A38 Derby Junctions

TR010022

Volume 6

6.3 Environmental Statement Appendices

Appendix 12.2: Human Health

Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

April 2019

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A38 Derby Junctions Development Consent Order 202[ ]

6.3 Environmental Statement Appendices
Appendix 12.2: Human Health

Regulation Number	Regulation 5(2)(a)
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Appendix 12.2: Human health

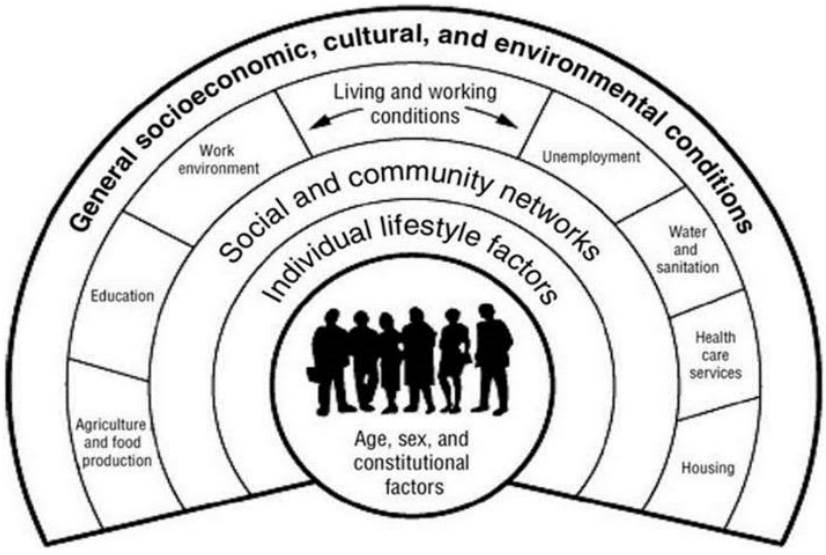
1 Introduction

1.1.1 This appendix provides additional detail to the methodology for the assessment of effects on human health resulting from the construction and operation of the A38 Derby Junctions (herein referred to as 'the Scheme'). An analysis of the Scheme's impact on the determinants of health is presented in Chapter 12: People and Communities Section 12.10 of the Environmental Statement (ES) [**TR010022/APP/6.1**].

2 Methodology

2.1.1 Factors that have the most significant influence on the health of a population are called 'determinants of health'; these include an individual's genetics and their lifestyle, the surrounding environment, as well as policy, cultural and societal issues. The interrelationship between these factors is shown in Illustration 1.

2.1.2 Within a population there can also be health 'inequalities'. The WHO defines these as "*differences in health status or in the distribution of health determinants between different population groups. For example, differences in mobility between elderly people and younger populations or differences in mortality rates between people from different social classes*" (World Health Organisation, 2006). This assessment of human health effects has taken account of these factors and considered how the Scheme may influence the physical and mental health wellbeing of local residents and inhabitants of the study area.



Source: Dahlgren and Whitehead (1991)

Illustration 1: The Dahlgren and Whitehead model of health determinants (World Health Organisation, 1992)

2.1.3 Table 1 sets out the health determinants as being relevant to the Scheme together with the key potential health impacts associated with each determinant.

