Sharpness Vale – Transport Technical Appraisal

Analysis of the transport and movement patterns likely to arise from the proposed Sharpness Vale growth point

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Prepared for:

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1.0 INTRODUCTION

1.1 BACKGROUND

Sharpness Development LLP are the promoters of the proposed Sharpness Vale settlement, following garden village principles, at Land south and east of Newtown and Sharpness, in the district of Stroud, Gloucestershire.

The site, referenced in this appraisal report as 'Sharpness Vale' is identified in the draft Stroud District Local Plan Review Draft Plan for Consultation (November 2019) as a proposed allocation under site reference 'PS36' for a new garden community comprising:

1. 10ha mixed employment uses, to complement what already exists at and around Sharpness Docks;
2. 2,400 dwellings in the Local Plan period, by 2040, and a total of 5,000 by 2050;
3. Local centre including shops and community uses, primary school(s) and secondary school, associated community and open space uses;
4. Strategic green infrastructure and landscaping;
5. Priority for walking, cycling, "micro-mobility" modes and public transport over the use of the private car including high quality pedestrian, cycle and micro-mobility routes throughout the development, bus only routes and displaced car parking;
6. The reopening of the Sharpness Branch line to passenger services, in addition to the current freight operations, including provision of a new rail station, providing direct enabling rail services to Cam and Gloucester, and onwards journeys to Bristol and the rest of the UK; and
7. Flexible and targeted bus services, utilising "Demand Responsive" services, traditional local bus routes, bespoke coach services and other emerging technologies to provide for a wide range of different journey purposes.

The aim of Sharpness Vale is to create an exemplar, high-quality and sustainable network of new neighbourhoods that people will aspire to live and invest in with a real 'sense of place.' The intention is for the neighbourhoods to grow organically in the future in a logical and sustainable manner, benefiting from the new infrastructure created by the initial development. In terms of transport and movement, Sharpness Vale is developing a wholly sustainably focused strategy for Access and Movement. The philosophical approach to this is two-fold:

1. Looking to the future, at emerging trends and changes in behaviour, technology and attitudes to create a place that is resilient to changes like necessary climate change responses, and;

2. Planning positively for people to use sustainable modes, and hence making positive provision for the outcomes that we want to see and deliver, rather than making reactionary provision based out of concerns that behaviour won't change.

As a result, we have developed a vision for movement at Sharpness Vale that picks up on the latest trends. This includes the re-opening of railways which has been part of emerging Government policy (reference Restoring your Railway Fund, and the Future of Transport regulatory review consultation which is on-going), and which we have been gratified to see follows the principles that we have outlined for Sharpness for some time.

1.2 SITE LOCATION

The site lies to the south of Gloucester, and west of the strategic M5 and A38 corridors in the district of Stroud, and its location is identified in red on the plan below:

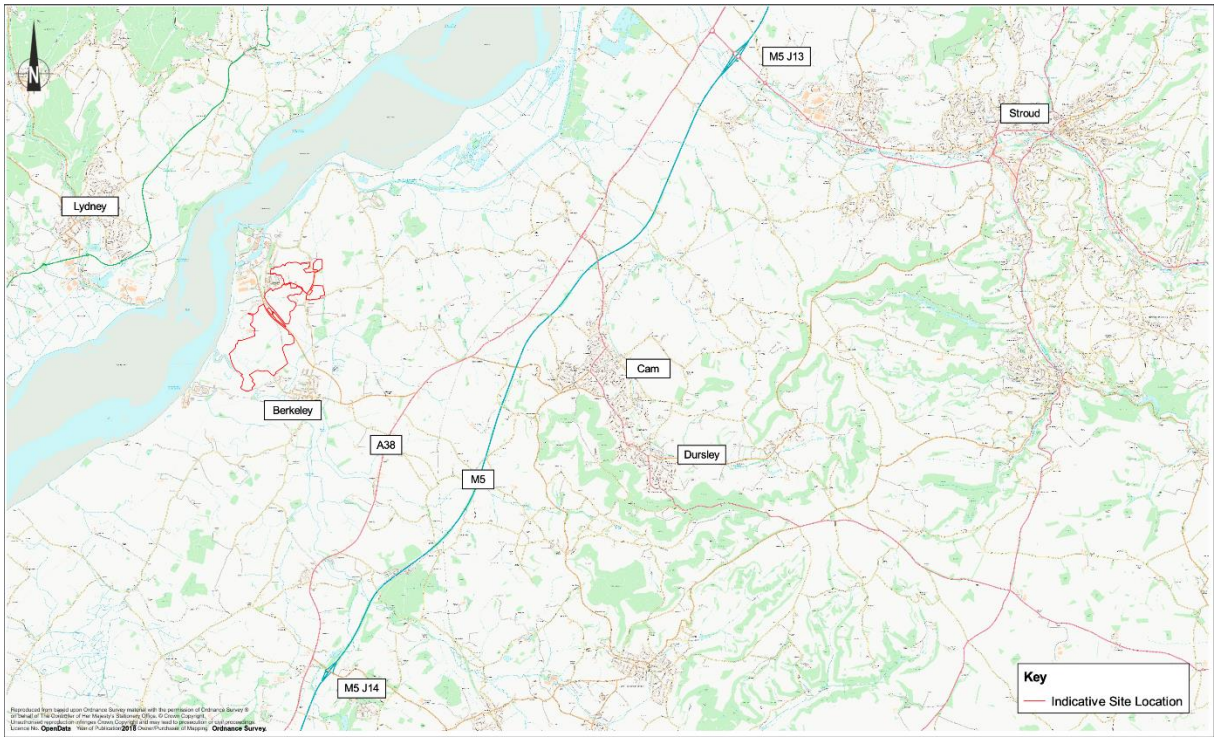

Figure 1 - Contextual Site Location

1.3 DEVELOPING OUR VISION FOR MOVEMENT

The vision is built around the key principles that we will make maximum use of the resources and capacity that is already available, and where new infrastructure is required, we will only invest in projects that create a sustainable outcome. In practice, we want:

- …as many people as practically can to meet their daily needs for work, shopping education and leisure within the Sharpness settlement;
- …to bring the railway back into use, providing a regular service to Cam & Dursley and onwards to Gloucester;
- …to provide bespoke, high quality coach services to key employment and education destinations that are a genuine alternative to the private car;
- …to provide neat, tidy, easily understandable local bus services that link places that people need to go and want to go;

There shouldn't be a need to pro-actively limit car use if people really want to use this mode, but by not providing extra capacity for these trips they will be discouraged – especially at peak times when the highway network is congested. We also know that adding highway capacity never solves congestion issues, and simply exacerbates the temptation to get in the car for trips that could be satisfied in other ways.

The vision focusses on the morning and evening peak periods, when the whole network is under stress. We believe that if we can make sure that almost everyone could complete the journey they need to make by a sustainable mode, then we can remove the need to provide unsustainable highway improvements.

This means providing for walking, cycling – and lots of other emerging personal transport modes, such as electric scooters, motorised skateboards and the like that are becoming increasingly widely available, so that people can get around Sharpness. For journeys further afield we will have made sure that there is a seat available for them on a bus, coach or train that matches where they need to go.

We have used census and other National survey data and statistics related to the Sharpness area to analyse the trips that people are likely to want to make, and used these to create a compelling alternative transport strategy that sets aside reliance on the private car.

We expect a high proportion of trips will stay in and around Sharpness when the development is complete, but some will need to travel further afield.

But, more than that, we think that in the future travel patterns from Sharpness Vale will not be dictated by current movement patterns and mode choices but will be shifted by the very existence of reliable, sustainable travel modes. We expect the people who choose to come and live in Sharpness to do so because of its easy travel connections to certain key employment destinations - and so following current

trip destination trends will not reflect where we expect the travel patterns to be when Sharpness Vale is complete.

With a new train service, twice every hour, to Gloucester more residents will look to match working there with a home in Sharpness. We have evaluated how much this might change as part of our on-going work.

We also expect bus services to be quite different. There will continue to be local, traditional bus services, that can efficiently serve the area with a "turn up and go" service, but we also expect there to be "Demand Responsive" services – developments of bespoke commuter coaches, local smaller vehicle services and other transport services that are emerging at present.

For trips heading to Bristol and its wider conurbation, we expect bus or coach services dedicated to take people efficiently to a particular business park or common employment destination. Services like this already run in various parts of the country.

The aspiration is that the sustainable transport measures provided alongside the scheme would provide for every trip that may need to be undertaken within or beyond the development in the congested peak periods and be available reliably at other times too.

This approach isn't expected to be cheap though. Providing the movement infrastructure necessary to make this work will be expensive to establish – although we are confident that it will be able to sustain itself once a "critical mass" is achieved at Sharpness Vale. But our plan is that, although this significant investment may need to be made into these sustainable modes, there should be very little requirement to provide highway capacity upgrades. The philosophy is that, as sustainable mode capacity will exist, sufficient to allow every movement likely to take place during the key peak periods to be undertaken without reliance on the private car, then no highway capacity provision will need to be made.

The only exceptions to this would be to provide priority for the public transport services or where highway safety may be compromised, and in that case upgrades could, and should, be considered.

In simple terms, this is how we intend to plan for what we want to happen rather than what we fear may happen.

There will be no explicit or artificial limitation on the use of the car – Sharpness residents and visitors will be free to choose this mode if they wish. But the layout of the development itself will give cars a lower emphasis in the hierarchy of travel, with careful thought to how parking is provided for and managed. The car will have its place, but it will be lower in the hierarchy, commensurate with it not being the primary mode for the future, and too inefficient to have the status it has enjoyed in the past.

We don't envisage needing to make any artificial concession in respect of limiting the car mode of transport. The approach recognises that where highway capacity is provided as part of development schemes – especially where it is provided as a "backstop" in the event that the sustainable modes are not taken up by users, then this effectively encourages use of the private car. If capacity is provided,

irrespective of what alternatives exist, then it is clear that that capacity will be used, and so we believe that we must break the cycle of dependency on provision for the car, and simply not indulge in it.

The Sharpness Philosophy is geared around attracting those that understand the approach that is being taken, as it will be self-evident. It will encourage people to come to Sharpness if they buy in to the philosophy and approach. We should make it really easy for those that do – and they must be able to adopt the lifestyle from the outset, day one, as soon as they move in.

1.3.1 Trends & Technology

Advances in technology are reducing the need to own a car. Apps and subscription services are making it easier to hire vehicles, board public transport and get involved in active transport. The ease and convenience of this technology is on a par with that of car ownership which is projected to encourage a transition to more sustainable modes. Below are some examples of where technology has been utilised to eradicate the need for owning a car:

1.3.1.1 MaaS & Whim

Mobility as a Service (MaaS) is a subscription service that gives the user access to a wide range of modes – from cycle hire to car rental, and public transport services, incorporates a real-time journey planner and can cater for both regular commuting journeys and one-off, discretionary trips equally well. It can therefore meet the complete travel needs of a person, but without the capital outlay required for car ownership.

Whim has been operational in the West Midlands for a couple of years now and is a MaaS type services. A mobility app on your phone assists your journey planning. The app allows the purchase of bus, rail, light rail tickets, book taxis and hire cars and bikes. The app consists of several payment structures where you can ‘pay as you go’ or pay monthly fees to receive different levels of use across all the modes of transport.

1.3.1.2 Car Clubs

There are a number of successful car clubs around the UK, all of which follow a similar model. In the South-West, the Enterprise car club has a membership model in which the user pays an annual fee or a monthly fee for membership and then an hourly rate to hire vehicles from Enterprise car club parking bays. Currently, Bristol has the scheme and their standard plan comes at a charge of £7 a month or £60 a year with each vehicle hire starting from £5.20. If the car club was introduced at Sharpness, it would reduce the need to own a car.

1.3.1.3 Vamooz

Vamooz is an app-based service for the hire of a bus. You can hire the bus to follow a route and stops that the user chooses. It is ideal for more rural areas that do not have many existing bus services. Vamooz is used mainly for school buses, for commuting employees, as a coach service to football games

and concerts in larger venues in the cities. An additional benefit of Vamooz is that it can still be used on Sundays, Bank Holidays and Boxing Day where existing bus services may not be running and the routes can be made longer than the normal bus routes in the area. The bus can be hired from the app where you can use a mobile ticket and the more people on the bus, the cheaper the ride is.

1.3.1.4 Arriva Click

Arriva Click is essentially a Demand Responsive service, with an app providing access to a flexibly routed mini bus service (approximately 12 passengers). The user puts the details of their journey into the app and it combines collection on journey with other passengers. The driver picks the user up from the designated spot and then travels to your destination whilst collecting others along the way.

1.4 BASIS OF THIS APPRAISAL

The intention, as stated above, would be to ensure that a public transport seat is available for every journey that might need to be made in the peak periods from and to Sharpness Vale. This would mean that there would need to be capacity for the total of all of the off-site trips that are outlined in this assessment.

However, it should be understood that the basis of this appraisal is slightly different. It is important to understood both the total number of person trips that may need to be accommodated, but also the propensity towards using particular modes, based on available evidence and assessment. This appraisal therefore provides an assessment of potential movement patterns, based on nationally recognised data sources, to evaluate how people are likely to want to travel.

The appraisal sets out a robust methodology for establishing where people may wish to use facilities and amenities within the site, or close to it, and where they may choose to work within the site or close to it, or from home. It also considers the attractiveness of the public transport and sustainable modes that will be provided and assigns person trips to those modes. These are trips that would be expected to adopt these modes, based on current travel trends and behaviours, and the convenience and reliability of the modes themselves.

The appraisal then defines a residual level of trip demand that, under normal circumstances, would be expected to choose to undertake their journeys by private car. This represents that challenge for the Sharpness Vale transport strategy and the sustainable measures that will be provided, to seek to ensure that these trips too will switch to sustainable modes – for which capacity will be provided. This will be achieved through Travel Plan measures, active travel planning, the provision of a MaaS subscription service and other support and subsidies.

In the absence of these, this appraisal provides an indication of the level of car trip generation that might otherwise occur from the Sharpness Vale development.

1.5 CONTENTS

Following this Introduction, this Transport Technical Appraisal is structured as follows:

- A high-level review of the current demographic and transport conditions in Sharpness including public transport and car travel (**Section 2**)
- A description of the transport proposals which will be implemented at Sharpness Vale (**Section 3**)
- A summary of the approach to trip generation, distribution and mode share (**Section 4**)
- A detailed review of the person trip generation for Sharpness Vale including journey purpose and internalisation assumptions (**Section 5**)
- Distribution of the external person trips to likely destinations split by journey purpose (**Section 6**)
- Mode share of external trips by journey purpose and destination (**Section 7**)
- A Rail Strategy for Sharpness Vale including a more detailed review of the rail trip generation and the proposed service to Gloucester (**Section 8**)
- A Bus Strategy for Sharpness Vale including commuter coach services, demand responsive transport and fixed route services (**Section 9**)
- A review of the highway network and the locations where a future Transport Assessment may need to consider further and more detailed analysis in order to deliver the objectives of the sustainable transport approach for Sharpness (**Section 10**)
- A review of the possible changes to travel and movement as a consequence of the current Covid-19 pandemic, and the implications that this may have for planning Sharpness Vale (**Section 11**).

2.0 SHARPNESS TODAY

2.1 CONTEXT

The area around Sharpness comprises small settlements (Newtown) located close to the existing Sharpness Docks. The Docks are busy, and typically provides a landing for bulk goods of various types and descriptions. To the south of the area is the small town of Berkeley, and south of that the site of the former nuclear power station – now being gradually re-purposed for a range of uses – education, police headquarters and so on.

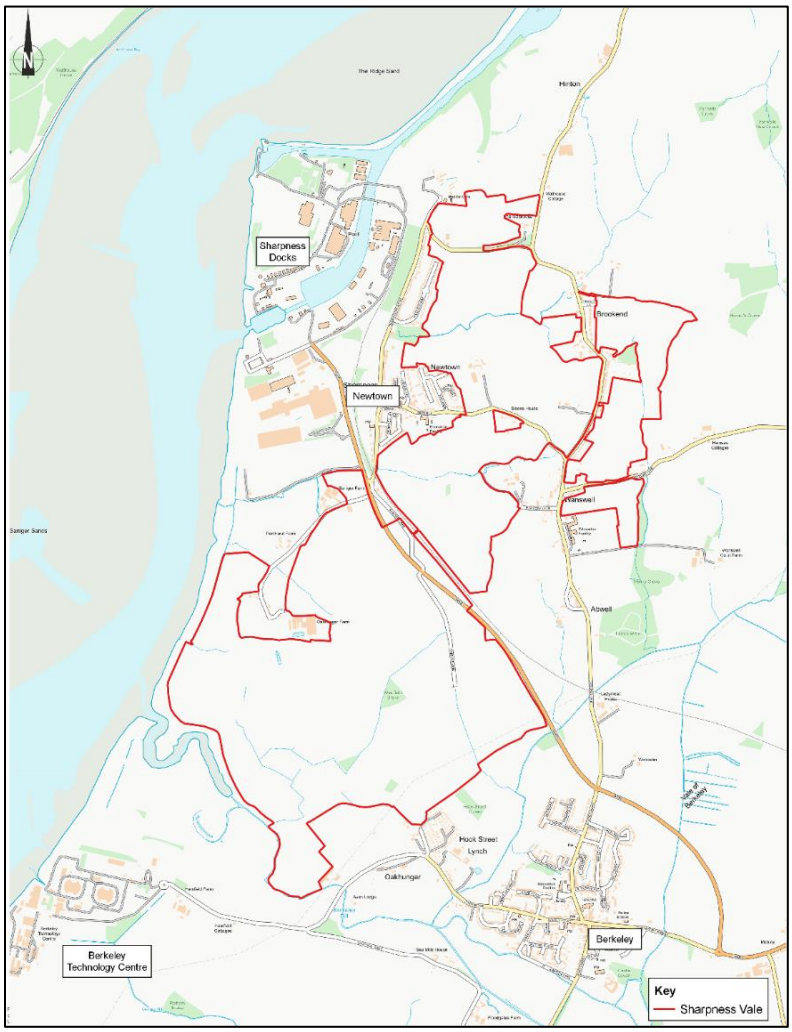

Figure 2 - Detailed Site Boundary & Context

2.2 DEMOGRAPHICS

According to Census 2011, 1,029 people currently live in Sharpness. The chart below shows that Sharpness has a higher proportion of people aged over 45 than Stroud District, South Gloucestershire District and England.

