ATKINS

Member of the SNC-Lavalin Group

COVID-19: Catalyst or Catastrophe for the Future of Mobility in the UK and the Solent Region

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1. COVID-19: Unpacking our assumptions

COVID-19; a highly infectious virus, hit the globe in the first quarter of 2020. Many governments have enforced a number of measures to restrict the spread of the virus, with a significant number resorting to a complete lockdown. Over the second quarter of the year in the UK, lockdown measures are likely to be gradually lifted.

This thought piece sets out how the government's response to COVID-19 has most significantly impacted travel and transport. This has caused us to challenge many assumptions, that for a long time we have held as valid.

> Coronavirus will offer a "once in a generation chance to change the way people travel in the UK". Grant Shapps, UK Transport Minister[3]

> The real risk reported by Autotrader is that 56% of people without a car plan to buy one post lockdown. [1]

After exploring the current context and the impact of similar events, specifically looking at the effects on transport and travel and quantifying what this could look like for the Solent region, we will look to what the future holds. We will seek to understand which assumptions no longer hold true regarding movement and which continue to remain valid. Drawing from these conclusions, we conclude the greatest risk to transport authorities will be the return to the private vehicle[1]. From there we make suggestions for ways in which authorities can respond to the challenges posed by COVID-19 and more specifically in the case of Solent Transport, how we can shape the opportunities of the Future Transport Zone funding to address these challenges.

2. COVID-19: Reshaping our travel behaviour

COVID-19 is transmitted through human to human contact and therefore there has been a clear focus globally of reducing human interactions. Travel lockdown, social distancing and hygiene campaigns have become the most widespread containment approaches. One third of the world's population were in lockdown as of April 28th, 2020[2].

Freedom of movement and travel choice are central to our way of life. Lockdown and sustained social distancing severely impact the accepted norms of travel and transport services. Grant Shapps, Secretary of State for Transport, reported on 9th May that in ensuring social distancing, public transport services can only operate at 10% of pre-COVID overall capacity[3]. As lockdown eases, and travel increases, this overwhelming downturn in public transport supply (and demand) presents significant challenges to the transport network. Accordingly, there is an expectation that reliance on the private car will increase, though the Government also sees opportunity within the current climate to promote national campaigns for active travel – cycling and walking – and embed some of the gains made by these modes during the immediate COVID-19 response. To back up these campaigns, a funding package of £2bn was announced to support cycling and walking in the short term.

Figure 2-1 highlights the significant reduction in travel following the COVID-19 outbreak.

[1] https://www.autotrader.co.uk/content/news/public-transport-distancing
[2] https://www.businessinsider.com/countries-on-lockdown-coronavirus-italy-2020-3?r=US&IR=T
[3] https://www.bbc.co.uk/news/uk-52600708

Figure 2-1 - Transport use change since lockdown[4]

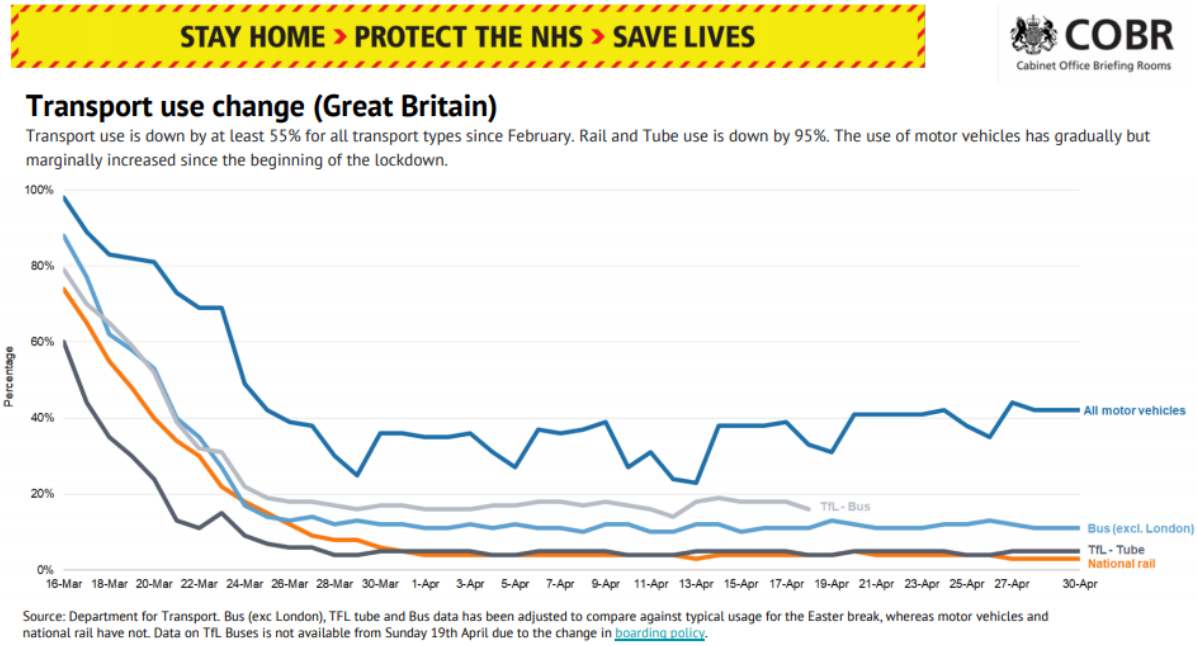
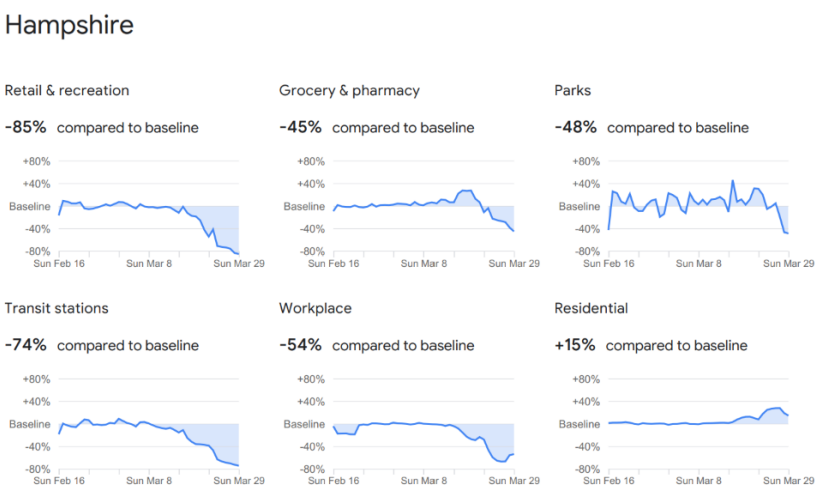


Figure 2-2 - How destinations of journeys have changed in Hampshire since lockdown[5]



The reduction in journeys to each of the destinations in Hampshire outlined in the figure above, have contributed to bus patronage reducing by 80%. This significant reduction has already seen one bus operator completely withdraw from its routes, highlighting the scale and impact that this crisis is having.[6] The reduction in travel has impacted all areas of life. Across the areas of work, education and leisure the following changes have been observed:

4 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/882878/Slides_to_accompany_coronavirus_press_conference-_2_May_2020.pdf

5 https://www.google.com/covid19/mobility/

6 Interview with Hampshire representative

Work

The economy has been brought to a standstill as many businesses have paused and halted activities. In order to support people through these lockdown measures the government has brought in a series of mechanisms and schemes to provide financial support to people and businesses. These measures have seen more than 9 million people furloughed, whereby their job is currently not required, with government paying 80% of these individuals' salaries[7]. Business loans and grants have been introduced to support businesses of all sizes.

> Within the UK GDP is set to fall by 35% during Q2 and if the lockdown lasts until the end of June it is likely that the UK economy will shrink by 1/5 over the year.[8]

Many businesses have adapted with a huge increase in homeworking. The Office for National Statistics reported that on average across 2019, 5% of people worked from home for the majority of their working week, with 30% reporting working from home at some point across the year[9]. During the UK lockdown the Office for National Statistics has predicted home working is at an average of 49.8%[10]. The significance of this is identified by the vastly increased use of video conferencing facilities with the 947% increase in calls since January[11].

