A59 Kex Gill Diversion Scheme

Options Assessment Report

APPENDIX 4 – EAST Appraisal

March 2017

Prepared for:

North Yorkshire County Council

Prepared by:

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building great relationships

1 Early Assessment and Sifting Tool (EAST) – Appraisal

1.1 Introduction

In order to determine the better performing corridors, in line with the DfT's Transport Appraisal Process guidance, a structured sifting process has been followed. This sifting process was undertaken using the DfT's Early Assessment and Sifting Tool (EAST).

EAST is a tool that has been developed to summarise and present evidence on options in a clear and consistent format in order to supports decision making. It also aids comparison of how different interventions perform against a wide range of metrics. The EAST is designed to be consistent with the DfT's five case transport business case structure and considers the impact of the scheme under the following business case headings:

- Strategic;
- Economic;
- Managerial;
- Financial; and,
- Commercial.

The full EAST appraisal table is set out in the tables below illustrating how each corridor scores against each metric.

The identified problems and objectives are the same for each corridor and are summarised below.

1.2 Identified Problems

There are a number of problems identified for the A59 at Kex Gill and it is recognised locally as being a constraint; the section of the A59, linking the A1 and Harrogate to Skipton and Craven District is identified in the YNYER LEP's SEP as a priority route.

Kex Gill is a narrow and steep sided valley on the A59, 16km west of Harrogate and 15km east of Skipton. There is a long history of landslips on the land above the A59 at Kex Gill. These landslips deposit material onto the road leading to unpredictable closures. The most recent landslip occurred in early 2016 and resulted in a road closure of approximately 8 weeks.

Fortunately, to date, there have been no personal injuries as a result of a landslip at Kex Gill. However, without intervention, there continues to be a risk that road users

could be caught in any future landslip, or of larger landslips leading to much longer road closures and an associated maintenance cost liability to NYCC.

In the event of a landslip at Kex Gill, the A59 is closed and users are forced to follow the diversion route which adds up to 10km to the journey distance, resulting in significant impacts on journey times and costs. The official diversion route runs through a number of towns in West Yorkshire, resulting in adverse impacts to the communities of Ilkley, Burley-in-Wharfedale and Otley, amongst others. Outside of any periods of closure, the main constraint on journey time reliability is the formation of convoys behind slow moving vehicles (usually HGVs). Due to the alignment of the road and the topography, there are few overtaking opportunities.

1.3 Objectives

A number of specific objectives to address the problems summarised above include:

- Prevent any future landslip related closures of the A59 at Kex Gill.
- Improve journey time reliability and journey times on the A59 between Skipton and Harrogate.
- Reduce road accident casualties.
- Reduce the volume of traffic using diversion routes in the event of a landslip at Kex Gill.
- Minimise environmental impact of the A59 route on the built and natural environment.

Operational Objectives have also been agreed for the scheme, these include:

- Reduce the impact of scheduled/unscheduled maintenance on A59 users and communities on diversion routes.
- Reduce the financial impact of scheduled/unscheduled maintenance on NYCC.

Table 1 – Blue Corridor

Scheme Description:

- Smoothing the bend at Kex Gill Farm;
- Utilise existing A59 and create new alignment to the north of the valley, where the land slips have taken place, returning to existing A59 before Blubberhouses;

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	<u>Prevention of landslip related closures</u> This route avoids the main areas at risk of landslip therefore reduces risk of closure. <u>Improve Journey Time Reliability</u> Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. <u>Safety</u> This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk <u>Traffic Volumes on Diversion routes</u> This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. <u>Environmental Impacts</u> This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. <u>Reduce maintenance impacts on road users</u> Beneficial as the new road sections will require reduced levels of maintenance. <u>Financial impact of maintenance</u> Beneficial as the new road sections will require reduced levels of maintenance.	4.	<u>Economic Growth</u> Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. <u>East-West Connectivity</u> There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective. <u>Delivery of Housing</u> Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. <u>Safety</u> A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Environmental Quality</u> The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. <u>Accessibility</u> Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. <u>Realignment at Kex Gill</u> Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. <u>Sustainable Environment</u> This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. <u>Reduce Impact of Travel</u> This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: <u>Cost</u> Only high level cost estimates are available; <u>Funding</u> Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; <u>Landslips</u> Frequency/severity of future landslips is unknown; <u>Ground Conditions</u> In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. <u>Acceptability</u> Stakeholder/public perception or support for scheme is not fully known; <u>Environmental</u> Acceptability of construction in environmentally sensitive land is uncertain. <u>Benefits</u> Level of benefits is unknown, modelling has not been undertaken.	2.	<u>Consultation</u> To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. There is a planning application currently being determined for reopening Blubberhouses Quarry. This route would pass near the area proposed to be excavated in the quarry therefore may have a negligible impact on operations there. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	2. Red/ Amber	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the north would move traffic away from Bothams Farm. <u>Natural Environment</u> Some negative impact expected to the land north of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Grade II Listed Building noted as being of medium value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. <u>Townscape/Streetscape</u> No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
4. 36-42 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 12 mths	4.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> Scheme avoids landslip risk area and avoids disruption to journeys during construction. It improves resilience, journey time reliability and is not impacting any different residences.	4.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (medium impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (medium impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (medium impact) Online construction on existing A59 between Kex Gill farm and Blubberhouses (medium Impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (no impact) <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option, medium impact expected.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	<u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – Low risk as only small structures likely to be required for this corridor. Increased drainage costs – relating to groundwater conditions -medium risk for this corridor Future maintenance costs – Medium risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
3.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be affordable, although additional funding may need to be sought.	3. £30-70m	Cost ranges: £45m - £65m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
4.	<u>Alignment</u> This corridor is relatively flexible in terms of alignment as it could be amended to be reduced in length and where it tied-in to the existing carriageway earlier. It also avoids area of landslips as it deviates from existing alignment. <u>Structures</u> Large structures are not required. <u>Scalability</u> Elements of the proposal such as smoothing of the bend at Kex Gill Farm can be removed from the proposal. In addition this option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. Funding to be utilised by financial year 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 2 – Yellow Corridor