Table 1: Human health determinants

Health determinant	Potential health impact
Access to healthcare services and other social infrastructure	Strong, vibrant, sustainable and cohesive communities require good quality, accessible public services and infrastructure. Access to social infrastructure and other services is a key component of Lifetime Neighbourhoods. Encouraging the use of local services is influenced by accessibility, in terms of transport and access into a building, and the range and quality of services offered. Access to good quality health and social care, education (primary, secondary and post-19) and community facilities has a direct positive effect on human health. Opportunities for the community to participate in the planning of these services has the potential to impact positively on mental health and wellbeing and can lead to greater community cohesion.
Access to open space and nature	Providing secure, convenient and attractive open/green space can lead to more physical activity and reduce levels of heart disease, strokes and other ill-health problems that are associated with both sedentary occupations and stressful lifestyles. There is growing evidence that access to parks and open spaces and nature can help to maintain or improve mental health. The patterns of physical activity established in childhood are perceived to be a key determinant of adult behaviour; a growing number of children are missing out on regular exercise, and an increasing number of children are being diagnosed as obese. Access to play spaces, community or sport facilities such as sport pitches can encourage physical activity. There is a strong correlation between the quality of open space and the frequency of use for physical activity, social interaction or relaxation.
Air quality, noise and neighbourhood amenity	The quality of the local environment can have a significant impact on physical and mental health. Pollution caused by construction, traffic and commercial activity can result in poor air quality, noise nuisance and vibration. Poor air quality is linked to incidence of chronic lung disease (chronic bronchitis or emphysema) and heart conditions and asthma levels of among children. Noise pollution can have a detrimental impact on health resulting in sleep disturbance, cardiovascular and psycho-physiological effects. Good design and the separation of land uses can lessen noise impacts.
Accessibility and active travel	Convenient access to a range of services and facilities minimises the need to travel and provides greater opportunities for social interaction. Buildings and spaces that are easily accessible and safe also encourage all groups, including older people and people with a disability, to use them. Discouraging car use and providing opportunities for walking and cycling can increase physical activity and help prevent chronic diseases, reduce risk of premature death and improve mental health.
Access to work and training	Employment and income is a key determinant of health and wellbeing. Unemployment generally leads to poverty, illness and a reduction in personal and social esteem. Works aids recovery from physical and mental illnesses.

Health determinant	Potential health impact
Social cohesion and neighbourhoods	Friendship and supportive networks in a community can help to reduce depression and levels of chronic illness as well as speed recovery after illness and improve wellbeing. Fragmentation of social structures can lead to communities demarcated by socio-economic status, age and/or ethnicity, which can lead to isolation, insecurity and a lack of cohesion. Voluntary and community groups, properly supported, can help to build up networks for people who are isolated and disconnected, and to provide meaningful interaction to improve mental wellbeing. Lifetime Neighbourhoods places the design criteria of Lifetime Homes into a wider context. It encourages planners to help create environments that people of all ages and abilities can access and enjoy, and to facilitate communities that people can participate in, interact and feel safe.
Climate change	There is a clear link between climate change and health. The available literature is clear that local areas should prioritise policies and interventions that 'reduce both health inequalities and mitigate climate change' because of the likelihood that people with the poorest health would be hit hardest by the impacts of climate change. Planning is at the forefront of both trying to reduce carbon emissions and to adapt urban environments to cope with higher temperatures, more uncertain rainfall, and more extreme weather events and their impacts such as flooding. Poorly designed homes can lead to fuel poverty in winter and overheating in summer contributing to excess winter and summer deaths. Developments that take advantage of sunlight, tree planting and accessible green/brown roofs also have the potential to contribute towards the mental wellbeing of residents.

2.1.4 The following health and wellbeing determinants have been excluded from the qualitative assessment of the potential effects as they are not considered to be capable of being influenced by the Scheme:

- Housing quality and design.
- Crime reduction and community safety.
- Access to healthy food.

3 Assessment of potential human health effects

3.1.1 Tables 2B to 2F set out in detail the assessment of the potential human health impacts and effects associated with the Scheme during the construction and operational phases and is supplementary to the assessment presented in Chapter 12: People and Communities of this ES (refer to Section 12.10) [**TR010022/APP/6.1**].

4 References

Department for Communities and Local Government (2011) Lifetime Neighbourhoods.

World Health Organisation (2006) Constitution of the World Health Organisation.

World Health Organisation (1992) European strategies for tackling social inequities in health: Levelling up Part 2. Available online at: http://www.euro.who.int/__data/assets/pdf_file/0018/103824/E89384.pdf

Table 2: Access to healthcare services and other social infrastructure

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal retain or re-provide existing social infrastructure?	No	The Scheme would not have an impact on the provision of existing health or social care services or influence the demand for and/or capacity of public services.	Construction: N/A Operation: N/A	N/A
Does the proposal assess the impact on healthcare services?	Yes	The Scheme would not have a direct impact on the provision of existing health and social care services, or influence the demand for and/or capacity of public services. During Scheme construction there is potential for increased severance for motorised users when accessing Kingsway Hospital and Derby Royal Hospital due to temporary road/lane closures associated with construction. This severance would be minimised through a Traffic Management Plan (refer to Appendix 2.3 [**TR010022/APP/6.3**] to be agreed with Derby City Council (DCiC), Erewash Borough Council (EBC), Derbyshire County Council (DCC) and the emergency services. Appropriate mechanisms would be set up to communicate with local residents to highlight potential periods of disruption. The Scheme is anticipated to improve journey times along the A38 between Kingsway and Little Eaton junctions through the provision of a grade separated junctions. This would reduce severance experienced by local residents when accessing healthcare facilities. Improved access to healthcare is an essential component of creating sustainable, healthy communities.	Construction: 0 Operation: +	Implementation of suitable diversions for motorised and non-motorised users to be agreed with DCiC, EBC, DCC and the emergency services prior to construction.