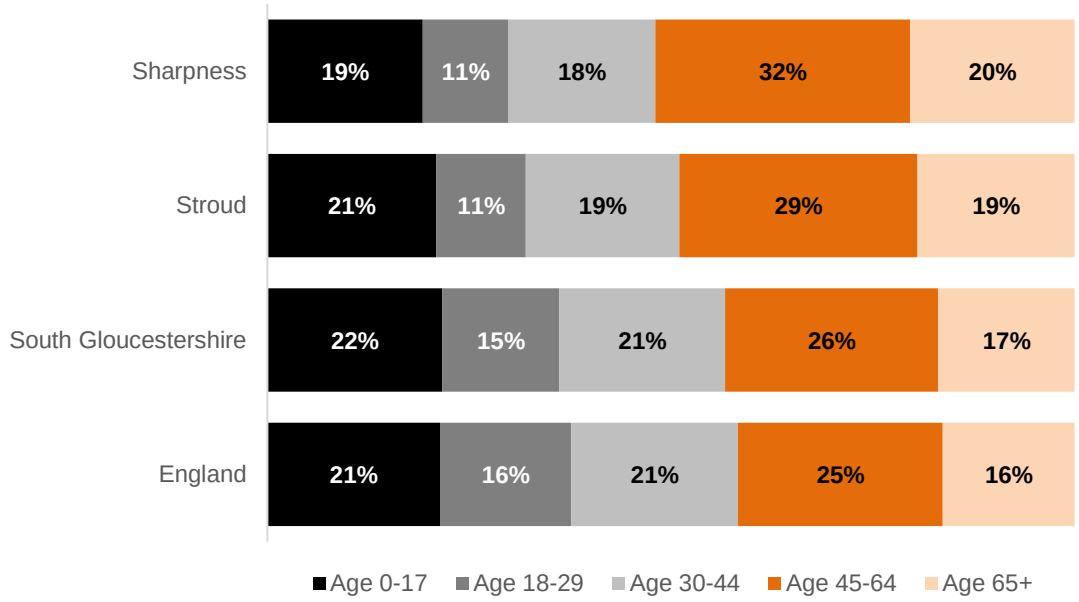

Figure 3 - Age Profile of existing Sharpness community

The current household composition of the of the population is that 66% consist of family households and 29% are one person households suggesting there is a range of mobility and needs.

Only 11% of households do not own a car compared to 14% in Stroud District, 13% in South Gloucestershire and 26% in England highlighting that the population is Sharpness is highly dependent on using a car. This is consistent with a relatively rural location, with limited transport infrastructure that is accessible to residents. It is notable that 1 in 10 households in Sharpness currently survive without owning a car, suggesting that it is possible to configure a lifestyle that doesn't rely on the car even now.

In regard to journeys to work, car is by far the dominant mode with 88% mode share compared to 83% for Stroud District, 80% for South Gloucestershire District and 67% for England as a whole. Only 2% of people in Sharpness use public transport, highlighting the lack of public transport options and confidence in public transport provision and reliability.

Sharpness Today

Sharpness	**88%**	**1%**	**1%**	**8%**	**2%**
Stroud	**83%**	**2%**	**2%**	**10%**	**2%**
South Gloucestershire	**80%**	**5%**	**1%**	**9%**	**4%**
England	**67%**	**8%**	**10%**	**11%**	**3%**

Figure 4 - Journey to Work by mode, existing communities

2.3 EXISTING TRANSPORT NETWORK

The transport and movement network around Sharpness is typical of many similar rural areas – a network of single carriageway roads, often reflecting ancient and medieval trackways and settlement patterns. These corridors were not designed for "multi-modal" movement, and often didn't envisage the motor car, and so may have no separate footway, and visibility provisions that are more suited to slower modes of travel – horse drawn carts and pedestrians, for example. The B4066 is the exception to this, as it has been upgraded and improved over time to provide a high capacity route to the docks – at least for vehicles.

The railway came to Sharpness on 1st August 1876, when the station opened at Sharpness. The railway remained, until the loss of the bridge over the River Severn in the sixties, and service patterns have declined so that it is only a freight service branch at present. It has a pick up point for nuclear fuel transport at Berkeley, and the track remains open and operational as far as Sharpness, but there are no longer any stations on the line, or passenger services.

Local bus services ply their trade around the roads of Newtown, Sharpness and Berkeley, but these are relatively infrequent. They are probably sufficient to permit less economically active residents to travel without reliance on a car – as evidenced by the census statistics.

2.3.1 Walking & Cycling

There is a comprehensive existing network of pedestrian and cycling routes around the area, as shown on the plan below:

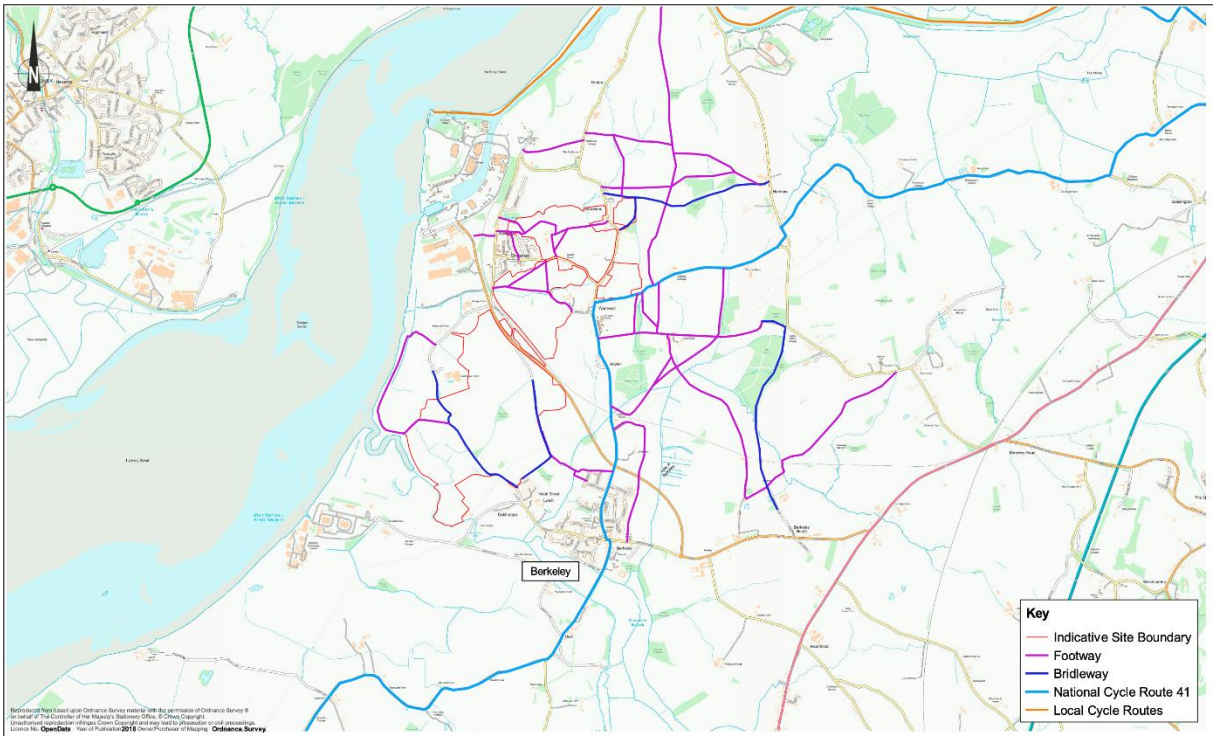

Figure 5 - Existing pedestrian and cycling routes

These routes provide local access to the various existing facilities and amenities that already form part of the Sharpness area, and which are highlighted on the plan below:

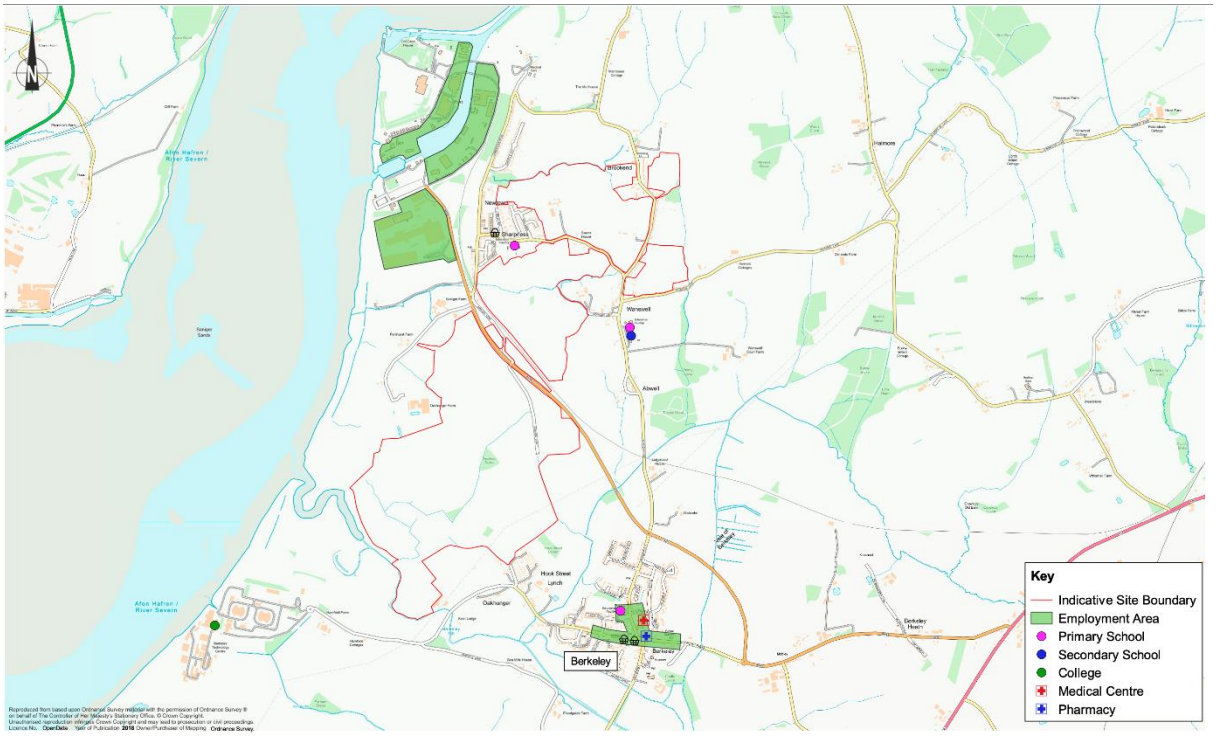

Figure 6 - Local amenities & facilities

2.3.2 Bus Travel

There are a number of bus stops in the vicinity of the site, predominantly on Saniger Lane, Oldminster Road, Station Road and in Berkeley. These stops are served by the Stagecoach 62 service which provides a two-hourly service between Gloucester (approximately an hour and half journey time) and Bristol (approximately one-hour journey time).

In addition to the number 62 service, there are a number of school services that run twice a day from stops around the site. These bus services serve a number of schools across the area including those in Thornbury, Cam and Dursley and Kingswood. These bus services are summarised on the plan below, with service patterns outlined in **Table 1**.

Sharpness Today

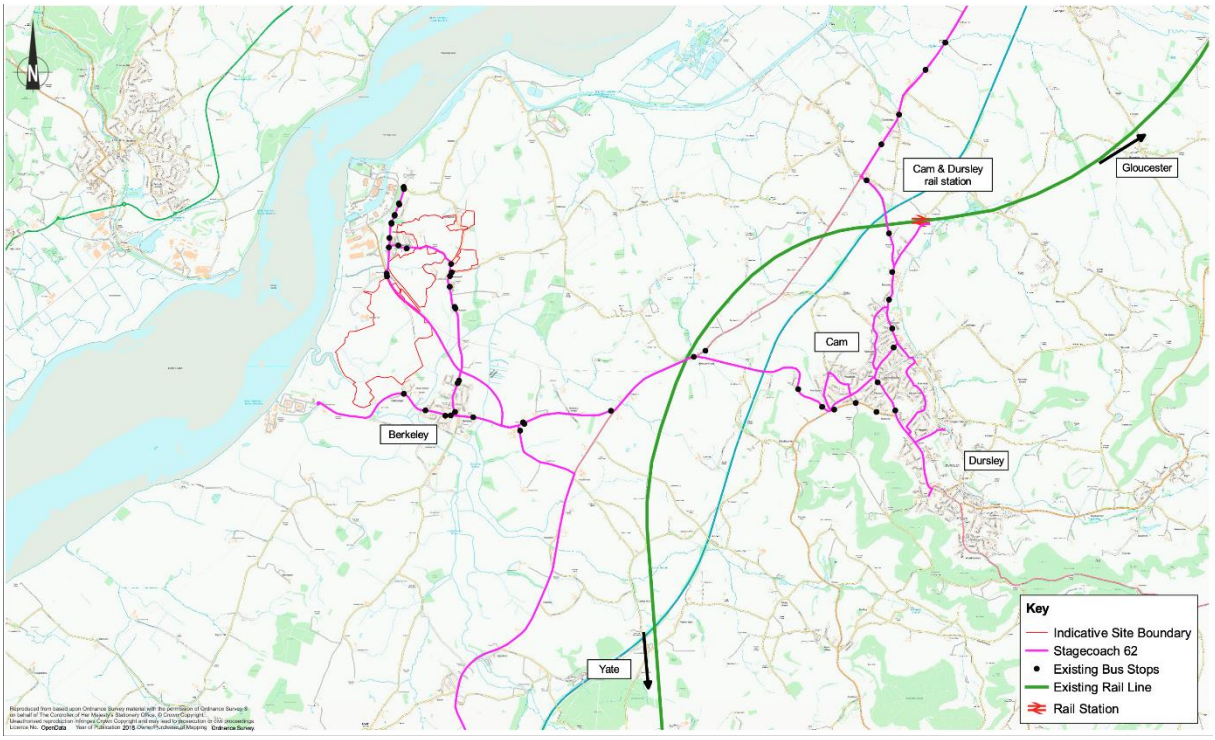

Figure 7 - Local Bus Routes

Table 1 - Summary of Bus Services

Bus Service	Operator	Bus Route	Frequency		
			Weekdays	Saturday	Sunday
X1	**Taylors Travel (School Bus)**	**Berkeley – Sharpness – Halmore – Rednock School**	**08:01** **16:10**	**No service**	
X2	**Taylors Travel (School Bus)**	**Berkeley – Sharpness – Cambridge – Eastington – Stroud**	**07:15** **18:00**	**No service**	

Sharpness Today

Bus Service	Operator	Bus Route	Frequency		
			Weekdays	Saturday	Sunday
		High and Marling School			
X6	**Taylors Travel (School Bus)**	**Sharpness – Berkeley – Stone – Charfield – Katharine Lady Berkeley School; Kingswood**	**07:26** **15:25**	**No service**	
6	**Ebley Coaches** **(School Bus)**	**Sharpness – Berkeley – Frampton – Eastington – The Stanleys – Maidenhill School**	**07:37** **15:15**	**No service**	
207	**Mike's Travel (School Bus)**	**Thornbury – Berkeley - Sharpness**	**07:55** **16:10**	**No service**	
62	**Stagecoach**	**Berkeley - Bristol**	**06:47** **10:22** **12:22** **14:35** **16:35**	**08:52** **10:52** **12:52** **14:52** **16:57** **19:02**	**No service**

2.3.3 Rail Travel

The nearest rail station to the site is Cam & Dursley, located approximately 11km from the site. The rail station can be accessed via the number 62 bus in an estimated 50 minutes, or via the A38 by car in an estimated 17 minutes.

Cam & Dursley rail station is located on the Bristol – Birmingham line and is served by northbound trains to Gloucester (with some trains continuing to Cheltenham, Ashchurch for Tewkesbury, Worcester Shrub Hill and Great Malvern) and southbound trains to Bristol Temple Meads (with some trains continuing to Bath, Westbury and Weymouth). The rail services at Cam and Dursley rail station are summarised below in **Table 2.**

Cam & Dursley Station provides both a car park and cycle parking provision for 30 bikes. The station has step free access to the platforms and a ramp is available for train access. Although no ticket office is provided there is a ticket machine and a customer help point available to offer assistance. A sheltered waiting area is provided on each platform as well as bench seating.