Scheme Description:

- Smoothing the bend at Kex Gill Farm;
- Utilise existing A59 and create new alignment to the south of the valley, above where the land slips have taken place, returning to existing A59 before or just after Blubberhouses;

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	Prevention of landslip related closures This route avoids the main areas at risk of landslip therefore reduces risk of closure. Improve Journey Time Reliability Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. Safety This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk Traffic Volumes on Diversion routes This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. Environmental Impacts This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. Reduce maintenance impacts on road users Beneficial as the new road sections will require reduced levels of maintenance. Financial impact of maintenance Beneficial as the new road sections will require reduced levels of maintenance.	4.	Economic Growth Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. East-West Connectivity There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective. Delivery of Housing Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. Safety A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. Environmental Quality The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. Accessibility Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. Realignment at Kex Gill Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. Sustainable Environment This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. Reduce Impact of Travel This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: Cost Only high level cost estimates are available; Funding Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; Landslips Frequency/severity of future landslips is unknown; Ground Conditions In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. Acceptability Stakeholder/public perception or support for scheme is not fully known; Environmental Acceptability of construction in environmentally sensitive land is uncertain. Benefits Level of benefits is unknown, modelling has not been undertaken.	2.	Consultation To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. No impact on quarry. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	1. Red	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts . Options within this corridor would however move traffic further away from Bothams farm, but closer to St Andrews Church and Manor House. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the south would move traffic away from Bothams farm, but closer to St Andrews Church and Manor House. <u>Natural Environment</u> Some negative impact expected to the land to the south of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape on greenfield land. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Grade II Listed Building noted as being of medium value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. <u>Townscape/Streetscape</u> No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
2. 48-54 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 21 mths	3.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> It improves resilience and journey time reliability. It will impact different residences/properties. Scheme avoids landslip risk area and avoids disruption to journeys during construction.	3.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (high impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (medium impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (low impact). Online construction on existing A59 between Kex Gill farm and Blubberhouses (medium Impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (no impact) No impact in relation to quarry. <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. Very high impact given the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available ‘off the shelf’ digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – Low risk as only small structures likely to be required for this corridor. Increased drainage costs – high risk due to peat and watercourses along the route. Future maintenance costs – Medium Risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
2.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be unaffordable, given that at least another £65m may need to be secured from other sources.	2. £70-100m	Cost ranges: £95m - £100m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
4.	<u>Alignment</u> This corridor is relatively flexible in terms of alignment as it could be amended to be reduced in length and where it tied-in to the existing carriageway earlier. It also avoids area of landslips as it deviates from existing alignment. <u>Structures</u> Large structures are not required. <u>Scalability</u> Elements of the proposal such as smoothing of the bend at Kex Gill Farm can be removed from the proposal. In addition this option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 3 – Magenta Corridor

Scheme Description:

- Start at Kex Gill Farm utilising the bridleway to take the corridor along the north edge of the valley beyond where the land slips have taken place before returning to the existing A59 before Blubberhouses;

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	Prevention of landslip related closures This route avoids the main areas at risk of landslip therefore reduces risk of closure. Improve Journey Time Reliability Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. Safety This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk Traffic Volumes on Diversion routes This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. Environmental Impacts This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. Reduce maintenance impacts on road users Beneficial as the new road sections will require reduced levels of maintenance. Financial impact of maintenance Beneficial as the new road sections will require reduced levels of maintenance.	4.	Economic Growth Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. East-West Connectivity There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective.. Delivery of Housing Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. Safety A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. Environmental Quality The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. Accessibility Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. Realignment at Kex Gill Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. Sustainable Environment This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. Reduce Impact of Travel This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: Cost Only high level cost estimates are available; Funding Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; Landslips Frequency/severity of future landslips is unknown; Ground Conditions In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. Acceptability Stakeholder/public perception or support for scheme is not fully known; Environmental Acceptability of construction in environmentally sensitive land is uncertain. Benefits Level of benefits is unknown, modelling has not been undertaken.	2.	Consultation To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. There is a planning application currently being determined for reopening Blubberhouses Quarry. This route would pass near the area proposed to be excavated in the quarry therefore may have a negligible impact on operations there. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	2. Red/ Amber	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the north would move traffic further away from Bothams farm. <u>Natural Environment</u> Some negative impact expected to the land to the north of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Grade II Listed Building noted as being of medium value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. <u>Townscape/Streetscape</u> No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
3. 42-48 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 18 mths	4.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> Scheme avoids landslip risk area and avoids disruption to journeys during construction. It improves resilience, journey time reliability and is not impacting any different residences.	4.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (medium impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (high impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (medium impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (no impact). <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. High impact given the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – Low risk as only small structures likely to be required for this corridor. Increased drainage costs – relating to groundwater conditions -medium risk for this corridor Future maintenance costs – Medium Risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
3.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be affordable, although additional funding may need to be sought.	3. £30-70m	Cost ranges: £45m - £70m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
4.	<u>Alignment</u> This corridor is relatively flexible in terms of alignment as it could be amended to be reduced in length and where it tied-in to the existing carriageway earlier. It also avoids area of landslips as it deviates from existing alignment. <u>Structures</u> Large structures are not required. <u>Scalability</u> This option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 4 – Orange Corridor

Scheme Description:

- Start at Kex Gill Farm heading south of the bridleway to take the corridor along the north edge of the valley beyond where the land slips have taken place;
- Maintain the corridor parallel with the existing A59 before returning to the existing A59 at Blubberhouses;