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal include the provision or replacement of a healthcare facility and does the facility meet NHS requirements?	No	The Scheme does not include the provision of healthcare facilities.	Construction: N/A Operation: N/A	N/A
Does the proposal assess the capacity, location and accessibility of other social infrastructure, e.g. schools, social care and community facilities?	Yes	The Scheme would not have an impact on the capacity and location of social infrastructure such as schools, social care and community facilities. During construction of the Scheme there is potential for temporary disruption to the accessibility of Brackensdale Primary School, Mackworth. The catchment area for this school spans the A38 and a number of families would need to cross the A38 to reach the school, whether on foot, bicycle or motorised vehicle. Increased congestion during Scheme construction and the closure of local accesses onto the A38 would result in changes to journey patterns. This has the potential to increase journey times during construction prior to the opening of the new junctions. During construction of the Scheme routes for motorised users and diversions for non-motorised users would be agreed with DCiC, DCC and EBC where appropriate to minimise disruption to access of community facilities. The school is located on Brackensdale Avenue which is predicted to experience a reduction in traffic flows as a result of Scheme operation. This is also one of two main routes to Mackworth from the east of the A38. The other route would be via the A52 Ashbourne Road and Prince Charles Avenue which would experience an increase in traffic levels with the Scheme. However, this is not anticipated to adversely affect access to the school.	Construction: 0 Operation: 0	Implementation of suitable diversions for motorised and non-motorised users to be agreed with DCiC, DCC and EBC prior to construction. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
		The catchment areas for the other schools in Derby do not bridge the A38 and therefore it is not predicted that the Scheme would significantly affect the accessibility of these schools.		
Does the proposal explore opportunities for shared community use and co-location of services?	No	The Scheme does not include or require the provision of community facilities for shared community use and co-location services.	Construction: N/A Operation: N/A	N/A
Does the proposal contribute to meeting primary, secondary and post 19 education needs?	No	The Scheme does not include or require the provision of education facilities.	Construction: N/A Operation: N/A	N/A
Does the proposal retain and enhance existing open and natural spaces?	Yes	A number of areas of public open space would be required to accommodate the construction and operation of the Scheme. The areas of public open space lost during construction are on the edge of much larger areas of public open space. The loss of this land is therefore not considered to negatively impact the use of the remaining public open space. Replacement public open space offered in exchange would not be provided prior to the loss of public open space at the start of the Scheme construction phase due to the location of the proposed replacement land. However, this is not anticipated to affect the quality of life in the neighbourhood due to the nearby availability of extensive areas of public open space. Those areas lost would be replaced with an area of public open of greater size than the area required for Scheme construction and operation. Public open space replacement proposals at Queensway have been agreed in principle with DCiC, with the	Construction: 0 Operation: +	Provision of replacement areas of public open space. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
		replacement public open space offered in exchange being integrated with facilities for pedestrians and cyclists connecting the A52 Ashbourne Road with the proposed new Markeaton footbridge in the area left vacant by the demolition of properties on Queensway. The Scheme would include ecological mitigation within areas designated as public open space; this has the opportunity to enhance the amenity of these natural spaces.		
In areas of deficiency does the proposal provide new open or natural space, or improve access to existing spaces?	Yes	As noted above an area of public open space would be required to accommodate the construction and operation of the Scheme. Those areas lost would be replaced with an area of public open space of greater size than the area required for construction and operation. During Scheme construction diversions for motorised users and pedestrians/cyclists would be agreed with DCiC, DCC and EBC where appropriate to minimise the disruption to the access of public open space. All pedestrian and cyclist facilities which provide access to public open spaces lost as a result of the Scheme would be replaced with like for like or improved facilities. The Scheme would include a number of improvements to access for public open space, these include: • Provision of a new shared pedestrian and cycle route across Kingsway junction creating a new link to Mackworth Park and areas of informal open space for residents east of the A38. • Improved crossing facilities in the form of signalised crossing would be installed on A52 Ashbourne Road west of Markeaton junction providing improved access to Markeaton Park from the south-west.	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as pedestrian and cyclist route diversions during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
		• Use of an area within the Kingsway Hospital site for flood storage, wetland habitat and a perimeter footpath which would support the use of the area as green wedge and has the potential to enhance the amenity of the site. • Provision of replacement public space in close proximity to the area lost and directly linked to Markeaton Park and Mill Pond.		
Does the proposal provide a range of play spaces for children and young people?	No	The Scheme does not provide specific play spaces for children and young people.	Construction: N/A Operation: N/A	N/A
Does the proposal provide links between open and natural spaces and the public realm?	Yes	During Scheme construction, changes to journey times, local travel patterns, and uncertainty of route for pedestrians and cyclists would arise from the temporary closures and diversions of PRoWs through direct land take and provision of access routes required for the construction of the Scheme. This would include the temporary loss of Markeaton footbridge (for approximately one and a half year) which provides access to Markeaton Park across the A38. However, diversions and other relevant access points would be provided to minimise potential adverse impacts on pedestrian and cyclist routes linking open and natural space. During operation, the new pedestrian and cycle route across Kingsway junction would provide a new link between Markeaton Park and the public realm. Provision is also made within the Scheme to maintain the existing function of PRoW, cycleways and footways through permanent realignments and replacement and improved crossing facilities.	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as pedestrian and cyclist route diversions during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to the Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
		The provision of replacement public space would be located in close proximity to area where land would be lost to construct the Scheme at Queensway. The replacement area would be directly linked to Markeaton Park by the new Markeaton footbridge.		
Are the open and natural spaces welcoming, safe and accessible for all?	Yes	Provision of replacement public open space would be designed to be welcoming, safe and accessible for all.	Construction: N/A Operation: 0	Provision of replacement public open space. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].
Does the proposal set out how new open space will be managed and maintained?	Yes	The Scheme includes replacement public open space offered in exchange for the loss of public open space; this would provide a new area of public open space which would be managed and appropriately maintained.	Construction: N/A Operation: 0	Maintenance of new area of public open space. Refer to Section 12.9 [**TR010022/APP/6.1**].

