*

4.3. SA / SEA

4.3.1. Stage A – Setting the Context and Establishing the Baseline

4.3.1.1. Other Relevant Legislation, Plans and Programmes

The STP will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local and combined authorities, by statutory agencies and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for the STP, both directly and indirectly. Relevant legislation, plans and programmes have been identified and considered to inform the preparation of this ISA Report (see Section 5 and Appendix B).

4.3.2. Baseline information

To predict accurately how potential STP proposals will affect the current baseline, it is first important to understand its current state and then examine the likely evolution of the environment without the implementation of the plan.

Baseline information provides the basis for understanding existing local environmental, economic and social issues, in particular in respect of health and equality, and alternative ways of dealing with them; formulating objectives to address these issues and predicting and monitoring sustainability effects.

Baseline conditions are presented in Section 6 and Appendices C and D.

4.3.3. Key Sustainability Issues

Key sustainability issues in general, and those pertaining to health and equality in particular, across the north of England have been identified as a result of the analysis of the baseline data and the review of other plans and programmes. The identification of these issues helped focus the ISA processes on the aspects that really matter. Implications to STP development and opportunities for how the STP could assist in addressing these issues were also identified. Information on key sustainability issues is presented in Section 7 of this report.

4.3.4. Developing the ISA Framework

A set of ISA Objectives has been developed, against which the policies and proposals in the STP could be assessed.

For each objective, assessment aid questions were set out to form the ISA framework. The assessment aid questions provided a clarification of the intended interpretation of each objective to support direction of change sought through the implementation of the STP. The questions have guided the STP's assessment process.

The ISA Objectives and assessment aid questions were refined through the consultation on the Scoping Report and are presented in Section 8 of this report.

4.4. Stage B – Developing alternatives

4.4.1. Testing the STP Objectives against the ISA Objectives

A compatibility assessment of STP objectives in its initial stages of preparation against the ISA objectives was carried out, as part of the iterative process to assess the sustainability of STP objectives. This assessment ensured that consideration of the ISA Objectives informed the development and refinement of the STP Objectives and provided a suitable framework for developing alternatives (see Section 9 of this report).

4.4.2. Developing, refining and appraising Strategic Alternatives

Consideration of alternative strategies and options for the STP are an integral part of the plan development. Four strategic scenarios were identified by TfN and have been assessed as part of the ISA process. This approach was developed to explicitly capture the uncertainty surrounding future outcomes. It uses a

foresighting approach to define several 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.

TfN's Partners can help shape these scenarios through their land use and transport plans and the digital infrastructure they provide. However, these are not totally within their control.

This task comprised the prediction of changes arising from the STP's strategic scenarios. While carrying out this evaluation, each alternative was considered in the context of whether it would have a likely significant effect in relation to each of the ISA objectives. The results are presented in Section 10 of this report.

4.4.3.   Assessing the effects of the draft STP

Assessing the significance of predicted effects is essentially a matter of judgement. There are a number of factors that will determine the significance of an effect, e.g. its scale and permanence and the nature and sensitivity of the receptor. It is very important that judgements of significance are systematically documented, in terms of the particular characteristics of the effect which are deemed to make it significant and whether and what uncertainty and assumptions are associated with the judgement. The assessment of significance also includes information on how the effect may be avoided or its severity reduced.

In the current practice of ISA (influenced by SEA), the broad-brush qualitative prediction and evaluation of effects can often be based on a qualitative nine point scoring scheme defined in easily understood terms. In general, this assessment has adopted the scoring scheme shown in Table 4-2 to assess the significance of predicted effects of the proposals in the STP.

Table 4-2   Criteria for assessing significance of effects

Terms		Effects					Assessment	
		Mag	**Scale**	**Dur**	**T/P**	**Cert**	**Scale**	**Category**
Mag	Magnitude	✔✔	Local	ST-MT	Temp	Low	+++	Large beneficial
Scale	Geographic Extent	✔	Local-Reg	ST-LT	Perm	Med	++	Moderate beneficial
Dur	Duration	-	Reg/Nat	MT-LT		High	+	Slight beneficial
T/P	Temporary / Permanent	?		ST			0	Neutral
Cert	Certainty	✘		MT			-	Slight adverse
ST	Short Term	✘✘		LT			--	Moderate adverse
MT	Medium Term						---	Strong adverse
LT	Long Term						?	Uncertain
Sm	Summary assessment						+/-	Combination of beneficial and adverse

Moderate and strong beneficial and adverse effects (and combination of this type of effect) have been considered of significance, whereas no effect and slight beneficial and adverse effects (and combination of this type of effect) have been considered non-significant.

Assessments have been undertaken for strategic proposals contained in the Draft STP. The results of the assessment of the Draft STP are discussed in Section 11.

As part of the assessment of the Draft STP a number of mitigation measures (recommendations) are set out in Section 12 and Appendix I. TfN has given careful consideration to these recommendations and has proposed to address these as appropriate.

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting significant adverse environmental effects that have been identified. A range of measures applying one or more of these approaches has been considered in mitigating any significant adverse effects predicted as a result of implementing the STP. In addition, measures aimed at enhancing positive effects have also been considered. All such measures are generally referred to as mitigation measures.

However, the emphasis of the assessments has been in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, then ways of reducing the scale/importance of the effect have been examined and proposed.

Mitigation can take a wide range of forms, including:

- Refining intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation stage;
- Identifying issues to be addressed in project environmental impact assessments for certain projects or types of projects;
- Proposals for changing other plans and programmes.

The assessment also considered cumulative, indirect (secondary) and synergistic effects of the Draft STP as outlined in the following section.

4.4.4. Secondary and Cumulative Effects Assessment

Annex I of the SEA Directive requires that the assessment of effects include secondary, cumulative and synergistic effects.

Secondary or indirect effects are effects that are not a direct result of the plan, but occur away from the original effect or as a result of the complex pathway e.g. a development that changes a water table and thus affects the ecology of a nearby wetland. These effects are not cumulative and have been identified and assessed primarily through the examination of the relationship between various objectives during the Assessment of Effects.

Cumulative effects arise where several proposals individually may or may not have a significant effect, but in-combination have a significant effect due to spatial crowding or temporal overlap between plans, proposals and actions and repeated removal or addition of resources due to proposals and actions. Cumulative effects can be:

- Additive - the simple sum of all the effects;
- Neutralising - where effects counteract each other to reduce the overall effect;
- Synergistic - is the effect of two or more effects acting together which is greater than the simple sum of the effects when acting alone. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

Many sustainability problems result from cumulative effects. These effects are very hard to deal with on a project by project basis through Environmental Impact Assessment. It is at the strategic level that they are most effectively identified and addressed.

Cumulative effects assessment is a systematic procedure for identifying and evaluating the significance of effects from multiple activities. The analysis of the causes, pathways and consequences of these effects is an essential part of the process.

Cumulative (including additive, neutralising and synergistic) effects have been considered throughout the entire ISA process, as described below:

- Identification of key sustainability (including detailed health and equality) issues as part of the review of relevant strategies, plans and programmes and baseline data analysis.
- Establishing the nature of likely cumulative effects, causes and receptors.
- Identifying key receptors (e.g. specific wildlife habitats) in the process of collecting baseline information and information on how these have changed with time, and how they are likely to change without the implementation of the STP.
- Particularly sensitive, in decline or near to their threshold (where such information is available) or with slow recovery receptors have been identified through the analysis of environmental issues and problems.

- The development of ISA objectives and assessment aid questions has been influenced by cumulative effects identified through the process above and ISA objectives that consider cumulative effects have been identified.
- Cumulative effects of STP proposals have been assessed.

The results are presented in Section 13 of this report.

4.4.5.   Monitoring the effects of the STP implementation

Monitoring involves measuring indicators which will enable the establishment of a causal link between the implementation of the plan and the likely significant effect (positive or negative) being monitored. It thus helps to ensure that any adverse effects which arise during implementation, whether or not they were foreseen, can be identified and that action can be taken by TfN, or partner bodies, to deal with them.

A monitoring programme has been prepared showing, for each significant effect, what data should be monitored, the source of the data, the frequency of monitoring, as well as when and what actions should be considered if problems are identified from the monitoring.

The results are presented in Section 14 of this report.

4.5.   Stage C – Preparing the ISA Report

This ISA Report has been prepared to accompany the draft STP on consultation.

4.6.   Stage D - Consulting on the Draft STP and ISA Report

4.6.1.   Assessing significant changes

The ISA Report will be 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 will have implications for the ISA Report. 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.

4.6.2.   Post Adoption Statement

Following completion of the public consultation and preparation of the Final STP document, a statement (separate document) will be prepared setting out the following:

- How sustainability considerations have been integrated into the plan, for example any changes to or deletions from the plan in response to the information in the ISA Report.
- How the ISA Report has been taken into account.
- How the opinions and consultation responses have been considered and addressed. The summary should be sufficiently detailed to show how the plan was changed to take account of issues raised, or why no changes were made.
- The reasons for choosing the plan as adopted in the light of other reasonable alternatives dealt with.
- The measures that are to be taken to monitor the significant environmental effects of implementation of the STP.

4.7.   HIA

In order to ensure that potential impacts of the STP on health and health inequalities have been considered and to fulfil the requirements of health legislation, an HIA has been undertaken in a fully integrated fashion with the SA/SEA process as set out in Table 4-1. The need for HIA arises from the recognition that the STP proposals may impact on the factors influencing the health of communities and individuals, including such factors as noise and air quality, accessibility to key services and facilities and the design of transport infrastructure.

4.7.1. Approach to HIA

The HIA objectives that have been considered have been developed in the light of HIA guidance and identified health issues, as well as the consultation that has taken place. The approach to the HIA has ensured that all relevant topics have been considered throughout the assessment process from establishing the baseline and building up the area's population profile in terms of health, identifying the key issues, developing the ISA Framework, assessing the STP, mitigation and monitoring.

The HIA has identified actions that can enhance positive effects and reduce or eliminate negative effects of the STP, with respect to health and health inequalities.

4.7.2. HIA consultation

Consultation to inform the HIA has been undertaken as part of the overall SA/SEA process as outlined in Table 4-1. Consultation responses have been analysed to inform the HIA (see reporting and consultation as part of the ISA process).

4.8. EqIA

In order to ensure that potential impacts of the STP on equality have been considered and to fulfil legislative requirements, an EqIA has been undertaken in a fully integrated manner with the SA/SEA process.

4.8.1. Approach to EqIA

The EqIA objectives that have been considered have been developed in the light of EqIA guidance and identified equalities issues, as well as the consultation that has taken place. The approach to the EqIA has ensured that all relevant topics have been considered throughout the assessment process from establishing the baseline and building up the area's population profile in terms of equalities, identifying the key issues, developing the ISA Framework, assessing the STP, mitigation and monitoring.

4.8.2. EqIA consultation

Consultation to inform the EqIA has been undertaken as part of the overall SA/SEA process as outlined in Table 4-1. Consultation responses have been analysed to inform the EqIA (see reporting and consultation as part of the ISA process).

4.9. Community Safety Assessment

To ensure that potential impacts of the STP on community safety have been considered, and to fulfil legislative requirements, a CSA has been undertaken in a fully integrated manner with the SA/SEA process.

4.9.1. Approach to CSA

The CSA objectives that have been considered have been developed in the light of CSA guidance and identified safety issues, as well as the consultation that has taken place. The approach to the CSA has ensured that all relevant topics have been considered throughout the assessment process from establishing the baseline and building up the area's population profile in terms of crime and safety, identifying the key issues, developing the ISA Framework, assessing the STP, mitigation and monitoring.

4.9.2. CSA consultation

Consultation to inform the CSA has been undertaken as part of the overall SA/SEA process as outlined in Table 4-1. Consultation responses have been analysed to inform the CSA (see reporting and consultation as part of the ISA process).