Table 2 - Summary of Rail Services from Cam & Dursley

Direction	Destination	Journey Duration (minutes)	Frequency	
			Mon – Sun	Sun
Northbound	Gloucester	19	Hourly	Every other hour
	Cheltenham Spa	32	Every other hour	
	Ashchurch for Tewkesbury**	42		
	Worcester Shrub Hill	58		
	Great Malvern	80		
Southbound	Bristol Temple Meads	40	Hourly	Every other hour

Direction	Destination	Journey Duration (minutes)	Frequency	
			Mon – Sun	Sun
	Bath Spa	**65**	**Hourly**	**No Service**
	Westbury	**95**	**Hourly**	
	Weymouth	**195**	**Every other hour**	

2.3.4 Car Travel

The existing highway network in the vicinity of the Sharpness site is shown on the plan below, and described in the following sections:

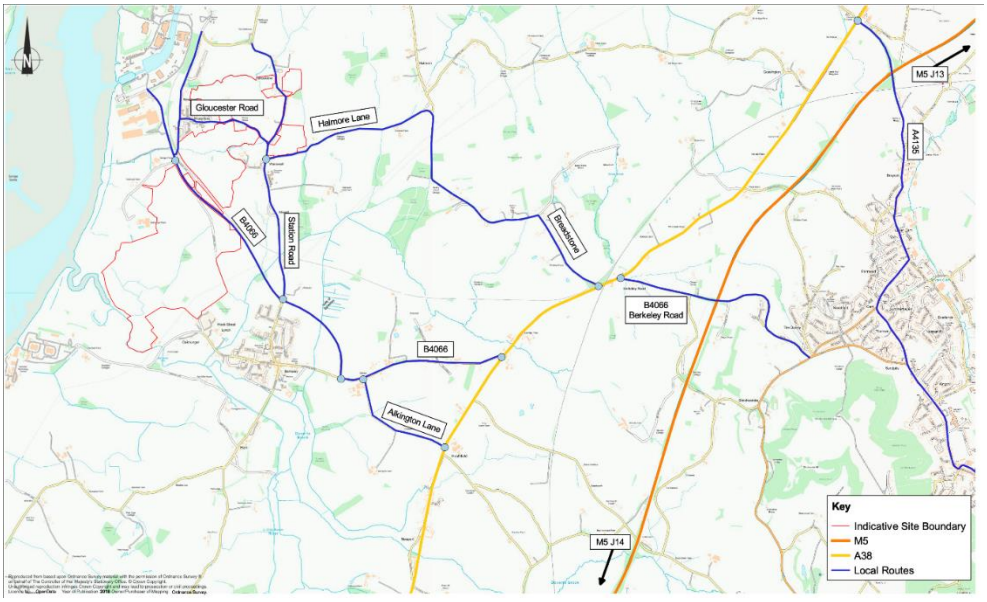

Figure 8 - Local highway network

B4066

The B4066 is a two-way, single-lane road that links Severn Road in the Sharpness docks to the A38. From the north, at Sharpness docks, the B4066 is subject to the National Speed Limit and this changes to 40mph at the Canonbury Street roundabout. This speed limit continues until the B4066 reaches the A38. The B4066 provides a key route between Sharpness and the A38. The quality of the road is generally good with well-defined verges and road markings, consistent with its significant function being used by heavy vehicles travelling to and from the docks and the associated commercial activities.

Station Road

Station Road is a two-way, single-lane road which provides access from Berkeley to the villages of Wanswell and Brookend. The road is subject to the National Speed Limit and is generally well lit with a continuous footway on the western side.

A railway bridge with a height limit of 3.9m bisects the road approximately 500m north of the B4066 roundabout which requires tall vehicles to use the centre of the carriageway.

Alkington Lane

Alkington Lane is a two-way, single-lane road that links the A38 and B4066. The road is subject to a 40mph speed limit with localised reduction to 30mph around Cold Elm Farm. Alkington Lane is the principle route from the B4066 to the A38 for vehicles travelling south to destinations including Bristol and the M5 at Junction 14.

A38

The A38 is a two-way, single-lane road that can be accessed from Sharpness from the B4066 or via Alkington Lane. The A38 connects Bristol, Gloucester and surrounding towns and villages including the local rail station at Cam and is subject to the National Speed Limit. Sharpness lies 5 kilometres to the west of the A38, reached using the B4066.

M5

The M5, part of the Highways England managed Strategic Road network, can be accessed via the A38 at Junction 13 (approximately 10km north) and Junction 14 (approximately 6km south) and provides access to Bristol, Taunton and Exeter to the south and Gloucester and Worcester to the north.

3.0 SHARPNESS VALE TRANSPORT PROPOSALS

3.1 INTRODUCTION

One of the key elements of the development of Sharpness Vale will be the delivery of early interventions in the transport network. There will be a requirement for investment to ensure that sustainable travel patterns can be supported and will establish as early as possible. However, the development of this infrastructure will take time to procure and implement. Therefore, a careful balance will need to be struck.

The basis of the proposals is underpinned by:

- Early public transport provision through buses – potentially demand responsive services linked to a web-based travel management app, as this will form a platform for the future;
- Aspirations to re-open the railway line – although this is likely to be delivered once development is underway, due to the lead times to reinstatement of this type of service and the necessary infrastructure upgrades;
- On-site provision to facilitate direct, safe and high quality links between facilities and transport interchanges by walking, cycling and “micro-mobility” personal transport modes;
- Provision of priority measures for sustainable modes – especially buses on the highway network, to allow them to avoid congestion spots;
- Highway network improvements only where this is required for safety reasons, or as the foundation to the provision of bus priority and sustainable transport measures (pedestrian and cycle crossings, for example).

Sequential infrastructure delivery will be required throughout the development, but with the establishment of the major elements of the sustainable transport network during the current plan period (up to 2036, relating to the first 2,400 homes). The aspirational improvements set out are intended to not only provide greater accessibility to the site, but also to create wider benefits, whereby existing settlements will be better connected and integrated.

3.2 PUBLIC TRANSPORT

The public transport solution will be built around a rural transport hub centred on the mixed-use centre and a new railway station at Sharpness. The public transport services serving the development would be likely to be diverse to meet a range of travel needs as effectively as possible:

3. Direct train services to Cam & Dursley and Gloucester, with changes available at both to access the wider network (notably Bristol to the south and London)

4. Local bus services, plying their trade around the Sharpness – Newtown – Docks – Berkeley – Berkeley Power Station to meet local needs, get people to the station, and potentially connecting to Stroud

5. Demand responsive and bespoke services, providing connections to key destinations where trips could be combined by suitable software, along the lines of the Arriva Click project in Sittingbourne (https://www.arrivabus.co.uk/arrivaclick/about-arrivaclick/)

6. Direct, express coach services to meet employment needs to major commercial centres where, broadly, a coach load of people would want to go each weekday (i.e. Aztec West, near Bristol)

7. Timetabled services that make strategic connections from Sharpness, and providing a wider service to the community – for example, a possible Sharpness – Buckover –Thornbury – Aztec West – Filton – Bristol Parkway – UWE service, that picks up numerous growth sites and employment locations

8. All of this would be made accessible with a MaaS subscription service, based on an app and website, for Sharpness Vale (accessible to the existing community as well) to create a foundation for future sustainable movement.

The rail line re-opening to passenger services needs to be subject to further and on-going work with Network Rail and potential operators, which has already begun. The proposal is supported by Stroud DC and the local MP (Siobhan Baillie), who submitted a bid for funding to re-establish the passenger service as part of the “Restoring your Railways” fund.

The initial “Restoring your Railways” fund bid was not successful, as other proposals were further forward in their development, and so were preferred. However, DfT has provided feedback requesting further information so that the proposal can be considered in further rounds of funding for the “Restoring your Railways” initiative, or, indeed, through other funding mechanisms. Therefore, Sharpness Development LLP is continuing dialogue with DfT, and preparing further information for them in support of the proposal.

It is envisaged that, if there is a will to achieve its delivery by all the stakeholders, the re-opening of the passenger railway could come forward at an early stage, potentially with a subsidised rail service. Extending the Sharpness branch line could also create a wider strategic opportunity to link the communities of Sharpness and Lydney via a new rail crossing over the River Severn (albeit this isn’t truly new, as a historic rail connection across the River did exist). Although the Sharpness Vale could not deliver this, it could accommodate it and not prejudice it for the future.

3.3 HIGHWAY NETWORK

At the early stages of development, a new junction would be proposed to the south of the existing B4066/Saniger Lane junction to enable access to development either side of the B4066.

It is envisaged that localised improvements will be required at the following junctions on the B4066 once development was underway and established to accommodate bus priority schemes and pedestrian and cycle accessibility:

- Saniger Lane
- Station Road
- Canonbury Street.

Further afield, it is considered that a larger quantum of development is likely to require improvements to the A38/Berkeley Road and B4066/Alkington Lane junctions to better accommodate sustainable transport modes. These will need to be sequenced as development progresses so that improvements are both proportionate and support the aspiration to a wholly sustainable movement strategy.

4.0 APPROACH TO TRIP GENERATION, DISTRIBUTION AND MODE SHARE

Given the scale of the Sharpness Vale development, forecasting the movements of future residents and visitors is vital to understanding what transport infrastructure is required on and off-site. A first principles, evidence-based approach to trip generation, distribution and mode share has been undertaken which considers the movement of people rather than vehicles, allowing for a more detailed analysis of journey purpose and travel mode.

As with all traffic forecasts which look many years into the future (in this case, 2050), the reality is that we are seeking to define future events against the likelihood of a range of possible outcomes. The way people travel is currently changing and will continue to do so as new technologies emerge and the private car becomes more undesirable due to cost and climate concerns. National and local investment in public transport, sustainably planned developments and changing attitudes will likely result in a shift away from car use towards more sustainable modes.

These changes are becoming more evident in urban areas, where alternatives to the private car readily exist at a sufficient level to make behaviour change viable. We expect that there will be a need to create catalysts for change in new settlements of any scale, and that where this is planned, it should also make a positive contribution to the opportunities for sustainable travel for existing communities too.

The trip generation, distribution and mode share presented in the following sections considers these changes and forecasts how we expect people to travel given the range of facilities to be provided on site and the public transport offer described in **Section 3** and in more detail in **Sections 8** and **9**.

The approach to trip generation, distribution and mode share, which is shown in detail at **sections 5 and 6**, is summarised below and shown in the graphic on the following page which uses the morning peak hour numbers as an example.

Step 1: Person trip generation

i. The total Sharpness Vale person trip generation (for the 5,000 homes and 10 hectares of employment, and the other supporting and core uses proposed) has been calculated using person trip rates from the TRICS database

ii. Journey purpose data for Stroud has been extracted from the TEMPro database and applied to the person trips

iii. An internalisation factor based on existing data sources and consideration of the on proposed on-site facilities has been applied to each journey purpose to derive the number of internal and external person trips

Step 2: Distribution of external person trips by journey purpose

iv. External person trips have been distributed by journey purpose, as follows:

a. **Work & Employment Trips**:

b. **Education Trips**: based on existing secondary school catchment areas. For clarity, specific re-assignment of existing school trips has not been included in the assessment, as current school catchment information is not available. However, the schools provided as part of the development would be "boundary blind" and so local children would be able to use them irrespective of whether they were in the new development or not. Hence, this adjustment would be expected to take place over time.

c. **Shopping and Personal Business Trips**: a simple proximity method which gives greater attractiveness to places of greater scale that are nearer the site

d. **Leisure Trips**: calculated using a method which combines population data, distance from Sharpness Vale and the amount of leisure facilities to provide an overall score for each destination and a resultant percentage distribution

Step 3: Mode share of external person trips by journey purpose and destination

v. For each journey purpose, the transport options (existing and proposed) between Sharpness Vale and the destinations identified in Step 2 have been reviewed. This has been used to determine a mode split for each journey purpose and destinations – i.e. work trips to Gloucester are likely to have a high train mode share due to the reopening of the Sharpness Branch Line

Approach to Trip Generation, Distribution and Mode Share

Step 1: Person Trip Generation

Land Use	Residential								Employment	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Journey Purpose	Going to Work		Primary & Secondary School		Shopping and PB		Leisure		Coming to Work at Sharpness	
	41%	35%	32%	9%	20%	27%	7%	30%		
	1,883	1,411	1,448	351	901	1,083	307	1,216	526	400
Internalisation Factor	18%		78%		60%		50%		18%	
Internal Trips	273	176	1,130	273	541	650	154	608	98	63
External Trips	1,610	1,234	319	77	360	433	154	608	428	336

Step 2: Distribution of External Person Trips by Journey Purpose

	Going to Work	Secondary School	Shopping and PB	Leisure	Coming to work at Sharpness
Destinations	Places with employment opportunities, including: Cam, Dursley, Bristol, South Gloucestershire, Gloucester, Stroud & Stonehouse	Rednock School or Katharine Lady Berkeley's School	Supermarkets, shops and facilities in: Cam, Dursley, Stroud, South Gloucestershire, Bristol & Gloucester	Wide range of potential destinations	Residential areas within commuting distance, including: Cam, Dursley, South Gloucestershire, Gloucester, Stroud & Stonehouse

Step 3: Mode Share of External Person Trips by Journey Purpose and Destination

	Going to Work		Secondary School		Shopping and PB		Leisure		Coming to work at Sharpness	
Mode	Car	PT	Car	PT	Car	PT	Car	PT	Car	PT
Cam/ Dursley	34%	66%	39%	61%	35%	65%	35%	65%	34%	66%
Bristol	18%	82%			35%	65%	35%	65%	18%	82%
South Gloucestershire	29%	71%			35%	65%	35%	65%	29%	71%
Gloucester	26%	74%			35%	65%	35%	65%	26%	74%
Stroud/ Stonehouse	12%	88%			35%	65%	35%	65%	12%	88%
Cheltenham	32%	68%					35%	65%	32%	68%
Tewkesbury	45%	55%					35%	65%	45%	55%
Wotton Under Edge	41%	59%	39%	61%			35%	65%	41%	59%
Frampton on Severn	30%	70%					35%	65%	30%	70%

5.0 PERSON TRIP GENERATION

5.1 INTRODUCTION

As outlined in **Section 4**, the person trip generation for Sharpness Vale is calculated as follows:

- Person Trip Rates and Generation:
- Journey Purpose, and
- Trip Internalisation.

This Transport Technical Appraisal considers only the full build out of Sharpness Vale – 5,000 homes, 10 hectares of employment (assumed to provide 20,000m^2 of B1 Use and 20,000m^2 of B2 Use) and on-site school, shopping and leisure provision.

5.2 PERSON TRIP RATES AND GENERATION

The total person trip generation of Sharpness Vale has been calculated using person trip rates from the TRICS database for the morning (8am to 9am) and evening (5pm to 6pm) peak hours using the selection criteria set out in **Table 3**. This selection criteria was considered appropriate since, when completed, Sharpness Vale will be of a sufficient scale to reflect movement provision that will reflect that seen in the suburban / edge of town / neighbourhood centres located developments that have been captured in the TRICS database. (In using TRICS there is a need to balance gaining sufficient sample sites to offset any locations that may be outliers in terms of travel patterns, but not to select sites that are vastly different to the proposed location – hence, it would not have been appropriate to select Inner City locations for inclusion in an appraisal at Sharpness).

Table 3 - Person Trip Rate Parameters

TRICS Parameter	Residential	B1 Employment	B2 Employment
Land Use	03 – Residential	02 - Employment	02 - Employment
Category	A – Houses	B – Business Park	D – Industrial Estate
Area	England and Wales		
Locations	Suburban Area, Edge of Town, Neighbourhood Centre		

Person Trip Generation

The person trip rates for residential and employment uses for the morning and evening peak hours are shown in **Table 4**. The resultant person trip generation is shown in **Table 5**.

Table 4 - Person Trip Rates

	A	*B*	*C*	*D*	*E*	*F*	*G*
1		Morning Peak (8am to 9am)			Evening Peak (5pm to 6pm)		
2		Arr.	Dep.	Tot.	Arr.	Dep.	Tot.
3	Residential	0.176	0.732	0.908	0.564	0.248	0.812
4	B1 Business Park	1.673	0.225	1.898	0.158	1.296	1.454
5	B2 Industrial Estate	0.502	0.232	0.734	0.100	0.444	0.544

Table 5 - Person Trip Generation

	A	*B*	*C*	*D*	*E*	*F*	*G*
1		Morning Peak (8am to 9am)			Evening Peak (5pm to 6pm)		
2		Arr.	Dep.	Tot.	Arr.	Dep.	Tot.
3	Residential	880	3,660	4,540	2,820	1,240	4,060
4	B1 Business Park (20,000m^2)	335	45	380	32	259	291

5	**B2 Industrial Estate (20,000m^2)**	**100**	**46**	**147**	**20**	**89**	**109**
6	**Total Person Trip Generation**	**1,315**	**3,751**	**5,066**	**2,872**	**1,588**	**4,460**

5.3 JOURNEY PURPOSE

TEMPro provides journey purpose data by mode based on results from the National Travel Survey. Data for the Stroud local authority area for the future year of 2050 has been extracted to determine the likely journey purpose for future residents of Sharpness Vale in the morning and evening peak hours. The Stroud local authority area was chosen over the Stroud 012 Middle Super Output Area (MSOA) as it is likely more representative of the development in terms of the future population of Sharpness Vale.

The home-based journey purpose data were aggregated into four categories:

i. Work – TEMPro 'Work' and 'Employers Business' trips

ii. School – TEMPro 'Education' trips

iii. Shopping and Personal Business – TEMPro 'Shopping' and 'Personal Business' trips

iv. Leisure – TEMPro 'Recreation/Social', 'Visiting Friends and Relatives' and 'Holiday/Day Trip' trips

The proportion of residents making these trips based on TEMPro data is shown in **Table 6**.

Table 6 - Proportion of residential trips by journey purpose

	A	***B***	***C***	***D***	***E***	***F***	***G***	***H***	***I***
1	**Journey Purpose**	**Morning Peak Hour (8am to 9am)**				**Evening Peak Hour (5pm to 6pm)**			
2		**%**	**Arr.**	**Dep.**	**Tot**	**%**	**Arr.**	**Dep.**	**Tot**
3	Work	41%	365	1,518	1,883	35%	980	431	1,411
4	School	32%	281	1,168	1,448	9%	244	107	351

5	Shopping and PB	20%	175	727	901	27%	752	331	1,083
6	Leisure	7%	60	247	307	30%	844	371	1,216
7	**Total**	**100%**	**880**	**3,660**	**4,540**	**100%**	**2,820**	**1,240**	**4,060**
8					Ref Table 5; cell D3				Ref Table 5; cell G3

5.4 TRIP INTERNALISATION

In addition to the 5,000 houses proposed at Sharpness Vale, a range of community facilities will be provided including primary schools, a secondary school, shops and facilities in the mixed-use hub and employment opportunities to complement those at the Docks. The provision of such facilities will result in a number of internalised trips – those which will remain within the site and therefore not join the surrounding movement network. These internalised trips have been quantified for the four journey purposes set out above.