Table 3 Air quality, noise and neighbourhood amenity

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
Does the proposal minimise construction impacts such as dust, noise, vibration and odours?	Yes	Best practice measures as outlined in Chapter 5: Air Quality, Chapter 9: Noise and Vibration [**TR010022/APP/6.1**] and detailed in the Outline Environmental Management Plan (OEMP) (refer to Appendix 2.1 [**TR010022/APP/6.3**]) would be developed into a Construction Environmental Management Plan (CEMP). These measures and procedures would minimise impacts on receptors associated with dust, noise, vibration and odours as far as is practicable during Scheme construction.	Construction: - Operation: N/A	Implementation of suitable mitigation measures as outlined in the OEMP.

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
		A Noise and Vibration Management Plan would form part of the CEMP and would be produced prior to construction outlining management and monitoring of noise and vibration during construction.		
Does the proposal minimise air pollution caused by traffic and energy facilities?	Yes	Best practice measures detailed in Chapter 5: Air Quality [**TR010022/APP/6.1**] and detailed in the OEMP (refer to Appendix 2.1 [**TR010022/APP/6.3**]) would minimise air pollution during construction of the Scheme. During operation of the Scheme a number of receptors would experience an increase in air pollution (NO_2, PM_{10} and $PM_{2.5}$ concentrations), whilst others would experience a decrease. Overall, there would be a slight improvement in local air quality as a result of the Scheme. The Scheme is anticipated to increase the overall number of vehicle kilometres travelled during its operation and therefore regional air pollution (emissions of NOx, PM_{10} and CO_2) are expected to increase with the Scheme. However, much of this increase would be on roads outside of densely populated areas. The Scheme is expected to be compliant with the EU Directive on Ambient Air Quality during the construction and operational years and therefore no significant air quality effects are anticipated during construction and operation of the Scheme. No energy facilities are proposed as part of the Scheme.	Construction: - Operation: +	Implementation of suitable mitigation measures as outlined in the OEMP.
Does the proposal minimise the noise pollution caused by traffic and commercial use?	Yes	Best practice measures detailed in Chapter 6: Noise and Vibration [**TR010022/APP/6.1**] and detailed in the OEMP (refer to Appendix 2.1 [**TR010022/APP/6.3**]) would minimise noise and vibration impacts during construction of the Scheme. Such measures would be included in a Noise and Vibration Management Plan would form part of the contractor's CEMP. The following measures have been incorporated into the	Construction: - Operation: +	Implementation of suitable mitigation measures as outlined in the OEMP. Completion of a noise