Education

Education for the majority has become remote. Universities have shut and moved lectures and exams completely online. Schools have shut for all children, except those of key workers and have produced online/remote resources for students. Those at the most crucial part of their education are receiving online lessons. This has been facilitated by a rapid uptake and development of tools to support distance and e-learning.

Shopping

Shopping habits have seen a significant and sustained change since lockdown. After the initial fears leading to panic buying died down, sustained trends have been observed across this sector. A return to larger, weekly/fortnightly shops, identified across all major supermarkets with a reduction in the number of transactions but increase in expenditure[12]. This is likely driven by the fear around leaving the house too often and the government to 'stay home', and social distancing measures meaning individuals would rather queue once for a larger shop than queueing regularly for little shops and odd items. Although a reduction in overall trips, this behaviour change will see an increase in car usage for larger shops which are difficult to carry.

Home deliveries have seen a significant increase across all retail sectors. Tesco has reportedly doubled the number of home delivery slots to match the significant increase in demand [13], Marks and Spencer are now offering a 30-minute home delivery slot[14] and Amazon are on a large recruitment drive after seeing significant uptake of their online store[15]. Although not posing a problem while there is a lack of other traffic on the road **this significant increase in van and truck usage owing to deliveries could pose a real challenge** if other road traffic increases.

Leisure/Sport and Recreation

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7 https://www.bbc.co.uk/news/business-52209790

8 https://www.theguardian.com/business/2020/may/01/long-lockdown-shrink-uk-economy-fifth-2020-study-coronavirus

9https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/coronavirusandhomeworkingintheuklabourmarket/2019

10 https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronavirustheukeconomyandsocietyfasterindicators/30april2020

11 https://palife.co.uk/news/video-conferencing-booming-during-lockdown/

12 https://www.thisismoney.co.uk/money/saving/article-8185081/How-Britains-shopping-habits-changed-amid-coronavirus.html

13 https://www.eastlothiancourier.com/news/18429886.tesco-doubles-number-home-delivery-slots/

14 https://www.bbc.co.uk/news/business-52545028

15 https://www.theguardian.com/technology/2020/apr/15/amazon-lockdown-bonanza-jeff-bezos-fortune-109bn-coronavirus

Within the UK, leisure and sport activities have also changed significantly with gyms closing and all team sport being banned. Once again this leads to a significant reduction in those travelling and the increased sales of "home" leisure and gym equipment demonstrates how people are adapting to the new restrictions and moving "online". During the lockdown phase there have been no international or domestic holiday trips further reducing movement.

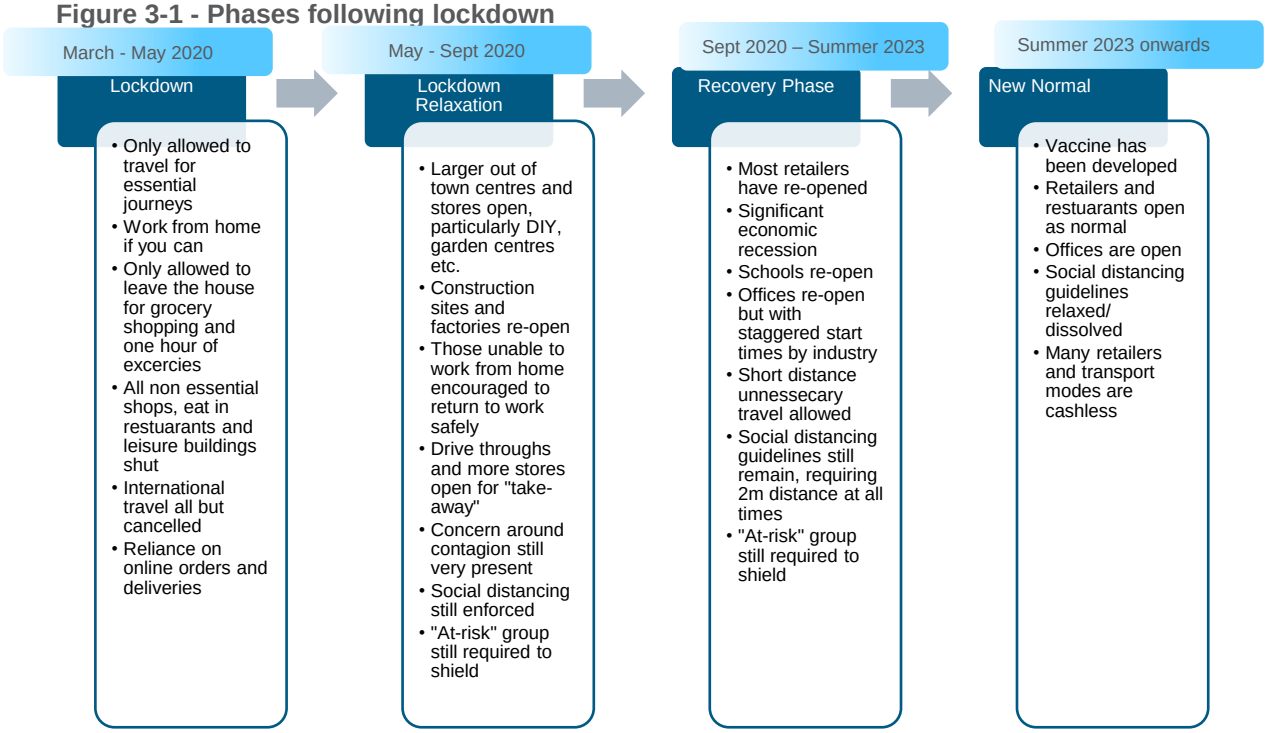
Within a similar vein online health care has risen within an industry that has been traditionally slower to adapt and make use of technological developments. Some are even claiming that this could mark a sustained change and the end of traditional GP appointments. [16]

Across these three aspects of day-to-day life, a picture is painted of a workforce that is working from home, an education sector that has moved online and a leisure industry that is offering people the same facilities and exercise classes within their home. These adaptations have caused us to call into question the assumption that we have all held that to be productive, educated and to undertake leisure activities we have to leave our homes and thus travel.

3. How will the UK respond?

At present there is much uncertainty surrounding how the UK will transition out of our lockdown period, however it is expected to follow a phased approach. A scale to help the public understand how critical the situation currently is, has been developed. For clarity, we have tried to summarise this into the next three phases we will witness, with the key assumption that a second peak of the virus does not return. We have summarised what the subsequent phases could look like in the UK and subsequent chapters will quantify how human behaviour and travel is likely to change throughout each phase and the response that is required from authorities to influence this:

Figure 3-1 - Phases following lockdown



While the government will the lead the lockdown relaxation, allowing more and more of the economy to re-open and therefore restart there is still a lot of uncertainty about how individuals will behave after lockdown is relaxed.

[16] https://www.businesscloud.co.uk/opinion/could-covid-19-spell-the-end-of-traditional-gp-appointments

The suggested timescales are an indication of when the phases may transpire, with activities increasing or becoming more common as the phase progresses and it should be seen as a gradual change as the colour gradient suggests.

4. Quantifying our response

One of the biggest challenges of accurately predicting the implications of COVID-19 is that a pandemic of this scale has not occurred in modern times. When considering past case studies as a guide to future behaviour, it is important to contextualise this pandemic in the globalisation era and consider the technological developments that have happened since. To find similar events we must look as far back as the flu pandemic of 1968 which accrued a death toll of around 1 million people or the Asian flu of the late 1950s which resulted in death tolls of around 2 million. Owing to global developments which have occurred since these past pandemics took place, we are left drawing assumptions about the future implications of COVID-19 based on events that are either:

1. Much smaller/confined in scale
2. Have a different causal relationship that has altered the way people change their lives

The following case studies detail how areas have responded to similar events to try and help us draw some conclusions about the expected impacts of COVID-19.

4.1. Case studies

London 7/7 Bombings

London 7/7 2005 was the single worst terrorist atrocity on UK soil. Four suicide bombers attacked central London striking at the heart of Public Transport, 3 devices on the London Underground and 1 device on a double decker bus.