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	Prevention of landslip related closures This route avoids the main areas at risk of landslip therefore reduces risk of closure. Improve Journey Time Reliability Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. Safety This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk Traffic Volumes on Diversion routes This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. Environmental Impacts This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. Reduce maintenance impacts on road users Beneficial as the new road sections will require reduced levels of maintenance. Financial impact of maintenance Beneficial as the new road sections will require reduced levels of maintenance.	4.	Economic Growth Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. East-West Connectivity There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective.. Delivery of Housing Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. Safety A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. Environmental Quality The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. Accessibility Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. Realignment at Kex Gill Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. Sustainable Environment This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. Reduce Impact of Travel This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: Cost Only high level cost estimates are available; Funding Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; Landslips Frequency/severity of future landslips is unknown; Ground Conditions In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. Acceptability Stakeholder/public perception or support for scheme is not fully known; Environmental Acceptability of construction in environmentally sensitive land is uncertain. Benefits Level of benefits is unknown, modelling has not been undertaken.	2.	Consultation To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. There is a planning application currently being determined for reopening Blubberhouses Quarry. This route would pass near the area proposed to be excavated in the quarry therefore may have a negligible impact on operations there. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	2. Red/ Amber	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the north would move traffic away from Bothams farm. <u>Natural Environment</u> Some negative impact expected to the land to the north of the existing road designated as Special Area of Conservation, Special Protection Area, Natural Env/Heritage/Landscape Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Grade II Listed Building noted as being of medium value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. <u>Townscape/Streetscape</u> No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
3. 42-48 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 18 mths	4.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> Scheme avoids landslip risk area and avoids disruption to journeys during construction. It improves resilience, journey time reliability and is not impacting any different residences.	4.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (medium impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (very high impact) Online construction on existing A59 between Kex Gill farm and Blubberhouses (Medium Impact on where this corridor ties in to existing road). Stabilisation of existing landslip features (no impact). <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. High impact given the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – Low risk as only small structures likely to be required for this corridor. Increased drainage costs – relating to groundwater conditions -medium risk for this corridor Future maintenance costs – Medium Risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
3.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be affordable, although additional funding may need to be sought.	3. £30-70m	Cost ranges: £65m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
4.	<u>Alignment</u> This corridor is relatively flexible in terms of alignment as it could be amended to be reduced in length and where it tied-in to the existing carriageway earlier. It also avoids area of landslips as it deviates from existing alignment. <u>Structures</u> Large structures are not required. <u>Scalability</u> This option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. However, the smoothing of the bend at Kex Gill Farm cannot be dropped. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 5 – Green Corridor

Scheme Description:

- Start at Kex Gill Farm utilising the bridleway to take the corridor along the north edge of the valley beyond where the land slips have taken place;
- Maintain the corridor parallel with the existing A59 and north of Blubberhouses and the Hopper Lane pub before returning to the existing A59 at the Meagill Lane junction.

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	<u>Prevention of landslip related closures</u> This route avoids the main areas at risk of landslip therefore reduces risk of closure. <u>Improve Journey Time Reliability</u> Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. <u>Safety</u> This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk <u>Traffic Volumes on Diversion routes</u> This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. <u>Environmental Impacts</u> This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. <u>Reduce maintenance impacts on road users</u> Beneficial as the new road sections will require reduced levels of maintenance. <u>Financial impact of maintenance</u> Beneficial as the new road sections will require reduced levels of maintenance.	4.	<u>Economic Growth</u> Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. <u>East-West Connectivity</u> There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective.. <u>Delivery of Housing</u> Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. <u>Safety</u> A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Environmental Quality</u> The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. <u>Accessibility</u> Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. <u>Realignment at Kex Gill</u> Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. <u>Sustainable Environment</u> This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. <u>Reduce Impact of Travel</u> This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: <u>Cost</u> Only high level cost estimates are available; <u>Funding</u> Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; <u>Landslips</u> Frequency/severity of future landslips is unknown; <u>Ground Conditions</u> In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. <u>Acceptability</u> Stakeholder/public perception or support for scheme is not fully known; <u>Environmental</u> Acceptability of construction in environmentally sensitive land is uncertain. <u>Benefits</u> Level of benefits is unknown, modelling has not been undertaken.	2.	<u>Consultation</u> To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. Climbing lane should improve traffic flow through provision of overtaking opportunities. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. There is a planning application currently being determined for reopening Blubberhouses Quarry. This route would pass near the area proposed to be excavated in the quarry and therefore may have a negligible impact on operations there. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	1. Red	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the north would move traffic away from Bothams Farm but closer to Hardisty Hill residences. <u>Natural Env/Heritage/Landscape</u> Some negative impact expected to the land to the north of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Grade II Listed Building noted as being of medium value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. Townscape/Streetscape No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. Climbing lane will provide overtaking opportunities helping improve safety of the route. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
2. 48-54 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 24 mths	3.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> Scheme avoids landslip risk area and avoids disruption to journeys during construction. It improves resilience and journey time reliability. It will impact different residences/properties.	2.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (high impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (high impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (high impact as high embankments required on approaches to viaducts in main Washburn Valley) Online construction on existing A59 between Kex Gill farm and Blubberhouses (medium Impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (no impact). <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. Very high impact given the structures involved and the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – high risk as substantial foundations will be required for the viaducts, possible requiring deep piles. Increased drainage costs – relating to groundwater conditions -medium risk for this corridor Future maintenance costs – Medium Risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
1. Not Affordable	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme is not affordable, given that at least another £90m may need to be secured from other sources.	1. £100m+	Cost ranges: £120m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
3.	<u>Alignment</u> This corridor is relatively inflexible in terms of alignment as it can not easily be amended to the tie in point. It avoids area of landslips as it deviates from the existing alignment. <u>Structures</u> Large structures are required. <u>Scalability</u> This option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. However, the smoothing of the bend at Kex Gill Farm element is not part of the proposal. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 6 – Purple Corridor

Scheme Description:

- Smoothing the bend at Kex Gill Farm;
- Utilise existing A59 and create new alignment to the south of the valley, above where the land slips have taken place (Yellow Corridor), returning to existing A59 at Meagill Lane.