In addition to the trips which will stay within the Sharpness Vale development, trips which will route to/from the areas immediately adjacent to the site have also been considered as internal trips. These destinations are:

- The town of Berkeley and villages/ hamlets of Sharpness, Newtown, Brookend, Wanswell and Abwell
- Gloucestershire Science and Technology Park which includes South Gloucestershire and Stroud College, the University of Gloucestershire's Cyber Security Centre and a number of other businesses, and
- Existing employment at Sharpness Docks.

5.4.1 Work and Employment Trips into Sharpness

Sharpness Vale will provide employment opportunities on site in the form of a 10-hectare business park in the centre of the settlement, designed to complement the existing employment activities at the Docks, as well additional jobs in the mixed-use hub.

To understand the current proportion of residents who live and work the same area, 2011 Census Journey to Work data has been examined for the 15 Stroud Middle Super Output Areas (MSOAs). The

number of journeys which start and end in the same MSOA have been extracted and divided by the total number of journeys to work. **Table 7** shows this data.

Table 7 - Stroud MSOA Internal Journey to Work Trips

MSOA	Location	% of Internal Work Trips
Stroud 001	Hardwicke	4%
Stroud 002	Painswick	7%
Stroud 003	Frampton on Severn	12%
Stroud 004	Cashes Green	8%
Stroud 005	Stonehouse	25%
Stroud 006	Stroud	21%
Stroud 007	Rodborough	7%
Stroud 008	Bussage	6%
Stroud 009	Kings Stanley	6%
Stroud 010	Amberley	8%
Stroud 011	Cam	12%
Stroud 012	Berkeley	18%

MSOA	Location	% of Internal Work Trips
Stroud 013	Nailsworth	15%
Stroud 014	Dursley	15%
Stroud 015	Wotton Under Edge	19%
Average		**12%**
Average (selected MSOAs)		**18%**

Table 7 shows an average internalisation of 12% across the Stroud MSOAs. However, several of these MSOAs have limited employment opportunities which results in a low proportion of work trips staying within the MSOA. An average of the MSOAs most similar to Sharpness Vale in terms of their population and employment opportunities has also been calculated (highlighted in green) which shows an average work trip internalisation of 18%.

Therefore, an internalisation factor of **18%** has been applied to the work trips generated by Sharpness Vale.

The internalised work trips are between the residential development and the employment development to be provided on-site. Therefore, it is assumed that internalisation only applies to the departing work journey purpose trips from the residential development in the morning peak hour (with the equivalent number internalised from the arriving trips to the employment development in the morning peak hour) and to the arriving work journey purpose trips from the residential development in the evening peak hour (with the equivalent number internalised from the departing trips to the employment development in the evening peak hour).

The number of internalised work trips is shown in **Table 8**.

Table 8 - Internal and external work journey purpose trips

	A	*B*	*C*	*D*	*E*	*F*	*G*
1		**Morning Peak Hour (8am to 9am)**			**Evening Peak Hour (5pm to 6pm)**		
2		**Arr.**	**Dep.**	**Tot.**	**Arr.**	**Dep.**	**Tot.**
3	**Residential**						
4	Internal	0	273	273	176	0	176
5	External	365	1,245	1,610	803	431	1,234
6				Ref. Table 6: E3			Ref. Table 6: I3
7	**Employment**						
8	Internal	98	0	98	0	63	63
9	External	337	91	428	52	285	336
10	**Total Internal**	**98**	**273**	**372**	**176**	**63**	**240**
11	**Total External**	**702**	**1,336**	**2,038**	**855**	**715**	**1,570**

5.4.2 School Trips

As shown in **Table 6**, a significant proportion of morning peak hour trips will be journeys to school. Gloucestershire County Council's pupil yields from new housing developments show the following number of pupils will be generated from the 5,000 dwellings at Sharpness Vale:

- Primary: 42 pupils per 100 dwellings = 2,100 pupils
- Secondary: 21 pupils per 100 dwellings = 1,050 pupils

Sharpness Vale will provide on-site primary school provision (through the expansion of existing schools and new schools) and a new secondary school, offering a good opportunity for many of these school trips to be within the site. Although sufficient primary and secondary school provision will be provided on-site, largely negating the need for pupils to travel off-site to other schools, it is accepted that there likely will be some external education trips as a result of parental and student choice.

National Travel Survey[1] data provides a breakdown of distance travelled to school for ages 5-10 (primary) and 11-16 (secondary). This data shows that, in 2018, 78% of pupils travel less than 5 miles to secondary school with the remaining 22% travelling over 5 miles.

Therefore, it has been assumed that **78%** of education trips will stay on site with the remaining 22% likely to travel to other local education facilities. The number of internal and external school trips is shown in **Table 9**.

Table 9 - Internal and external school journey purpose trips

	Morning Peak Hour (8am to 9am)			Evening Peak Hour (5pm to 6pm)		
	Arr.	**Dep.**	**Tot.**	**Arr.**	**Dep.**	**Tot.**
Internal	219	911	1,130	190	84	273
External	62	257	319	54	24	77

5.4.3 Shopping and Personal Business Trips

The National Travel Survey defines shopping trips as *'all trips to shops or from shops to home, even if there was no intention to buy'* whilst personal business trips are defined as *'visits to services, e.g. hairdressers, launderettes, dry-cleaners, betting shops, solicitors, banks, estate agents, libraries, churches; or for medical consultations or treatment'.* It should be noted that NTS data splits all trips out by a single journey purpose, and hence as a single trip can only have one purpose, there is a possibility that linked trips are counted as two trips. This creates a robust framework, but in the context of peak hour trips the overlap is considered to be small.

[1] National Travel Survey Table NTS0614: Trips to school by main mode, trip length and age: England, 2018

The average trip length for a number of journey purposes can also be extracted from National Travel Survey data[2]. This shows for the South West area in 2017/2018, the average trip lengths for shopping and personal business trips are 4.4 and 5.1 miles respectively.

Sharpness Vale will include a mixed-use local centre close to the rail station which would include small scale local shops and services such as a supermarket, bank, hairdresser and post office. Additionally, Berkeley provides a number of shops and services including two local food stores, four hairdressers, a beauty salon, a doctor's surgery, a pharmacy, an opticians, two cafes, a bakery, a church and a library. These existing facilities combined with those to be provided at Sharpness Vale will significantly reduce the need for residents to travel out of the local area.

It is also important to consider how the use of these services are changing and its impacts on travel. Some of the key trends in shopping and personal business journey trip purpose are listed below.

- **People are travelling less** – National Travel Survey data[3] shows that, across England, the number of trips per person per year for shopping and personal business trips has reduced by 15% and 22% respectively

- **Online food shopping** – online food delivery services are now offered by most supermarkets and are particularly popular amongst the younger generation: in 2019, 45% of 25-34 year olds had purchased food shopping online compared to 19% of 55-64 year olds and 13% of those aged 65+[4]. Online groceries are expected to make up 10% of the sector by 2023, compared to 7% in 2018[5].

- **Online comparison goods shopping** – between 2008 and October 2019, the proportion of retail money spent online has increased from 4.9% to 19.2%[6]. Next day delivery (e.g. Amazon Prime), collection services (e.g. Doddle and Amazon Lockers) and free returns offer consumers greater flexibility

- **Online services** – many of the personal business serviced described in paragraph 5.4.13 can now be undertaken easily online including banking, betting, estate agents and even online medical consultations

Based on the evidence above, it is expected that most shopping and personal business trips will be undertaken in the local area or will not comprise of a trip at all as the 'trip' will be undertaken online.

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[2] National Travel Survey Table NTS9912 Average trip length by purpose
[3] National Travel Survey Table NTS0403 Average number of trips (trip rates) per person per year by trip purpose
[4] https://www.statista.com/statistics/286116/food-and-groceries-online-purchasing-in-great-britain-by-demographic/
[5] https://www.bbc.com/news/business-47900669
[6] https://www.ons.gov.uk/businessindustryandtrade/retailindustry/articles/howourinternetactivityhasinfluencedthewayweshop/october2019

Therefore, an internalisation factor of **60%** has been used with the remaining 40% travelling off-site. The number of internal and external shopping and personal business trips is shown in **Table 10**.

Table 10 - Internal and external shopping and persoanl business journey purpose trips

Land Use	Morning Peak Hour (8am to 9am)			Evening Peak Hour (5pm to 6pm)		
	Arr.	Dep.	Tot.	Arr.	Dep.	Tot.
Internal	105	436	541	451	199	650
External	70	291	360	301	132	433

5.4.4 Leisure Trips

The Sharpness Vale proposals include significant areas of formal sports provision as well as a network of pedestrian and cycle priority routes through the site which will be suitable for leisure activities. A number of leisure facilities are located in the local area including several pubs, takeaways, Hamfields Leisure, Sharpness Village Hall and tennis courts on Oldminster Road. Additionally, the proposed Sharpness Dock development will create new leisure and amenity space including new marinas which could deliver a mix of commercial, retail, food and drink uses.

The NTS data utilised in this appraisal provides further details of the purposes that lie behind leisure trips, as least of the evening peak period when far more leisure trips occur than in the morning. This shows that around half of the trips are for recreation and social purpose, and half for visiting friends and family or holidays and day trips. NTS also provides information about the average distance travelled for such trips – 11 miles for visiting friends and relatives in their homes, 6.1 miles if meeting them somewhere public (a restaurant or pub) and 7.6 miles from sport, entertainment and recreational trips.

On the basis of these statistics, it has been assessed that **50%** of leisure trips will stay on-site with the remaining 50% travelling off-site. The number of internal and external leisure trips is shown in **Table 11**.

Table 11 - Internalised leisure journey purpose trips

Land Use	Morning Peak Hour (8am to 9am)			Evening Peak Hour (5pm to 6pm)		
	Arr.	**Dep.**	**Tot.**	**Arr.**	**Dep.**	**Tot.**
Internal	30	124	154	422	186	608
External	30	124	154	422	186	608

5.4.5 Total Internal and External Trips

The total number of internal and external person trips by each journey purpose is shown in **Table 12**.

Table 12 - Total Internal and External Trips

	A		B	C	D	E	F	G
1	**Journey Purpose**		**Morning Peak Hour (8am**			**Evening Peak Hour (5pm**		
2			**Arr.**	**Dep.**	**Tot.**	**Arr.**	**Dep.**	**Tot.**
3	**Internal Trips**							
4	Residential	Work	0	273	273	176	0	176
5		School	219	911	1,130	190	84	273
6		Shopping	105	436	541	451	199	650
7		Leisure	30	124	154	422	186	608
8	Employment		98	0	98	0	63	63
9	**Total**		**452**	**1,744**	**2,196**	**1,240**	**531**	**1,771**
10	**External Trips**							
11	Residential	Work	365	1,245	1,610	803	431	1,234
12		School	62	257	319	54	24	77
13		Shopping	70	291	360	301	132	433
14		Leisure	30	124	154	422	186	608
15	Employment		337	91	428	52	285	336
16	**Total**		**863**	**2,008**	**2,871**	**1,632**	**1,057**	**2,689**
17					Table 5: D6			Table 5: G6

6.0 TRIP DISTRIBUTION

6.1 INTRODUCTION

This section outlines the destinations which residents of Sharpness Vale may choose to travel to for each journey purpose.

6.2 INTERNAL TRIPS

As shown in **Table 12**, 2,196 person trips will be internalised in the morning peak hour and 1,771 in the evening peak hour. Due to the short distance of most of these internalised trips, it is expected that walk, cycle and personal micro-mobility modes will be the predominant travel mode with some undertaken by bus and only a small number undertaken by car, as a result of the layout of the development, and the reduction in status given to the car.

The destinations which these internal trips will travel to will be spread around the Sharpness Vale development and to existing facilities in Newtown, Sharpness and Berkeley; therefore, detailed distribution of internal trips has not been considered at this stage. It will be necessary to consider these, and give expression to them as part of a future planning application and detailed Transport Assessment to ensure the proposed pedestrian, cycle & micro-mobility infrastructure is in the correct location and the internal highway network is appropriate for the vehicles envisaged (bus routes, bus only roads and other streets).

6.3 EXTERNAL TRIPS

6.3.1 Work Trips

To provide a baseline for our work trip distribution, 2011 Census Journey to Work data has been extracted for the Stroud 012 Middle Super Output Area (MSOA) in which the Sharpness Vale development is located. The 2011 Census data in **Table 13** provides the proportions of the most common destinations which current residents in the Stroud 012 MSOA travel to – these are Bristol, South Gloucestershire, Gloucester and Stroud/ Stonehouse.

As outlined in **Section 3**, Sharpness Vale will provide a number of public transport options for residents including a rail link to Gloucester and bus/ coach provision to other key employment, shopping and leisure destinations such as Cam, Dursley, Stroud and north of Bristol. These public transport options will result in an increase in the number of residents choosing to travel to destinations such as Gloucester and Cheltenham (by train) and Bristol and Stroud (by bus/ coach), subsequently reducing the number of trips to destinations which are not well served by public transport like Wotton Under Edge, Frampton on Severn and the Forest of Dean.

The proposed distribution in **Table 13** takes account of these changes by reflecting higher percentages of external trips travelling to Bristol, Gloucester and Cheltenham. This gives a positive weighting to the proposed public transport services that will provide direct and reliable links to major employment centres in the region. The appraisal therefore represents a relative decrease in trips to other destinations including Stroud/ Stonehouse, Wotton Under Edge and Frampton on Severn. These locations will still be accessible by sustainable transport modes, but do not represent such significant range of employment opportunities as the larger centres towards which new services would be emphasised.

Table 13 - 2011 Census and Proposed Work Trip Distribution

Destination	Distribution			Two-Way Person Trips	
	2011 Census	Changes	Proposed Distribution	Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Cam/ Dursley	**8%**	**-**	**8%**	**136**	**104**
Bristol	**11%**	**+4%**	**15%**	**238**	**183**
South Gloucestershire	**35%**	**-7%**	**28%**	**452**	**347**
Gloucester	**13%**	**+7%**	**20%**	**322**	**247**
Stroud/ Stonehouse	**16%**	**-4%**	**12%**	**191**	**146**
Cheltenham	**3%**	**-**	**3%**	**54**	**41**
Tewkesbury	**4%**	**-**	**4%**	**62**	**47**
Wotton Under Edge	**5%**	**-**	**5%**	**87**	**67**

Destination	Distribution			Two-Way Person Trips	
	2011 Census	Changes	Proposed Distribution	Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Frampton on Severn	**4%**	**-**	**4%**	**68**	**52**
Total	**100%**	**-**	**100%**	**1,610**	**1,234**

6.3.2 Employment Trips

To understand the destinations that people are currently travelling from in order to access existing employment opportunities in and around Sharpness (including the Docks, Howard Tenens and Berkeley town centre), 2011 Census Method of travel to work (workday population) data has been examined. **Table 14** shows that the majority of work trips originate in locations within 20km of Sharpness including Cam, Dursley, South Gloucestershire, Gloucester, Stroud, Stonehouse and Wotton Under Edge.

The employment offer at Sharpness Vale is planned to be different to the existing activity, and to complement it, with more office and light industrial jobs in the business park as well as retail and service industry jobs across the development. It is possible that the origins of employees may differ from existing patterns, as a result of the different types of work being undertaken in the new employment area, but for the purposes of this appraisal we have applied the 2011 Census Methodology for Travel to Work (workday population) data as the most reasonable proxy.

Table 14 - 2011 Census and Proposed Employment Trip Distribution

Destination	Distribution			Two-Way Person Trips	
	2011 Census	Changes	Proposed Distribution	Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Cam/ Dursley	**29%**	**-**	**29%**	**123**	**97**
Bristol	**6%**	**-**	**6%**	**26**	**20**

Destination	Distribution			Two-Way Person Trips	
	2011 Census	Changes	Proposed Distribution	Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
South Gloucestershire	**21%**	**-**	**21%**	**89**	**70**
Gloucester	**13%**	**-**	**13%**	**56**	**44**
Stroud/ Stonehouse	**16%**	**-**	**16%**	**68**	**53**
Cheltenham	**2%**	**-**	**2%**	**9**	**7**
Tewkesbury	**3%**	**-**	**3%**	**11**	**9**
Wotton Under Edge	**6%**	**-**	**6%**	**28**	**22**
Frampton on Severn	**4%**	**-**	**4%**	**18**	**15**
Total	**100%**		**100%**	**428**	**336**

6.3.3 School Trips

As described in **Section 5.4**, the on-site education provision will result in the majority of education journey purpose trips staying within the wider Sharpness Vale area, at new and existing schools. Sharpness Vale is within the catchment area for Rednock School in Dursley and Katharine Lady Berkeley's School in Wotton Under Edge and it has been assumed that 50% of the external school trips will travel to each facility, as shown in **Table 15**.

Table 15 - Proposed School Trip Distribution

Destination	Education Facility	Proposed Distribution	Two-Way Person Trips	
			Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Cam/ Dursley	Rednock School	50%	159	39
Wotton Under Edge	Katharine Lady Berkeley's School	50%	159	39
Total		100%	319	77

6.3.4 Shopping and Personal Business Trips

The external shopping and personal business trips are likely to comprise of comparison shopping and trips to services which cannot be done within Sharpness Vale or the local area. These trips are expected to route to local town centres (Stroud, Stonehouse, Cam and Dursley), supermarkets or further afield to Bristol and Gloucester for city centre shops and facilities which are not available in the smaller settlements. Sharpness Vale is well located for access to these off-site facilities: Cam, Dursley, Stroud, Stonehouse and Thornbury are within 20km and Gloucester, Bristol and Cribbs Causeway are within 30km.

The proposed shopping and personal business trip distribution is shown in **Table 16**. It has been assumed that Cam/ Dursley will be the most popular destination as it provides a range of facilities and is within 10km of Sharpness Vale. Supermarkets in Quedgeley (Gloucester) and Thornbury (South Gloucestershire) are also likely to be popular destinations as the next layer of provision beyond the most local facilities. Smaller proportions of people are likely to travel to Bristol, Stroud and Stonehouse, and most likely for more occasional comparison shopping and more significant personal business trips.