Behavioural Change

There were a number of notable changes that occurred as a response to this significant attack. Immediately after the event there was an 8.3% reduction in London Underground usage, and it was found 1/5 of people had reduced their travel as a result of the incident. There was a significant increase in bike use with an extra 4000 journeys made daily. However, by the September 2005 most evidence points to a return to normal with the increased bike use only lasting approximately two weeks. One of the greatest reasons for the quick return to normal is the fact that this was a one-off event.

Salisbury Novichok Incident

The Salisbury Novichok Incident was a poison-based attack targeted towards a specific individual. It occurred in March 2018 and saw two people purposely poisoned and two indirectly poisoned, with one fatality. The attack occurred in the city centre and led to panic and fear due to the invisible nature of the poison.

Behavioural Change

This panic and fear of coming into contract with the unknown (now known to be the Novichok Nerve Agent) led to a reduction in people coming into and visiting the city. Footfall was down by 17.1% in March 2018 and it was estimated that international visitors and organised tour visitors were down by 40%. Less people wanted to travel by bus and the local buses saw a decline in ridership. The levels bus increased over time, but a year after the event footfall was still down by around 10%.

Salisbury Reds, the largest bus operator in Salisbury, have shared data on patronage trends before and after the March 2018 Novichok poisoning incident. Whilst seasonality and other factors (e.g. changes to car parking charges aimed at stimulating the visitor economy) make it difficult to pick out any immediate short term trends following the incident, it is notable that in the medium term (2019) network wide passenger numbers had dropped by 5 to 7% in certain key periods of the year (e.g. Christmas and school summer holidays) compared to the two previous years. It appears probable that that the Novichok incident may have compounded and worsened the impact on Salisbury of some nationwide trends, which has in turn contributed to a medium term (at least 18 month) negative impact on bus usage in the city.

SARs outbreak

SARs part of the coronavirus strand of viruses was an epidemic which started in Guangdong, China in November in 2002 and was ongoing till 2004. In total 26 countries were affected and there were more than 8000 cases. The disease was transmitted from person to person and 774 were killed by the virus.

Behavioural Change

A notable impact of the virus was the behavioural changes around transport and travel. Public transport become less favourable (50% reduction in Taiwan during the outbreak) as people choose to avoid the risk of travelling in an enclosed space with others. This saw a large increase in private car purchase, 33% in China compared to the year before. Along with car purchases there was a large increase in cycling as those who couldn't afford a car or were making shorter journey moved to bike use.

Recession (2007-9)

The great recession saw economic downturn and financial crisis experienced across the globe. It especially impacted the banking and real estate industries. The crisis led to widespread unemployment and job insecurity across Europe and the US, reduction in bank lending and loans, and a drop-in house prices.

Behavioural Change

One behavioural change saw a reduction in household spending, as many become more cautious due to the uncertain financial situation. From a transportation perspective, travel and unessential journeys were considered more carefully before they occurred, as people were became more stringent with their money. This saw a 15% reduction in travelling for leisure, a 12% increase in people travelling off-peak, and a 14% increase in purchasing advanced fares. Businesses reduced business travel and encouraged conference calls. This also saw more people choosing to work from home to reduce travel costs. The recession naturally saw many people reduce their spending, and the purchasing of large goods especially furniture and white goods decreased as people couldn't afford to buy new items.

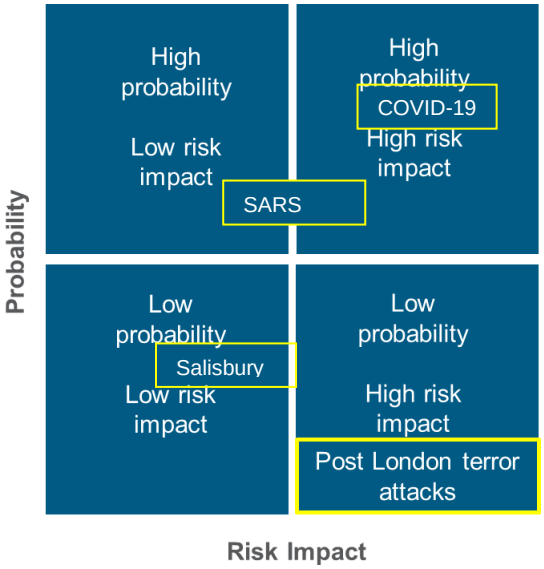
Transport Impacts

- Road traffic and congestion levels fell during the recession. This is believed to have been due to people travelling less for leisure, not commuting and a reduction in road freight as people weren't making large purchases.
- In 2009 motorway traffic levels had reduced by 31% based off the previous two-years.
- There was a 15% fall in rush hour congestion based on loss of jobs, 20% of commuters worked from home more to save money, 14% had turned to public transport and 12% had moved to lift-sharing to save money.
- Lorry freight travel also fell 12% from 2008 to 2009 as people weren't making purchases.

In order to draw conclusions, the following table has highlighted the elements of the case studies above that can be applied to the existing COVID-19 situation:

As 7/7 demonstrates, with terrorist related events, there is an underlying level of caution and fear after the event, however a normal pattern of life is able to return shortly after the event. This is because the risk profile associated with a terrorist attack sees a high risk and low probability event alongside a public push to fightback against terrorism and not let it impact day to day life. This allows the public to return to normal activities after calculating their own associated risk.

Figure 4-1 - Overview of risk profile with different events



The COVID-19 related risk profile is different to what we have experienced in previous events. The risk is still present, and the uncertainty of how the virus would impact us personally, remains. This creates an unknown level of risk and without a vaccine the probability of contraction remains high. Taking these variables into consideration it is likely we will see a continued level of fear and caution throughout the lockdown relaxation and recovery phase until the time a vaccine is produced and widely available. These cautious tendencies will be exacerbated by continued implementation of measures to mitigate social interactions.

With this in mind the bounce back will be delayed until a vaccine is available, and this is predicted to be over a year since the UK entered lockdown and therefore an established series of behaviours and habits may become ingrained and be long-lasting in ways which are unprecedented.

That said there are two key things we should note from the events above:

1. Encouraging the return to public transport poses a significant challenge. If it is not addressed effectively then the number of car journeys is likely to increase dramatically throughout the lockdown relaxation and recovery phases. If measures are not put in place to ensure there is sufficient supply of safe alternatives modes to car usage, then the increase in private car dependency is likely to remain a key component of the New Normal. The SARS case study highlights both the return to the private vehicle and the potential to shift to other modes such as cycling.
2. It is possible to predict short term behavioural changes that will occur from COVID-19 but predicting the longevity of these changes is much more difficult. There is an opportunity for authorities to influence the long-term behavioural changes using measures put in place during the early stages of exiting lockdown to nudge people to more sustainable travel habits. After events (London 7/7 and SARs) cycling has been seen to become an immediate response, but these behavioural changes are often short lived. To see lasting habits formed encouragement/ campaigns, incentives and infrastructure improvements will be required.

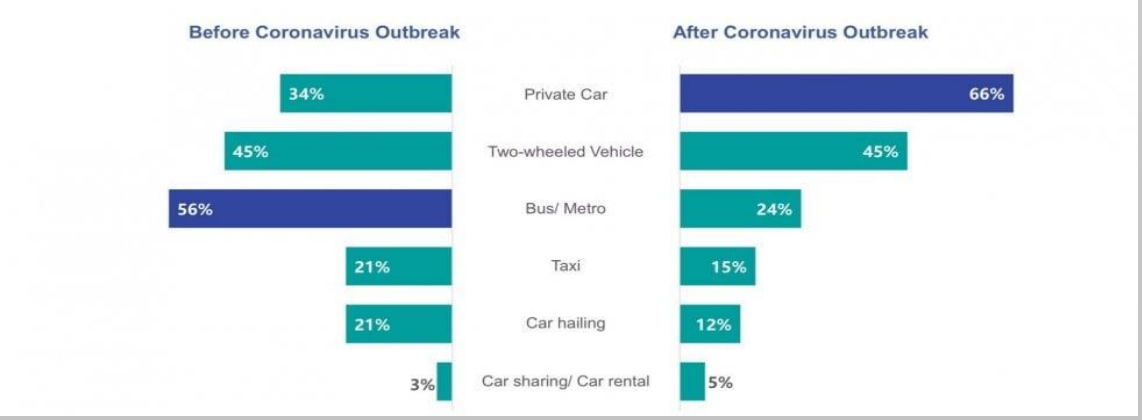
4.2. Recovery phase in China

China, 2020

Wuhan, a region within China is thought to have been the provenance of the COVID-19 virus. Wuhan has gone through the lockdown phase prior to the UK, therefore evidence can begin to be gleaned around how travel behaviour in particular has returned to the cities within it.