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
		Scheme design to, where practicable, minimise noise pollution caused by traffic using the Scheme: • The new A38 mainline through Kingsway junction and Markeaton junction would be in underpasses below the level of the existing junctions, screening traffic from nearby sensitive receptors. • The use of low noise thin surfacing. • The construction of noise barriers at the following locations: - East side of Kingsway Park Close. - The northbound and southbound A38 mainline between Brackensdale Avenue and Markeaton junction. - Western boundary of the Royal School for the Deaf. - Northbound A38 mainline at Little Eaton junction in the vicinity of the Ford Farm Mobile Home Park. - Southbound diverge slip road at Little Eaton junction. - Southbound A38 mainline at Little Eaton junction. There would be both increases and decreases in noise levels at residential properties as a result of the Scheme. Overall, operation of the Scheme would result in a slight reduction in the number of residential buildings above the level of noise, above which significant adverse effects on health and quality of life occur. This is anticipated during both the day and night in 2024 and 2039.		regulations assessment following detailed design to determine which properties qualify for installation of additional noise insulation under the Noise Insulation Regulations.
Does the proposal prioritise and encourage walking (such as through shared spaces)?	Yes	During construction, changes to journey times, local travel patterns, and certainty of route for pedestrians and cyclists would arise from the temporary and permanent closure and diversions of PRoWs required for the construction of the Scheme. Prior to construction diversion routes would be agreed with DCiC, DCC and EBC to minimise the disruption to access of	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as pedestrian and cyclist route diversions during construction where

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
		community facilities and public open space. All pedestrian and cyclist facilities would be replaced with like for like or improved facilities to encourage walking and access to public open space/shared spaces. Further mitigation measures embedded within the Scheme design to encourage walking include: • Provision of a new shared pedestrian and cycle route across Kingsway junction providing an access across this junction, linking communities and their facilities on either side of the A38. • Provision of a perimeter footpath within the Kingsway hospital site used for flood storage. • Improved crossing facilities in the form of controlled crossing on all arms of Markeaton junction and on the A52 Ashbourne Road (west) providing improved access across the junction to areas of public open space. • Permanent diversion of Breadsall Footpath No. 3 would provide a safer route with improved amenity for pedestrians away from the A39 mainline carriageway. This route links into a wider network of PRoW.		required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Table 4: Accessibility and active travel

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
Does the proposal prioritise and encourage cycling (for example by providing secure cycle parking and cycling lanes)?	Yes	During construction, changes to journey times, local travel patterns, and certainty of route for cyclists would arise from the temporary and permanent closure and diversions of national cycle routes NR54 and NR68 and regional route RR66. Prior to construction of the Scheme, diversion routes would be agreed with DCiC, DCC and EBC to minimise the disruption to cycle routes. All existing cycle routes directly and permanently affected by the Scheme would be realigned or rebuilt with no material change in journey length. Improvements to these routes would be made where appropriate. A new cycle route across Kingsway junction would be provided as part of the Scheme and would link into the existing local and strategic cycle network.	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as cyclist route diversions during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].
Does the proposal connect public realm and internal routes to local and strategic cycle and walking networks?	Yes	During construction, changes to journey times, local travel patterns, and certainty of route for cyclists and pedestrians would arise from the temporary and permanent closure and diversions of national cycle routes NR54 and NR68 and regional route RR66. Prior to construction of the Scheme diversion routes would be agreed with DCiC, DCC and EBC to minimise the disruption to cyclist and pedestrian routes. All existing pedestrian and cycle routes directly and permanently affected by the Scheme would be realigned or rebuilt with no material change in journey length. Improvements to these routes would be made where appropriate. A new shared pedestrian and cyclist route across Kingsway junction would be provided as part of the Scheme and would link into the existing local and strategic cycle network and PRoW.	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as diversions to pedestrian and cyclist routes during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
Does the proposal include traffic management and calming measures to help reduce and minimise road injuries?	Yes	Construction traffic impacts would be minimised through the CEMP and associated Traffic Management Plan (TMP) (refer to Appendix 2.3 [**TR010022/APP/6.3**]) to be agreed with DCiC, DCC, EBC and the emergency services. Appropriate mechanisms to communicate with local residents would be set up to highlight potential periods of disruption (for example, web-based, newsletters, newspapers, radio announcements etc.) and an appropriate communication strategy would be developed. The Scheme's highway design is based on good practice, as embodied in the Design Manual for Roads and Bridges (DMRB). As part of the design process, appropriate safety measures have been included. The grade-separation of the junctions would mitigate conflicts between local and strategic traffic and reduce queuing at the roundabouts, which would improve safety for road users. The Scheme would mitigate conflicts between motorised users and pedestrians/cyclists and improve safety for all. The Transport Assessment Report [**TR010022/APP/7.3**] estimates that the Scheme would reduce Personal Injury Accidents by 1,396 over a 60 year period, fatal causalities reduced by 8, serious causalities reduced by 135 (i.e. saving of 142 killed or seriously injured).	Construction: 0 Operation: +	Implementation of suitable traffic management implemented through a TMP and CEMP. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].
Is the proposal well connected to public transport, local services and facilitates?	No	N/A	Construction: N/A Operation: N/A	N/A