5. Review of Legislation and other Plans and Programmes

5.1. Introduction

The first task of the ISA is the identification of other relevant plans, policies, programmes and legislation. This helps to identify relevant environmental and wider sustainability themes, baseline information and key issues. The STP must be prepared to take these PPPs into account as it may influence and be influenced by them.

The SEA Directive specifically states that information should be provided on:

> "The relationship [of the plan or programme] with other relevant plans and programmes"

> "The environmental protection objectives, established at international, [European] Community or [national] level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation"

In addition to this, the PPPs related to wider sustainability, HIA and EqIA have also been considered.

5.2. Methodology

Both the STP and the ISA Report should be set in the context of international, national, regional and local objectives along with environmental, strategic planning, transport, health, social, economic and equality policies.

Relevant plans and programmes include those at different levels (international, national, regional and local) which influence the Transport Plan, or those in other sectors which contribute, together with the Transport Plan, to sustainability conditions of the area to which they apply.

Appendix B lists the documents reviewed to identify environmental, social (health and equality) and economic themes. A series of key generic themes which have emerged from the review are presented below.

Environmental Themes
The review of the PPPs revealed a large number of common themes in terms of their objectives relating to sustainability within the context of transport planning.

- Climate Change and Energy
- Reduce energy consumption and energy wastage;
- Reduce GHG emissions, particularly carbon dioxide;
- Maximise the use of renewable energy;
- Increase energy efficiency and make use of new and clean technologies;
- Minimise the use of fossil fuels;
- Need for measures to adapt to climate change.
- Transport
- Promote mixed-use development policies to reduce the need to travel;
- Improve local air quality through minimising traffic related emissions;
- Encourage walking, cycling and the use of public transport;
- Reduce traffic congestion and improve safety for all road users;
- Promote sustainable alternatives to car travel;
- Promote viable alternatives to road haulage, such as shipping and rail;
- Promote clean vehicle technology;
- Connect key regeneration sites;
- Promote integration, maintain and improve the public right of way and wider access network;

- Connect the area to the wider regional, national and international networks.
- Natural Resources and Waste
- Ensure efficient resource use and minimise resource footprint;
- Raise awareness of resource use/depletion;
- Use secondary and recycled materials;
- Consider opportunities to maximise on-site re-use of materials;
- Employ waste reduction methods to minimise construction and maintenance waste;
- Reduce the amount of waste disposed of at landfill.
- Land
- Brownfield/Greenfield hierarchy of land use;
- Minimise and seek to reclaim derelict and contaminated land whilst taking into account any biodiversity interests;
- Protect farmland and soils.
- Water
- Improve the quality of ground and surface water;
- Improve the biological and chemical quality of rivers;
- Make use of vegetated drainage systems and 'Sustainable Urban Drainage Systems';
- Minimise the risk and impact of flooding by controlling surface water management and floodplain management;
- Prevent inappropriate development in floodplains;
- Prepare for impacts of climate change, including sea level rise, coastal squeeze and coastal erosion.
- Biodiversity
- Contribute to the delivery of local and national Biodiversity Action Plans;
- Protect and enhance endangered species, habitats and geodiversity, including sites of geological importance;
- Protect and enhance existing wildlife and provide opportunities for new habitat creation
- Increase tree cover and ensure the sustainable management of existing woodland;
- Protect, maintain and where possible enhance natural habitat networks and green infrastructure, to avoid fragmentation and isolation of networks;
- Protect and enhance designated nature conservation sites of international importance (SPA/SAC) and national importance (SSSI);
- Promote access and understanding of nature and biodiversity.
- Landscape
- Protect and enhance landscape and townscape character and local distinctiveness;
- Heritage
- Help to conserve historic buildings through sympathetic design;
- Conserve, protect and enhance designated and non-designated historic assets;
- Improve access to buildings and landscapes of historic/cultural value;
- Use architectural design to enhance the local character and "sense of place" of development;
- Protect local distinctiveness.

Economic Themes
- Improve physical accessibility of jobs through the location of employment sites and transport links close to areas of high unemployment.
- Widen the number and range of accessible employment opportunities.
- Improve rail and road journey reliability for business users.
- Support local businesses.

Social Themes (Health, Equalities and Community Safety)
- Safety
- Promote design that discourages crime and fear of crime e.g. by reducing hiding places or escape routes;
- Address anti-social behaviour.
- Community services and amenities
- Provide or improve access to local health and social care services;

- Provide or improve physical accessibility of education facilities and training opportunities;
- Provide information and advice to the community on the transport services and initiative available;
- Reduce light pollution;
- Reduce noise pollution and protect tranquillity;
- Minimise dust, odours, litter;
- Ensure the protection, maintenance, enhancement (including creation) of, and access to green spaces, and the wider multi-functional green infrastructure network including the wider countryside; and
- Improved public spaces.

Health

The derived key health-related themes are:

- Improve health in the UK and globally, taking account of the diverse factors influencing health, such as climate change, pollution, conflict, environmental degradation and poverty;
- Tackle poor health by improving the health of everyone, and of the worst off in particular;
- Reduce health inequalities among different groups in the community (e.g. young children, pregnant women, black and minority ethnic people; older people, people with disabilities; low income households);
- Support the public to make healthier and more informed choices with regard to their health and adopt physically active lifestyles;
- Address pockets of deprivation;
- Provide physical access for people with disabilities;
- Provide or improve access to local health and social care services;
- Provide opportunities for increased exercise, thus reducing obesity, particularly in children, and illnesses such as coronary heart disease;
- Provide for an ageing population;
- Promote healthy lifestyles through exercise, physically active travel and access to good quality and affordable food, which can assist in reducing both physical and mental illnesses.

Equality

The derived key equality-related themes are:

- Protect human rights (e.g. the right to liberty and security of person) and fundamental freedoms (e.g. a right to freedom of thought, conscience and religion, freedom of expression, etc);
- Prohibit discrimination, harassment and victimisation on such grounds as sex, race, language and religion;
- Promote equality of opportunity in the way services are planned, promoted and delivered;
- Treat everyone with dignity and respect;
- Recognise people's different needs, situations and goals and removes the barriers that limit what people can do and can be;
- Create sustainable communities which are active, inclusive, safe, fair, tolerant and cohesive;
- Create sustainable communities which are fair for everyone - including those in other communities, now and in the future;
- Improve economic, social and environmental conditions particularly in the most deprived areas;
- Ensure fair access to and distribution of resources across the community;
- Assess and address the impacts upon diverse communities including cultural, racial, economic, generational, social (including disabilities) and religious mixes;
- Create a sense of belonging and wellbeing for all members of the community;
- Provide physical access for people with disabilities;
- Minimise isolation for vulnerable people.

Community Safety

The derived data for community safety related themes are:

- Create communities which are safe, inclusive, fair, tolerant and cohesive;
- Maintain reductions in crime and anti-social behaviour; and
- Improve perceptions that the communities are safe places to work, live and visit.

6. Baseline Information

6.1. Introduction

The next task addresses the collection of an evidence base for the ISA. The SEA Directive states that the Environmental Report should provide information on:

> "relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan" and the "environmental characteristics of the areas likely to be significantly affected" (Annex I (b) (c))

and

> "any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC (Birds Directive) and 92/43/EEC (Habitats Directive)" (Annex I (c)).

To accurately predict how STP proposals will affect the environmental characteristics, it is important to understand the current state of the environment and then examine the likely evolution of the environment without the implementation of the plan. In this report the current state regarding wider sustainability, rather than just environment, has been characterised.

6.2. Methodology

Existing baseline information provides the basis for the prediction and monitoring of the effects of the implementation of the STP and helps identify sustainability problems and alternative ways of dealing with them.

Due to the fact that ISA is an iterative process, subsequent stages in its preparation and assessment might identify other issues and priorities that require the sourcing of additional data and/or information and identification of monitoring strategies. This makes the ISA process flexible, adaptable and responsive to changes in the baseline conditions and enables trends to be analysed over time.

The most efficient way to collate relevant baseline data is through the use of indicators whenever possible (see below). This ensures that the data collation is both focused and effective. The identification of relevant indicators has taken place alongside the review of other relevant legislation, plans, policies and programmes (Section 5 and Appendix B), the identification of sustainability issues (Section 7) and developing the ISA framework (Section 8).

6.3. Data Analysis

Data has been collated and analysed for the following topics (as detailed in Appendices C and D):

6.3.1. Environmental Data

- CO_2 emissions
- Climate change
- Local air quality
- Noise
- Light pollution
- Biodiversity, fauna and flora
- Landscape and townscape
- National Character Areas
- Heritage assets
- Green space
- Soil

- Water quality
- Flooding

6.3.2.   Economic Data

- Employment
- Long term trends in GVA
- Long term trends in population
- Economic sectors, including those related to rural output
- Performance gap and sub-regional performance
- Overview of each LEP as noted in NPIER
- Identification of economic centres

6.3.3.   Social Data (including Health, Equalities and Community Safety)

- Population and diversity
- General health statistics
- Accessibility
- Road safety and accidents
- Physical activity in children and adults
- Equality target groups
- Multiple deprivation

The baseline data provides an overview of the sustainability characteristics of the STP area and how these compare within the region and to the UK as a whole. This overview is presented in Appendices C and D.

This scoping baseline data was updated as part of the detailed assessment process, with a view to identifying likely future trends and sensitivity to change against the ISA objectives using a simple three-point normative scale as follows:

- Current Conditions - Good / Moderate / Poor
- Sensitivity to change - High / Medium / Low
- Current Trends - Improving / Stable / Declining
- Information Quality - High / Medium / Low

Sensitivity to change in the context of ISA represents the extent to which, for instance, ecological thresholds may be close to being breached or carrying capacity exceeded, such that relatively small changes might be likely to induce disproportionately large effects, which in some instances might have wide-ranging and/or unexpected consequences. An example might be the decline of a particular wildlife population below the level at which it is viable in a particular habitat.

The quality of the information base gives an indication of the certainty with which the other three parameters are known, and this is presented using a similar colour-coded three-point scale (high/medium/low).

The baseline data has been prepared by cross checking the indicators in the baseline against the ISA objectives, analysing the data for each indicator, and drawing together this analysis in summary form using the scoring method described above together with a concise commentary on key baseline features. The likely future trends without the implementation of the Plan have been used to inform the assessment of the Plan in the next stages of the ISA.

TfN, within the STP, in describing the 'Business as Usual' scenario have assumed the future will be like the past, reflecting both historical experience and substantial levels of previous policy intervention and investment, as well as expected UK trends. It is to be noted that this is distinct from a 'Do-Nothing' Scenario.

Note that the future projected baselines depicted below incorporate all known committed developments and plans which are outside the control of TfN – in effect a 'Business as Usual' scenario. As noted that the baseline information contained within the ISA Scoping Report formed the starting point for this exercise, but account has now been taken of additional sources e.g. research on predicted trends in car fleet changes to inform the development of the future baseline.

The analysis of the baseline data has highlighted a number of key issues in the north of England. These, together with implications and opportunities arising for the STP have been summarised in Section 7.

6.4. Campaign for Better Transport

Transport for the North have commissioned the Campaign for Better Transport (CfBT) to facilitate participation by Non-Governmental Organisations (NGOs) and voluntary sector groups with an interest in the environment and sustainable transport in contributing to the emerging STP.

CfBT have undertaken an extensive round of consultation with a wide range of stakeholders to set out key issues, along-side challenges and opportunities to the STP.

The key issues, challenges and opportunities identified as part of the CfBT process have been noted and considered as part of the assessment. Please see Appendix A-3 for further details of the results of the CfBT consultation.

6.5. Data Limitations

The purpose and use of indicators is to provide quantified, objective information in order to show how things change over time. However, they do not explain why particular trends are occurring and the secondary, or knock-on, effects of any changes.