Behavioural Change

Within China evidence has pointed to a significant increase in travel again since lockdown has lifted. This has been across air, road and Public Transport. Car sales have dramatically increased across China with sales expected to return to normal by early summer. Some Chinese states are choosing to support the return to the private vehicle with subsidies for cars as both Shanghai and Beijing have witnessed a return to 2019 traffic levels. As demonstrated in the graph below, post lockdown there has been a quick rebound and growth in private car use, balanced with a large decline in public transport use.



However, air travel has seen a more conservative return. Data from flightradar24 shows domestic air travel in China is at around 50% of 2019 volumes. While these figures are likely to be due to remaining restrictions, it also indicates how other transport will take time to recover due to concerns surrounding the virus.

Evidence from China and other cases studies suggests that there are three significant and consistent trends that we can include as we try to quantify travel behaviours during the recovery phase and the new normal:

1) Reduction in public transport usage forcing a move to the private vehicle

Upon exiting lockdown, Beijing and Shanghai have both seen traffic levels reach the same levels as 2019 while the public transport metro has seen a downturn by 50%.[17]

The heightened fear around overcrowding will lead to a distrust of Public Transport and in a region such as Solent that has already been identified as “car dependent” this could be significant. A recent study suggested that 61%[18] of Britons would feel nervous about using Public Transport as we begin to move into the recovery phase. If immediate changes are not made it is likely across the UK but particularly in car dependent regions the preference will be to return to vehicles, with over 50% of people not owning a car before lockdown suggesting they will buy one post lockdown.

Public Transport operators will be forced to make changes to the way their services operate by reducing the maximum capacity of people allowed on buses (see Figure 4-2) and trains, in some cases up to 90% reductions to enforce social distancing. This could also force people to use their private vehicles and will

[17] https://uk.reuters.com/article/uk-health-coronavirus-china-autos/chinas-car-market-seen-rebounding-from-virus-as-lockdowns-ease-idUKKCN21R22Y

18 https://www.ipsos.com/ipsos-mori/en-uk/majority-britons-uncomfortable-sport-music-bars-coronavirus

reinforce the need for better information, advice and facilitation (Figure 6-2 - How authorities support people's journeys). These changes could all justify a move to the private vehicle where this is a feasible option.

Figure 4-2 - Example of a bus with social distancing controls

2) Reduction in public transport usage towards alternative modes

Cycling has been shown to significantly increase during the lockdown period. Lack of car ownership or the lack of ease around using a private vehicle for journeys is forcing people to look at alternative modes to both the private vehicle and public transport. This has led to significant increases in both cycling and bike share schemes globally.

> In March, use of bike-share systems increased by roughly 150% in Beijing and 67% in New York, where cycling on main thoroughfares increased by 52%. Meanwhile, cycling traffic increased by 94% in Dundee during April.[19]

Consideration of these approaches presents an opportunity for the UK to encourage a longer-term shift to more active travel modes at a time when people are seeking alternative journey options. Through making cycling and active modes more attractive and safe, this may see the diversion from public transport move towards cycling/ walking instead of private vehicles.[19]

3) Reduction in overall travel

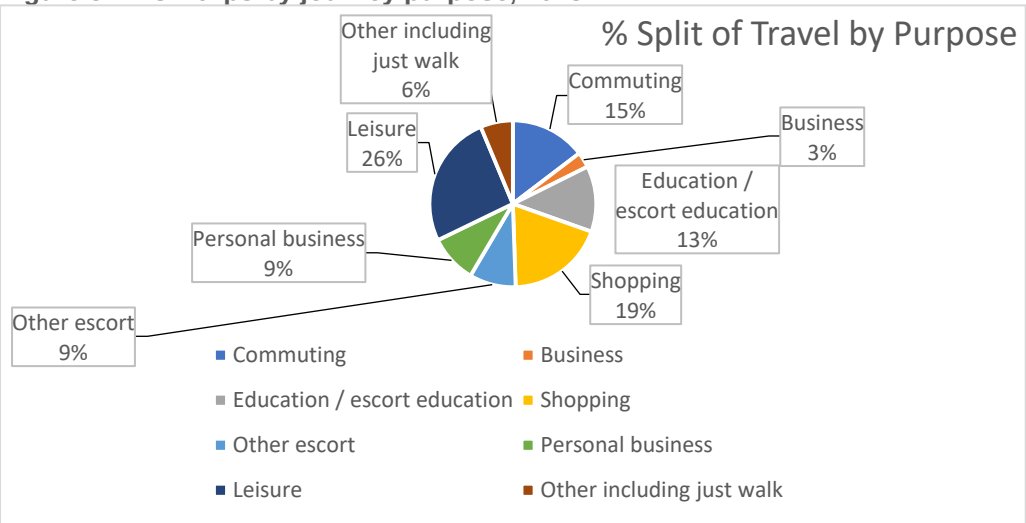
It is important to note the fact that technology has proven to withstand the pressures of large organisations working at home, a return to previous patterns of travel is unlikely to occur, certainly in the shorter term. This suggests that in the longer-term travel demand may remain suppressed as remote solutions evolve more rapidly to meet the needs of the day than transport providers (especially PT) can.

5. Quantifying these changes in the Solent Region

Taking Sections 3,4 and 5 we are able to assess and predict the impact that this will have on travel within the Solent region.

5.1. Overview of journey split in the UK[20]

Figure 5-1 - UK trips by journey purpose, 2018



[19] https://www.bbc.com/future/article/20200429-are-we-witnessing-the-death-of-the-car
[20] https://www.gov.uk/government/statistical-data-sets/nts04-purpose-of-trips

Further dividing the most significant journey purposes by mode helps draw further conclusions.

Table 5-1 - Percentage split of modal choice by journey type (rounded)

	Active travel	Car	Public Transport
Commuting	18	66	16
Education / escort education	44	46	10
Shopping	27	65	8
Leisure	20	71	9

Figure 5-1 and Table 5-1 are representative of journeys across the entire UK, so actual modal split is likely to be even further skewed towards the car in regions such as Solent which are known to have lower Public Transport numbers and a higher preference for individual journeys towards the private car[21].

In order to assess and quantify the impact on the Solent region, we will now explore the expected modal changes by journey purpose.

5.2. COVID Commuting Challenge

Table 5-2 illustrates how industry within the Solent region compares to the rest of the UK. The ability of individuals to work from home in each industry is then considered.

Table 5-2 - % Industry Split between UK and Solent compared to working from home split

	UK Split	Solent Split	Mainly work - own home	Work at home in the week prior to interview (week 1 of lockdown)	Ever work at home	Never work from home
A Agriculture forestry and fishing	1.2	0.8	8.6	13.7	39	38.7
B Mining and quarrying	0.2	0.1	5.7	8.9	24.8	60.6
C Manufacturing	7.5	7.1	3.9	9.3	21.1	65.7
D Electricity gas air cond supply	0.4	0.3	4.9	13.6	29.6	51.9
E Water supply sewerage waste	0.6	0.6	1.9	6.5	20.4	71.2
F Construction	6.7	6.7	3.8	10.2	25.9	60.1
G Wholesale retail repair of vehicles	14.6	14.6	3.2	6.2	13.4	77.2
H Transport and storage	4.7	5.3	1.8	3.4	11	83.8
I Accommodation and food services	6.8	7.9	2.1	4.4	10	83.5
J Information and communication	4.1	4.2	14.8	32.8	53.1	0
K Financial and insurance activities	3.3	2.5	5.2	22.8	38.9	33.1
L Real estate activities	1.6	1.4	12.3	18.4	40.3	29
M Prof scientific technical activ.	9	6.1	12.8	26.3	46.3	14.6
N Admin and support services	8.8	8.5	5.6	11.2	23.2	60
O Public admin and defence	4	5.5	2.6	13.7	29.4	54.3
P Education	8.4	10.1	2.7	12.8	38.3	46.2
Q Health and social work	12.3	12.7	3.9	8	20.3	67.8
R Arts entertainment and recreation	2.9	3.1	9.9	17.4	33.3	39.4
S Other service activities	2.9	2.7	7.8	16.8	30.3	45.1

[21] https://solentlep.org.uk/media/1514/tip-final-web-version.pdf

The Solent region sees only small comparative differences with the industry split across the UK. However, significantly in the industries that make up larger percentages of the ability to work from home we see Solent lower than the UK average, notably in M, P and I. This will lead to a likely increase in those returning to work outside of their home during both lockdown relaxation and the recovery phase. With commuting making up a significant amount of the Public Transport usage and this mode most likely to fall, having a large economic base that need to travel for work offers a significant commuting challenge for Solent during the recovery phase.