Table 16 - Proposed Shopping and Personal Business Trip Distribution

Destination	Facilities	Proposed Distribution	Two-Way Person Trips	
			Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Cam/ Dursley	Supermarkets: Tesco, Sainsburys and Lidl	40%	144	173
Bristol	City Centre Shops	10%	36	43
South Gloucestershire	Supermarkets: Tesco, Morrisons, Asda Cribbs Causeway	20%	72	87
Gloucester	Supermarkets: Asda, Tesco Extra City Centre Shops	20%	72	87
Stroud/ Stonehouse	Supermarkets: Sainsburys, Waitrose, Tesco	10%	36	43
Total		100%	360	433

6.3.5 Leisure Trips

The leisure trip category covers a range of potential journey purposes including visiting friends and family (either at someone's home or elsewhere) and types of entertainment including sports clubs, cinema, voluntary work and going to a restaurant.

Trip Distribution

To provide an indication of where leisure trips may travel to, the following methodology has been undertaken:

i. 2011 Census population data and the distance from Sharpness Vale has been extracted for each destination – this provides a useful proxy for trips to visit friends and family (i.e. someone is likely to know more people in a place with a higher population and therefore more likely to travel there to visit them)

ii. The distance between Sharpness Vale and the destination has been extracted from Google Earth

iii. A population weighting has been assigned to each destination based on the following values

- **1.0** = Less than 50,000
- **1.2** = 50,000 – 99,999
- **1.4** = 100,000 – 199,999
- **1.6** = 200,000 – 399,999
- **1.8** = 400,000+

iv. A distance weighting has been calculated using 1 / distance

v. A review of the leisure facilities in each destination has been undertaken and each destination has been ranked from 1 to 9 with the destination with the most leisure facilities scoring a 9 and the least scoring a 1

vi. The population weighting, distance weighting and leisure facilities rank have been multiplied together to give an overall score

vii. The score proportions have been calculated to determine the percentage distribution

The leisure trip distribution calculations are shown in **Table 17** and the resultant morning and evening peak hour leisure trips are shown in **Table 18** for each destination.

Table 17 - Leisure Trip Distribution calculations

Section 6 Reference	i.	ii.	iii.	iv.	v.	vi.	vii.
Destination	Population	Distance from Sharpness Vale (km)	Population	Distance	Leisure Facilities	Score	% Dist.
Cam/ Dursley	**14,859**	**9**	**1.0**	**0.11**	**6**	**0.67**	**23%**
Bristol	**428,100**	**30**	**1.8**	**0.03**	**9**	**0.54**	**19%**
South Gloucestershire	**262,767**	**22**	**1.6**	**0.05**	**7**	**0.51**	**16%**
Gloucester	**136,362**	**25**	**1.4**	**0.04**	**8**	**0.45**	**13%**
Stroud/ Stonehouse	**69,072**	**19**	**1.2**	**0.05**	**4**	**0.25**	**8%**
Cheltenham	**116,447**	**35**	**1.4**	**0.03**	**5**	**0.20**	**7%**
Tewkesbury	**19,778**	**40**	**1.0**	**0.03**	**2**	**0.05**	**2%**
Wotton Under Edge	**8,606**	**12**	**1.0**	**0.08**	**3**	**0.25**	**10%**
Frampton on Severn	**6,554**	**11**	**1.0**	**0.09**	**1**	**0.09**	**3%**

Table 18 - Proposed Leisure Trip Distribution

Destination	Proposed Distribution	Two-Way Person Trips	
		Morning Peak (8am to 9am)	Evening Peak (5pm to 6pm)
Cam/ Dursley	**23%**	**35**	**140**
Bristol	**19%**	**29**	**115**
South Gloucestershire	**16%**	**24**	**95**
Gloucester	**13%**	**20**	**80**
Stroud/ Stonehouse	**8%**	**12**	**49**
Cheltenham	**7%**	**11**	**44**
Tewkesbury	**2%**	**3**	**10**
Wotton Under Edge	**10%**	**15**	**59**
Frampton on Severn	**3%**	**4**	**16**
Total		**154**	**608**

6.3.6 Person Trip Distribution Summary

The person trip distribution for each journey purpose for the morning and evening peak hours is shown in **Tables 19** and **20** respectively.

Table 19 - Morning Peak Hour Distribution

Destination	Residential				Employment	Total
	Work	School	Shopping and PB	Leisure		
Cam/ Dursley	136	159	144	35	123	598
Bristol	238		36	29	26	329
South Gloucestershire	452		72	24	89	637
Gloucester	322		72	20	56	470
Stroud/ Stonehouse	191		36	12	68	307
Cheltenham	54			11	9	74
Tewkesbury	62			3	11	76
Wotton Under Edge	87	159		15	28	289

Trip Distribution

Destination	Residential				Employment	Total
	Work	School	Shopping and PB	Leisure		
Frampton on Severn	68			4	18	91
Total	1,610	319	360	154	428	2,871
						Table 12: D16

Table 20 - Evening Peak Hour Distribution

Destination	Residential				Employment	Total
	Work	School	Shopping and PB	Leisure		
Cam/ Dursley	104	39	173	140	97	553
Bristol	183		43	115	20	361
South Gloucestershire	347		87	95	70	598
Gloucester	247		87	80	44	457

Trip Distribution

Destination	Residential				Employment	Total
	Work	School	Shopping and PB	Leisure		
Stroud/ Stonehouse	146		43	49	53	292
Cheltenham	41			44	7	92
Tewkesbury	47			10	9	66
Wotton Under Edge	67	39		59	22	186
Frampton on Severn	52			16	15	83
Total	1,234	77	433	608	336	2,689
						Table 12: G16

7.0 MODE SHARE

7.1 INTRODUCTION

In order to determine the mode share for trips from Sharpness Vale, we have had to adopt an essentially first principles approach. The traditional approach has been to extrapolate trends forwards from historic data – but we believe that this is flawed, as it perpetuates the outcomes that are an inherent part of the philosophy of adding highway capacity and allowing unfettered use of the private car. If we are to break this cycle, we will have to start deriving mode share parameters that are closer to what we are planning and providing for, and not so much about continuing historic trends, which are based on behaviours that we want to change.

Indeed, we can see from the graph below that even where we do consider the extrapolation of current trends to be appropriate, our ability to do this with any degree of accuracy is poor:

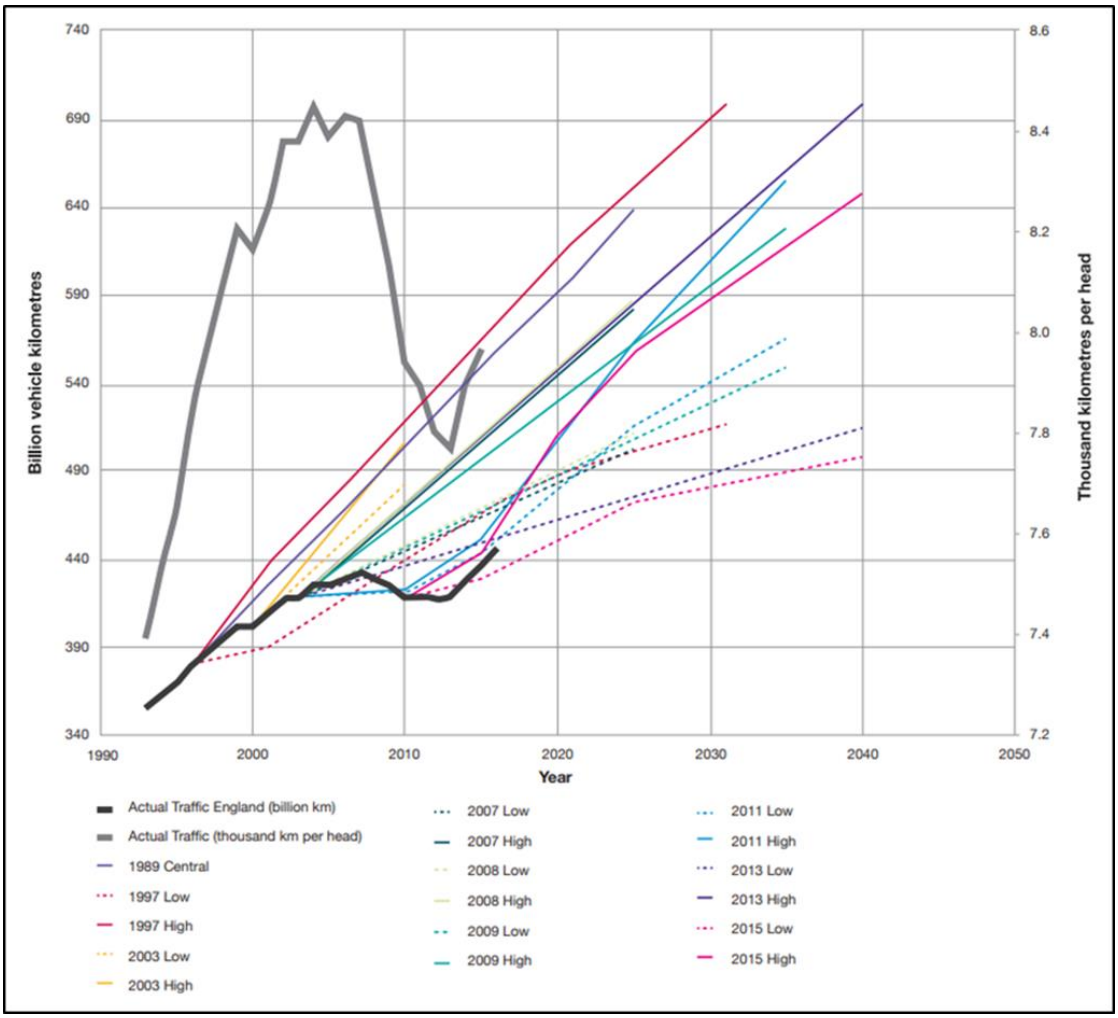

Figure 9 - Actual traffic trends against historic forecasts

However, we do see that trends are changing – faster in urban areas than in rural areas, but significant enough to be considered material. These changes are being driven by a multitude of factors:

- **Climate change** – as people become increasingly concerned about the long-term effects, not only on a global scale, but also on a local level as flooding hits countries like the UK with increased frequency and severity;

- **Costs** – as car ownership becomes more expensive, especially alongside increases in housing costs and other priorities that upcoming generations have, their propensity to drive and own a car is reducing – and this is reinforced by:

- **Congestion** – the increasing levels of journey time uncertainty on the highway network are making the car a much less attractive option for many people. The upcoming generations do not perceive the car as representing freedom and independence, as they may value

productive time on public transport more greatly than being in a car compared to older generations, who grew up with relatively certain car journey times.

- **Changes to working patterns** – with more people being able to work from home, or remotely in hubs and even cafes, the need to "commute" is reducing. This is likely to be accelerated as a direct result of the Covid-19 impacts and restrictions, people have learnt, and will increasingly learn and experiment, with new virtual and digital ways of holding meetings, contributing to a lowering of the demand for travel simply for the convenience of a face-to-face meeting.

Government is picking up on these trends too and exploring what they may mean for travel in the future. The "Restoring your Railway" fund is one such example, but Grant Shapps, the transport minister, has pointed to other changes recently, and noted that the Government is taking these seriously as the way to plan for movement in the future. They have recently published a white paper on Decarbonising Transport as a first step towards formally recognising this change:
https://www.gov.uk/government/publications/creating-the-transport-decarbonisation-plan

We have therefore used data that is available and adopted the principle that we will provide for all external trips out of Sharpness Vale during the peak hours to be provided for by public transport. The objective is that the residents and business in Sharpness Vale, and the surrounding areas, would be able to become "transport network" reliant, and not "Single mode" reliant – specifically in respect of the car.

7.2 MODE SHARE

The appraisal methodology utilises census and available pricing data to consider the relative costs of potential trips from Sharpness Vale. Typical journey times for the different modes have also been extracted from publicly available data – internet sources for car-based journey times and timetable information to derive public transport journey times.

The various trip purposes are identified individually, as their propensity to mode selection criteria may be different.

7.2.1 Work Trips

7.2.1.1 Assessment of Journey Time and Cost

To determine how future residents of Sharpness Vale may choose to travel to work, an assessment of journey times and costs by car, rail, bus/coach has been undertaken and is set out below by reference to each mode:

7.2.1.2 Car trips – journey times and costs

Existing patterns (excluding traffic within MSOA – which relates to local trips within the growth area, and so is not relevant to planning for external trips) using the following parameters:

i. **Journey Time**: maximum journey time from Sharpness Vale in the morning peak hour based on Google Maps

ii. **Daily Parking Cost**: cost of annual parking pass divided by average number of working days (assumed 254)

iii. **Daily Fuel Cost**: calculated from length of journey based on 35 MPG and a fuel cost of £1.20 per litre

iv. **Daily Running Cost**: based on a Kwik Fit report which found that, excluding fuel and parking, an average car costs £94.70 per month to run; this includes insurance, maintenance and servicing, road tax, breakdown cover, cleaning and fines

Table 21 - Journey Time & Cost of Journeys by Car

Destination	Two-way Journey Time (minutes)	Daily Parking Cost	Daily Fuel Cost	Daily Running Cost	Total Daily Cost
Gloucester	**110**	**£2.26**	**£6.97**	**£2.93**	**£12.16**
Cheltenham	**150**	**£2.64**	**£8.52**		**£14.09**
Tewkesbury	**120**	**£0.98**	**£10.07**		**£13.98**
Stroud/ Stonehouse	**110**	**£2.17**	**£4.84**		**£9.93**
Cam/ Dursley	**28**	**-**	**£2.13**		**£5.06**
Bristol	**140**	**£8.40**	**£7.55**		**£18.88**
Aztec West/ Rolls Royce/ Airbus	**90**	**-**	**£5.23**		**£8.16**
MoD/ UWE	**110**	**-**	**£5.81**		**£8.74**

7.2.1.3 Public Transport trips – journey time and costs

Rail costs using the following parameters:

i. Journey Length: distance between Sharpness Vale and the destination in kilometres by rail or road

ii. Two-way Journey Time: existing journey time from Cam & Dursley rail station + ten-minute train journey between Sharpness Vale and Cam & Dursley + ten-minute interchange time for all destinations except Cam & Dursley and Gloucester

iii. Daily Ticket Cost:

- **Rail** – cost of annual ticket between Cam & Dursley and destination + £762 (estimated annual cost of Sharpness to Cam & Dursley) divided by average number of working days (assumed 254)
- **Bus** – cost of a Stagecoach Monthly Megarider or Monthly Megarider Gold (depending on destination) multiplied by 12 (months) and divided by the average number of working days (assumed 254)
- **Commuter Coach** – the cost a return trip on the Zeelo service between Leamington Spa and Jaguar Land Rover Gaydon is £2.76 per day (based on purchasing 100 trips for £137.99)[7]. The journey length is 17km which works out at 16p per km – this value has been applied to the journey length for the destinations

Table 22 - Journey Time & Cost of Rail, Bus, DRT and Coach Trips

Destination	Journey Length (km)	Two-way Journey Time (minutes)	Daily Ticket Cost
Rail			
Gloucester	**29**	**56**	**£8.57**
Cheltenham	**40**	**110**	**£9.02**
Tewkesbury	**52**	**128**	**£10.61**

[7] https://zeelo.co/rides/jlr

Mode Share

Destination	Journey Length (km)	Two-way Journey Time (minutes)	Daily Ticket Cost
Cam/ Dursley	**9**	**20**	**£3.00**
Filton Abbey Wood (for MoD/ UWE)	**44**	**92**	**£10.73**
Bristol	**51**	**106**	**£12.69**
Bus			
Stroud/ Stonehouse	**25**	**60**	**£2.55**
Cam/ Dursley	**11**	**30**	**£2.55**
Wotton Under Edge	**14**	**40**	**£3.90**
Frampton on Severn	**16**	**40**	**£2.55**
Commuter Coach			
Bristol	**39**	**90**	**£6.33**
Aztec West/ Rolls Royce/ Airbus	**27**	**80**	**£4.38**
MoD/ UWE	**30**	**70**	**£4.87**

Mode Share

7.2.2 Comparison

The table below compares the various journey times and costs to provide an overview of the relative characteristics of journeys by each mode.

Table 23 - Car vs Public Transport Journey Time & Cost Comparison

Destination	Two-way Journey Time (minutes)			Journey Cost			
	Car	Public Transport	Time Saving	Car	Public Transport	Daily Cost Saving	Annual Cost Saving
Rail							
Gloucester	**110**	**56**	**54**	**£12.16**	**£8.57**	**£3.59**	**£912**
Cheltenham	**150**	**110**	**40**	**£14.09**	**£9.02**	**£5.07**	**£1,288**
Tewkesbury	**120**	**128**	**-8**	**£13.98**	**£10.61**	**£3.38**	**£858**
Cam/ Dursley	**28**	**20**	**8**	**£5.06**	**£3.00**	**£2.06**	**£523**
Filton Abbey Wood (for MoD/ UWE)	**110**	**92**	**18**	**£8.54**	**£10.73**	**-£2.19**	**-£556**
Bristol	**140**	**106**	**34**	**£18.11**	**£12.69**	**£5.42**	**£1,377**
Bus							

Mode Share

Destination	Two-way Journey Time (minutes)			Journey Cost			
	Car	Public Transport	Time Saving	Car	Public Transport	Daily Cost Saving	Annual Cost Saving
Stroud/ Stonehouse	**110**	**60**	**50**	**£9.93**	**£2.55**	**£7.38**	**£1,875**
Cam/ Dursley	**30**	**30**	**0**	**£5.06**	**£2.55**	**£2.51**	**£637**
Wotton Under Edge	**40**	**40**	**0**	**£5.64**	**£3.90**	**£1.74**	**£442**
Frampton on Severn	**40**	**40**	**0**	**£6.03**	**£2.55**	**£3.48**	**£883**
Commuter Coach							
Bristol	**140**	**90**	**50**	**£18.88**	**£6.33**	**£12.55**	**£3,188**
Aztec West/ Rolls Royce/ Airbus	**90**	**80**	**10**	**£8.16**	**£4.38**	**£3.77**	**£959**
MoD/ UWE	**110**	**70**	**40**	**£8.74**	**£4.87**	**£3.87**	**£982**

This analysis shows that generally travelling by rail and coach between Sharpness and key employment destinations can offer significant journey time and cost savings. For example, travelling by train to Gloucester rather than driving and parking in the city centre could save nearly an hour per day in journey time and almost £1,000 in cost per year. Similarly, travelling by commuter coach to Bristol city centre offers substantial cost savings due to not having to pay for parking.