It is believed that the data sets available provide a comprehensive overview of the sustainability situation across the north of England.

7. Key Sustainability Issues

The SEA Directive states that the Environmental Report should provide information on:

> *"Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC" (Annex I(d))*

This table provides a discussion on the implications/opportunities of such issues to the STP and provides a clear link to the proposed ISA Objectives. The analysis of sustainability issues has influenced the development of the ISA Framework (see Section 8), in particular in formulating assessment aid questions.

It should be noted that, because HIA and EqIA are also being undertaken, the approach involved the identification of generic HIA and EqIA key sustainability issues, implications and opportunities and objectives in Table 7-1 under the Social dimension of sustainability. These have been further developed to ensure a more in-depth level of coverage of issues to satisfy specific HIA and EqIA requirements leading to the development of HIA and EqIA sub-objectives.

Table 7-1   Key Sustainability Issues and implications / opportunities for the STP

Key Sustainability Issue	Implications / Opportunities for the STP	ISA Objective
Carbon Emissions and Climate Change Mitigation • Climate change is happening – caused in part due to transport emissions e.g. road transport accounts for one quarter of UK greenhouse gas emissions • UK is predicted to get hotter and drier in summer, warmer and wetter winters and increased storms and sea level rise • The increasing take up of electric vehicles and other initiatives are helping to lower emissions but fossil fuels will be required for some time	• The Plan should seek to reduce emissions as a core element • The Plan should ensure new schemes maximise opportunities to absorb carbon dioxide and other greenhouse gases	Reduce greenhouse gas emissions from transport overall, with particular emphasis on road transport
Biodiversity, Flora and Fauna • Decline of biodiversity is a major issue across the UK. • Particular conservation issues are with species that require specific habitats • The Plan area has many sites designated for nature conservation – Ramsar sites, SACs, SPAs, SSSIs and many other local sites. • Many designated sites across the UK are in worse condition than they should be – 57% of SSSI are in favourable condition, 37% of SACs, 86% of Ramsar sites and 73% of SPAs. • Transport schemes can impact designated sites and habitat directly e.g. through requirement for land and severance of sites, or indirectly e.g. through air pollution and climate change. • Transport schemes need not be negative – many offer opportunities for enhancement of biodiversity	• Need to protect all sites of biodiversity importance – especially sites which are recognised to be important and have therefore been designated • Transport schemes should be designed to avoid important areas of habitat • Opportunities for protection of biodiversity and new habitat creation and enhancement should be explored during planning and design	Protect and enhance biodiversity, geodiversity and the green infrastructure network Conserve and enhance the International Sites (HRA specific objective)
Air Quality • Air quality has improved across the UK over the last 60 years. • Air quality problems remain a significant issue due to vehicles – particular issues downwind of urban areas and adjacent to major transport routes • Poor air quality has implications for public health and biodiversity • Air Quality Management Areas introduced to tackle the issue – Plan area has 133, mostly in urban centres and near major roads	• The Plan should have as a fundamental priority consider the need to protect and enhance air quality – this will help protect public health and biodiversity • This will also help meet Government targets	Protect and enhance air quality
Flooding and Adaptation to Climate Change • The risk of flooding is a major issue across the UK, including the Plan area. • Flood Risk and Management Plans are in place to address flood risk and reduce the likelihood of flooding • Flood risk remains a significant planning issue to the development of major infrastructure • Climate change will increase the risk of flooding • Climate change will also bring other risks to transport infrastructure e.g. from sea level rise or from direct impacts such as rails buckling in hotter temperatures	• The Plan should ensure transport infrastructure avoids areas of highest flood risk and protect the floodplains • Flood risk and management of flooding should be included in any design • The Plan should recognise the challenges of a changing climate	Increase resilience of the transport network to extreme weather events and a changing climate

Key Sustainability Issue	Implications / Opportunities for the STP	ISA Objective
Water • There are many considerable pressures on the water environment in terms of pollution and management across the UK • Pressures can be experienced by surface waters such as rivers, lakes and coastal waters, as well as groundwater • Pollution from transport schemes is recognised as one of the major pressures e.g. through polluted runoff from roads	• The Plan should seek to prevent pollution of all water bodies • Recognition should be made of other plans and their requirements e.g. those developed under the Water Framework Directive	Protect and enhance the inland and coastal water environment
Land Use and Soil • There are a mix of land use types across the Plan area – heavily urbanised, suburban, urban fringe and rural. • New transport schemes may utilise existing infrastructure, or may need to use new areas not previously utilised. • Any new areas are likely to affect areas of soil and agriculture • Many areas within the Plan area will have been contaminated by past industrial and other human activities • Transport infrastructure is also a frequent source of contamination	• The Plan should seek to use areas that are already urbanised and prioritise brownfield land • When agricultural areas are used, the Plan should aim to avoid areas of highest quality and protect soils • All opportunities to address past industrial legacy should be taken	Protect and conserve soil and seek to remediate / avoid land contamination
Cultural Heritage • The Plan area has many cultural heritage assets which span the full range of human settlement – including those of World Heritage interest • Transport schemes if inadequately designed or poorly located can affect these sites directly or through their settings	• The Plan should aim to protect and preserve designated and non-designated cultural heritage features and their settings • Opportunities to enhance access to cultural sites or showcase historic transport related assets should be taken	Conserve and enhance the quality and distinctiveness of historic assets, industrial and cultural heritage and their settings
Landscape and Townscape • The Plan area has many different landscapes – including five areas of significant value which have been designated as National Parks • Landscape has changed over the years due to urbanisation (including transport infrastructure), changes to farming practices etc.	• The Plan should seek to ensure that transport schemes avoid sensitive areas and respect landscapes and townscapes. • The Plan should take opportunities for landscape and townscape enhancement	Protect and enhance the character and quality of landscapes and townscapes
Waste and Resources • Transport requires the use of a lot of resources such as fuel, construction materials, etc. – transport is the largest energy consuming sector in the UK • Transport construction also generates large amounts of waste	• The Plan should seek to reduce consumption of energy / fuel • The Plan should seek to reduce consumption of materials and therefore waste	Promote the prudent use of natural resources, minimise the production of waste and support re-use and recycling
Transport • There are areas of the northern region's transport network that are stretched beyond capacity at peak times • There is increasing congestion on roads across the Plan area due to commuting, freight transportation from ports etc. • There is a need for investment in transport infrastructure – particularly east / west links	• The Plan should minimise dependence on the private car • The Plan should increase travel by train into and between cities • Freight movements to be encouraged away from road network • Integrated transport infrastructure (including ticketing) should be encouraged	Enhance lower carbon, affordable transport choice

Key Sustainability Issue	Implications / Opportunities for the STP	ISA Objective
• There is a requirement to address the need to travel and facilitate a shift toward lower impact and more sustainable modes of transport. Rail travel is one area of particular suitability	• The Plan should create infrastructure to encourage people to switch to low emission vehicles	
Economic growth and productivity • The Plan area represents a significant portion of the UK's economic output (one fifth and around £290 bn GVA) but it could be larger – GVA per capita as well as employment growth and labour productivity have been lagging behind the rest of England for the last 30 years. • A key barrier is transport connectivity which is constrained by the transport infrastructure available – congested roads and an underdeveloped rail network. • In a global economy, high levels of international connectivity are crucial, but increased demand on roads to ports and airports is making it harder to access export markets.	• The Plan should improve strategic regional, national and international connectivity • Sustainable and affordable strategic road and rail improvements are of particular importance • More efficient transport links • The Plan should seek to reduce road congestion • The Plan should seek to limit rising costs associated with travel • High quality green and blue infrastructure can play an important role in attracting investment • The Plan should contribute to much needed improvements in GVA per capita, growth in employment and labour productivity	Enhance long term economic prosperity and promote economic transformation
Patterns of Land Use • A more accessible and efficient transport system requires compact and mixed-use urban development, focussed in and around existing town centres and regional centres	• The Plan should support a co-ordinated approach to land use and transport planning across the region and prioritise investment in this regard	Coordinate land use and strategic transport planning across the region
Human Health • Health and inequalities exist in many communities – with health outcomes varying significantly between different areas • Participation in Healthy activities such as walking and cycling also varies across the Plan area • Air pollution affects different communities and people within these communities to different levels • Noise levels are increasing in the UK • Road traffic is a dominant source of noise	• The Plan should seek to provide accessible and affordable transport • Indirectly health could be improved through policies to reduce air and noise pollution • Physical activity levels could be improved by improving walking and cycling facilities • Improving access to and provision of greenspace and improving the physical environment may also encourage physical activity	Improve health and well-being for all citizens and reduce inequalities in health (HIA specific objective)
Equalities • The population profiles tend to reflect that of England as a whole, but with notable differences between areas and between issues such as ethnicity and religion • The needs, behaviour and barriers people face differ between age groups. These groups can also be impacted differently by different transport interventions	• The Plan should aim for all citizens opportunity to access transport and related services that come with this • Focus should be on children and older people	Promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society (EqIA specific objective)
Community Safety • Crime is an important feature of deprivation that has major effects on individuals and communities • Crime levels vary across the Plan area	• The Plan should consider schemes that engender a sense of safety and reduce crime and fear of crime through indirect measures • Interventions that discourage incidences of anti-social behaviour and opportunistic crime should be promoted	Promote community safety and reduce crime and fear of crime for all citizens (CSA specific objective)

Key Sustainability Issue	Implications / Opportunities for the STP	ISA Objective
• Accident rates also vary across the region, but it is noted that fatal accidents are above the national average		

8. ISA Framework

8.1. Introduction

The assessment framework is a key component in completing the ISA by synthesising the baseline information and sustainability issues into a systematic and easily understood tool that allows the prediction and assessment of effects arising from implementation of the STP.

8.2. ISA Objectives and assessment aid questions

Defining ISA Objectives before the STP is written gives an early indication of the sustainability issues that will require particular attention in the STP making process.

The ISA objectives (and HIA, EqIA and CSA sub-objectives) have been worded so that they reflect one single desired direction of change for the theme concerned and do not overlap with other objectives. They include both externally imposed sustainability objectives and other objectives have been devised specifically in relation to the context of the STP being prepared.

In addition, assessment aid questions have been identified to substantiate the proposed ISA Objectives and HIA and EqIA sub-objectives. The assessment aid questions provide a clarification of the intended interpretation of each objective to support direction of change sought through the implementation of STP. These questions guided the assessment process reported in Sections 9, 10 and 11.

The ISA objectives, together with the assessment aid questions make up the ISA Framework that has been used in the assessments of the STP. The ISA Framework is presented in Table 8-2, with Tables 8-2 and 8-3 and 8-4 showing the proposed EqIA, HIA and CSA sub-objectives and assessment aid questions, respectively.