The rise of home working has been significant during the COVID-19 lockdown phase. IT Teams have responded to facilitate new technologies to enable remote working and maintain levels of productivity without travel. This varies by industry, but one poll suggests that 24%[22] of people plan to work from home more regularly even after lockdown is lifted. However, it is important to bear in mind that an estimated 50% of people are unable to work from home and that this group of workers is often skewed towards those on a lower income, or in service and gig economy jobs.

All of this suggests that while for some the assumption 'that we need to travel to be productive' still applies, for a large sector of the job market, it no longer stands as true as it once did. This leads us to conclude that throughout the recovery phase travel will remain reduced compared with pre COVID-19 numbers, but larger than during lockdown. As those primarily working in office-based roles will continue to work remotely supported by now established digital solutions.

Applying the evidence above to Solent we can assume the following numbers of commuters will return to travel during each phase:

Table 5-3 – Commuter numbers per month during COVID-19 phases

Pre-COVID-19 2020 predicted levels	Lockdown Phase	Lockdown Relaxation	Recovery Phase	New Normal
69,000	17,000	27,000	48,000	60,000

Assumptions

- Number of industries that are able to work from home, inferences drawn from Table 5-2 - % Industry Split between UK and Solent compared to working from home split
- 40,000 people cannot work from home in the Solent Region
- During recovery phase some people who can work from home will occasionally still travel for work
- New normal will see increase in travel for work again with a significant number preferring to work from home but not possible everyday

5.3. A Re-Education

The Solent region's travel patterns are influenced by two international universities, with 23,000 students at the University of Southampton and 25,000 students at the University of Portsmouth and therefore notably a higher percentage of population working in education than the UK average as presented in Table 5-2. Although schools will likely return before the end of the academic year, universities are better suited to coping with remote learning and may not return until 2021. The University of Southampton travel plan shows the staff and student travel patterns by mode:

Table 5-4 - University of Southampton travel by mode, 2016/17

	Private vehicle	Car share	Public Transport	Active travel	Other
Staff	39.3	8.4	17.9	32.3	1
Students	1	0.2	60.5	37.9	0.4

[22] https://www.bbc.co.uk/news/business-52414376

The delay of students returning to university may benefit and free up capacity on Public Transport but will have a very small impact on the number of private vehicles on the roads. Staff will either fall into the working from home category or where this isn't possible, will contribute to private occupancy vehicles, perhaps more significantly as car sharing reduces.

Extrapolating the evidence above for universities and evidence-based assumptions on schools to the entire Solent region we can assume the following numbers of education trips will be seen during each phase:

Table 5-5 - Education trips per month during COVID-19 phases

Pre-COVID-19 2020 predicted levels	Lockdown Phase	Lockdown Relaxation	Recovery Phase	New Normal
50,000	1,500	3,000	35,000	50,000

Assumptions

- Schools at 1% of capacity during lockdown, raising to 3% during relaxation[23]
- University of Portsmouth completely shutdown and University of Southampton seeing some travel during lockdown
- Minimal increase during relaxation phase as minimal number of children return to school when construction sector returns to work
- Recovery phase (likely from September for education) will be at 80% as universities have limited return but schools return in a much more complete context

5.4. Solent Shoppers

As evidenced above shopping habits have significantly changed during the lockdown phase. During lockdown relaxation we expect the habits of larger, less frequent shops to continue. This will be driven by a reluctance to visit confined and crowded convenience stores and the inconvenience of social distancing meaning individuals preferring to queue for larger shops less frequently. The larger less frequent shopping habit also leads to a tendency towards increased car usage as individuals, although making less shopping trips overall, increase their propensity for car usage for food shopping.

The other impact seen as a result of COVID-19 has been the increase in home deliveries, not only for food shopping but across all retail sectors. This has been in some regards to support the "at-risk" population for whom it is recommended that they do not visit confined areas such as supermarkets. Once again we envisage that throughout lockdown relaxation a reliance on home deliveries will be sustained, partially due to the need to carry on supporting the "at-risk" population until there is a vaccine and the convenience.

Applying the evidence above to Solent we can assume the following numbers of shoppers will be seen during each phase:

Table 5-6 - Shopping trips per month during COVID-19 phases

Pre-COVID-19 2020 predicted levels	Lockdown Phase	Lockdown Relaxation	Recovery Phase	New Normal
75,000	44,000	60,000	60,000	67,000

Assumptions

[23] https://schoolsweek.co.uk/coronavirus-school-attendance-around-1-finds-dfe-analysis/

- Limited data pertains to number of trips during lockdown phase, by calculating car usage at 25%, public transport at 20% we have estimated a total number of journeys. After subtracting the commute trips and education trips, this gives a best guess for shopping trips.
- Assume during relaxation stage this stays consistent but increases during recovery phase as more shops open and home deliveries become less frequent as more people return to work

5.5. Life of leisure

In a pre COVID-19 world the private vehicle was the mode of choice for the majority of leisure trips[24]. This is most likely due to the majority of multiple passenger trips and longest journeys by number of miles being attributable to leisure journeys. During the recovery phase and new normal we can expect the private vehicle to increase for these modes and particular for a car dependent area such as Solent. Journeys that were made by car in a pre COVID-19 world will remain that way and likely increase. Leisure will look markedly different as individuals reduce international and national holidays for a while leading to increased day trips by car. This will lead to an increase in car journeys at the weekend from both visitors and locals within regions like Solent. These types of journeys are typically difficult to influence and in many regards the private vehicle offers the most efficient and safest mode of travel for "multiple occupancy journeys".

> In 2018, 1052 was the average miles per person for leisure trips by car, compared with 788 for commuting and just over 400 for shopping.[20]

The Solent region is home to 85% of the UK Cruise industry, notably because of the Southampton dock and its deep water. With the cruise industry predicting a significant fall in number of passengers across 2020 and following years this will support a reduction in some vehicles within the Solent.

Applying the evidence above to Solent we can assume the following numbers of leisure will be seen during each phase:

Table 5 -7 - Leisure trips per month during COVID-19 phases

Pre-COVID-19 2020 predicted levels	Lockdown Phase	Relaxation	Recovery Phase	New Normal
101,000	0	0	81,000	110,000

Assumptions

- Leisure and personal business see a significant return during the recovery phase as a vast majority of individuals are eager to return to leisure
- Spikes should be anticipated during months such as August as individuals are not able to undertake international travel
- Many shielding, some estimates at 20% and still a sense of fear preventing some from travelling further
- New normal leaves more UK leisure travels as holiday and day trips become more accepted

5.6. Travel within the Solent

Taking the assumptions listed above and the evidence from previous scenarios we have estimated how this could impact the Solent region in terms of number of journeys made by mode and purpose. Taking the most recent survey in 2015 we have factored this up (to account for population increase) to predict number of trips by mode in 2020 and then interpolated this to a monthly aggregation of trips and applied our insights from the findings above around commuting, education, shopping and leisure to identify the total number of trips.