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
4.	<u>Prevention of landslip related closures</u> This route avoids the main areas at risk of landslip therefore reduces risk of closure. <u>Improve Journey Time Reliability</u> Improvements will result by avoidance of areas at risk of landslip and thereby improving journey time reliability. <u>Safety</u> This corridor has a reduced risk of accidents by avoiding risk of being caught by a landslip and smoother alignment should reduce accident risk <u>Traffic Volumes on Diversion routes</u> This corridor will reduce volumes travelling through smaller towns/villages as use of diversion routes will be reduced. <u>Environmental Impacts</u> This corridor will adversely impact on environment due to new road passing through environmentally sensitive areas. <u>Reduce maintenance impacts on road users</u> Beneficial as the new road sections will require reduced levels of maintenance. <u>Financial impact of maintenance</u> Beneficial as the new road sections will require reduced levels of maintenance.		<u>Economic Growth</u> Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. Improvements at Kex Gill at this location will enhance accessibility helping businesses develop and grow through improved access to their markets, customers and other relevant services, helping meet this aspiration. <u>East-West Connectivity</u> There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will facilitate improved connectivity in this region helping meet this objective.. <u>Delivery of Housing</u> Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for development immediately adjacent to this proposal therefore impacts are considered to be small. <u>Safety</u> A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Environmental Quality</u> The road passes through an environmentally sensitive area (SSSI, AONB, SPA) and so construction here will have adverse impacts on these designations. <u>Accessibility</u> Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will improve accessibility through provision of a more reliable route with improved resilience allowing access for greater periods of time. <u>Realignment at Kex Gill</u> Realignment of the road at Kex Gill is a specific scheme/objective in NYCC's Transport Prospectus. This scheme would directly meet this objective. <u>Sustainable Environment</u> This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. <u>Reduce Impact of Travel</u> This option will reduce the impact of travel in the surrounding communities as there route will have improved resilience reducing impact of road closures and issues associated with diverted traffic.		N/A	Strategic uncertainties include: <u>Cost</u> Only high level cost estimates are available; <u>Funding</u> Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; <u>Landslips</u> Frequency/severity of future landslips is unknown; <u>Ground Conditions</u> In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. <u>Acceptability</u> Stakeholder/public perception or support for scheme is not fully known; <u>Environmental</u> Acceptability of construction in environmentally sensitive land is uncertain. <u>Benefits</u> Level of benefits is unknown, modelling has not been undertaken.	2.	<u>Consultation</u> To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
4. Amber/ Green	<u>Connectivity</u> Journey time will improve as the alignment will be smoother and there is less risk of closure. Cost of travel will largely remain the same. <u>Reliability</u> Alignment will reduce risk of collisions and landslips causing road closure therefore reducing risk of severance and impacts to the economy relating to poor connectivity and unreliable routes. <u>Resilience</u> New alignment will improve resilience and reliability of route and therefore facilitate economic growth through increased confidence of investing/developing in areas that are reliant on the route. <u>Housing</u> Although not specifically serving housing developments improved connectivity and reliability of the route can facilitate/accommodate planned housing growth in the wider area.	3. Amber	<u>Efficiency</u> Reduced emissions as a result of improved fuel efficiency on the route as it will facilitate smoother travel and reduced congestion relating to road closures, slow moving traffic and associated congestion on diversion routes. Climbing lane should improve traffic flow through provision of overtaking opportunities. No change in vehicle speed limits planned. <u>Distance Travelled</u> The length of route will change but it is not considered to be significant to the level of carbon emissions. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	4. Amber/ Green	<u>Economy</u> Improved east-west connectivity could improve the wider economy/regeneration. No impact on quarry. <u>Severance and Accessibility</u> The improved resilience of the route that this corridor will provide will reduce risk of severance relating to the long diversions created as a result of road closures. It will also improve accessibility as the route will remain open and provide more reliable journey times for users of this route. <u>Safety:</u> Smoother alignment should reduce accident risks on route. Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route. <u>Journey Time</u> Reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability.	1. Red	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the south would move traffic away from Bothams farm, but closer to St Andrews Church and Manor House. <u>Natural Env/Heritage/Landscape</u> Some negative impact expected to the land to the south of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape on greenfield land with more land take from these designations than other corridors. Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. Non designated heritage asset noted as being of low value but since there are only two options here - high or low, a precautionary approach has been adopted and high value chosen. <u>Townscape/Streetscape</u> No change	4. Amber/ Green	<u>Severance</u> Reduced risk of severance due to greater resilience of route, this will improve access to facilities in urban areas east and west of Kex Gill. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks on route as well as addressing accidents at Kex Gill Farm corner. Climbing lane will provide overtaking opportunities helping improve safety of the route. <u>Accessibility</u> Improved accessibility due to improved resilience of route. This could improve access to a range of goods and services and improve journey time reliability. No noticeable changes to physical activity, crime and public realm.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
2. 48-54 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 21 mths	3.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> Scheme avoids landslip risk area and avoids disruption to journeys during construction. It improves resilience and journey time reliability. It will impact different residences/properties.	2.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (high impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (medium impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (high impact - as high embankments required on approaches to viaducts in main Washburn Valley) Online construction on existing A59 between Kex Gill farm and Blubberhouses (Medium Impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (no impact) No impacts in relation to Blubberhouses Quarry. <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. Very high impact given the structures involved and the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – high risk as substantial foundations will be required for the viaducts, possible requiring deep piles. Increased drainage costs – high risk because of ground conditions including peat and watercourses crossing the route. Future maintenance costs – Medium Risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
1. Not Affordable	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme is not affordable, given that at least another £80m may need to be secured from other sources.	1. £100m+	Cost ranges: £110m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a relatively long section of new road that avoids landslip risk areas.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
3.	<u>Alignment</u> This corridor is relatively inflexible in terms of alignment as it can not easily be amended to the tie in point. It avoids area of landslips as it deviates from the existing alignment. <u>Structures</u> Large structures are required. <u>Scalability</u> Elements of the proposal such as smoothing of the bend at Kex Gill Farm can be removed from the proposal. In addition this option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 7 – Red Corridor