Table 8-1   ISA Framework and of objectives and assessment aid questions

No.	ISA Objective	Decision making questions	ISA Topics
1	Reduce greenhouse gas emissions from transport overall, with particular emphasis on road transport	*Will the Strategic Transport Plan…* • Encourage a greater proportion of passenger and freight movement by lower carbon modes? • Encourage greater carbon efficiency in the movement of goods and people? • Encourage use of innovative new low carbon transport technologies? • Encourage use of the transport estate for low carbon energy generation? • Encourage the protection and enhancement of carbon sinks in the transport estate? Will it support the creation of carbon sinks?	Climatic factors
2	Protect and enhance biodiversity, geodiversity and the green infrastructure network	*Will the Strategic Transport Plan…* • Lead to the direct physical loss of wildlife and habitats? • Prevent damage to / destruction of / disturbance of sites designated for nature conservation and or geodiversity? • Affect greenfield and/or brownfield land which has significant biodiversity or geological interest of recognised local importance? • Support the protection and enhancement of green infrastructure and avoid severance of habitats links / promote or provide wildlife corridors and cohesive habitat networks? • Support new habitat creation and enhancement? • Promote good design to secure biodiversity / green infrastructure benefits?	Biodiversity
3	Conserve and enhance the international sites (HRA specific objective)	*Will the Strategic Transport Plan…* • Affect international sites designated for nature conservation identified as part of the HRA screening process (including positive and negative effects)?	Biodiversity
4	Protect and enhance air quality	*Will the Strategic Transport Plan…* • Support the minimisation of emissions of air pollutants and enhancement of air quality	Air quality; human health; biodiversity
5	Increase resilience of the transport network to extreme weather events and a changing climate	*Will the Strategic Transport Plan…* • Promote an increase in the resilience of the transport network to extreme weather events and subsequent consequences such as flooding, including through natural flood risk management? • Encourage design for successful adaptation (including through green and blue infrastructure) to the predicted changes in weather conditions and frequency of extreme events (freezing, heat waves, intense storms), from a changing climate?	Climatic factors; material assets

No.	ISA Objective	Decision making questions	ISA Topics
		• Support the minimisation of the risk of flooding by avoiding areas of flood risk / flood plains where possible? • Promote appropriate compensatory measures are in place where transport schemes require a land take from the floodplain?	
6	Protect and enhance the inland and coastal water environment	*Will the Strategic Transport Plan…* • Support the protection of the quality of inland and coastal surface water and groundwater resources? • Promote the minimisation of the use of impermeable hard surfacing and promote the use of SuDS? • Provide opportunities to improve Green / blue infrastructure? • Provide opportunities to improve water body status?	Water; biodiversity
7	Protect and conserve soil and remediate / avoid land contamination	*Will the Strategic Transport Plan…* • Maximise construction on previously developed land / minimise use of greenfield? • Prevent permanent (irreversible) loss of the most highly productive agricultural soils? • Prevent impact to agricultural holdings through contamination or severance? • Support protection of soil resources during any infrastructure construction activities? • Lead to the remediation of contaminated land?	Land use; soils
8	Support the conservation and enhancement of the quality and distinctiveness of historic assets, industrial and cultural heritage and their settings	*Will the Strategic Transport Plan…* • Support the conservation, protection and enhancement of the region's cultural and designated / non-designated historic assets (e.g. locally important buildings, archaeological remains, World Heritage Sites, Scheduled Monuments, Listed Buildings and structures, registered Parks and Gardens, Registered Battlefields and Conservation Areas), their integrity and their settings? • Improve access to historic / culturally important sites by sustainable transport modes? • Appropriately manage elements of the transport infrastructure which are designated heritage assets? • Aid the appropriate management of any relevant Heritage at Risk to help remove it from the HAR register?	Cultural heritage; landscape
9	Protect and enhance the character and quality of landscapes and townscapes	*Will the Strategic Transport Plan…* • Encourage design, construction, repair and maintenance of transport infrastructure (and associated green / blue infrastructure) that respects and enhances the landscape character and townscapes of the north of England?	Landscape; cultural heritage

No.	ISA Objective	Decision making questions	ISA Topics
		• Promote the conservation, protection and enhancement of the natural environmental assets (e.g. National Parks, AONBs, parks and green spaces, common land, woodland / forests, etc.) of the north of England? • Consider avoidance of sensitive areas and respect of the integrity and setting of landscapes / townscapes? • Support the protection of 'tranquil' areas (e.g. areas free from visual intrusion, noise, light pollution etc)? • Promote the protection and enhancement of locally important buildings and townscapes, maintaining and strengthening local distinctiveness and a sense of place?	
10	Promote the prudent use of natural resources, minimise the production of waste and support re-use and recycling	*Will the Strategic Transport Plan…* • Help to enable new / upgraded infrastructure to be resource efficient (materials, energy, water, sustainable procurement etc) in construction and operation? • Promote sustainable waste management practices? • Encourage the use of recycled or secondary materials? • Promote the use of local suppliers and locally produced materials in construction? • Seek to reduce fuel use by encouraging the use of more sustainable modes of transport?	Material assets
11	Enhance lower carbon, affordable transport choice	*Will the Strategic Transport Plan…* • Support the minimisation of dependence upon the private car? • Promote a shift to rail travel into and between city centres? • Promote the transportation of freight by waterways and rail? • Enhance public transport availability, convenience, accessibility and affordability? • Promote a wider choice of passenger travel through quality integrated facilities and services, walking and cycling improvements, demand management, network management, travel planning and intelligent transport systems? • Consider the specific transport needs of rural communities? • Contribute to the creation of infrastructure to encourage people to switch to low emission vehicles?	Material assets; air quality; climatic factors
12	Enhance long term economic prosperity and promote economic transformation	*Will the Strategic Transport Plan…* • Ensure better connections (passengers and freight) between the North's cities, with other regions and internationally? • Improve the capacity and resilience of the North's strategic road and rail networks? • Improve overall journey times (passengers and freight), travel convenience and reliability?	Economic

No.	ISA Objective	Decision making questions	ISA Topics
		• Consider local requirements to guide investments to connect to regional and national networks? • Contribute to establishing an effective transport network that increases investment? • Support improved availability and accessibility to good quality employment opportunities, particularly in high unemployment areas? • Support economic activities in rural areas? • Help reduce the GVA per capita gap between the Northern economy and the rest of England? • Help improve labour productivity across the region? • Help improve employment rates across the region?	
13	Coordinate land use and strategic transport planning across the region	*Will the Strategic Transport Plan…* • Support the development of compact, higher density mixed use development coordinated with transport infrastructure? • Support housing and employment development in areas that are or will be served by rail transport?	Economic
14	Promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society *(EqIA specific objective)*	*Will the Strategic Transport Plan…* • Promote greater equality of opportunity to the varying age groups of residents (the older population and younger travellers), disabled people, different nationalities and ethnic groups, different religious groups, low income and unemployed people, different sex and sexual orientation groups?	Equality
15	Improve health and well-being for all citizens and reduce inequalities in health *(HIA specific objective)*	*Will the Strategic Transport Plan…* • Promote the health and well-being of vulnerable groups (children and adolescents; older people; disabled people and people with other health problems; low-income groups and communities with high level of deprivation; cyclists, pedestrians, commuters by public transport, drivers) and of the wider population (residents, workers, commuters, tourists and visitors)? • Support increasing travel by active or recreational (e.g. equestrian) modes through integration and interchange with the strategic transport networks? • Avoid impacts on quality and extent of existing recreational assets, such as formal and informal paths, including National Trails?	Human health
16	Promote community safety and reduce crime and fear of crime for	*Will the Strategic Transport Plan…*	Community safety

No.	ISA Objective	Decision making questions	ISA Topics
	all citizens *(CSA specific objective)*	• Support the provision of initiatives that enhance safety and therefore reduce the number of accidents, particularly for vulnerable users– children, older people, disabled people, and those in deprived areas? • Promote the application of 'Secured by Design' in transport development schemes? • Contribute to improvements of public realm and levels of natural surveillance to create a more welcoming environment for travel, physical activity, and accessing key facilities? • Encourage improvements in personal security on public transport and at its facilities to improve accessibility to key facilities?	

Table 8-2   EqIA Sub-Objectives

No.	EqIA Objective	EqIA Sub-Objective	Decision making questions	ISA Topics
1	Promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society	Improve accessibility to services, facilities and amenities for all	*Will the Strategic Transport Plan…* • Improve access to essential facilities, including employment, healthcare and education, particularly for those in the most deprived areas (e.g. in the 20% most deprived areas nationally), older and disabled people? • Improve public realm and overall environment in the most deprived areas (20% most deprived nationally)? • Improve walking, cycling and public transport measures in the most deprived areas (20% most deprived nationally)? • Support provision of transport services/ initiatives that are accessible for all, including those with a physical or learning disability and those with limited mobility? (this includes physical access to services and provision of accessible information on transport service) • Support provision of transport services that are welcoming for all groups of society to increase availability of travel options? • Encourage initiatives that improve perceptions of transport, and therefore increase range of travel options available? • Take due regard of requirements for travel by disabled and mobility impaired people?	Equality
		Improve affordability of transport	*Will the Strategic Transport Plan…* • Support provision of transport services that are financially accessible for all, specifically those in the most income deprived areas nationally or those on limited incomes? • Support provision of transport services or initiatives that improve the affordability of travel options in the area, specifically the most deprived areas and vulnerable users?	Equality

No.	EqIA Objective	EqIA Sub-Objective	Decision making questions	ISA Topics
			• Support provision of transport services that provide appropriate and/or statutory fare structures for vulnerable users (i.e. concessionary fares on public transport services)? • Promote use of technology to reduce transport costs for users, e.g. integrated ticketing and smart cards?	
		Improve road safety and reduce the number of accidents and other incidents	*Will the Strategic Transport Plan…* • Encourage initiatives that enhance road safety and therefore reduce the number of accidents, particularly for vulnerable users– children, older people, disabled people, and those in deprived areas?	Equality
		Reduce severance	*Will the Strategic Transport Plan…* • Support better access to essential facilities to reduce any existing severance issues? • Improve accessibility between communities? • Improve access to information for all users to promote travel options available for all? • Consider the physical and perceived impact of the transport system on the local environment (particularly for the most vulnerable population in terms of severance - including older children and disabled people)?	Equality
		Reduce environmental impacts of transport – air and noise pollution	*Will the Strategic Transport Plan…* • Improve impact of transport on the local environment to create more welcoming areas for travel? • Provide transport options that improve / do not worsen air and noise pollution levels, particularly for the most vulnerable groups such as deprived residents and children (as air quality and noise impacts are known to adversely impact learning ability of children in extreme cases)? • Reduce traffic levels and congestion and promote more sustainable transport patterns across the area, particularly focusing on areas with low air quality (e.g. AQMAs)? • Promote sustainable travel to reduce the environmental impact of transport for vulnerable groups?	Equality

Table 8-3   HIA Sub-Objectives

No.	HIA Objective	HIA Sub-Objective	Decision making questions	ISA Topics
1	Improve health and well-being for all citizens and reduce inequalities in health (HIA specific objective)	Improve accessibility to services, facilities and amenities for all	*Will the Strategic Transport Plan…* • Provide support for ensuring that (new and existing) developments are accessible (particularly on foot, by cycling or public transport) to health services, particularly for the most vulnerable groups? • Promote and enable measures to help all residents to adopt healthy lifestyles (e.g. active travel through walking and cycling)? • Promote accessibility (particularly on foot or by cycling or public transport) to open space, nature and recreational activities (e.g. playing fields, sports facilities, footpaths, National Trails etc), particularly for vulnerable groups? • Encourage the protection and enhancement of green infrastructure, a network of linked, multifunctional green spaces in and around the area's towns and cities, thus creating new or improved public green space? • Provide overall accessibility improvements that improve the quality of life of users and therefore benefits health of residents?	Health
		Improve affordability of transport	*Will the Strategic Transport Plan…* • Support the provision of affordable transport options to ensure accessibility to vital health services? • Support the provision of affordable transport options to ensure accessibility to key facilities such as open spaces, employment locations etc.? • Promote use of technology to reduce transport costs for users, e.g. integrated ticketing and smart cards? • Support the provision of transport services that provide appropriate and/or statutory fare structures (e.g. concessionary fares on public transport services) to ensure the most vulnerable groups in terms of health (children, older), can afford to use transport options to access healthcare facilities?	Health
		Improve road safety and reduce the number of accidents and other incidents	*Will the Strategic Transport Plan…* • Encourage provision of safe facilities for walking and cycling? • Support the reduction of the total killed and seriously injured in traffic accidents, particularly for vulnerable users in terms of accidents - children, young males, older people and those from deprived areas? • Support the reduction of the total slight casualties? • Support improvements to the safety of vulnerable road users such as pedestrians, motorcyclists and cyclists? • Support reduction in collisions involving wildlife?	Health