The graph below compares the number of trips by the assumed mode breakdown currently witnessed within the Solent region across the three most immediate phases, with the following:

[24] https://www.gov.uk/government/statistical-data-sets/nts04-purpose-of-trips

The Solent LEP 2018 reports suggests modal split as:

Table 5-8 - 2018 Solent Modal Split (%)

	Active travel	Car	Public Transport
Commuting	18	66	16
Education / escort education	44	47	10
Shopping	27	65	8
Leisure	20	72	9

However, owing to the likely decrease in Public Transport expected we have assumed a 75% reduction in Public Transport, which is assumed on buses – the main form of Transport in Solent and distributed the remaining journeys evenly between active travel and car

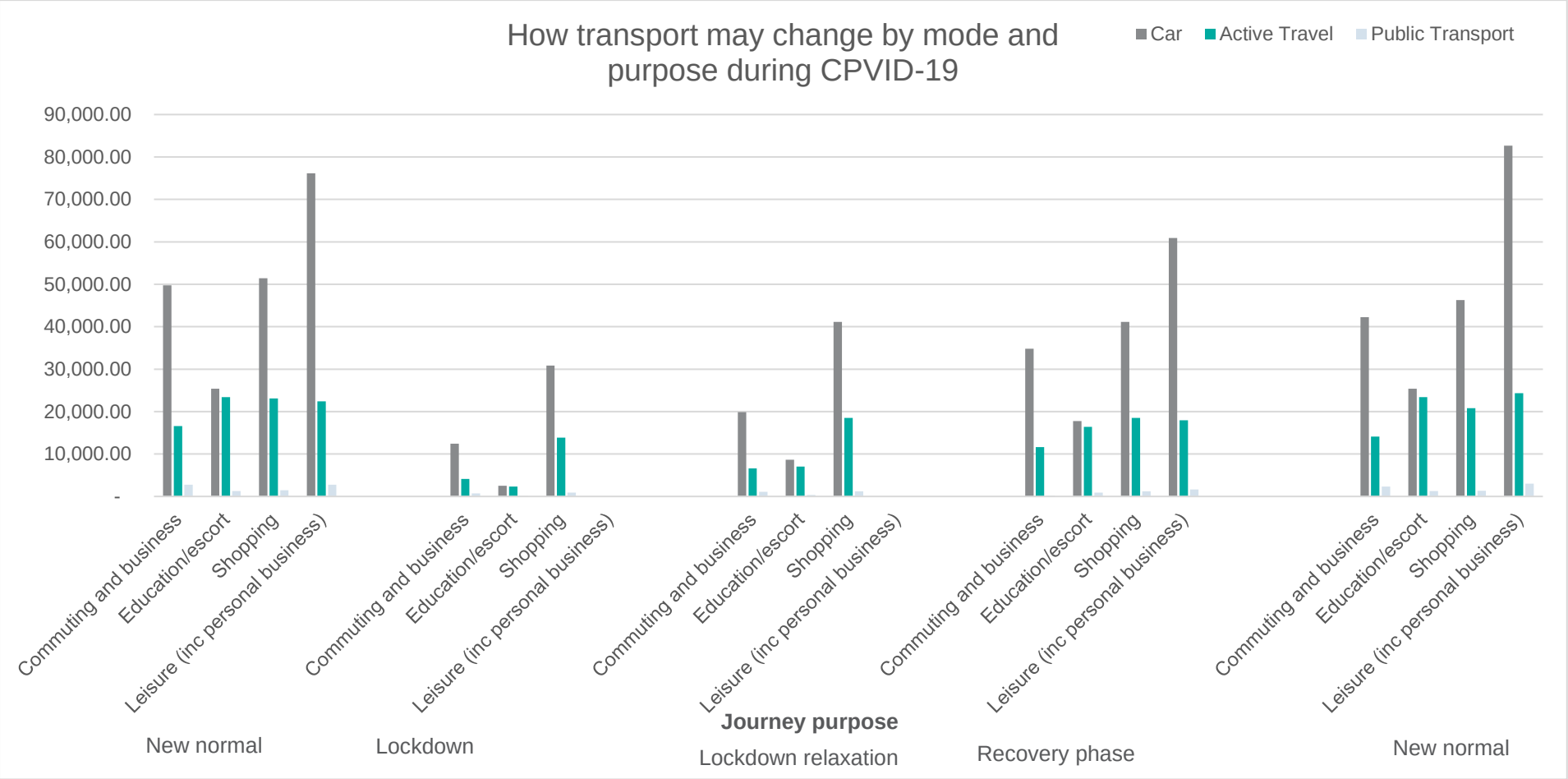


Figure 5-2 - Potential changes to transport during COVID-19 phases by purpose and mode

This graph above and our evidence enables us to summarise the challenges that the Solent region will face in regard to travel during the recovery phase:

1) Commuting and business returns with high level of car usage.
2) Move from Public Transport to private car usage.
3) Reduction in lift shares for commuting increase car usage.
4) Shopping habits increase vehicles on the road (both private and deliveries).
5) Walking and cycling increases and the need to maintain social distancing may mean that in some areas capacity becomes an issue, even though in a pre COVID-19 era it was rarely a challenge for Solent. The above assumptions suggest more than 10,000 extra journeys undertaken per month by active travel during the recovery phase.
6) Frequency of buses increases to accommodate for social distancing during peak times or reduction in bus services as not sustainable forcing people to the car.
7) Increased leisure journeys, visitors and locals, as holidays decrease once again increasing car usage.

The likely increase in car usage will bring about significant and damaging impacts on the Solent region, if not addressed. Authorities need to consider:

1) Air Quality

In March 2020, DfT set out ambitious plans to decarbonise transport[25]. During the recovery phase the return to private vehicle could offer significant setbacks in meeting ambitious targets as part of the UK's overall Net Zero campaign. Furthermore, this is concerning as the length of recovery phase is likely to ingrain new behaviours within individuals that, based on our understanding of human behaviours, will be adopted well into the "new normal" phase.

Second of all there are worryingly links to air quality and the health impact of COVID-19[26]. This highlights the importance of addressing air quality during the lockdown phase.

One study reveals 80% of deaths across 4 countries were in the most polluted regions.[17]

2) Congestion

Congestion is known to negatively impact a number of key metrics for cities. Returning to increased levels of congestion would not be a desired outcome.

3) Health and wellbeing

Arguably more than ever before, the health and wellbeing of the UK population will be challenged. With reports of significant increase in mental and physical health problems not being addressed a significant return to the private vehicle rather than active travel of public transport could exacerbate this.

The statistics laid out so far and the prediction of modal choice in the Solent region, assume a limited influence by authorities in their response to COVID-19 and therefore presents COVID-19 as a hinderance of Future Mobility and the potential to undo significant advancements that have been made in these fields over previous years. However, challenges can also offer opportunities and there is a unique opportunity to influence behaviour during the recovery phase that could address the challenges for a sustained period and use COVID-19 as a catalyst for positive change.

[25] https://www.gov.uk/government/publications/creating-the-transport-decarbonisation-plan
[26] https://www.theguardian.com/environment/2020/apr/20/air-pollution-may-be-key-contributor-to-covid-19-deaths-study

6. The driving forces behind people's travel behaviour

The case studies and prediction of travel for Solent above highlight the significant changes that could be expected. Our evidence-based predictions and the observations from other nations set out that there is a precedence for individuals to return to the private vehicle and although total number of trips are not likely to peak for many years increased car dependency is a challenge and should be concerning. The **primary focus during the recovery phase** should therefore be to:

1) Prevent car dependency through:
    a. Encouraging active travel
    b. Safely enabling a return Public Transport
    c. Developing novel approaches and models that can support new lifestyles and travel patterns

It takes 66 days to form habits, the recovery phase is like to be over a year. The challenge is therefore to encourage individuals to form positive habits as these will be sustained.[27]

Solent Transport and authorities in general have an opportunity to use this as a catalyst to change people's travel patterns, not just in the short term as seen with other events, but longer sustained travel behaviour changes.

As lockdown measures have been lifted internationally, the evidence coming from these countries suggests a return to private vehicles is most likely. This is caused by a significant downturn in traditional public transport usage. **How can authorities understand these changes in behaviour and what is causing them?**

Focussing on travel and transport, it is accepted that there are three factors that people consider when deciding how to travel:

Figure 6-1 - Factors that alter individual's journey choice

These assumptions still stand true and will continue to drive travel behaviours, however there are some differences that need to be considered:

Table 6-1 - How people decide their approach to travel

Type of choice	Pre COVID-19	Post COVID-19
Efficiency	• Financial Cost • Time Cost • Ease	Financial cost will become a more important factor due to the financial impact of COVID-19 and the general fear of recession.