Mode Share

As stated previously, a key aspiration of Sharpness Vale is to provide residents with fast, convenient and cost-effective public transport options to make their journey. A package of rail and bus improvements will be provided (set out in further detail in **Sections 8** and **9**) to enable residents to access key destinations without using the private car. These proposals include:

i. **Cam/ Dursley** – a new bus service will connect Sharpness Vale with Cam and Dursley with a journey time of less than 20 minutes

ii. **Bristol** – a commuter coach service which will pick up at three locations within Sharpness Vale and then run direct to Bristol city centre via the M32. Commuters will also be able to access Bristol by rail, changing trains at Cam & Dursley station.

iii. **South Gloucestershire** – Some commuters may choose to use the train to Filton Abbey Wood or Bristol Parkway by changing at Cam & Dursley but the majority of trips will be undertaken by commuter coach services which will pick up at three locations within Sharpness Vale and then run direct to key employment destinations. Separate buses will run to the following destinations to ensure a quick journey time:

   - Aztec West, Rolls Royce and Airbus (Via M5 J16)
   - MoD/ UWE (Via M4 and M32)

iv. **Gloucester** – the Sharpness to Gloucester rail service will offer residents the quickest and cheapest option of travelling to Gloucester city centre

v. **Stroud and Stonehouse** – a new bus service will provide a convenient link between Sharpness Vale, Stroud and Stonehouse

vi. **Cheltenham and Tewkesbury** – most trips will be undertaken by rail (changing at Gloucester or Cam & Dursley)

vii. **Wotton Under Edge and Frampton on Severn** – for destinations where the patronage may not be sufficient for a fixed route service, Demand Responsive Transport will provide a flexible service

In order to derive the mode split between car and public transport for each destination, the journey times and journey costs in **Table 23** have been used. The ratios between journey time by car and public transport and between journey cost by car and public transport have been calculated, as shown in **Table 24**. These ratios have then been multiplied together to give a combined value which is a function of journey time and journey cost. Finally, the ratio between these values has been calculated to derive the mode share shown in the final two columns.

Mode Share

Table 24 - Car vs Public Transport Mode Share Calculations

Destination	Mode	Journey Time		Journey Cost		Mode Share	
		Car	PT	Car	PT	Car	PT
Cam/ Dursley	**Bus**	**50%**	**50%**	**34%**	**66%**	**34%**	**66%**
Bristol	**Coach**	**39%**	**61%**	**25%**	**75%**	**18%**	**82%**
South Gloucestershire	**Coach**	**43%**	**57%**	**35%**	**65%**	**29%**	**71%**
Gloucester	**Rail**	**34%**	**66%**	**41%**	**59%**	**26%**	**74%**
Stroud/ Stonehouse	**Bus**	**35%**	**65%**	**20%**	**80%**	**12%**	**88%**
Cheltenham	**Rail**	**42%**	**58%**	**39%**	**61%**	**32%**	**68%**
Tewkesbury	**Rail**	**52%**	**48%**	**43%**	**57%**	**45%**	**55%**
Wotton Under Edge	**Bus**	**50%**	**50%**	**41%**	**59%**	**41%**	**59%**
Frampton on Severn	**Bus**	**50%**	**50%**	**30%**	**70%**	**30%**	**70%**

The mode share data in **Table 24** has been processed further to derive the split between car driver and car passenger. National Travel Survey data[8] shows an average car occupancy of 1.2 for commuting

[8] National Travel Survey Table NTS0905 Car / Van Occupancy and lone driver rate by trip purpose

journey purpose trips. The majority of commuting trips will be undertaken by public transport but for those which are still undertaken by car, a car share scheme will be implemented. A car occupancy figure of 1.5 (i.e. only half of commuting car trips are undertaken alone) has been applied to the car mode share in **Table 24** to derive the car driver and car passenger mode share in **Table 25**.

An adjustment has also been made to the public transport mode share for Bristol and South Gloucestershire. Although it is expected that the majority of commuters to these destinations which travel by coach, the reopened Sharpness Branch Line will offer opportunities to travel by train by changing at Cam & Dursley. **Table 23** shows that there are potential cost and time savings from travelling by train to Bristol (albeit not as high as travelling by coach) and although getting the train to Filton Abbey Wood is not cheaper, it is slightly quicker.

To reflect the availability of two sustainable travel modes to Bristol and South Gloucestershire, it has been assumed that 10% of those travelling via public transport will do so by rail with the remainder travelling by coach. This is reflected in the mode share in **Table 25**.

Table 25 - Work and Employment Trip Mode Share by Destination

Destination	**Mode**				
	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**22%**	**11%**	**66%**		**100%**
Bristol	**12%**	**6%**	**72%**	**10%**	**100%**
South Gloucestershire	**20%**	**10%**	**61%**	**10%**	**100%**
Gloucester	**18%**	**9%**		**74%**	**100%**
Stroud/ Stonehouse	**8%**	**4%**	**88%**		**100%**
Cheltenham	**21%**	**11%**		**68%**	**100%**

Mode Share

Destination	Mode				
	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Tewkesbury	**30%**	**15%**		**55%**	**100%**
Wotton Under Edge	**27%**	**14%**	**59%**		**100%**
Frampton on Severn	**20%**	**10%**	**70%**		**100%**
Average	**18%**	**9%**	**50%**	**23%**	

Table 26 - Morning and Evening Peak Work Trips by Destination and Mode

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**8%**	**30**	**15**	**90**		**136**	**23**	**12**	**69**		**104**
Bristol	**15%**	**28**	**14**	**172**	**24**	**238**	**22**	**11**	**132**	**18**	**183**
South Gloucestershire	**28%**	**88**	**44**	**275**	**45**	**452**	**68**	**34**	**211**	**35**	**347**
Gloucester	**20%**	**57**	**28**		**237**	**322**	**43**	**22**		**182**	**247**

Mode Share

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Stroud/ Stonehouse	**12%**	**16**	**8**	**167**		**191**	**12**	**6**	**128**		**146**
Cheltenham	**3%**	**11**	**6**		**37**	**54**	**9**	**4**		**28**	**41**
Tewkesbury	**4%**	**18**	**9**		**34**	**62**	**14**	**7**		**26**	**47**
Wotton Under Edge	**5%**	**24**	**12**	**52**		**87**	**18**	**9**	**40**		**67**
Frampton on Severn	**4%**	**13**	**7**	**48**		**68**	**10**	**5**	**37**		**52**
Total	**100 %**	**286**	**143**	**804**	**377**	**1,610**	**219**	**110**	**616**	**289**	**1,234**

Mode Share

Table 27 - Morning and Evening Peak Employment Trips by Destination and Mode

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**29%**	**16**	**8**	**49**		**73**	**14**	**7**	**43**		**64**
Bristol	**6%**	**2**	**1**	**11**	**2**	**15**	**2**	**1**	**10**	**1**	**13**
South Gloucestershire	**21%**	**10**	**5**	**32**	**5**	**52**	**9**	**5**	**28**	**5**	**46**
Gloucester	**13%**	**6**	**3**		**24**	**33**	**5**	**3**		**21**	**29**
Stroud/ Stonehouse	**16%**	**3**	**2**	**35**		**40**	**3**	**1**	**31**		**35**
Cheltenham	**2%**	**1**	**1**		**4**	**5**	**1**	**0**		**3**	**5**
Tewkesbury	**3%**	**2**	**1**		**4**	**7**	**2**	**1**		**3**	**6**
Wotton Under Edge	**6%**	**4**	**2**	**10**		**16**	**4**	**2**	**9**		**14**
Frampton on Severn	**4%**	**2**	**1**	**8**		**11**	**2**	**1**	**7**		**10**

Mode Share

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Total	**100 %**	**47**	**24**	**144**	**38**	**253**	**42**	**21**	**127**	**34**	**223**

7.2.3 School Trips

Both Rednock School in Dursley and Katharine Lady Berkeley's School in Wotton under Edge are served by existing school bus services which pick up in Sharpness, Newtown and Berkeley. National Travel Survey data shows that, for school journeys of over 5 miles, 61% are undertaken by bus. Therefore, it has been assumed that 61% of Sharpness Vale residents who choose to travel to these two schools will use the existing school bus services (or an additional/expanded service is demand warrants it) with the remaining pupils dropped off by car. To determine the car driver/ car passenger split, car occupancy data for education journeys from the National Travel Survey has been applied which showed an average car occupancy of 2. **Table 28** shows the school trip mode share by destination, and **Table 29** shows the resulting movements.

Table 28 - School Trip Mode Share by Destination

Destination	Mode				
	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**20%**	**19%**	**61%**		**100%**
Wotton Under Edge	**20%**	**19%**	**61%**		**100%**

Mode Share

Average	**20%**	**19%**	**61%**		

Table 29 - Morning and Evening Peak School Trips by Destination and Mode

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**50%**	**32**	**30**	**97**		**159**	**8**	**7**	**24**		**39**
Wotton Under Edge	**50%**	**32**	**30**	**97**		**159**	**8**	**7**	**24**		**39**
Total	**100 %**	**64**	**61**	**194**		**319**	**15**	**15**	**47**		**77**

7.2.4 Shopping and Personal Business Trips

As set out in **Section 5**, a significant amount of shopping and person business trips are likely to be undertaken on-site, in the local area or use online services such as home delivery. Trips which travel to external destinations are likely to be for comparison goods shopping or personal business trips to services which are not present in Sharpness Vale or the local area. It is likely that the majority of these external trips will be too destinations in town centres which will be accessible by the public transport services proposed as part of Sharpness Vale.

A public transport mode share of 60% has been assumed for each destination with the remaining 40% using a car. A car occupancy of 1.7 has been used, resulting in 24% car driver mode share and 16% car passenger mode share. The resultant shopping and personal business trips by destination and mode are shown in **Table 30** and the resulting trips are shown in **Table 31**.

Mode Share

Table 30 - Shopping and Personal Business Trip Mode Share by Destination

Destination	Mode				
	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	24%	16%	60%		100%
Bristol	24%	16%	50%	10%	100%
South Gloucestershire	24%	16%	50%	10%	100%
Gloucester	24%	16%		60%	100%
Stroud/ Stonehouse	24%	16%	60%		100%
Average	24%	16%	45%	15%	

Table 31 - Morning and Evening Peak Shopping and Personal Business Trips by Destination and Mode

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	40%	35	23	87		144	42	28	104		173
Bristol	10%	9	6	18	4	36	10	7	22	4	43

South Gloucestershire	**20%**	**17**	**12**	**36**	**7**	**72**	**21**	**14**	**43**	**9**	**87**
Gloucester	**20%**	**17**	**12**		**43**	**72**	**21**	**14**		**52**	**87**
Stroud/ Stonehouse	**10%**	**9**	**6**	**22**		**36**	**10**	**7**	**26**		**43**
Total	**100 %**	**87**	**58**	**162**	**54**	**360**	**104**	**69**	**195**	**65**	**433**

7.2.5 Leisure Trips

Although these trips may be considered to be more likely to be made by car, there may be less of a time constraint on them that would mean that the propensity to change to a more sustainable mode may be equally likely. Therefore, the same cost and journey time assessment has been applied to them.

There may be a residual level of car use that relates to visiting a friend or relative whose house is not on a bus or rail route, but in this case it would be expected that there would be a higher propensity for more people to travel together. National Travel Survey data for leisure trips shows an average car occupancy of 1.7. The mode share in **Table 32** uses a car occupancy of up to 1.7 for each destination. The resultant leisure trips by destination and mode are shown in **Table 33**.

Table 32 - Leisure Trip Mode Share by Destination

Destination	**Mode**				
	Car Driver	**Car Passenger**	**Bus/ Coach**	**Train**	**Total**
Cam/ Dursley	**24%**	**16%**	**60%**		**100%**
Bristol	**24%**	**16%**	**50%**	**20%**	**100%**

Mode Share

South Gloucestershire	**24%**	**16%**	**50%**	**10%**	**100%**
Gloucester	**24%**	**16%**		**60%**	**110%**
Stroud/ Stonehouse	**24%**	**16%**	**60%**		**100%**
Cheltenham	**24%**	**16%**		**60%**	**100%**
Tewkesbury	**24%**	**16%**		**60%**	**100%**
Wotton Under Edge	**24%**	**16%**	**60%**		**100%**
Frampton on Severn	**24%**	**16%**	**60%**		**100%**
Average	**24%**	**16%**	**43%**	**19%**	

Table 33 - Morning and Evening Peak Leisure Trips by Destination and Mode

Destination	% Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	**23%**	**8**	**6**	**21**		**35**	**33**	**22**	**84**		**140**
Bristol	**19%**	**7**	**5**	**15**	**6**	**29**	**28**	**18**	**58**	**23**	**115**

Mode Share

South Gloucestershire	**16%**	**6**	**4**	**12**	**2**	**24**	**23**	**15**	**48**	**10**	**95**
Gloucester	**13%**	**5**	**3**		**12**	**20**	**19**	**13**		**48**	**80**
Stroud/ Stonehouse	**8%**	**3**	**2**	**7**		**12**	**12**	**8**	**29**		**49**
Cheltenham	**7%**	**3**	**2**		**7**	**11**	**10**	**7**		**26**	**44**
Tewkesbury	**2%**	**1**	**0**		**2**	**3**	**2**	**2**		**6**	**10**
Wotton Under Edge	**10%**	**4**	**2**	**9**		**15**	**14**	**9**	**35**		**59**
Frampton on Severn	**3%**	**1**	**1**	**2**		**4**	**4**	**3**	**10**		**16**
Total	**100 %**	**37**	**25**	**67**	**28**	**154**	**146**	**97**	**263**	**113**	**608**

7.3 TOTAL TRIPS

The total Sharpness Vale two-way peak hour trip generation by destination and mode are shown in **Table 34**.

Table 34 - Morning and Evening Peak Total Trips by Destination and Mode

Destination	Average % Distribution	Morning Peak (8am to 9am)					Evening Peak (5pm to 6pm)				
		Car Driver	Car Passenger	Bus/ Coach	Train	Total	Car Driver	Car Passenger	Bus/ Coach	Train	Total
Cam/ Dursley	21%	129	92	377		598	122	86	345	0	553
Bristol	13%	46	27	223	36	332	59	41	226	48	373
South Gloucestershire	22%	127	70	377	64	637	121	73	344	60	598
Gloucester	17%	87	50		333	470	88	56	0	314	457
Stroud/ Stonehouse	11%	32	19	256		307	37	25	230		292
Cheltenham	3%	16	9		49	74	20	13		59	92
Tewkesbury	3%	22	11		42	76	19	10		37	66
Wotton Under Edge	9%	67	49	174		289	45	30	111		186
Frampton on Severn	3%	18	9	63		91	17	9	56		83
Total	100 %	543	336	1,471	524	2,874	527	343	1,313	517	2,700
All Purpose Mode Share		19%	12%	51%	18%		20%	13%	49%	19%	

8.0 RAIL STRATEGY

8.1 INTRODUCTION

The re-opening of the Sharpness branch line for passenger services would underpin the transport offer from Sharpness Vale. A new, fully accessible station would need to be provided at Sharpness, supported by direct walking, cycling, personal mobility and local bus routes to allow people from across the development, and the existing community, to access the trains.

8.2 PROPOSED SERVICE

The reopened Sharpness Branch Line will be used by a service between a new station at Sharpness Vale and Gloucester with an intermediate stop at Cam & Dursley and possible stops at new stations at Stonehouse Bristol Road and Hunts Grove. It is expected that a half hourly service will be provided when there is sufficient demand (i.e. when a substantial amount of Sharpness Vale has been built) with an hourly service provided to begin with.

Table 35 - Journey Times from Sharpness

Direction	Destination	Journey Time	Frequency
North	Cam & Dursley	9	2 trains per hour
	Stonehouse Bristol Road	*16*	
	Hunts Grove	*22*	
	Gloucester	27	
South	Cam & Dursley (arr)	9	2 trains per hour
	Cam & Dursley (dep)	19	

Direction	Destination	Journey Time	Frequency
	Charfield	***26***	
	Yate	**32**	
	Bristol Parkway	**41**	
	Filton Abbey Wood	**45**	
	Bristol Temple Meads	**54**	

These journey times have been derived based on current timetable information, coupled with an appraisal of the likely speed of trains from Sharpness to the mainline at Cam & Dursley if they travel at an average speed of around 30mph.

8.3 INFRASTRUCTURE REQUIREMENTS

It is known that, although the railway line is in place, and remains fully operational, this is only for freight services at the moment. It is likely that the track would need to be upgraded to allow for the higher speeds that passenger services would need to travel at to make the journey times sensible. In addition, upgrades to the type of signals on the line, and providing access to it from the mainline, would also need to be upgraded,

However – the submission made by Stroud District Council in respect of the “Restoring your Railways” fund recognises that, as the track is already in place and operational, that the costs of achieving this are likely to be significantly less than for many branch line resurrection schemes where the track bed itself would also need to be re-established. This work will be further considered in the more detailed supporting data to be provided to DfT in respect of the scheme to restore passenger services to the line.