No.	HIA Objective	HIA Sub-Objective	Decision making questions	ISA Topics
		Reduce severance	*Will the Strategic Transport Plan…* • Improve access to essential facilities such as healthcare services to reduce any existing severance issues? • Improve accessibility between communities? • Consider the physical and perceived impact of the transport system on the local environment (particularly for the most vulnerable population in terms of severance and health - including older and disabled people)?	Health
		Reduce environmental impacts of transport - vibration and air, noise and light pollution	*Will the Strategic Transport Plan…* • Support the reduction of the transport impact on air quality and noise, particularly around vulnerable users such as children, older people and deprived areas? • Promote practices, equipment and materials which reduce vibration and air, noise and light pollution to assist in improving health levels?	Health

Table 8-4   CSA Sub-Objectives

No.	CSA Sub-Objective	CSA Sub-Objective	Decision making questions	ISA Topics
1	Promote community safety and reduce crime and fear of crime for all citizens	Improve road safety and reduce the number of accidents and other incidents	*Will the Strategic Transport Plan…* • Provide initiatives that enhance road safety and therefore reduce the number of accidents, particularly for vulnerable users– children, older people, disabled people, and those in deprived areas?	Community Safety
		Improve actual and perceived safety and security issues	*Will the Strategic Transport Plan…* • Promote the application of 'Secured by Design' in transport development schemes? • Contribute to improvements of public realm and levels of natural surveillance to create a more welcoming environment for travel, physical activity, and accessing key facilities? • Support improved personal security on public transport and at its facilities to improve accessibility to key facilities?	Community Safety

9. Compatibility between STP Objectives and ISA Objectives

9.1. Introduction

To help ensure that the Objectives of the STP are as closely aligned with the ISA Objectives as possible, a test of their compatibility has been undertaken. This test helps identify potential synergies and inconsistencies and helps refine the STP Objectives as well as identifying strategic alternatives.

The draft STP Objectives that were considered at the early stages of development (March 2017) of the STP were as follows:

1. Transform 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

The 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)

9.2. Initial Assessment of Draft STP Objectives (March 2017)

The compatibility assessment of the STP Objectives completed in March 2017 showed that while there were a number of 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. This was found to be particularly pronounced for the environmental ISA Objectives (Objectives 1 to 11) and STP Objectives 1 and 3. In relation to the International sites (HRA specific) ISA Objective, no specific mention was made of these types of site within the STP and there was general uncertainty across all the STP Objectives. Due to the sensitivities of these sites, it was suggested that more consideration was required of these before any determination of broad compatibility could be made. A small number of areas of potential conflict were also identified relating to the Equality, Health and Community Safety ISA objectives.

It was also the case during the initial Compatibility Assessment that at that time the Prime Objective of the STP was to 'Transform Economic Performance', with the other STP Objectives acting to support this objective. An overview of the findings of the initial Compatibility Assessment is shown in Appendix A below.

It was therefore recommended that there were three 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. The three broad areas for identified for improvement were:

1. More commentary on sustainability within the objectives and supporting commentary;
2. Within the objectives, greater acknowledgement and more discussion on the key sustainability issues of GHG emissions, air quality and protection of the natural and built environment; and
3. Greater clarity on the geographical focus of the STP investment plans, in particular in relation to prioritisation of support for economic transformation.

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.

9.3.   Assessment of Updated STP (October 2017)

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. It is also important to note that the updated STP Objectives now all carry the same weight – i.e. Transforming Economic Performance is no longer the prime objective of the STP.

The revised draft STP Objectives, assessed against the ISA Objectives in October 2017, are set out below:

Transform economic performance
This objective aims to secure investment in transport between economic centres and assets to support transformation of the North's economic performance. This objective focuses on addressing the challenges identified in the NPIER and securing investment in transport interventions that improve productivity across the North and delivers agglomeration benefits between the North's important economic centres and assets, both rural and urban.

The STP will:

- Clearly articulate, prioritise and sequence strategic transport investment between important economic centres and assets, to our important ports and airports, to support the transformation of economic performance across the North; and
- Ensure TfN's long term Investment Programme aligns with and complements the development and delivery of local transport, development and economic plans and policies.

Promote and support the built and natural environment
This objective will ensure that transport interventions across the strategic transport system protect and enhance the natural and built environment, ensuring that the north's strategic transport system is as sustainable as possible. It covers a range of issues, including the need to provide sustainable travel choices for the movement of people and goods across the North; reducing emissions from transport; making best use of our existing transport infrastructure before investing in new capacity; and ensuring that new infrastructure is designed to minimise the negative impacts on both the natural and built environment.

The STP will:

- Promote measures that improve sustainable travel options and make best use of the North's existing strategic transport networks
- Promote and support the use of solutions that reduce emissions across the strategic road and rail networks

- Ensure that environmental and sustainability impacts are a key consideration in option selection for new strategic transport infrastructure interventions; and
- Ensure that improvements to the strategic transport network align with local environmental objectives.

Improve opportunities across the North

This objective will ensure that the STP improves access to opportunities for all across the North. Ultimately transport is a means to an end. To ensure that economic growth in the North is as inclusive as possible, investment in the strategic transport network should enable better access to key opportunities, including employment, healthcare, social activities and education, for all, regardless of their age, income-level and mobility. This will require a carefully co-ordinated approach to ensure that strategic and local transport investment programmes and policies are aligned and complimentary.

The STP will:

- Ensure that improvements to our strategic transport networks support the inclusive growth and provide affordable access to key opportunities across the North, aligning strategic proposals carefully with local aspirations.

Increase efficiency, reliability and resilience on the transport system

This objective aims to improve the performance of the North's strategic transport network by making the case for interventions that improve its efficiency, reliability and resilience. This will ensure that the North's strategic transport networks meet the needs of its users, whether they are residents, businesses or visitors. The management of these networks will need to be able to adapt to changing demands over the period to 2050, such as shifting commuter patterns, changing leisure aspirations, more extreme weather conditions as a result of climate change and the emergence of new disruptive technologies, such as connected and autonomous vehicles. TfN will also identify opportunities to improve travel choices for the movement of both people and freight, to boost the resilience and sustainability of our pan-Northern networks, with a particular focus on making more sustainable travel options as attractive as possible. TfN will also promote measures that help to make the best of our existing networks, exploring new technologies and demand management tools that help to maximise network efficiency.

The STP will:

- Promote measures that will make the best use of the North's existing strategic transport networks and improve their performance, including through the use of best practice measures or new innovations;
- Improve travel choices and user experience for the movement of people and goods across the North; and
- Ensure that improvements to the performance of strategic transport networks are developed in a co-ordinated and integrated way with local networks.

9.4.   Assessment (Oct 2017) Findings

A key consideration in the assessment of the updated STP was that it now is the case that all the STP Objectives carry the same weight, with no objective prioritised over any other. This represented a fundamental improvement in terms of potential sustainability performance, as it meant that the objective to 'Promote and support the built and natural environment' now carries as much weight and is considered as important as the objective to 'Transform economic performance'.

Overall, assessment of the updated STP indicated that there is a substantial degree of compatibility between the two sets of Objectives, with only a very small number of areas of potential conflict indicated.

There are still areas where there is some degree of uncertainty as to the compatibility of the Objectives. These areas offer the potential to be compatible dependent upon the implementation measures proposed through development of the STP Strategy Components and other elements of the plan.

The main areas of uncertainty identified in the assessment, as well as areas of potential conflict, relate to the STP Objective to 'Transform economic performance'. This is not entirely surprising as probable interventions arising from implementation of this objective have the potential for both negative and positive environmental

outcomes. This is reflected in the general areas of uncertainty of compatibility for ISA objectives relating to biodiversity, sites designated for nature conservation, resilience to a changing climate, the water environment, soil, contaminated land, areas of cultural and historic heritage, landscape, townscape and the use of natural resources. Compatibility is likely to depend upon the nature and location of potential interventions.

The assessment also identified a small number of areas under the Objective to 'Transform economic performance' which had potential for conflict with the ISA Objectives. These are noted as follows:

- ISA Objective 1: Reduce Greenhouse Gas emissions from transport overall, with particular emphasis on road transport. It was considered that there is potential for conflict as it is the aim of this STP Objective to result in greater transportation facilities, which would likely facilitate more movement by fossil fuelled vehicles. This could result in greater GHG emissions, at least in the short term.
- ISA Objective 4: Protect and enhance air quality. As with the GHG emissions ISA Objective, it is considered that there is potential for conflict as it is the aim of this STP Objective to result in greater transportation facilities, which would likely facilitate more movement by fossil fuelled vehicles. This could result in poorer local air quality, at least in the short term.
- ISA Objective 11: Enhance lower carbon, affordable transport choice. As with the other noted objectives, it is considered that there is potential for conflict as it is the aim of this STP Objective to result in greater transportation facilities, which would likely facilitate more movement by fossil fuelled vehicles. This could result in constraints in relation to lower carbon transport choices, at least in the short term.

The updated STP now includes 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.

9.5.   Conclusion to the Compatibility Assessment

In conclusion, the results of the compatibility assessment indicate that the revised STP Objectives provide a firm underpinning to help ensure that the sustainability performance of the plan can be maximised.

10. Assessment of Alternatives

10.1. Introduction

In conducting the ISA, account has been taken of the SEA Directive requirement that the Environmental Report should consider:

> 'reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme' and 'give an outline of the reasons for selecting the alternatives dealt with' (Article 5.1 and Annex lh)'.

10.2. Defining the alternatives

Four alternative scenarios have been outlined in the STP and have been derived by TfN following examination of the high level economic growth forecasts as outlined in the Northern Powerhouse Independent Economic Review (NPIER). This review noted that a significant proportion of growth is focussed on major towns and cities, but there are opportunities to achieve transformational growth across all parts of the North.

This development of likely scenarios was also informed by a Northern Transport Demand Model developed by TfN, which estimates how changes in employment, population and the transport network affect travel patterns across the North. The model forecasts transport demand on the road and rail networks up to the year 2050 using different potential futures based on the findings of NPIER, as well as to predict demand for travel to and from other parts of the UK.

The approach was developed to explicitly capture the uncertainty surrounding future outcomes and uses a foresighting approach to define several future scenarios representing the potential variation in 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 considered more likely than another, but taken together they represent the likely range of outcomes in travel demand in the North.

Areas of uncertainty relating to the scenarios have been identified by TfN as being enabling policy and plans which will affect key transport drivers of housing, employment and the level of improvement achieved in travel conditions (journey times, etc.). Technological and socio-cultural change also represents uncertainty and relates to issues such as the cost of energy, capacity and usage of the road network and the decision to undertake activities face to face or digitally.

In order to assess the four alternative scenarios against the ISA Objectives, a series of ISA assumptions were developed. These assumptions were based on what are considered likely outcomes from each of the scenarios.

The four alternative scenarios and ISA assumptions are defined as follows:

Table 10-1   Alternative Scenarios

Scenario	ISA Assumptions
Scenario 1 – Compact and Digital	
• Urban areas are 'Compact', with brownfield development in the cores. • Local transport systems focus on serving radial movements. • Technological development has led to a preference for 'Digital'	• Compact urban cores lead to more emphasis on public transport in and between urban areas. • Higher energy costs have greater effect on road usage (lower) due to greater elasticity of road use pricing (fuel cost) compared to rail and other public transport. • Emphasis placed on rail between urban areas – both new rail lines and widened rail corridors / line upgrades required. • New stations and improvements to stations required. • Multi-modal interchanges required. • Some new roads and widened road corridors / junction improvements.