Scheme Description:

- Smoothing the bend at Kex Gill Farm;
- Utilise existing A59 or improve its horizontal alignment, where the land slips have taken place, and provide geotechnical / structural protection;

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
2.	<u>Prevention of landslip related closures</u> This route does not avoid the main areas at risk of landslip therefore does not reduce risk of closure. <u>Improve Journey Time Reliability</u> Area at risk of landslips is not avoided therefore issues relating to reliability remain. <u>Safety</u> This corridor has a reduced risk of accidents as a result of a smoother alignment. <u>Traffic Volumes on Diversion routes</u> This corridor will not reduce volumes travelling through smaller towns/villages as there will be continued use of diversion routes. <u>Environmental Impacts</u> This corridor will have similar impacts on environment as existing due to the route largely remaining the same. <u>Reduce maintenance impacts on road users</u> Continued high levels of maintenance required as the road is still at risk of landslips and the older sections of road have shorter life spans. <u>Financial impact of maintenance</u> Continued high maintenance costs as the road is still at risk of landslips and the older sections of road have higher maintenance costs associated with them.	3.	<u>Economic Growth</u> Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. This proposal will not make significant improvements in relation to this as the risk of landslips will remain at Kex Gill. Therefore this option will not necessarily enhance accessibility in the area and so will have a negligible impact on meeting this aspiration. <u>East-West Connectivity</u> There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will make negligible improvements in this regard as the risk of landslips will remain. <u>Delivery of Housing</u> Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for housing development immediately adjacent to this proposal therefore impacts are considered to be small. <u>Safety</u> A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Environmental Quality</u> The construction of this route will not impact on any new sections of land therefore will not pose any additional impacts to environmental quality. <u>Accessibility</u> Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will not improve accessibility as the resilience issue and risk of landslips remains. <u>Realignment at Kex Gill</u> This proposal will not provide a major realignment of the road at Kex Gill, therefore does not directly meet the specific objective in NYCC's Transport Prospectus. <u>Sustainable Environment</u> This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. <u>Reduce Impact of Travel</u> This option will have negligible impact on reducing the impacts of travel in the surrounding communities as the option will not remove the issues relating to landslips and overall resilience of the route.		N/A	Strategic uncertainties include: <u>Cost</u> Only high level cost estimates are available; <u>Funding</u> Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; <u>Landslips</u> Frequency/severity of future landslips is unknown; <u>Ground Conditions</u> In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. <u>Acceptability</u> Stakeholder/public perception or support for scheme is not fully known; <u>Environmental</u> Acceptability of construction in environmentally sensitive land is uncertain. <u>Benefits</u> Level of benefits is unknown, modelling has not been undertaken.	2.	<u>Consultation</u> To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
3. Amber	<u>Connectivity</u> Journey times will generally remain the same, albeit the alignment will be smoother, as the risk of landslips will remain impacting journey length and times due to long diversions. <u>Reliability</u> Reliability will largely remain the same although there will be a slight improvement due to reduced risk of accidents however this is offset by the risk of road closures from landslips not being fully eradicated. <u>Resilience</u> The route will not be fully resilient to the risk of landslips so will remain vulnerable to severe weather events. <u>Housing</u> Given the risk of landslips remains this route will not help facilitate housing delivery and the overall attractiveness of the area for investment and economic growth.	2. Red/ Amber	<u>Efficiency</u> Some reduced emissions as a result of improved fuel efficiency on the route due to smoother alignment however, risk of road closures remains and so increased mileage and congestion from diversions may mean carbon emissions from vehicles will largely remain the same. No change in vehicle speed limits planned. <u>Distance Travelled</u> No change. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	3. Amber	<u>Economy</u> Risk of landslips will remain so will not remove the issue of poor east-west connectivity and impact on improvements to the wider economy/regeneration. No impact on quarry. <u>Severance and Accessibility</u> The risk of landslips occurring is not removed so the route will not offer significantly improved resilience and so the risk of severance relating to the long diversions created as a result of road closures remains. This will also mean the overall accessibility will remain the same. <u>Safety</u>: Smoother alignment at Kex Gill Farm should reduce accident risks along that section of the route. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route.	3. Amber	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. <u>Noise</u> No change. There are no Defra Noise Important Areas within 600m of this corridor. <u>Natural Env/Heritage/Landscape</u> Smoothing of the bend at Kex Gill Farm will be within the existing road corridor. No impact therefore expected to the Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty adjacent to the existing road. <u>Townscape/Streetscape</u> No change	3. Amber	<u>Severance</u> The winding route will remain with risk of severance remaining as landslip issue will not be eradicated. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks at Kex Gill Farm corner however there remains a risk that road users could be hit by a landslip. <u>Accessibility</u> Will remain largely the same as resilience to landslips still an issue so will not improve access to key locations/services. No noticeable changes to physical activity, crime and public realm. Accessibility issues related to collisions should reduce due to some improvements in road safety.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
3. 42-48 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 15 mths	2.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> The scheme however does not avoid the landslip risk area and so resilience may not be improved. This option avoids impacting new areas of land within environmental designations and will not impact new residences/properties. Journeys will be disrupted during construction as a diversion route is likely to be necessary.	3.	<u>Ground conditions</u> No impacts in relation to peat deposits as route is online. Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (medium impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (low impact) Online construction on existing A59 between Kex Gill farm and Blubberhouses (Very High Impact on Red Corridor as heavy engineering works required within/immediately adjacent to road to stabilise landslips) Stabilisation of existing landslip features (very high impact with substantial drainage, soil stabilisation or structural solutions likely to be required and likely to involve high residual risk of future landslide activity) No impact in relation to Blubberhouses Quarry. <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route cannot be utilised during construction - a diversion route will be required. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. Low impact expected as majority of proposal would likely be permitted development.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	Risks set out in Risk Register including: <u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events - high risk. Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – High risk if structures are required to support road or stabilise landslips. Increased drainage costs – high risk depending on measures required to stabilise landslips relating to groundwater conditions. Future maintenance costs – very high risk due to potential future landslide activity <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
3.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be affordable, although additional funding may need to be sought.	3. £30-70m	Cost ranges: £40m -£45m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	0. In landslip risk area	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued maintenance and monitoring to ensure the route is safe for use due to continued risk of landslips. This option is largely the same as the existing route.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
2.	<u>Alignment</u> Inflexible option. Limited scope to amend route without it becoming an offline option. It does not avoid the area of high landslip risk as it does not deviate significantly from the existing route. <u>Structures</u> Large structures are not required. <u>Scalability</u> Very limited opportunities to scale up/down once work commences. The smoothing of the bend at Kex Gill Farm can be removed. <u>Diversion/Alternative Routes</u> Online works may be constrained by the need to keep the route partly open for users.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill, available in 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).