There would need to be a new station at Sharpness, and this would most likely need to have the following provision as a minimum (and noting that the station is likely to sit in the centre of the market centre for the development where local shops, cafes and other facilities would be immediately accessible to rail users on route to and from the station).

As the train will terminate at Sharpness, and it is unlikely that two trains would meet at the station, on the basis of a half-hourly service, only a single platform would be required at the new station for the passenger service to terminate. This may be different if the Vale of Berkeley Railway proposals for heritage services also come forward, but as there is a Memorandum of Understanding between Sharpness Vale and VoBR, it would be expected that this would have been resolved between the parties in this case.

Therefore, it is envisaged at this stage that the new Sharpness station would be configured to include the following:

- A single 100m long platform
- Automatic ticket machines
- Lighting, security cameras and customer help points
- Seating and an enclosed waiting area on the platform
- A footbridge, or similar provision to allow people to access the station from either side of the track – noting that this provision could be made by a structure that serves multiple functions (i.e. a road bridge over the track).

It is not expected that the station would need to be staffed, but it would have the very latest connectivity and digital information to ensure that users were fully informed and able to obtain virtual tickets where necessary.

The station would be located within the development at the market centre, where many of the local bus services and pedestrian / cycle / personal mobility routes would converge. There would need to be a suitable public square associated with the station to allow users to interchange effectively and easily between modes to access the train.

8.4 DEMAND

Based on the earlier sections of the appraisal, which examined the likely levels of usage for each mode, the demand from Sharpness Vale can be established. It should be noted that this is an assessment of the likely propensity for people to choose the rail node, and not the level of usage that would arise if the travel behaviour change measures (MaaS, travel planning etc) were successful in moving people from the private car to the train mode. Hence the actual demand could be higher.

In addition, as the station and passenger services would be a wholly new public transport provision into the area, it would be expected that a proportion of existing residents would also take advantage of the service and start to use the train. This has also been assessed below.

It is also possible that some people working in the area (at the docks or existing employment areas) may choose to use the train to get to work once the service was available. This is difficult to assess, as there

is no reliable information available to assess where these people live, and hence whether the rail mode would be viable for them. As a result, no allowance has been made in the assessment below for these trips.

Finally – there would also be a potential for people visiting the area – either to enjoy the amenity, to visit family or for leisure purposes to use the train. Again, these are difficult to assess, although we would expect them to be modest in number – especially during the peak periods, but they have been omitted for the purposes of this assessment.

Therefore, the potential demand for the train mode from the Sharpness Vale and existing communities is as follows:

8.4.1 Demand from Sharpness Vale

The peak period passenger demand from the completed Sharpness Vale development is assessed to be as follows:

Table 36 - Sharpness Vale Peak Hour Rail Demand

	Morning Peak (8am to 9am)			Evening Peak (5pm to 6pm)		
	Arr.	Dep.	Tot.	Arr.	Dep.	Tot.
Gloucester	38	113	152	103	55	158
Cheltenham	2	6	9	6	3	10
Tewkesbury	1	4	5	5	2	7
Bristol	14	44	57	43	22	65
South Gloucestershire	21	62	84	61	33	94
Total	77	229	306	218	116	335

8.4.2 Demand from Berkeley, Sharpness and surrounding settlements

The existing community that could use the train service will be comprised of both the households contained within the local area, and those from development that is committed already or likely to come forward. This suggests that, by the time the Sharpness Vale development is complete, the "existing" community would include some 3,205 households:

Table 37 - Number of Dwellings in the Berkeley & Sharpness area

Site	Number of Dwellings	Status
Existing		
Stroud 012 MSOA	**2,540**	**-**
Proposed		
Sharpness Docks	**300**	**Awaiting Decision**
Land North West of Berkeley	**107**	**Awaiting Decision**
Land East of Berkeley	**188**	**Under Construction**
Wanswell School	**70**	**Allocated**
Total	**3,205**	

For the peak period passenger demand from the existing community, a modest 3% mode share has been applied to make an allowance for existing household trips that would choose to take advantage of the train service:

Table 38 - Rail Demand from residents in the Berkeley & Sharpness area

	Morning Peak (8am to 9am)			Evening Peak (5pm to 6pm)		
	Arr.	Dep.	Tot.	Arr.	Dep.	Tot.
Person Trip Rates						
Residential	0.176	0.732	0.908	0.564	0.248	0.812
Person Trip Generation						
Person Trip Generation (3,205 dwellings)	564	2,346	2,910	1,808	795	2,602
Rail Trips (3% mode share)	17	70	87	54	24	78
Rail Trips by Destination						
Gloucester	8	34	42	26	12	38
Cheltenham	0	2	3	2	1	2
Tewkesbury	0	1	2	1	0	1
Bristol	3	13	17	10	5	15
South Gloucestershire	5	20	24	15	7	22
Total	17	70	87	54	24	78

8.4.3 Total Demand

The total demand would therefore comprise:

Table 39 - Total Demand for Sharpness Rail Station

	Morning Peak (8am to 9am)			Evening Peak (5pm to 6pm)		
	Arr.	**Dep.**	**Tot.**	**Arr.**	**Dep.**	**Tot.**
Gloucester	**46**	**147**	**194**	**129**	**67**	**196**
Cheltenham	**3**	**8**	**11**	**8**	**4**	**12**
Tewkesbury	**2**	**5**	**7**	**6**	**3**	**8**
Bristol	**17**	**57**	**74**	**54**	**27**	**80**
South Gloucestershire	**26**	**82**	**108**	**76**	**40**	**116**
Total	**94**	**300**	**393**	**273**	**140**	**413**

A passenger demand of c.300 passengers in the morning peak period would represent two 2-car trains, with some allowance for passengers to be standing in the peak period.

It would expected that the peak period demand would equate to 15 – 20% of the daily demand, and so the daily demand can be estimated to be of the order of 4,000 passengers per day, on a typical weekday, or around 22,500 passengers per week, and potentially around 1,000,000 passenger journeys arising from the Sharpness station each year.

9.0 BUS AND COACH STRATEGY

9.1 INTRODUCTION

The provision of bus services is inherently flexible, as they are relatively easily procured and changed. Therefore, this section of the appraisal considers the levels of patronage that would be likely to be generated by Sharpness, Vale – and again, this ignores the additional affects in terms of mode shift towards public transport that would be anticipated as a result of the sustainable transport support for the development.

The local bus services that run operate around the Sharpness area would be expected to provide links to the docks, marina, Newtown and Berkeley centre – all of which are included within the census output area that has been used to assess the wider transport effects of Sharpness Vale. Therefore, trips within this area have are been evaluated explicitly, as they effectively fall within the area within which the site is designated to sit for statistical analysis purposes.

The appraisal also excludes school trips, or those associated with specific school only services.

9.2 CAM AND DURSLEY – JOURNEY TIMES:

Apart from Berkeley, which will be a good local centre destination (and which is deemed to be within the local area of the site for the purposes of this assessment), the next closest location to provide a range of services would be Cam and Dursley. This is therefore likely to be a viable potential destination for residents of Sharpness Vale who travel off-site for work, amenity and leisure purposes. The forecast peak hour Sharpness Vale bus demand is shown in **Table 40**.

Table 40 - Cam & Dursley Bus Demand

Journey Purpose	Morning Peak (8am to 9am)		Evening Peak (5pm to 6pm)	
	Inbound	Outbound	Inbound	Outbound
Work and Employment	33	41	26	32
Shopping and Personal Business + Leisure	11	44	53	23
Total	44	85	79	55

It is envisaged at this stage that this demand could be met by an extension of the local bus service on a timetabled basis, or by the emerging trends towards Demand Responsive services that would join trips together to match them to a common destination, like Cam & Dursley.

Local bus services serving this area would be likely to route via the larger settlement areas, outside of Sharpness Vale itself, and so reach places such as: Berkeley – Berkeley Heath –– Cam & Dursley Station – Draycott – Lower Cam – Dursley

9.3 BRISTOL AND SOUTH GLOUCESTERSHIRE

The level of demand for services to Bristol and South Gloucestershire in the peak periods is relatively modest, based on the assessment methodology (and bearing in mind that this does not include other trips that may be encouraged to switch mode):

Table 41 - Bristol and South Gloucestershire Bus Demand

Journey Purpose	Morning Peak (8am to 9am)		Evening Peak (5pm to 6pm)	
	Inbound	Outbound	Inbound	Outbound
Bristol				
Work and Employment	**21**	**63**	**41**	**24**
Shopping and Personal Business + Leisure	**1**	**4**	**8**	**3**
Total	**22**	**67**	**49**	**27**
South Gloucestershire				
Work and Employment	**52**	**137**	**88**	**57**
Shopping and Personal Business + Leisure	**4**	**17**	**32**	**14**
Total	**56**	**154**	**120**	**71**

Nevertheless, there does appear to be sufficient patronage to support a bus operation – whether this is bespoke, as an "express" style service or as part of a longer, timetabled route that might start and terminate at Sharpness Vale, but would pick up other attraction centres on its route.

A potential service route could operate between Sharpness Vale and UWE, picking up major employment centres and growth locations along the way. This would suggest a route that was broadly: Sharpness Vale – Buckover – Thornbury - Aztec West – Filton - Bristol Parkway – UWE.

The delivery of these bus services will need to be investigated further – alongside the introduction of MaaS and travel behaviour initiatives, as development progresses. They will need to be matched to the emerging technology and trends – as well as the attractiveness of each of the employment and other destinations, to develop services that attract people.

9.4 STROUD AND STONEHOUSE

As the largest district centre, Stroud would be expected to be an attractor for trips from Sharpness Vale, for a range of purposes. This could most easily be served by an extension of the local bus services, at a suitable frequency to provide a service from Sharpness Vale that also provided a new or more frequent service from some of the smaller settlements between the site and Stroud.

The assessment suggests a modest level of demand from Sharpness Vale to Stroud:

Table 42 - Stroud and Stonehouse Bus Demand

Journey Purpose	Morning Peak (8am to 9am)		Evening Peak (5pm to 6pm)	
	Inbound	Outbound	Inbound	Outbound
Work and Employment	**25**	**49**	**32**	**26**
Shopping and Personal Business + Leisure	**3**	**15**	**25**	**11**
Total	**28**	**64**	**57**	**27**

A new service (which may be met by DRT, subject to changes in technology and travel trends) would need to serve a range of destinations: Sharpness Vale – Berkeley Heath – A38 – A419 – Oldends Lane Industrial Estate – Stroudwater Business Park – Stonehouse Rail Station – Cainscross – Stroud Rail Station. This would provide connections to Stonehouse in roughly 30 minutes from Sharpness Vale, and onwards to Stroud in around 40 minutes from Sharpness.

9.5 GLOUCESTER

Despite the fact that a new passenger train service, direct to Gloucester, is proposed as part of the Sharpness Vale settlement, there is still likely to be a residual demand for some level of more flexible bus provision. This is picking up those trips that might be going to the outskirts of the city or places where a connecting trip from the station within Gloucester would be less attractive than a slower bus service that offers a direct connection.

The actual demand for this would need to be considered carefully at the time. It is entirely possible that, if the travel behaviour initiatives at Sharpness Vale were successful, and most people that chose to locate there did so to take advantage of the new rail service, then the theoretical demand assessed below may not be realised.

However – the assessment suggests that there would be a modest demand for some bus provision towards Gloucester:

Table 43 - Gloucester Bus Demand

Journey Purpose	Morning Peak (8am to 9am)		Evening Peak (5pm to 6pm)	
	Inbound	Outbound	Inbound	Outbound
Work and Employment	**10**	**28**	**18**	**11**
Shopping and Personal Business + Leisure	**0**	**0**	**0**	**0**
Total	**10**	**28**	**18**	**11**

10.0 HIGHWAY MANAGEMENT

10.1 INTRODUCTION

In the context of an approach to transport that seeks to reduce the attractiveness of the private car, and provide every opportunity for people to quite easily and viably travel by other modes, where they need to travel at all, it would not be expected that substantial investment would be made into road infrastructure. The highway network is there and will be available for residents and others to use, but it is not proposed to make the sort of provision that has traditionally been made.

The provision of additional highway capacity as a result of development proposals has generally been approached from a "worst case" scenario. The trip rates adopted in assessments have taken the highest sampled rates of traffic generation from existing development areas and overlaid them onto new developments. This has generally resulted in a significant requirement to provide additional highway capacity, making this mode better provided for than others, and so encouraging and perpetuating the car-based travel culture that has persisted in the decades since the Fifties.

In recent times this has changed, and there has been a recognition that the approach is unsustainable – not just in an environmental context, but also related to peoples' quality of life and aspirations. This has been shifted even further by the current Covid-19 crisis, with changes to travel and working patterns across the board (there is a separate and particular chapter on Covid-19 effects following this one).

10.1.1 Understanding the highway network

There are multiple of considering the way that the highway network operates – and often particular methodologies are adopted which don't necessarily represent the best use of resources. It is true to say that, for almost all of the time, the highway network around the Sharpness area has more than sufficient capacity to meet the demands placed on it. Observations suggest that sufficient capacity exists throughout the weekends, during the middle of the weekday period, and overnight on these days.

In fact, in common with much of the rest of the country, it is only essentially at the morning and evening weekday peak periods that the network is under any stress. The logic of evaluating the whole performance of the network based purely on the busiest sample hours, which only occur ten times each week, is increasingly being challenged in terms of its deployment of resources and sustainability.

Adding capacity to resolve these time sensitive issues needs to be considered in terms of its economic cost (value for money) and environmental impacts. The addition of more road space which is only used over relatively small periods of the week, but which is a permanent and irrevocable change to the environment, could be considered to be a poor approach to sustainable planning.

10.1.2 The peak hour approach at Sharpness Vale

It is helpful to briefly reprise the approach that is being adopted at Sharpness Vale. We are able to assess the number of trips that are likely to be made from the development to places further afield in the peak periods, and we can propose the provision of modes of travel to satisfy all of these needs, proportionately in respect of who is travelling where. In simple terms, we can provide enough seats on trains for those people heading to Gloucester, Bristol and elsewhere, enough seats on buses for those going to the outer Bristol business parks, Stroud and so on.

This should mean that we don't need to provide large highway improvements, essentially on the basis that there will be a means for people to travel sustainably and reliably without relying on the car. We have rejected the traditional approach that has been taken, where highway capacity is added on a "belt and braces" basis, even when alternative modes exist. We think that this is outdated and inappropriate, as it perpetuates reliance on the car and encourages its continued usage.

10.1.3 Planning for the highway network

Notwithstanding the principles outlined above, the highway network will remain an important component in the transport mix – even if there is a need to re-evaluate how we apportion the space and priority of movement in the context of changing trends. We expect that highway authorities will take a pragmatic view of how to manage their networks in the future, and hence the expectations that they have of how developers should interact with them.

Hence, it is not the case that there wouldn't be any highway improvements as a part of the Sharpness Vale scheme. There are criteria that would make this necessary:

- Where there was safety issue on a road or at a junction that would be exacerbated by the effects of some development traffic
- Where there is the scope to re-calibrate the way that the highway is used to better reflect the use of local sustainable modes (for example, where cycle facilities could be added, or better pedestrian crossings could be provided)
- Where there is the need to enhance the highway to give priority to sustainable modes – especially buses and coaches, and where there is scope to improve the reliability and security of journey times for these modes
- Exceptionally, where there is a pre-existing issue that the highway authority has identified in their Local Transport Plan that an improvement to the network would be beneficial, and Sharpness Vale should make a contribution to that provision.

Ascertaining where these improvements could be necessary, and the extent and nature of the works that may be appropriate will need to be the subject of a future detailed Transport Assessment. However, for the purposes of this appraisal, and based on the knowledge of the area that is available, there are corridors and locations that will clearly need to be considered in this context.

10.2 TARGET AREAS FOR HIGHWAY ENHANCEMENTS

The following locations have been identified as locations where more detailed work will be appropriate in due course to derive specific options for highway management and to ensure that the criteria for planning for the highway network set out above have been achieved.

The B4066 corridor

This route provides the highway connection between Sharpness and Newtown and the more strategic A38 corridor to the west. The road is generally of a good standard, consistent with its use by trucks associated with the dock's activity, and it has been enhanced in some locations, for example, to bypass Berkeley to the south.

However – although it has good provision for vehicular traffic, there is very limited provision for pedestrians and cyclists along the corridor, and no provision at all to provide any priority or particular facilities for bus and coach service. The corridor has been surveyed from Sharpness all the way to the A38 junction, and the highway boundary has been plotted for this route. This confirms that there is scope to re-consider the management of the corridor and the allocation of space for different purposes to enhance the sustainable and operational performance of the route. This would be outlined in a Transport Assessment, along with assessment of the key junctions along the route and the ways that they could be enhanced to meet the criteria set out above for planning for the highway network.

Saniger Lane – north

Provides a link between the B4066 and into the Newtown settlement. This is a two-way semi-urban road, with footway provision in part. It passes under the railway line close to the B4066 junction, but otherwise is of consistent carriageway width to allow two way working by all types of vehicles (certainly cars and buses, for example).

This route would take a place in the wider settlement as Sharpness Vale was developed, and so would need to be managed in a way that was similar to the streets planned within the development. It would be likely to be more intensively used by buses and personal transport modes, and so it would be helpful to consider how this could be achieved by mitigating vehicle speeds and ensuring safe space for walking, cycling and personal transport modes.

Saniger Lane – south

This corridor runs to the south and provides routes to the former Power Station site – now an employment and education destination. It is a single track, rural lane, with relatively high hedges on either side. Consideration could be given to ensuring that traffic speeds on this route were well controlled, to ensure that it was an attractive route for cycling and other personal transport modes (where they are legal to us on the highway).

A38 corridor

This route provides the strategic links to the north and south, and especially to the nearby M5.

The road itself is of a good standard, with a wide carriageway, but limited provision for walking and cycling. The consistency of the provision for all modes would need to be considered, along with opportunities to ensure that buses and coaches had priority along the route.