Scenario	ISA Assumptions
rather than physical connectivity. • Energy costs and therefore travel costs are high. • 192% Rail growth • 26% Road growth	• Greater uptake of digital connectivity and smart mobility technology (CAVs, smart ticketing, etc), compared to Scenario 2, leading to potentially more efficient road space use and less parking space. • Higher uptake of electric and hybrid road vehicles, compared to Scenario 2. • Opportunities for contamination remediation due to brownfield use. • Less overall land take due to more compact development. • Less greenfield land take. • Less need for motorised movement, and greater use of walking, cycling for shorter journeys. • More opportunities for co-location of housing and employment within compact urban areas. • Improved walking/cycling access to public transport, due to higher population within shorter distances to stations, hubs and stops. • More compact development generally higher density and more energy efficient (buildings as well as transport). • Greater digital connectivity reduces potential for road congestion in denser urban areas, as does greater walking/cycling.
Scenario 2 – Compact and Travel Friendly	
• Urban areas are 'Compact', with brownfield development in the Cores • Local transport systems focus on serving radial movements • Technological development has led to advances in 'Travel Friendly' connectivity options • Energy costs and therefore travel costs are low • 327% Rail growth • 52% Road growth	• Compact urban cores, together with greater 'travel friendly' connectivity, lead to more emphasis on public transport in and between urban areas. • Energy costs are low – therefore both road and rail are emphasised with new routes and route widening between urban areas. • Lower energy costs have greater effect on road usage (higher) due to greater elasticity of road use pricing (fuel cost) compared to rail and other public transport, with new road routes and route widening between urban areas. • New stations and improvements to stations required (more than Scenario 1). • Multi-modal interchanges required (more than Scenario 1). • Lower uptake of digital connectivity and smart mobility technology (CAVs, smart ticketing, etc), compared to Scenario 1, leading to potentially less efficient road space use and more parking space. • Lower uptake of electric and hybrid road vehicles, compared to Scenario 1. • Opportunities for contamination remediation due to more brownfield use. • Less overall land take due to more compact development, but greater than Scenario 1, due to greater transport facility provision. • Less greenfield land take, but likely greater than Scenario 1. • Less need for motorised movement, and greater use of walking, cycling for shorter journeys. • More opportunities for co-location of housing and employment within compact urban areas. • Improved walking/cycling access to public transport due to higher population within shorter distances to stations, hubs and stops, and greater public transport provision (compared to Scenario 1). • More compact development generally higher density and more energy efficient (buildings as well as transport). • Less digital connectivity and greater road usage may lead to greater potential for road congestion in denser urban areas.
Scenario 3 – Dispersed and Digital	
• Urban areas are 'Dispersed', with mixed greenfield and brownfield development	• Greater emphasis on road improvement in urban areas due to dispersed nature of development and need to allow easy cross-district movement. • Higher energy costs have greater effect on road usage (lower) due to greater elasticity of road use pricing (fuel cost) compared to rail and other public transport.

Scenario	ISA Assumptions
in the suburbs and urban fringes • Local transport systems provide for all types of cross district movement • Technological development has led to preference for 'Digital' rather than physical connectivity • Energy costs and therefore travel costs are high • 60% Rail growth • 27% Road growth	• Greater uptake of digital connectivity and smart mobility technology (CAVs, smart ticketing, etc), compared to Scenario 2, leading to potentially more efficient road space use and less parking space. • Higher uptake of electric and hybrid road vehicles, compared to Scenario 4. • Rail emphasised between urban areas with route upgrades required. Less requirement for new lines. • Lowest overall movement increase compared to all other scenarios likely to result in less overall land take. • More greenfield land take, compared to Scenarios 1 and 2. • Fewer opportunities for contamination remediation due to less brownfield land take. • Fewer opportunities for non-motorised movement for short journey as development less compact and likely to be less co-location of housing and employment. • Less compact development generally lower density and less energy efficient (buildings as well as transport).
Scenario 4 – Dispersed and Travel Friendly	
• Urban areas are 'Dispersed' with mixed greenfield and brownfield development in the suburbs and urban fringes • Local transport systems provide for all types of cross-district movement • Technological development has led to advances in 'Travel Friendly' connectivity options • Energy costs and therefore travel costs are low • 136% Rail growth • 54% Road growth	• Greater emphasis on road improvement in urban areas due to dispersed nature of development and need to allow easy cross district movement, but all types of mode considered. • Lower energy costs have greater effect on road usage (higher) due to greater elasticity of road use pricing (fuel cost) compared to rail and other public transport, with new road routes and route widening between urban areas. • Lower uptake of digital connectivity and smart mobility technology (CAVs, smart ticketing, etc), compared to Scenario 3, leading to potentially less efficient road space use and more parking space. • Lower uptake of electric and hybrid road vehicles, compared to Scenario 3. • New rail lines and line upgrades required for inter-urban routes. • Multi-modal interchanges required. • Emphasis placed on full and continuous implementation of Smart • Higher land take compared to Scenario 3. Fewer opportunities for contamination remediation. • More overall land take compared to Scenario 3. • More greenfield land take, compared to Scenarios 1, 2 and 3. • Fewer opportunities for non-motorised movement for short journeys as development less compact. However, greater public transport connections may encourage more walking / cycling more (relative to Scenario 3). • Less compact development generally lower density and less energy efficient (buildings as well as transport).

In addition to the above scenarios, for the purposes of assessment, a Business as Usual scenario was also developed, as set out in Appendix F1.2, including underpinning assumptions and which included committed and planned development.

10.3. Assessing the Alternatives

The four alternatives outlined in the STP, along with the Business as Usual Scenario (see Appendix D), were assessed against the ISA Framework.

The assessments were undertaken using the following scoring scheme:

Terms		Effects					Assessment	
		🔲🔲🔲	Scale	Dur	T/P	Cert	Scale	Category
Mag	Magnitude	✓✓	Local	ST-MT	Temp	Low	**+++**	Large beneficial
Scale	Geographic Extent	✓	Local-Reg	ST-LT	Perm	Med	**++**	Moderate beneficial
Dur	Duration	-	Reg/Nat	MT-LT		High	**+**	Slight beneficial
T/P	Temporary / Permanent	?		ST			**0**	Neutral
Cert	Certainty	✗		MT			**-**	Slight adverse
ST	Short Term	✗✗		LT			**--**	Moderate adverse
MT	Medium Term						**---**	Strong adverse
LT	Long Term						**?**	Uncertain
Sm	Summary assessment						**+/-**	Combination of beneficial and adverse

The assessment was carried out by evaluating the sustainability performance of each strategic alternative, including the Business as Usual scenario, compared to the other scenarios.

10.4. Alternatives assessment summary

A discussion of the findings of the strategic alternatives assessment follows. A summary of the results is shown in Table 10-1. Detailed assessment tables are set out in Appendix F.

Table 10-2   Summary of findings of Assessment of Alternatives

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 can be seen that Transformational Scenario 1 (Compact & Digital) clearly performs 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 information on likely interventions locations, it is not possible to ascertain the nature of potential effects, as this will depend upon the type and location of the interventions. Performance against all other ISA Objectives under Transformational Scenario 1 are anticipated to be either slight beneficial or moderate beneficial.

Environmentally, Transformational Scenario 1 benefits particularly from the compact urban form which allows greater opportunities for walking and cycling, an expected uptake of LZEVs, reduced greenfield land take (and therefore less disturbance to habitats, soils, the water environment, etc.), 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 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 impact on travel impacts such as severance. Reduced traffic and congestion due to mode shift should also have a beneficial impact on road safety and severance. An increase in CAVs may also improve road safety, avoiding human error. An increase in use of LZEVs will 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 Transformational 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.

In equality terms, Scenario 4 would improve public transport between urban areas which will encourage some mode shift, but local networks are more likely to be car-focussed and so there would likely be an increase in traffic and congestion in denser urban areas, with an adverse impact on severance and road safety. The lower fuel costs may also encourage driving and increase traffic and congestion in some areas including denser urban areas, again having an adverse effect on severance, road safety and environmental aspects. Improved interchanges would again make multi-stage journeys easier and have an impact on perception of security.

Transformational Scenario 4 also performs worse in overall sustainability terms than the Business as Usual scenario. Under the Business as Usual scenario, it is anticipated that, for the most part, while performance against some ISA objectives should result in slight benefits, performance will lack the overall potential to transform the North that other scenarios provide.

Across all scenarios, it should be noted that carefully considered mitigation measures will be key in ensuring that any adverse effects are reduced and beneficial effects enhanced as appropriate.

It is not the purpose of the ISA to decide the alternative to be pursued. The STP itself and Partners Strategies, Policies and Plans will help shape the future scenarios, though these will also be influenced by a range of external factors, for example the impact of technological change on transport systems and on future travel behaviour. 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.

11. Assessment of the Draft STP

11.1. Introduction

This section predicts and evaluates the likely sustainability effects arising from the proposed draft STP and puts forwards recommendations in order to address shortfalls identified during the assessment.

11.2. STP Strategic Components

Pages 28 to 55 of the STP includes a series of strategy elements focusing on different policy aspects. For the purposes of the ISA these have been termed 'Strategic Components'. The Strategic Components support the STP Objectives Set out in Page 10 of the STP, with the overall aim of setting out how the STP will help drive economic transformation in the North. The Strategic Components are defined as follows

- 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

A full description of each Strategic Component is set out in Appendix G.

In order to undertake the assessments of the Strategic Components, it was important to understand the types of intervention which could result from implementation of the each. The full list of assumed potential intervention types is listed below. Not all these interventions are relevant to every Strategic Component. For example, those Strategic Components relating to rail will clearly only result in rail type interventions.

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

To help inform understanding of the potential effects of interventions associated with specific Strategic Components, it was also necessary for the purposes of the ISA to develop a series of key assumptions which underpinned evaluation of sustainability performance against each of the ISA Objectives. This set of assumptions, termed the Assessment Rationale, is set out in Appendix G.

A summary of the assessment findings is presented in the section below. Tables detailing the assessment results are provided in Appendices G and H.

11.3.   Summary of assessment results – Strategic Components

The assessment scores for each ISA Objective and each Strategic Component are provided in Table 11-1. A discussion of the assessment results follows.

Table 11-1   Summary of assessment score for the STP Strategic Components

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

No.	ISA Objective
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)

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 mode. 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 have 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 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, on the whole, perform better in the environmental elements of the ISA than the strategic components of 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 those 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 the intervention.

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 impact 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 impacts 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 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 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 90 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.

11.4. Assessment of the Strategic Development Corridors

A fundamental outcome of the STP will be a long-term Investment Programme, which will define the major, strategic interventions to be delivered during the lifetime of the Plan. This long-term Investment Programme will enable TfN to develop a pipeline of investment so that TfN and its STP partners can work with government and delivery partners to secure funding and delivery of the right schemes at the right time, providing certainty for local transport authorities to plan complementary investment.

The long-term Investment Programme will be split into three periods which will be used to group and phase interventions according to planned needs and operational delivery. The three time periods are:

- Up to 2025
- 2026 - 2035
- 2036 - 2050

It is clearly acknowledged within the STP that the long term Investment Programme is still in development and will be refined as further studies are undertaken and a greater understanding of needs is developed. Precise details of potential interventions are therefore not known at this stage.

In relation to likely interventions, the STP defines a set of seven Strategic Development Corridors (SDCs) which group major strategic interventions required to drive transformational economic growth according to key locational factors, closely tied to NPIER analyses. Table 11-1 provides a summary description of each of the seven SDCs. The table also includes a set of assumptions regarding likely types of intervention for each SDC, developed for the purposes of the ISA.