Table 8 – Brown Corridor

Scheme Description:

- Smoothing the bend at Kex Gill Farm;
- Utilise existing A59 and create new alignment to the north of the existing alignment, midway up the valley, returning to existing A59 before Blubberhouses

Strategic Case								
Scale of Impact	**Scale of Impact Comments**	**Fit with Wider Transport and Government Objectives**	**Wider Transport and Government Objectives Comments**	**Fit with Other Objectives**	**Fit with Other Objectives Comments**	**Key Uncertainties**	**Degree of Consensus Over Outcomes**	**Degree of Consensus Over Outcomes Comments**
2.	<u>Prevention of landslip related closures</u> This route does not avoid the main areas at risk of landslip therefore does not reduce risk of closure. <u>Improve Journey Time Reliability</u> Area at risk of landslips is not avoided therefore issues relating to reliability remain. <u>Safety</u> This corridor has a reduced risk of accidents as a result of a smoother alignment. <u>Traffic Volumes on Diversion routes</u> This corridor will not reduce volumes travelling through smaller towns/villages as there will be continued use of diversion routes. <u>Environmental Impacts</u> This corridor will have similar impacts on environment as existing due to the route largely remaining the same. <u>Reduce maintenance impacts on road users</u> Continued high levels of maintenance required as the road is still at risk of landslips and the older sections of road have shorter life spans. <u>Financial impact of maintenance</u> Some reduction in maintenance costs as there are new sections of road but it is still at risk of landslips and the older sections of road have higher maintenance costs associated with them.	3.	<u>Economic Growth</u> Growth of the economy is a key aim for many of the relevant policy documents (including NYCC's LTP, LEP Strategic Economic Plan and relevant Local Plan documents) for this scheme. This proposal will not make significant improvements in relation to this as the risk of landslips will remain at Kex Gill. Therefore this option will not necessarily enhance accessibility in the area and so will have a negligible impact on meeting this aspiration. <u>East-West Connectivity</u> There is limited east-west connectivity in this region, particularly for strategic traffic. This proposal will make negligible improvements in this regard as the risk of landslips will remain. <u>Delivery of Housing</u> Provision of improved infrastructure will facilitate growth in surrounding and neighbouring areas (NYCC, Harrogate, Craven, Leeds and Bradford) however there are no proposals for housing development immediately adjacent to this proposal therefore impacts are considered to be small. <u>Safety</u> A smoother alignment should reduce accident risks on the route. The reduction in risk of road closures will improve user benefits from improved journey times and journey time reliability. <u>Environmental Quality</u> The construction of this route will not impact on any new sections of land therefore will not pose any additional impacts to environmental quality. <u>Accessibility</u> Accessibility is an important objective in the relevant policy documents, particularly the LTP. This proposal will not improve accessibility as the resilience issue and risk of landslips remains. <u>Realignment at Kex Gill</u> This proposal will not provide a major realignment of the road at Kex Gill, therefore does not directly meet the specific objective in NYCC's Transport Prospectus. <u>Sustainable Environment</u> This proposal will do little to improve the sustainability of travel - as it is unlikely to encourage more sustainable forms of travel and will continue to predominantly accommodate travel for cars and HGVs. <u>Reduce Impact of Travel</u> This option will have negligible impact on reducing the impacts of travel in the surrounding communities as the option will not remove the issues relating to landslips and overall resilience of the route.		N/A	Strategic uncertainties include: <u>Cost</u> Only high level cost estimates are available; <u>Funding</u> Currently DfT has provisionally indicated £25m resilience funding is available for this scheme but this is not guaranteed and other funding opportunities have not yet been identified; <u>Landslips</u> Frequency/severity of future landslips is unknown; <u>Ground Conditions</u> In-depth ground investigation has not been undertaken so there may be unforeseen issues, including uncertain depth of soft soil, ground instability, bedrock conditions and groundwater conditions. <u>Acceptability</u> Stakeholder/public perception or support for scheme is not fully known; <u>Environmental</u> Acceptability of construction in environmentally sensitive land is uncertain. <u>Benefits</u> Level of benefits is unknown, modelling has not been undertaken.	2.	<u>Consultation</u> To date there has not been any consultation with the public over any particular option/corridor. Some high-level stakeholder engagement has taken place (indicating support of a scheme in principle). Likely that environmental organisations will not support construction in the SSSI and other environmentally sensitive locations/designations.