[27] https://www.quickanddirtytips.com/education/science/how-long-habit

	• Ability to be productive	Importance of time cost is likely to be overtaken by other factors.
Comfort	• Wet/cold • Overcrowding • Sit/standing	Overcrowding will likely be the most significant considerations within the “comfort” bracket.
Safety	• Well-lit journey • Avoiding travelling solo	Assumption on relative risk to health and transmission is now likely to inform travel choices more so than previously more weighted factors such as “time cost”.

The evidence is suggesting that once lockdown is relaxed individuals continue to avoid crowded areas and spaces and as such public transport use is diverted towards other modes. This is due to the perception that public transport is less safe as there is greater risk of transmission. This avoidance behaviour sees the rise of private car use, as well as more people cycling. Bike share schemes are also seeing an increase, suggesting that it’s not the aspect of sharing that puts people off public transport use, but the travelling in close proximity to others. This choice is based upon the perception that travelling in a private vehicle or with space around you is safer than a bus or train which at particular times may see crowding.

Authorities and operators still have the same ability to support the public’s journeys. This leads to the final assumption that we wish to consider in this thought piece. That in order to travel, people will continue to require:

Figure 6-2 - How authorities support people's journeys

Historically these three have been undertaken in isolation with separate platforms providing elements such as real-time information, journey planning and smart ticketing but in the pre COVID-19 world the rise of Mobility as a Service sought to bring the three of these together. Once again, the three of these stand true however the way in which they are applied will look different in a post COVID-19 world:

Table 6-2 - Requirements for travel pre and post COVID-19

	Pre COVID-19 baseline requirements		Drivers for change	Post COVID-19 adjusted requirements	
	Channels	**Type**		**Channels**	**Type**
Information	• Online • In-app • Phone • In person	• Cost • Modal options • Number of modal changes • Time • Notifications of delays	• Desire for less human interaction • Less surface interaction • Desired reduction in sharing • Social distancing • Desire for more real-time information updates • Reduced capacity of services • Reduced availability of services	• Remote channels such as online and in-app preferred • More interest in real-time data on the go which favours apps	• Most information required remains the same • Additional information on “live” capacity of public transport vessels • Notifications more important as service frequency changes • Information on crowding and busyness at destinations will inform advice about whether to travel
Advice	• Online • In-app • Phone • In person	• Prioritisation based on individual preference. Preference towards efficiency and cost factors		• Remote channels such as online and in-app preferred • Seek on-demand travel advice related to overcrowding	• Cost may become a more important factor after the financial impact of COVID-19 • Overcrowding will now be a significant consideration. • Tailored advice may be required for new “high risk” user groups • Notifications on mandated travel restrictions desired • Prioritisation to include factors such as current capacity • Number of mode changes during a journey becomes more significant as people seek to reduce interactions
Facilitation	• In person • Self -ticket booths • In-app • Point of travel contactless ticketing • Advance purchase online	• Ticket purchasing • Directions for active travel • Disability support		• Preference for contactless payments • Reduction in cash transactions	• Demand for directions for active travel journeys such as walking and cycling may be increased • Rise in desire for contactless payments • Reduction in demand for season tickets and a move to PAYG model as people make fewer journeys/commutes per week

As per the pre COVID-19 world information, advice and facilitation is still going to be required for individuals. The nature of how this is achieved is unlikely to change, however the type of information and advice that is given will change. For instance, crowding information more than ever may change and influence people's journey, however this information could still be received in the same way.

7. Authority solutions

As established, the opportunity for authorities is to imbed positive behaviours that will last. Minimal action by authorities will risk a significant return to the private vehicle and the problems established in previous sections.

Public Transport

As established within Section 5 commuting trips are likely to see the biggest swing away from Public Transport to the private vehicle or active travel. Within the Solent region which we know is heavily car dependent there should be a focus on discouraging the shift to the private vehicle through:

1) **Demand management**

In order to ensure social distancing can be maintained demand management will be seriously considered. This occurred very effectively within the UK during the 2012 Olympics but required significant engagement with industry and business. Although it may not directly encourage a shift away from the private vehicle it encourages the spreading of peak travel times reducing the impact of the private vehicle. For those who have Public Transport as an option, demand management may make this more appealing as it offers the ability to travel at a time which is less crowded or to destinations that are less crowded.

> "There are a series of different things that we can do including staggering work times." Grant Shapps, April 2020

2) **Active travel**

An alternative to Public Transport that does not have the crowding implications is improving active travel options and micro mobility offerings, namely walking, cycling, bike and e-scooter share.

Considerations by authorities could include:

a. Reallocation of road space for walking and cycling maximising the use of relaxation of regulations
b. Bike hire schemes
c. New cycle share facilities
d. Subsidising bike usage
e. E-Scooter trials after relaxation of DfT regulations
f. Ability for information, advice and facilitation (contactless) in one place across all modes

> Many countries that are ahead of the UK and already within their recovery phase are seeking opportunities to capitalise on changes to people's behaviour that have been seen during lockdown. France, Belgium and Italy have all taken similar approaches as they incentivise bike riding, improve cycling infrastructure and widen pavements to ensure social distancing can be maintained while walking and cycling.[28]

As observed in Section 5, Active travel modes have the second highest usage levels in Solent. While most of the active travel trips are made by walking, the recent lockdown growth in cycling could see a greater proportion of these trips made by bike. Therefore, the above considerations could attempt to "lock in" this cycling growth in the recovery phase which would deliver significant modal shifts away from the private car (and, provide an alternative to public transport) and mitigate some of the negative impacts of reduced public transport attractiveness and options.

[28] https://www.bbc.co.uk/news/world-europe-52483684

3) Making Public Transport safer in a public health context

a. Providing live/predicted crowding information
b. Better information provision to reduce waiting times
c. Contactless payment/Prepayment
d. Introduction of a carnet style ticket to encourage alternative travel demand/less than daily travellers

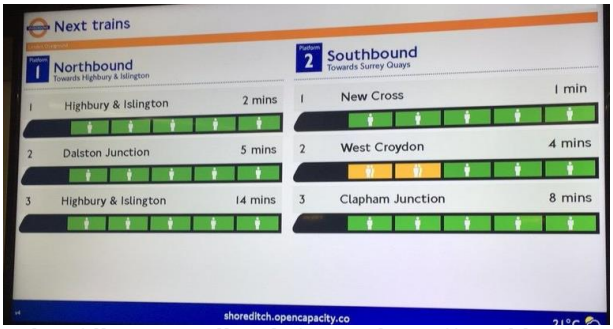


Figure 7-1 - Example of live crowding information offered by TfL

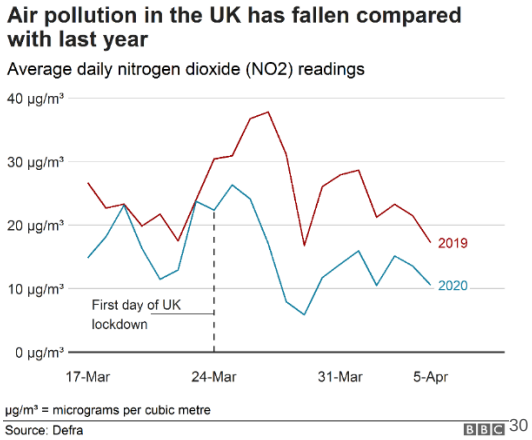
4) Public awareness

Public awareness campaigns are a useful tool to encourage users to adopt different travel behaviours. COVID-19 has increased awareness around how we travel as some stark images have come to light highlighting the impact our journey choice has on air quality.

Greater Manchester have committed to £5m to public campaign around social distancing supporting walking and cycling. [29]

One stark example is the below graph highlighting how air pollution has fallen in the UK, clearly identifying the period which lockdown begun.

Figure 7-2 - Air pollution pre and during COVID-19 lockdown



5) Freight

With the short term and likely sustained increase in freight deliveries, options to reduce the impact of additional deliveries by road need to be carefully considered and balanced with the requirement to bolster the economy and encourage the necessary wealth exchange. This is particularly important in areas such as the Solent which is expected to see a 45% increase in freight over the next 35 years[31].