Table 11-2   Strategic Development Corridors Components and anticipated scheme types

Investment Programme element	Description	Assumed potential interventions
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	There is a strong presence of the North's prime capabilities within this corridor. These economic centres and assets need to be better connected within the corridor, as well as to the north-south transport corridors. Transport investment will support nationally significant infrastructure investment, unlock opportunities for employment, support the supply chain and housing construction, such as proposed garden villages. Enhanced connectivity will also support tourism and leisure connectivity to some natural assets such as Lake District. Centres of excellence in the Nuclear industry would also benefit, along with advanced manufacturing and renewable energy centres. To the east there is significant potential in energy generation industry and logistics. Specialisation in manufacturing and production is key to this corridor. East-West movements are currently constraining opportunities for investment and connectivity to ports and airports. Some improvements have been made in North-South movements but corridor is significantly affected by efficiency and resilience issues. Current investment is focused on east coast and north-south movements on both the road and rail networks, with clear gaps in east-west connections and their resilience.	Corridor is anticipated to be multi-modal and would likely have the following types of scheme: **Highways** • New highway links • Highway infrastructure improvements • Smart highways / adaptive network **Railways** • New rail links • Rail infrastructure improvements • New stations • Station upgrades (including park and ride) **Public transport (excl. 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
SDC 2 – West and Wales Improving connectivity for people and goods, to, from and through the important economic centres and	This corridor can strengthen connectivity between important and densely populated economic centres and assets, as well as strengthen cross border connectivity to Wales and The Midlands. Significant economic and population growth is forecast in this corridor. There is strong representation of prime capabilities and economic assets that benefit the whole of the north. Strategic connectivity improvements can support growth at these assets e.g. Manchester Airport. This corridor has a complex, dense transport network with multi-modal opportunities that require further consideration. At present, significant congestion, efficiency, capacity and reliability impacts on the road and rail networks are constraining	Corridor is anticipated to be multi-modal and would likely have the following types of scheme: **Highways** • New highway links • Highway infrastructure improvements • Smart highways / adaptive network **Railways** • New rail links

Investment Programme element	Description	Assumed potential interventions
assets of Cheshire, Liverpool City Region and Greater Manchester, with strategic connectivity in to North Wales and the Midlands.	economic growth. There is also poor connectivity from south and west to Manchester Airport. There may be opportunities for greater use of waterborne and intermodal freight. Significant investment in both the road and rail networks / infrastructure is taking place at present, with further improvements planned.	• Rail infrastructure improvements • New stations • Station upgrades (including park and ride) **Public transport (excl. 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
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.	This corridor is a major economic area and has some of the North's key economic and population centres. Addressing east-west connectivity is a priority for TfN – failure to address these would critically restrict transformational growth. Enhanced connectivity can support complementary high growth, high value economic sectors and clusters and attract new business and investment. Freight and logistics is a key element of this corridor. This corridor can provide enhanced additional road and rail capacity across the Pennines and across the corridor there is a diverse mix of strategic movements to cater for. Improving connectivity would accelerate employment, new housing and increase scale of growth opportunity. Demand exceeds supply at present on rail network and M62 Motorway. There are current investments in road and rail networks.	Corridor is anticipated to be multi-modal and would likely have the following types of scheme: **Highways** • New highway links • Highway infrastructure improvements • Smart highways / adaptive network **Railways** • New rail links • Rail infrastructure improvements • New stations • Station upgrades (including park and ride) **Public transport (excl. rail)** • Park and ride schemes • Station and Interchange works **Enabling infrastructure** • EV facilitating • Smart / adaptive roads • Digital connectivity

Investment Programme element	Description	Assumed potential interventions
		Waterways • Inland and coastal port upgrades • Use of canals
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.	This corridor provides connectivity between some major economic and population centres, along with four major ports and three international airports. East-west connectivity will need to be transformed in order to support forecasted economic and population growth. Prime enabling capabilities are highly represented in this economic area, with advanced manufacturing a particular strength and advanced materials around GM offering significant potential. The corridor has the opportunity for freight and logistics to continue to strengthen operations and investment at the corridors ports, airports and inland ports. Investment will need to be sensitive to sustainability considerations, particularly the Peak District National Park, as well as identifying the visitor economy benefits from the enhanced strategic connectivity. Improved multi-modal connectivity would address the economic challenges and ambitions of the corridor. Improving resilience will enhance conditions for freight movements particularly. A number of schemes have been identified to meet short term challenges on both the road and rail networks. Work continues to develop large local major schemes and work on the Trans-Pennine Tunnel and wider connectivity work.	Corridor is anticipated to be multi-modal and would likely have the following types of scheme: **Highways** • New highway links • Highway infrastructure improvements • Smart highways / adaptive network **Railways** • New rail links • Rail infrastructure improvements • New stations • Station upgrades (including park and ride) **Public transport (excl. 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
SDC 5– North West to Sheffield City Region Strengthening rail connectivity between the advanced	This rail corridor looks to strengthen the strong and growing connectivity and collaboration between advanced manufacturing, health tech, digital businesses and research centres across this corridor. The corridor is home to globally significant businesses, supply chains and economic assets. Professional and financial services which support the prime capabilities are also within this corridor. Logistics industry is also important across and within this corridor and there is a strong visitor and tourism offer, including two National Parks, which enhanced strategic connectivity could support.	Corridor is anticipated to be rail based and would likely have the following type of scheme: **Railways** • New rail links • Rail infrastructure improvements • New stations • Station upgrades (including park and ride)

Investment Programme element	Description	Assumed potential interventions
manufacturing clusters and assets in Cumbria, Lancashire, Greater Manchester and Sheffield City Region.	While this is a rail corridor, it will complement other road improvements. There is strong demand for growth in terms of rail passengers and freight. Issue of poor rail connections, journey times and frequency. There are also speed and capacity constraints. In addition, there are tensions between freight movements and passenger movements which impact on each other.	
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.	This is a rail corridor that looks to strengthen the significant economic development already along it – including major rail hubs, rail freight interchanges and intermodal terminals and airports. Advanced manufacturing is a particular strength – notably car manufacturing. Also growing renewable energy sector that requires connectivity, as does the growing health sector. Enabling capabilities of the financial and logistics sectors are also notable. Air and freight hubs provide a focus for growth in movements of goods, with a growing inland port and distribution capability. There is a strong visitor and tourism offer. East Coast Main Line is a key passenger and freight spine – this rail corridor includes local and national lines. Both have capacity issues. Investment required at rail stations to increase capacity. This corridor has existing capacity, operability, timetabling and reliability constraints.	Corridor is anticipated to be rail based and would likely have the following type of scheme: **Railways** • New rail links • Rail infrastructure improvements • New stations • Station upgrades (including park and ride)
SDC 7 – Yorkshire to Scotland Strengthening road connectivity between Midlands, South	This road corridor looks to strengthen and complement the East Coast Corridor to Scotland rail corridor and will look beyond current Road Investment Strategy commitments. There are significant economic developments in this corridor and major rail hubs and intermodal freight terminals. Advanced manufacturing is a particular strength – notably car manufacturing. Also growing renewable energy sector that requires connectivity, as does the growing health sector. Enabling capabilities of the financial and logistics sectors are also notable.	Corridor is anticipated to be road based and would likely have the following type of scheme: **Highways** • New highway links • Highway infrastructure improvements **Enabling infrastructure**

Investment Programme element	Description	Assumed potential interventions
Yorks, West Yorks, North Yorks, Tees Valley and North East and Scotland, building on existing road investment commitments.	Significant freight and logistics centres along the corridor with key national links – air and freight hubs provide a focus for growth in the movements of goods, supported by a growing inland port and distribution capability. There is also a strong visitor and tourism offer. North-South routes of A1 and A19 must provide a consistent level of service and resilience and will complement other bodies aspirations for additional north-south connectivity and resilience.	• EV facilitating • Smart / adaptive roads • Digital connectivity

Although there is limited information available on the likely interventions within each SDC, it is nevertheless possible to develop high level evaluations of the likely effects that potential assumed interventions may have on each of the ISA objectives.

A two-step risk based approach has been used in developing the assessment of the SDCs:

- The relative sensitivity of natural environment assets within each SDC area was identified using GIS analyses of frequency and spatial extent of assets, normalised against total SDC area and population. A similar approach was used to identify the relative need for improvement for socio-economic features, again using GIS analyses and normalising by area and population. Normalised figures for each parameter were then categorised as 'High', 'Medium' or 'Low' based on relative differences across the full set of SDCs.

- Projected road and rail movement within each corridor was analysed using STP model output data, estimated as total person travel kilometres. Volumes of current movement and projected change in movement over the three assessment time periods (see below) were then categorised as 'High', 'Medium' or 'Low' based on relative differences across the full set of SDCs.

- A similar approach was used to categorise GHG emissions, current and projected over the three implementation time periods, based on STP transport demand model data.

Appendix H provides datasheets on each SDC which set out more detail on the information used within the ISA SDC supporting analyses and assessments.

A summary of the assessment results is presented in the section below. Tables detailing the assessments are provided in Appendices H.

Note that the SDC assessment use the following scoring scheme:

Terms		Effects					Assessment	
		Mag	Scale	Dur	T/P	Cert	Scale	Category
Mag	Magnitude	✓✓	Local	ST-MT	Temp	Low	**+++**	Large beneficial
Scale	Geographic Extent	✓	Local-Reg	ST-LT	Perm	Med	**++**	Moderate beneficial
Dur	Duration	-	Reg/Nat	MT-LT		High	**+**	Slight beneficial
T/P	Temporary / Permanent	?		ST			**0**	Neutral
Cert	Certainty	✘		MT			**-**	Slight adverse
ST	Short Term	✘✘		LT			**--**	Moderate adverse
MT	Medium Term						**---**	Strong adverse
LT	Long Term						**?**	Uncertain
Sm	Summary assessment						**+/-**	Combination of beneficial and adverse

11.5.   Assessment summary – Strategic Development Corridors

The assessment scores for each ISA Objective and each SDC are provided in Table 11-3. A discussion of the assessment results follows.

Table 11-3   Summary of assessment scores for the STP Strategic Development Corridors

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

No.	ISA Objective
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)

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 HRA.

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 SDC 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, in particular for SDC 1 Connecting the Energy Coasts.

For all SDCs, GHG emissions from road movement is anticipated to grow in the short term, up to 15% in the case of SDC 1, relative to today. However, 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 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 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 is 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 and 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 except SDC 7. 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.

12. Mitigation

12.1. Introduction

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting any significant adverse environmental effects that have been identified. In practice, a range of measures applying one or more of these approaches is likely to be considered in mitigating any significant adverse effects predicted as a result of implementing the STP. In addition, it is also important to consider measures aimed at enhancing positive effects. All such measures are generally referred to as mitigation measures.

However, the emphasis should be in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, should mitigation then examine ways of reducing the scale / importance of the effect.

Mitigation can take a wide range of forms including:

- Refining intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation phase;
- Identifying issues to be addressed in project assessment (including but not limited to WebTAG, environmental impact assessment and the development of Environmental Management Plans) for certain projects or types of projects;
- Proposals for changing other plans and programmes; and
- Contingency arrangements for dealing with possible adverse effects.

12.2. Mitigation of significant adverse effects

An overview of the recommended mitigation for each ISA Objective is as detailed in a series of Mitigation Tables contained within Appendix I. Each of these tables also provides an overview of the mitigation and how it might be applied to any intervention developed from the STP. This overview is provided below in Table 12-1

Table 12-1   Overview of Mitigation

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	Particular consideration needs to be made to protection measures in relation to any scheme which may impact directly, or indirectly, on any site

ISA Objective	Overview of Mitigation
(HRA specific objective)	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 / avoid land contamination	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 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.

ISA Objective	Overview of Mitigation
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 public transport, 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 of the proposed 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 relevant schemes.
14. Promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society (EqIA specific objective)	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 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 No. 15 above.

13. Cumulative, Synergistic and Indirect Effects

13.1. Introduction

As noted in the SEA Directive, there is a requirement to consider cumulative, synergistic and indirect effects of implementation of the STP. Secondary and indirect effects are effects that are not a direct result of the STP, but which occur away from the original effect or as the result of a complex pathway. Cumulative effects arise where several proposals or elements of the STP, individual may or may not have significant effect 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 an effect greater than the simple sum of the effects when acting alone.