Economic Case											
Economic Growth	**Economic Growth Comments**	**Carbon Emissions**	**Carbon Emissions Comments**	**Socio Distributional Impacts and the Regions**	**Socio Distributional Impacts and the Regions Comments**	**Local Environment**	**Local Environment Comments**	**Well Being**	**Well Being Comments**	**Expected VfM Category**	**Expected VfM Category Comments**
3. Amber	<u>Connectivity</u> Journey times will generally remain the same, albeit the alignment will be smoother, as the risk of landslips will remain impacting journey length and times due to long diversions. <u>Reliability</u> Reliability will largely remain the same although there will be a slight improvement due to reduced risk of accidents however this is offset by the risk of road closures from landslips not being fully eradicated. <u>Resilience</u> The route will not be fully resilient to the risk of landslips so will remain vulnerable to severe weather events. <u>Housing</u> Given the risk of landslips remains this route will not help facilitate housing delivery and the overall attractiveness of the area for investment and economic growth.	2. Red/ Amber	<u>Efficiency</u> Some reduced emissions as a result of improved fuel efficiency on the route due to smoother alignment however, risk of road closures remains and so increased mileage and congestion from diversions may mean carbon emissions from vehicles will largely remain the same. No change in vehicle speed limits planned. <u>Distance Travelled</u> No change. <u>Vehicle Composition</u> Change in vehicle composition is likely to remain the same so no change in emissions as a result of conversion to NMUs. <u>Construction</u> Some increase in carbon emissions due to construction activities but in the long term the options within this corridor will not result in an increase in non-traded carbon emissions.	3. Amber	<u>Economy</u> Risk of landslips will remain so will not remove the issue of poor east-west connectivity and impact on improvements to the wider economy/regeneration. There is a planning application currently being determined for reopening Blubberhouses Quarry. This route would pass near the area proposed to be excavated in the quarry therefore may have a negligible impact on operations there. <u>Severance and Accessibility</u> The risk of landslips occurring is not removed so the route will not offer significantly improved resilience and so the risk of severance relating to the long diversions created as a result of road closures remains. This will also mean the overall accessibility will remain the same. <u>Safety</u>: Smoother alignment at Kex Gill Farm should reduce accident risks along that section of the route. <u>Air Quality/Noise</u> Based on information currently available, options within this corridor are not expected to have beneficial or adverse operational air quality and noise impacts on specific non-local groups of people over and above the existing route.	2. Red/ Amber	<u>Air Quality</u> No AQMA within 200m and no AQMA needed. No change in speed limit, traffic is not expected to change to an extent that options within this corridor would result in a change in air quality impacts. Options within this corridor would however move traffic further away from Bothams Farm. <u>Noise</u> There are no Defra Noise Important Areas within 600m of this corridor. This alignment to the north would move traffic away from Bothams Farm. Some potential for noise impacts still exists for Bothams Farm as this corridor is still within 600m of the existing A59. Corridor doesn't deviate sufficiently away from properties for a benefit. <u>Natural Environment</u> Some negative impact expected to the land north of the existing road designated as Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest and Area of Outstanding Natural Beauty. Options within this corridor would also become a new visual distractor in the landscape. . Nidderdale AONB, North Pennine Moors (SPA, SAC) and West Nidderdale, Barden and Blubberhouses Moors SSSI designated sites noted as high value. West End Marsh Site of Importance for Nature Conservation - medium value <u>Townscape/Streetscape</u> No change	3. Amber	<u>Severance</u> Risk of severance remains as landslip issue will not be eradicated. <u>Injury or death (safety)</u> Smoother alignment should reduce accident risks at Kex Gill Farm corner however there remains a risk that road users could be hit by a landslip. <u>Accessibility</u> Will remain largely the same as resilience to landslips still an issue. No noticeable changes to physical activity, crime and public realm. Accessibility issues related to collisions should reduce due to some improvements in road safety.	Not Assessed.	At this stage of the study it is not possible to develop an accurate assessment of the Value for Money of a corridor. Whilst high level indicative scheme cost estimates have been produced, in the absence of a suitable traffic model, it has not been possible to quantify the level of benefits offered by any corridor. This will be a key area of development as the study progresses.