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
Does the proposal seek to reduce car use by reducing car parking provision, supported by the controlled parking zones, car clubs and travel plan measures?	No	N/A	Construction: N/A Operation: N/A	N/A
Does the proposal allow people with mobility problems or a disability to access buildings and places?	Yes	During construction, temporary diversions and closures to PRoWs may have a differential impact on people with mobility issues and footpaths that have a higher use of groups with protected characteristics. Baseline data on the use of PRoW within the Scheme by users with mobility problems or a disability is not available. Consideration would be given to the accessibility of temporary diversions for users with mobility problems or a disability. Appropriate diversions would be agreed with DCiC, DCC and EBC prior to the start of construction. The Royal School for the Deaf is located in close proximity to Markeaton junction, off the A52 Ashbourne Road. The existing access to the Scheme off the A52 would be reconfigured as part of the Scheme to ensure safe access to the school during Scheme operation. During Scheme construction, the contractor would liaise with the Royal School for the Deaf regarding school access. If access issues become apparent, the contractor would investigate development of a school drop off for cars at the end of Markeaton Street at the back of the school, within land owned by Derby University. Any such arrangements would be undertaken by agreement between affected parties. During operation, new and improved pedestrian and cyclist facilities would improve connectivity at Kingsway and Markeaton	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as diversions to pedestrian and cyclist routes during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to Scheme	Details of evidence	Potential health impact	Further action or mitigation recommended
		junctions, increasing opportunities for active travel for all. This is a beneficial impact that could be shared by groups with protected characteristics including children, young people, older people and people with disabilities.		

Table 5: Access to work and training

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal provide access to local employment and training opportunities, including temporary construction and permanent end-us jobs?	Yes	The construction phase of the Scheme is anticipated to provide net additional employment opportunities associated with the construction activities. No direct impacts on employment are expected as a result of the Scheme. Operation of the Scheme may improve accessibility to local employment and training opportunities with indirect benefits on mental health and well-being.	Construction: + Operation: +	A local employment and procurement policy would help to ensure that recruitment involving contractors during the construction stage and businesses during the operation stage where applicable is inclusive and that opportunities are available to all protected characteristic groups. This should include a requirement for contractors to adhere to national or local schemes to promote employment amongst underrepresented protected characteristic groups e.g. the Disability Two Ticks scheme.
Does the proposal provide childcare facilities?	No	The Scheme does not include the provision of childcare facilities due to the nature of the Scheme.	Construction: N/A Operation: N/A	None required.
Does the proposal include managed and affordable workspace for local businesses?	No	The Scheme does not include the provision of workspace for local business due to the nature of the Scheme.	Construction: N/A Operation: N/A	None required.