As required by the SEA Regulations, cumulative, synergistic and indirect effects have also been considered during the ISA. The identification of these effects already takes into account the fact that TfN have taken on board earlier recommendations to improve the sustainability performance of the STP. Table 13-1 lists the results of this analysis.

Table 13-1   Anticipated cumulative, synergistic and indirect effects

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.
Greenhouse gas emissions	It is considered that the STP will help to result in a fall in GHG 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 will 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.

Effects	Causes	Significance
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 to 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.

13.2. Likely cumulative effects

13.3.   ISA Objectives which have the potential for cumulative effects have been identified (as required by the SEA Directive) from the analysis of plans and programmes, the baseline data, consultation responses and an examination of the identified key issues. This analysis has identified a set of likely cumulative effects, their receptors and likely causes, as shown below in Table 13-2.

Table 13-2   Likely cumulative effects and their causes

Cumulative effect	Affected Receptor	Causes
Climate change	Population (human health) Transport infrastructure	Even though local actions to combat an increase in GHG emissions (in particular carbon dioxide emissions) are important, climate change is a global phenomenon and GHG concentrations in the atmosphere are likely to increase during the STP period as a result of human activities worldwide. These activities include transport, energy, industry, buildings sectors and others. Joint efforts of all nations may lead to a subsequent stabilisation and decline of GHG concentrations but such effects may occur in a distant future, beyond the STP period.
Increase in air pollution	Population Wildlife habitats Species (in particular within AQMA and in proximity to major roads)	Air emissions from major roads and particularly congested areas are of concern. Designation of the AQMAs indicates that national air quality standards are unlikely to be met in the areas concerned. This affects the health of humans and other species.
Habitat degradation, loss and fragmentation	Areas of wildlife habitats (in particular those in unfavourable condition), valuable	Use of land for new infrastructure, including transport infrastructure, commercial uses and housing. Disturbance of habitats and species and negative effects as a result of human activities (recreation, noise from transport, etc), coastal squeeze and pollution of environmental media (water, soil and air).

Cumulative effect	Affected Receptor	Causes
	landscapes (in particular those showing negative trends)	
Increase in flood risk	Population Infrastructure (bridges, roads, rail lines etc) Heritage assets Wildlife habitats Species	Use of land for new transport infrastructure, commercial uses, housing and associated increase in impermeable surfaces. Risk of significant flooding events is also likely to increase in the future, particularly as a result of climate change consequences.
Increase in water pollution	Rivers Groundwater	Water pollution is largely caused by human activity and has had a major impact on our local waterways and their ability to be healthy and function naturally. Water pollution comes from two sources - point sources or diffuse sources. Pollution from various sources (including transport related infrastructure such as roads and rail lines, areas of parking etc.) discharging into the same waterbody can result in exceedances of water quality standards.
Heritage degradation	Heritage assets (in particular those on the Heritage at Risk Register)	Use of land for new infrastructure, including transport infrastructure, commercial uses and housing. Disturbance of heritage assets and their settings as a result of human activities (recreation, noise from transport, etc.) and pollution of environmental media (water, soil and air).
Landscape and townscape degradation	Local landscapes / townscapes	Combined effects can arise through the interaction of two or more developments, whether of the same type or not, within the landscape/townscape and visual baseline context. Collectively they give rise to an overall combined effect and have the potential to cause irreversible harm.
Transport	Population Local landscapes / townscapes Infrastructure Heritage assets (including, in particular, those relating to canals, railways) Wildlife Habitats and Species	Use of land, including within towns, for new infrastructure. Disturbance to species / habitats. Use of heritage assets as new / improved transport modes, e.g. canals, railways etc.
Economic growth	Population	Changes in access to employment opportunities, shift in employment locations.
Health	Population	Changes in access to health and leisure facilities. Changes in air quality and emissions.

14. Monitoring

14.1. Introduction

The SEA Directive states that '*member states shall monitor the significant environmental effects of the implementation of plans and programmes… in order, inter alia, to identify at an early stage unforeseen adverse effects and to be able to undertake appropriate remedial action' (Article 10.1). In addition, the Environmental Report should provide information on a 'description of the measures envisaged concerning monitoring' (Annex I (i)) (Stage E).*

In line with the SEA Directive, ISA monitoring will cover significant social, environmental and economic effects and it will involve measuring indicators that will enable the establishment of a causal link between the implementation of the STP and the likely significant effects (both positive and negative) being monitored.

The proposed monitoring programme is outlined at Table 14-1 below:

Table 14-1   Proposed Monitoring Programme

No.	ISA Objective against which a significant effect has been predicted (without mitigation)	Indicators to be used	Targets	Source	Suggested frequency of analysis of monitoring of data / mitigation	Responsibility for undertaking monitoring
1	Reduce greenhouse gas emissions from transport overall, with particular emphasis on road transport	CO_2 emissions from road transport	Reduce	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		LZEVs as proportion of total fleet, by vehicle type	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		Proportion of passenger travel kilometres for public transport	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		Proportion of travel kilometres for walking and cycling	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		Volume of lower value freight movement (travel km) by mode (road, rail, water and air)	Reduce road, rail and air volume amount of lower value freight; Increase rail and water volume of higher value freight	Govt Transport Statistics, Haulage bodies; Freight Organisations	Annually	TfN supported by all relevant Transport Authorities within STP area
2	Protect and enhance biodiversity, geodiversity and the green infrastructure network	Area of green infrastructure (greenways, etc.)	Increase	Natural England; Local Authorities; Transport Authorities – TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
		Net gain in biodiversity (using the Defra metric) due to transport schemes	Increase	Natural England; Local Authorities; Transport Authorities– TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
3	Conserve and enhance the international sites (HRA specific objective)	Number of transport schemes impacting on designated areas	Zero	Natural England – TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
4	Protect and enhance air quality	Concentrations of air pollutants across the transport network	Reduce	DEFRA	Annually	TfN supported by all relevant Transport Authorities within STP area

No.	ISA Objective against which a significant effect has been predicted (without mitigation)	Indicators to be used	Targets	Source	Suggested frequency of analysis of monitoring of data / mitigation	Responsibility for undertaking monitoring
		Area covered by AQMAs declared due to transport emissions	Reduce	DEFRA	Annually	TfN supported by all relevant Transport Authorities within STP area
		LZEVs as proportion of total fleet, by vehicle type	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		Proportion of passenger travel kilometres for public transport	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
		Proportion of travel kilometres for walking and cycling	Increase	Govt Transport Statistics	Annually	TfN supported by all relevant Transport Authorities within STP area
5	Increase resilience of the transport network to extreme weather events and a changing climate	Proportion of drainage provision for transport schemes (new or improvements) incorporating best practice SuDS	Increase	Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
6	Protect and enhance the inland and coastal water environment	Proportion of drainage provision for transport schemes (new or improvements) incorporating best practice SuDS	Increase	Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
		Number of water pollution incidents attributable to transport	Zero	Environment Agency; Local Authorities	Annually	TfN supported by all relevant Transport Authorities within STP area. Additional information provided by Environment Agency
7	Protect and conserve soil and remediate / avoid land contamination	Area of grade 1, 2 or 3a agricultural land permanently lost or significantly degraded as a result of transport schemes	Zero	Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
		Proportion of area covered by transport schemes located on previously developed land	Increase	Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
8	Support the conservation and enhancement of the quality and	Area of historic sites impacted by transport schemes	Decrease	Local Authorities; Transport Authorities / Agencies; Historic	Annually	TfN supported by all relevant Transport Authorities within STP

No.	ISA Objective against which a significant effect has been predicted (without mitigation)	Indicators to be used	Targets	Source	Suggested frequency of analysis of monitoring of data / mitigation	Responsibility for undertaking monitoring
	distinctiveness of historic assets, industrial and cultural heritage	Number of heritage assets impacted by transport schemes		England - TfN promoted schemes only		area. Additional information provided by Historic England
9	Protect and enhance the character and quality of landscapes and townscapes	% area of transport schemes that incorporate improvements to public realm and sympathetic design	Increase	Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only	Annually	TfN supported by all relevant Transport Authorities within STP area
		Countryside Quality Counts (CQC) - focus on any changes in the landscape quality due to transport effects)	No noticeable adverse changes in landscape quality	Natural England	As and when CQC results are published	TfN utilising information from Natural England
		Area covered by transport schemes within or in close proximity to AONB / National Park / Heritage Coast designated areas	No noticeable adverse changes in landscape quality	Local Authorities; Transport Authorities / Agencies; Parks authorities; Natural England - TfN promoted schemes only	Annually	TfN utilising information from Parks authorities and Natural England
10	Promote the prudent use of natural resources, minimise the production of waste and support re-use and recycling	Proportion (by mass) of recycled materials used in transport related construction

Proportion (by mass) of waste arising associated with transport schemes which is reused or recycled

Proportion (by mass) of waste arisings associated with transport schemes which is sent to landfill | Increase | Local Authorities; Transport Authorities / Agencies - TfN promoted schemes only | Annually | TfN supported by all relevant Transport Authorities within STP area with additional information supplied by relevant Road and Rail Authorities |
| 15 | Improve health and well-being for all citizens and reduce inequalities in health (HIA specific objective) | Population within AQMA

Population within Noise Important Areas | Reduce | Local Authorities Transport Authorities / Agencies - TfN promoted schemes only | Annually | TfN supported by Local Authorities / Transport Authoritise and Agencies within STP area |
| 16 | Promote community safety and reduce crime and fear of crime for all citizens (CSA specific objective) | Crime incidents associated with transport network
Accidents and safety incidents associated with transport network | Reduce | Govt Crime Statistics; British Transport Police | Annually | TfN informed by Crime Statistics and information supplied by British Transport Police |

15. 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).

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.

The cross-cutting element of the 'Ensuring a sustainable investment programme' Strategic Component clearly sets out how TfN proposes to address such issues and also how it is intended that opportunities for enhancement are to be realised. For example, the Component sets out the intention to encourage new and / or upgraded infrastructure to be undertaken using sustainable procurement procedures and be resource efficient, including promoting the circular economy, through exploring opportunities that can reduce the consumption of natural resources, such as soil, materials, energy and water in construction, operation and maintenance.

It is recognised that a major element of the STP is the development of new roads or upgrading of existing roads. In terms of sustainability performance, these have the potential for the greatest adverse effects. The STP does state that implementation of any interventions will be subject to further consideration and assessment. 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 Regulations 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.

Road schemes also currently have major adverse effects in terms of GHG emissions and air pollutant emissions. These issues are anticipated to continue into the short term (up to 2025). However, over the medium to long term (2025 to 2050) it is anticipated that there would likely be substantial uptake of LZEVs. GHG emissions per travel kilometre are expected to drop substantially, with an overall marked decrease in overall emissions, despite growing road movement. Air pollutant emissions from road vehicles are also expected to decline significantly, associated with the anticipated substantial increase in the proportion of LZEVs. Overall, therefore, performance against the ISA Objectives relating to GHG emissions and air quality shows marked improvement in the long term with overall beneficial effects over the timeframe of STP implementation.

In addition to the road schemes, it is also the case that the STP support significant growth in other modes, particularly rail. The two Strategic Components Northern Powerhouse Rail and the Rail North Long Term Strategy form key elements of this.

The STP sets out a number of approaches to supporting a modal shift from road to rail. These include the development of 'Integrated and Smart Travel'. This Strategic Component should act in a 'cross cutting' fashion to help ensure that modal shift takes place and that a greater amount of travel movement is by more sustainable modes, including via smart mobility technology such as CAVs.

In terms of impact 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 common theme across the STP. 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 impacts 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.

Overall, it is considered that the STP represents a well-balanced approach in terms of sustainability performance across the full range of potential key effects delineated in the ISA Framework, and should help ensure that the vision for 'A thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life' can be achieved in a sustainable and integrated fashion.

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