Management Case								
Implementation Timetable	**Implementation Timetable Comments**	**Public Acceptability**	**Public Acceptability Comments**	**Practical Feasibility**	**Practical Feasibility Comments**	**Quality of the Supporting Evidence**	**Quality of the Supporting Evidence Comments**	**Key Risks**
4. 36-42 months	Implementation time frames are based on Highways England Major Projects Lifecycle Workflow. Preliminary Design - 8mths to 11mths Statutory Procedures - 15mths to 20mths Construction Preparation - 7mths to 14.5mths Construction - 12 mths	2.	<u>Public Consultation</u> No public consultation undertaken to date. Expected to be mixed opinion as road users would welcome improved resilience, reliability and journey time savings but there is also likely to be concern regarding environmental impact and any impacts on areas currently not affected by the A59. <u>Scheme Impacts</u> The scheme however does not avoid the landslip risk area and so resilience may not be improved. This option will impact new areas of land within environmental designations and will not impact new residences/properties.	3.	<u>Ground conditions</u> Extensive peat deposits with water courses crossing route causing stability, including shallow cutting slopes, and drainage issues (medium impact) Construction over deep soft ground deposits at western end of Kex Gill with potential for large embankment settlements (medium impact) Construction of embankments over soft ground in valley floor in vicinity of Blubberhouses (medium impact) Online construction on existing A59 between Kex Gill farm and Blubberhouses (Medium Impact on where this corridor ties in to existing road) Stabilisation of existing landslip features (very high impact with substantial drainage, soil stabilisation or structural solutions likely to be required and likely to involve high residual risk of future landslide activity) Unknown ground conditions and contamination: Risk of buried obstructions and ground contamination associated with the Blubberhouses Quarry (high impact) <u>Highways/Design</u> Design is in accordance with DMRB. No departures from standards. Large structures are not required as part of the design. The existing route can be utilised during construction. <u>Legal/Statutory Permissions</u> Legal feasibility and statutory permissions have not been obtained for this option. High impact given the length of route, offline, passing through environmentally sensitive land.	3.	<u>Road closures</u> NYCC has a good record of the history of road closures including costs and duration of time. <u>Accident data</u> Full accident data for the past five years along the length of A59 is available. <u>Traffic flow</u> Good traffic flow data is available for A59 and other roads in the vicinity. <u>Journey Time information</u> Good for different routes in normal conditions (but not for when closure is in place - awaiting traffic master data) <u>Geotechnical data</u> Ground Conditions - poor quality evidence – generally reliant on geological maps and site walkover inspection. Landslip activity – good records of locations of existing landslide activity but lacking detail of ground conditions and landslip mechanisms. Groundwater conditions: Poor quality of evidence. Some anecdotal evidence along Red route. Ongoing GI on central area of Red route will provide data in coming months. <u>Mapping/Highways</u> Conceptual design has been based on available 'off the shelf' digital information. Good mapping data available: o Digital Terrain (5m grid) Horizontal Accuracy ±1m RMSE Vertical Accuracy ±1.5m RMSE. o Aerial Photography 25cm resolution Overall Accuracy ±1.5m RMSE. o Options developed using Autodesk Infraworks360 programme. o Earthworks, steel and concrete quantities derived directly from the programme <u>Environmental</u> Desktop evidence from Local Planning Policy documents	<u>Cost/affordability</u> £25m funding available from DfT however, this is not committed and there is a risk this funding will not be secured. Also risk funding is not sufficient and additional funding is likely to be required from other/local sources (LA contribution) - this has not been identified; <u>Acceptability</u> Stakeholder/public support is not known potential concern relating to environmental impacts <u>Consents/Approvals</u> Statutory procedures required - likely to require a Public Inquiry, business case approval will be required to release DfT funding; <u>Ground conditions</u> Risk of future landslip events (low risk). Unforeseen ground conditions – High risk due to lack of ground investigation data Increased earthworks construction costs – High risk due to lack of ground investigation data Increased cost of structural foundations – Low risk as only small structures likely to be required for this corridor. Increased drainage costs – relating to groundwater conditions -medium risk for this corridor Future maintenance costs – Medium risk due to soft ground but can be reduced to Low by adoption of appropriate earthworks designs. <u>Environmental</u> Risk associated with appropriateness of proposal as the scheme passes through environmentally sensitive areas with statutory designations including SPA and SSSI <u>Design</u> Uncertainties relating to ground conditions and statutory undertakers can impact design. <u>Construction and contractual risks</u> Risks associated with procurement and timely implementation of the scheme exist.

Financial Case									
Affordability	**Affordability Comments**	**Capital Cost (£m)**	**Capital Cost (£m) Comments**	**Revenue Costs (£m)**	**Revenue Costs (£m) Comments**	**Cost Profile**	**Overall Cost Risk**	**Overall Cost Risk comments**	**Other Costs**
3.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely. As a result, it is considered that this scheme may be affordable, although additional funding may need to be sought.	3. £30-70m	Cost ranges: £30m -£50m Capital cost estimates include for: • Roadworks • Structures • Preliminaries • Contingencies (10%) • Other major items • Works by others • Land costs • Design, management, supervision • Risk allowance • Optimism bias (45%) • Inflation • Non recoverable VAT.	1. Avoids landslip risk	High level operation, maintenance and monitoring costs provided. Maintenance costs are higher for existing sections of road compared with new sections of road as it requires continued monitoring to ensure the route is safe for use due to continued risk of landslips. This option has a short section of new road section.	At this stage of the study, no cost profiles have been developed for corridors. Whilst high level cost estimates have been developed for each corridor, further detailed consideration of the ground conditions and construction approach is needed before accurate cost profiles can be developed.	1. High Risk	In terms of cost risk, a high degree of risk exists for all corridors. The initial estimates developed for both capital and revenue costs are at high level and there is large uncertainty surrounding the inputs, particularly the known ground conditions for the majority of the study area, which have the potential to have a significant impact on the earthworks related costs. Given the high level of uncertainty, the capital costs developed include: • Contingencies 10%. • Optimism Bias 45%.	At this early stage, no other significant costs items are anticipated.

Commercial Case				
Flexibility of Option	**Flexibility of Option Comments**	**Where is Funding Coming From?**	**Any Income Generated?**	**If Yes, How Much Income Generated (£m)**
3.	<u>Alignment</u> This corridor is relatively inflexible in terms of alignment as it could not be amended to be reduced in length without it being only a slight amendment from an online option. It does deviate from the existing alignment however does not avoid the area of high landslip risk. <u>Structures</u> Large structures are not required. <u>Scalability</u> This option can be constructed to futureproof for increased capacity need e.g. for widening and/or NMU provision but would only be for a short section. The smoothing of the bend at Kex Gill Farm can be removed. <u>Diversion/Alternative Routes</u> This option can be constructed whilst the original route remains open.	The DfT has established a £100m fund/budget for resilience schemes and provisionally allocated £25m of funding to NYCC for a scheme at Kex Gill. Funding to be utilised by financial year 2019/20. The exact requirements for securing the funding (e.g. business case) are still to be confirmed. It is anticipated that NYCC would need to fund any additional cost over and above this £25m. Given the nature of the scheme, developer/private contributions are unlikely.	No	No income will be generated. No plans to introduce any form of user charging (e.g. toll).