The A38 / B4066 junction is likely to be a particular location where there will be a need to deliver improvements to ensure that walking, cycling and buses and coaches are properly catered for. In particular, providing for buses and coaches to be able to negotiate this junction quickly and efficiently may well require a more positive form of control at the junction – and this could be purely for them, or for all vehicles, depending on the results of detailed assessment.

The format and layout of the junction is quite large, and so it is considered that a suitable enhancement scheme could be delivered at this location.

A419 corridor

This road provides the link from the A38 eastwards towards Stroud, including crossing the M5 motorway and provide strategic connections via it to the north and south.

The corridor towards Stroud is currently the location for improvements works, and so this may well be sufficient to provide reliable public transport services along this corridor into Stroud – but this would need to be considered in more detail as and when these works were completed and the Sharpness Vale scheme was progressing.

The M5 junction and A38 / A419 junctions would need to be tested, but, in the light of the strategy for transport at Sharpness Vale, it is not anticipated that the development would have a significant impact at these locations. They would need to be assessed in the context of enhancements to public transport reliability and cycling / personal transport mode provision.

M5 corridor

The M5 corridor is a strategic route between the Midlands and South-west, and although some traffic from Sharpness Vale would be expected to use it, it would not be expected to have any discernible effect on the operation of the motorway.

The access junctions that traffic from Sharpness Vale may use would be at junction 13, to the north – which is reviewed above, and junction 14 to the south.

Both of these locations feature development proposals that are nearer to them, and which are likely to have direct impacts on the performance of these junctions, as any trips generated by them and subsequent traffic from them will not be able to dissipate into the wider area before impacting the

motorway junctions. Therefore, these locations are both under consideration by Highways England in terms of their future operations as part of the respective Local Plan processes.

It would be expected that there may be a need for strategic improvements to these locations, and consequently that Sharpness Vale may well be expected to contribute to these improvements. Any such contribution would be expected to be proportional to the forecast impact of the development on these locations, and so would need to be assessed as part of a future Transport Assessment associated with the development. It would not be expected at this stage that the Sharpness Vale scheme would have the greatest impact on these junctions under the Local Plan growth scenarios that are being contemplated, as a result of scale and proximity compared to other allocations that may come forward in due course (although these are still to be determined).

11.0 COVID-19 EFFECTS ON TRAVEL

In the current context, writing this appraisal in May 2020, it is clear that the effects of the global coronavirus pandemic, declared by the WHO, will have a lasting effect on travel and work patterns. It is therefore important to consider the implications of this for proposals such as Sharpness Vale, and to consider what should be planned differently to ensure that the development remains both sustainable and viable in the context of possible changes.

This section is, by its nature, based on a good deal of conjecture, as the long-term effects of the pandemic, and changes that both individuals, organisations, companies and Government may choose to make in response to it, is, as yet, unknown. It may be that it will take a considerable period – perhaps years, for the world to properly adjust to the new ways that people must live and interact to manage the risks of Covid-19 (C-19). All of this is very much dependent on whether a vaccine can be found, and its effectiveness once it is deployed.

In any event, even if a vaccine is found, it will take some time to manufacture it and immunise the population to wholly remove the risk of the virus and allow unlimited interaction once more.

11.1 STRUCTURE OF THIS SECTION

We have structured this section as a series of responses to questions and propositions that we have come across in the course of research around how responses to Covid-19 are being formulated by Governments (not just the UK Government), organisations, companies and public commentary and the apparent appetite to accept new risks in daily life.

Will life return to normal quickly?

This seems unlikely to us, and only seems possible if there is a viable vaccine, and it has been rolled out to enough of the population to effectively remove the virus from society. Over time, with appropriate controls, the virus may well die out anyway, if the “R” number can be sustained below 1 – but this seems a long way off, as many parts of the world do not have effective Governments that could achieve this level of control.

Therefore, it seems likely that we will develop a “new normal”, where social norms and guidance from Government effectively produces a way to live with C-19 that is acceptable. This won’t be risk free, as this assumes that the virus remains in communities, but would mean that many things could happen once more, or we would find new ways of doing things,

Chief in the armoury of managing the effects will be social distancing, and this would be expected to continue – impacting on almost every aspect of society, from workplaces to leisure activities to the way that we shop. There may be guidance on personal PPE too – wearing masks on public transport is a good example, and better teaching for everyone on how to use gloves to avoid cross-contamination.

These would be expected to be more normal – as would the general availability of hand sanitisers and gloves at many locations.

Some activities – especially public events (theatres, cinemas, festivals etc) may be very difficult to undertake in a socially distanced world.

It is possible that some of these activities will be able to return, but if they do their seating arrangements may have to respect social distancing, leading to much smaller numbers of people in the audience, and a consequent rise in costs of attendance.

It seems likely that C-19 will be manageable in a "new normal", but it may take some time for some events and activities to be able to re-configure themselves to be viable in this case.

Educations is likely to change significantly, with far greater controls over things like class sizes and interaction between groups. The schools planning to return at present are providing guidance about "student bubbles", where students stay in small groups throughout their time at school, and interaction is limited. This may mean that schools have to re-configure how they use their spaces to allow for social distancing – some will be in a better position to do this than others, no doubt.

We suspect that those organisations, companies and individuals that will be able to succeed in this environment will be the adaptable and flexible ones, who can interpret the new rules for living effectively to manage the new risk in society, but work within them to achieve what they need to achieve.

For new communities – such as that planned at Sharpness Vale, there is a golden opportunity to create places that are "fit for purpose" in this new normal, with intelligently designed buildings and spaces that allow for social distancing. This should mean that new communities are far better able to manage the impacts of distancing, and so control the spread and management of any outbreaks better.

In terms of travel, there are many aspects to this that will be critical to the way that people react and respond. As with other influences on travel, it would be expected that there would be a significant difference between individuals based on their attitudes to risk, wealth, travel need and so on. However, on a wider scale, where assessment techniques have considered the overall population, and its typical travel responses, these may well need to change.

In the short term it may be very difficult to know what the effects of C-19 changes will be, and so assessment may need to be based on a bespoke set of criteria and suggested patterns of behaviour that the promoter and authorities are comfortable with. It seems unlikely to us that using historic models and patterns of behaviour would be appropriate going forward – the volumes of movement, and mode choices have certainly changed for the foreseeable future. There will, in the short term, be considerable thought needed regarding when survey data could be considered representative – historic data, prior to the C-19 restrictions, won't be appropriate or representative, but we suspect that the industry will find it hard to adapt to accepting the prevailing conditions as "normal" whilst ever some form of restriction applies – even though this may be the "new normal".

In the medium to longer term, we would expect that there will be a settling down of the "new normal", and hence a recognition that representative data can be gathered and deployed in assessment. However, we predict that there will need to be a very flexible approach to developing and agreeing mechanisms to monitor impacts and effects and respond to actual conditions and effects as they arise. This may well mean having management and monitoring strategies, with agreed pots of resource to fund them, but with a flexible and collaborative approach to how and when they are spent, and on what.

Fortunately, these types of mechanism already exist, and many large scale developments have phased and staged "Monitor & Manage" structures to the delivery of transport mitigation measures, and so these approaches will need to be rolled forward into almost every development proposal of scale.

Will people be prepared to use public transport?

The answer to this seems to be a cautious yes, but it is going to depend on how operators approach the issues, and probably the location of the trip.

With Governments announcement that there could be a return a work from 20th May, there was a considerable increase in the usage of the Underground network in London, as people returned to work, but this does not seem to have been reflected in other public transport services. Anecdotal evidence suggests that many commuter services, and mainline train services between key cities remain effectively deserted.

Part of this is due to a reticence by people to return to society, as they assess the risk they face for themselves, and the realisation that much more work and meetings can be done virtually, and from home. All of this will have an impact on travel demand across the board – and especially on public transport usage. This will drive a reluctance to want to return to public transport services as they existed before "lockdown" for some time yet.

However – there may well be changes to the way that these services are provided and managed, as operators seek ways to maximise usage and iterate towards the "new normal". We would expect to see some tools being deployed to improve take up of public transport:

- Imposition of PPE and social distancing measures at stops and stations, including wearing masks etc.
- Operators may well make much greater use of booking systems, to control and manage the number of people in carriages or on buses, and so provide confidence to users that there is an appropriate degree of social distancing;
- Bespoke services and Demand Responsive Services that use smaller vehicles may well be considered much more acceptable – if you travel to work on a dedicated service each day, with the same people in your "travel bubble" then this would reduce the risk of using public transport – especially if you shared an employer, and hence could have common patterns of behaviour both during travel and when at work to increase confidence;

- Ticketless systems and reduced contact with buttons, handles and other objects during travel are likely to prevail, as the provision of gloves and sanitiser on public transport may be difficult to achieve;

- Operators may decide to run longer trains or more buses to allow for lower loading capacities caused by social distancing. This would obviously increase costs, and so may not be viable, or would require additional revenue from users or other sources of support. (This may prove unnecessary if fewer people are travelling at peak times due to changes in working practices discussed below).

For Sharpness Vale, the strategy that was being proposed for public transport was, fortuitously, built around re-opening the railway (which has considerable capacity) and using some bespoke coach and bus services in any event. We would expect to see these types of provision become much more normal in any event.

The use of "Mobility-as-a-Service" type apps and booking systems is also likely to be boosted by the need for greater control and management of public transport. Whereas these systems were developed to allow users to find the most cost effective routes, even in real time to avoid congestion hotspots on the transport network, they will easily be able to adapt to booking systems on public transport to provide assurances to users that they will be able to use a service before turning up at the station or stop. "MaaS" is already built-in to the transport proposals for Sharpness Vale.

In terms of users, we would expect that people will be more likely to want to book a seat on public transport where they can. The risk of turning up at a stop or station and finding the next bus or train to be so crowded that social distancing cannot be maintained may be enough to put people off. We suspect that this will drive a move towards pre-booking, and operators will need to respond to this to stave off passengers avoiding services which could accommodate them for fear of not knowing that they would be safe.

How might working practices change?

It seems very likely that working practices will change in very many types of jobs. Office jobs, especially, may well become more likely to be office based. Some companies are setting limits to the number of people that can be in the office at any one time – some as low as only 30% of employees who may have been based there before C-19. Where the business is able to function like this, with significant home working (or, at least, non-office based working) then this may well become the norm.

For these types of business, if the "new normal" prevails for some time, there will be a desire to re-assess their office requirements to match the business requirements. There are competing factors here that seem to be coming to the fore – on the one hand, they may need more space to ensure social distancing, on the other, they may need less as fewer people are office based, hot-desking and flexible working practices start to take effect and there are far fewer meetings and visitors into offices. It is difficult to predict how this may turn out.

One thing that is certain is that there will be far greater levels of home working. This is not only for risk management reasons, but many employers and workers have discovered that the "great experiment" forced upon us in how we work has improved their quality of life significantly. We would also expect to see big changes in flexible working, with people working around other commitments to suit themselves better. Many firms have experienced an upswing in productivity as a result of the trust that they have had to extend to their workers.

For Sharpness Vale, there will be an opportunity to provide space for home working within house designs, but this won't be practical or affordable for all house types. There may be opportunities to provide "work hubs" in market and village centres that are available for local people to base themselves in, but are walkable from home.

The concept of being able to work from a desk / pod / room in a common building that was walkable from within the development may be desirable in both new and existing developments. We envisage a nominal rental paid by the occupier (or more likely their employer) with a serviced facility to provide docking stations, copier, printer and so on. It should be conveniently located to be near local retail, primary schools, nursery and local facilities were at hand, and with accessible transport.

This may be important in consolidating neighbourhood links, like those that have been forged in many places during the lockdown, where people would work there regularly so that they developed a "home based colleague network". In simple terms, instead of finding a common link through their employer, there would be a new common link to colleagues in the "work hub" world. They would be linked by being local, getting to know each other as "work colleagues" but in a different way.

The space would be flexible (with social distancing) but people could come and go, but it would be the regular workspace for many. We envisage there may be some meeting spaces, but video suites may be part of the mix now.

This solution tackles the problem that it may prove uneconomic and unaffordable to provide fully flexible work at home space in every dwelling, or at all in some types of dwelling. The cost premium would make the house unviable to purchase for many – and for non-home workers (quite a lot of essential / key workers) they wouldn't want it anyway. To avoid having to calculate what proportion of home working units we would need, we simply adopted the "work hub" concept – a flexible space, that is easily walkable.

Manufacturing jobs may be less affected, although adjustments may need to be made to operations and working practices in plants and factories.

Will companies relocate to change employee catchments?

There is some conjecture that, in the mid to long term, companies may choose to relocate to places where employees could realistically both find and afford places to live that were within walking or cycling distance of the office. Or towards locations where, in addition to a walking and cycling catchment, there is plenty of parking for slightly longer distance commuting to a large workforce catchment.

This idea sits alongside the changes to working practices, and what that might mean for employers. There will be a balance between those where they can effectively operate with a minimum number of people in the office, compared to those who want to (or need to) achieve a full complement in their office.

If this effect does occur, then locations like Gloucester, Cheltenham, Bristol and other smaller cities may be significant beneficiaries.

Will people drive a lot more – especially commuting?

When Government announced the changes to the lockdown rules from 20th May, including that people could start to return to work they encouraged the use of the private car for commuting in order not to overwhelm the public transport system and risk significant over-crowding and inability to maintain social distancing guidelines. This could be seen as a shift in policy towards car use by the Government, but this doesn't seem to be so, as it has been trailed as a temporary measure.

However, in the context of the "new normal" it is possible that people will turn back to the private car if they remain risk averse or reticent about returning to public transport. This could see a growth in car use and traffic levels.

At present it seems more than likely that any propensity in this respect will be offset – possibly wholly offset, by the increased likelihood that people will continue to work from home and will travel far less to attend meetings. We expect that traffic levels will not return to their former levels for some time – and possibly not for a very long time.

Increased levels of relatively short, car-based commuting could see a faster shift away from petrol and diesel towards electric cars. The cheaper running costs, and relative ease of use in a commuting context where people may be able to re-charge at home could see this as a way that people balance the environmental benefits that have been observed during lockdown with a need to travel to work.

One aspect that is as yet unproven, as relatively few people have returned to normal working patterns and so many are furloughed, is how many people will seek to change their lifestyles – including their employment, as a result of this crisis. Many people may have discovered that they were reliant on systems and networks that they have much less confidence in now, or consider offer a greater risk to them and their families – the risks of longer distance commuting, especially by public transport, for example, and the exposure that it requires to strangers for extended periods of time.

We suspect that there will be a noticeable number of people who wish to change their lives as things settle into the "new normal", essentially to both bring some resilience to their ways of living, but also to lock in some of the lifestyle benefits they have seen during lockdown (spending quality time with children, for example). This may mean that people take different jobs, possibly much closer to home, to remove the travel risks they perceive and reduce their travel time to allow them to reallocate to their families.

Longer distance trips would not be expected to grow, although these will return over time, leisure travel and even longer business trips would be expected to be less attractive for some time to come.

What will happen to our High Streets?

There has been considerable concern over the impacts of lockdowns and social distancing on High Streets, and is clear that some smaller (and even some bigger) businesses will not survive the dramatic changes that have impacted them with the C-19 effects. Retailing will still have to complete with online selling, which has seen a real boom during lockdown as people have grasped the only way to buy things – often things that they are using to improve their quality of life at home (gardening supplies, home workout equipment, hobbies and crafts and so on).

However, we are not entirely pessimistic about the role of the local centre and High Street in a social distanced world. There are any places where there is a new found aspiration towards "local living". Many people have re-discovered their local, walkable and cyclable facilities during the C-19 lockdown period, and have re-engaged with them, and many high street and local shops have gone the extra mile in meeting the needs of their communities.

This feels like quite a change in attitude for many people, as they have re-considered the extent to which they value local relationships, and it seems likely that this will be a change that sticks for some time.

In addition, with "Track and Trace" becoming normalised in our lives, there will be an impetus to stay local. It is possible that people will recognise that their area is at low risk of a "Local lockdown", if the R number locally stays low and, that travel to, or contact with, people from areas where there may be higher risks could be perceived as more hazardous or risky, and so people will be less likely to wish to do it.

This will force the local living agenda further forward and mean that local neighbourhoods and facilities will be more highly valued than they have been of late.

At Sharpness Vale, the masterplan features neighbourhood villages and local facilities that will allow the growth of local living and communities. The range of employment proposed will also allow local employment, with a range of opportunities between the new employment area and existing commercial activity around the docks. All of this will reduce the need to travel at all and provide truly local living opportunities for residents.

11.1.1 Summary

The changes that the C-19 crisis has created are, effectively, a great experiment in some core societal issues – the resilience of economies, supply chains, healthcare facilities, social care structures and many other parts of modern life have been tested. For the most part, at least at the time of writing (late May 2020) society has stood up well to the test imposed upon it, with people generally accepting the sacrifice that they must make and pitching in to help and get through it.

In the mid to long term, it seems unlikely that thigs will go back entirely as they were before. There have been too many disruptions to too many areas of society for things to revert – and, as time goes on these changes will become embedded.

Covid-19 effects on travel

We expect that patterns of travel will change, and that, in general, people will retain a nervousness about using public transport until measures that give them confidence are in place. Car usage may be the alternative in the short term – but a significant proportion of people probably won't make the journeys that they use to make at all, and so it is not expected that traffic levels will return to pre-C-19 levels for some time, if ever.

Local living is expected to become much more prevalent, with a reduced aspiration to travel on a day to day basis, and greater confidence in remaining relatively local where the risks of lockdown or infection can be better assimilated by people. This will drive increased reliance on home working and local employment.

The Sharpness Vale scheme already incorporates many of these principles, albeit that they were applied on the basis of a sustainable development, that responded to the impacts of climate change. However, it is well placed to adapt to the "new normal" requirements around local living, and public transport provision that is positively managed to allow social distancing and safe travel.