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal include opportunities for work for local people via local procurement agreements?	Yes	The construction phase of the Scheme is anticipated to provide net additional employment opportunities associated with the construction activities, some of which may be for local people.	Construction: + Operation: N/A	A local employment and procurement policy would help to ensure that recruitment involving contractors during the construction stage is inclusive and that opportunities are available to all protected characteristic groups. This should include a requirement for contractors to adhere to national or local schemes to promote employment amongst underrepresented protected characteristic groups, e.g. the Disability Two Ticks scheme.

Table 6: Social cohesion and lifetime neighbourhoods

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal connect with existing communities, i.e. layout and movement which avoids physical barriers and severance and land uses and spaces which encourage social interaction?	Yes	During the Scheme construction phase, temporary severance issues may occur due to disruption to existing road usage and pedestrian/cyclist facilities. However, with mitigation measures in place, this would be limited. During the operation phase the Scheme would allow traffic to flow freely along the A38 reducing journey times and transferring some traffic from local roads onto the strategic network. The Scheme would also separate local and regional traffic through the use of grade-separated which would reduce severance. The Scheme layout would not result in any new physical barriers between existing communities. New pedestrian and cyclist routes would provide increased connectivity between communities.	Construction: 0 Operation: +	Implementation of suitable mitigation measures such as diversions to pedestrian and cyclist routes during construction where required. Refer to Chapter 12: People and Communities Section 12.9 [**TR010022/APP/6.1**].

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal include a mix of uses and a range of community facilities?	No	Due to the nature of the Scheme, it would not provide properties for a mix of uses or a range of community facilitates. Replacement public open space offered in exchange to mitigate the loss of public open space would be provided.	Construction: N/A Operation: N/A	N/A
Does the proposal provide opportunities for the voluntary and community sectors?	No	Due to the nature of the Scheme it would not provide opportunities for voluntary and community sectors.	Construction: N/A Operation: N/A	N/A
Does the proposal address the six key components of Lifetime Neighbourhoods?	Yes	The Scheme has the potential to address the 'Built Environment' component of Lifetime Neighbourhoods. Street design and road maintenance has been found to be crucial to old people's ability and confidence in going outside.	Construction: N/A Operation: +	N/A

Table 7: Climate change

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal Incorporate renewable energy?	Yes	Solar powered lighting studs would be installed along the mainline at Little Eaton junction, refer to Chapter 14: Climate (refer to Table 14.12) [**TR010022/APP/6.1**]. No other forms of renewable energy are currently incorporated into the Scheme design.	Construction: N/A Operation: 0	N/A
Does the proposal ensure that buildings and public spaces are designed to respond to winter and summer temperatures, ie ventilation, shading and landscaping?	Yes	Chapter 14: Climate assesses the combined effects of the Scheme and potential climate change impacts on the receiving environment. During the operation phase in respect to climate change resilience, the Scheme may be vulnerable to a range of potentially significant impacts. As identified in Chapter 14: Climate [**TR010022/APP/6.1**], based on the mitigation built into the Scheme design and assumed management practices, UKCP18 climate change projections, information from other environmental disciplines, none of the potential impacts identified would be significant. Mitigation measures built into the design and management practices are identified in Appendix 14.2 [**TR010022/APP/6.3**] and include: • Use of construction materials with superior properties such as increased tolerance to fluctuating temperatures. • Installation of equipment capable of withstanding high temperatures.	Construction: N/A Operation: 0	Resilient design measures will be implemented where appropriate as outlined in Appendix 14.2.

Assessment criteria	Relevance to Scheme	Details and evidence	Potential health impact	Further action or mitigation recommended
Does the proposal incorporate sustainable urban drainage techniques?	Yes	The Scheme design includes an appropriate highway runoff drainage system designed in accordance with DMRB guidance (refer to the Road Drainage Strategy provided in Appendix 13.4 [**TR010022/APP/6.3**]). The drainage strategy incorporates sustainable drainage systems (SuDs) such as swales and open attenuation ponds. The system would appropriately manage and mitigate highway runoff quantities and quality and thus avoid significant effects on the receiving water environment. The system also makes appropriate allowances for climate change. Further details are provided in Chapter 13: Road Drainage and Water Environment, the Drainage Strategy and in the OEMP (refer to Appendix 2.1 [**TR010022/APP/6.3**]).	Construction: N/A Operation: 0	Implementation of appropriate embedded mitigation measures and on-going maintenance as detailed in Chapter 13: Road Drainage and the Water Environment Section 13.9 [**TR010022/APP/6.1**].