- Different approaches to consolidation
- Relaxing/altering delivery hours (in many areas this has been in place for the lockdown phase)
- Incentivising environmentally friendly vehicles
- Exploring mixed use vehicles (freight and passengers to support the commercial viability of bus solutions)

[29] https://www.transportxtra.com/publications/local-transport-today/news/65387/greater-manchester-authorities-launch-5?etid=1497519&artid=65387
30https://www.bbc.co.uk/news/uk-england-52202974
31 MDS Transmodal (2019), Future of Freight Demand, report for the National Infrastructure Commission

6) New models

One of the UK's leading software providers in DDRT is trialling DDRT for key workers abroad and there are other examples of this being explored within the UK. [32]

Another opportunity that exists is around the type of Public Transport use. People's caution around public transport use is likely to make a number of bus routes unprofitable as highlighted within Section 2. This presents the opportunity to consider new approaches to bus travel through which Dynamic Demand Responsive Transit (DDRT) schemes may offer a better alternative to the private vehicle and more profitable commercial models. DDRT could offer a suitable option as it offers the ability to actively manage the number of people within a vehicle as well as suitable transport for key workers that are continuing to require travel.

7) Electric vehicle charging points

Although electric vehicles maintain some of the significant flaws of private ridership. One of the significant challenges identified is improving air quality to reduce the impact of COVID-19 on individual health. Additional investment in charging points could lead to the improved incentivisation of electric vehicle uptake, reducing some of the air quality concerns.

8) Incentivisation

Incentivisation is a powerful tool to encourage the uptake of positive behaviours. At a time when there is significant opportunity to encourage new behaviours that will be enforced by a significant COVID-19 recovery phase incentivisation should be considered as a positive opportunity. Mobility credits could be considered as part of an incentivisation model. As we move into a recession those households identified as low income alongside unemployment are both likely to increase meaning different solutions and incentivisation for these groups to be able to move is required.

8. FTZ and COVID-19 working together or opposed?

Solent Transport has recently announced the successful award of Future Transport Zone (FTZ) funding from DfT. With this funding set to be received shortly it is important to understand synergies between the COVID-19 response and maximising the delivery of an FTZ in the Solent region.

If COVID-19 is to be a catalyst for future mobility it is important the funding is not simply spent on supporting the typical COVID-19 recovery operation that all authorities will explore. Instead, there should be a continued focus on the innovations which will support the 'future' element of these areas.

By adapting and maintaining flexibility within the delivery of the Future Transport Zone we are confident that the funding can support both the necessary recovery phase for COVID-19 and go beyond this to achieve the objectives set out within the FTZ. Table 8-1 sets out the interventions/objectives that were separately developed for the FTZ funding and a suggested response strategy to COVID-19, developed through the evidence above, and outlines whether meeting the objectives of one supports the objectives of the other.

Table 8-1 - COVID-19 response compared against the FTZ

Original focus	Intervention/Objective	Aligns with FTZ	Aligns with COVID-19 response
FTZ	Reduce car dependency	✓	✓
	Improved air quality	✓	✓
	Increase productivity	✓	✓
	Increase physical activity	✓	✓

[32] https://ridewithvia.com/2020/04/d-c-bowser-administration-and-via-launch-transportation-solution-for-essential-healthcare-workers/

	Addressing the impact of movement of goods by road	✓	✓
COVID-19	Ensure Public Transport is not a high risk environment for COVID-19		✓
	Maximise opportunity to shift to bikes/cycle share/e-scooters	✓	✓
	Explore new models for buses	✓	✓
	Provide better information for individuals around public transport e.g. crowding/times of operation	✓	✓

One of the significant areas within the personal mobility section of Future Transport Zone is the Mobility as a Service section. Taking the assumptions forward from Figure 6-1 - Factors that alter individual's journey choiceabout what people require, more than ever there will be a greater desire for:

- **Better information**
  - Timetables have changed and individuals will want to reduce waiting time
  - Buses may be running but have reached capacity as this will be significantly reduced
- **Tailored advice**
  - Routes/modes that are the safest and require limited interaction
  - Essential for “at risk” population
- **Facilitation**
  - Contactless payment/ pre-payment through an app
  - Introduction of a carnet style ticket to encourage alternative travel demand/less than daily travellers

These objectives are met by the Solent Go improvements and a MaaS platform. Although historically it would have not been envisaged that crowding information was essential to people’s journeys the fact that FTZ provides a method for getting better information to people is the important requirement within the system.

The key focus will be on producing or procuring back office systems that are flexible enough to respond to the different information and modes that will be required as patterns and behaviour changes.

It is clear that FTZ funding if applied in the right way can be used to both maximise on an existing opportunity to encourage an uptake in active travel while supporting a safe return to public transport and the uptake of active travel as part of the COVID-19 recovery.

9. What’s next for Future Mobility Zones?

The government measures implemented in response to COVID-19 have caused us to call into question many assumptions which were so fundamental to our daily lives that we never had reason to challenge them before. We have sought to set out in the above article that there significant changes in peoples travel patterns will be seen and witnessed, not only by journey purpose but mode as well.

If authorities do not act upon this there is a significant risk that years of encouraging active travel and Public Transport uptake could be undone as people return to the safety of the private vehicle, the problems of which are exacerbated by increasing van usage for deliveries. This would significantly hinder the future, not only of our mobility, but our planet. The Solent region finds itself in particular need of making active decisions around this owing to the type of employment and the existing car dependency found within the region, highlighting the efficiency, comfort and safety of the private vehicle in the area.

There are opportunities and decisions that can be taken to ensure this hindrance does not occur and these have been established above. Despite the Solent region finding itself, arguably in a more difficult position than other areas it also has a significant advantage over other regions, the Future Transport Zone. To prevent the reflex reaction to rely on private vehicles for journeys made in the recovery phase of the pandemic, there is a huge opportunity to leverage this point of change in people’s routine to encourage sustainable modal shift in line with the FTZ objectives. Some

examples of interventions which will both support the objectives of the FTZ and respond to the challenges brought about by COVID-19 are outlined below:

- Now more than ever, we are seeing the opportunity for technology to be used to ensure that people have access to; accurate real-time information, advice tailored for their circumstances and safe facilitation of journeys. These three aspects of **Mobility as a Service** will remain just as important during the recovery phase as they are in the phases which follow.
- By introducing **bike share schemes**, as laid out in Solent's FTZ proposal we are helping to facilitate a sustained increase in cycling stimulated during the recovery phase.
- The introduction of new operational models such as **Dynamic Demand Responsive Transit**, allows for a more agile use of assets and a greater control over information collection and dissemination including live capacity updates.
- The introduction of ticketing products such as **carnet** which move away from the 'season ticket' model and towards a pay as you go model will also help people to be more flexible with travel times and modes to reduce overcrowding of Public Transport and prevent the return of 'rush hours'.
- Facilitation of contactless payments, in-app bookings and the expansion of **Solent Go**'s smart ticketing will reduce the human interaction required to making travel bookings and purchase tickets.
- Further growth in online shopping, and potential shifts in shopping pattern to favour fewer, bigger shops, could cause increases in home delivery and shopping related traffic. Identifying how **sustainable last mile deliveries**, e.g. through use of e-vans, cargo bikes etc could help to reduce some of the negative impacts of this trend will be beneficial. Also, further increased delivery volumes and activity may further generate the case for, and conditions for success for, **consolidated deliveries and collection points** at varying scales.

An additional challenge for FTZ programmes in general surrounds measuring the effectiveness and impacts of the new transport solutions that are trialled. This is a key focus for the DfT's FTZ programme, but creation of a baseline (against which impact of trials and tests can be measured) will be challenging as the pre COVID-19 norm is unlikely to return, and the process of transition to a "new normal" will be lengthy. Additionally, the "start point" particularly for public transport may be much lower than before. Therefore how the impact, effectiveness or "success" of FTZ projects is measured will need to change, perhaps becoming more focused on establishing longer term viability and applicability of trials to other areas, and focusing on broader outcomes- rather than being primarily based on comparing impacts of trials to baseline "without intervention" data.

The fundamental role of the FTZ funding is to ensure that the future transport ecosystem in the Solent Region is better (more efficient and environmentally friendly) than it was pre COVID-19. In spite of social distancing regulations and the likely fear of Public Transport that risks setting the UK back even further in our strive to reduce car dependency, by seizing the unique opportunity to influence travel behaviour and introduce new transport solutions, COVID-19 could be the catalyst to sustained modal shift away from the private car in the Solent Region.