

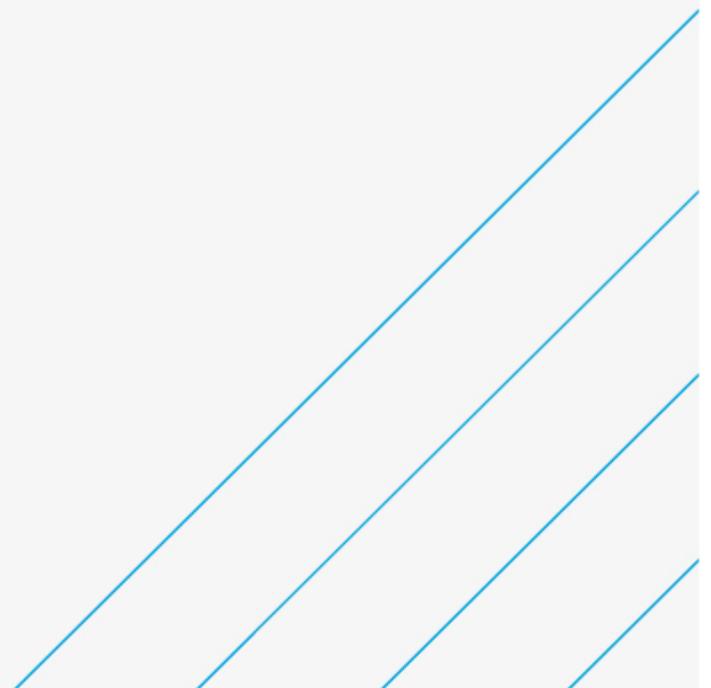


**SNC • LAVALIN**

# Portsmouth Air Quality Local Plan

E3 - Distributional Impact Assessment  
(FBC Update)

December 2020



# Notice

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## Document history

Revision	Purpose description	Origin-ated	Checked	Reviewed	Authorised	Date
1.0	Distributional Impact Update	ER	JR	TM	JR	14/12/2020

## Client signoff

Client	Portsmouth City Council
Project	Portsmouth Air Quality Local Plan
Job number	5196555
Client signature / date	

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# Executive Summary

## Impact on Vulnerable groups

The CAZ C Benchmark option and the Refined Alternative Package (CAZ B + non-charging measures) option are shown to have a **slight adverse and slight / moderate impact on accessibility**, as taxi drivers may increase their charges or chose to stop operating in the CAZ area, limiting the availability of hackney carriages and private hire vehicles and disproportionately impacting on income deprived residents and disabled people living in the centre of Portsmouth.

For both options, the impact of the proposed CAZ on traffic flow and re-routing is small. The overall impact in terms of **severance, accidents and noise**, is therefore limited, and the change which is predicted is found to have a slight beneficial impact on relevant vulnerable groups.

In terms of air quality, both options benefit the high proportion of children and low income households in central Portsmouth, who will benefit from reduced emissions. The impact is considered **large beneficial** for the CAZ C Benchmark, and **moderate beneficial** for the CAZ B+ Refined Alternative Package, reflecting the smaller scale of the CAZ area.

The overall impact on **user benefits** for non-business trips is **slight adverse**. Increased parking costs outweigh time and vehicle operating cost savings resulting from small-scale re-routing of traffic and reduction in congestion, but in relative terms the most income-deprived areas experience less dis-benefit than other income groups. Similarly, the overall impact on **personal affordability** (for non-business trips) is **slight adverse**, as the income-deprived areas experience less dis-benefit than other income groups.

The **majority of SMEs** (65%) are located in areas where business trips experience net user benefits, due to small scale re-routing of traffic and reduction in congestion; but very small adverse impact on journey affordability, due to users paying for the CAZ charge, and changes to parking charges. Areas with the highest proportion of SMEs experience a disproportionately high level of user and affordability dis-benefits, although the absolute scale of the dis-benefits is very small.

*The above assessment focuses on how the benefits and dis-benefits of the Refined Alternative Package are distributed across vulnerable groups, in relative terms. In all cases, the absolute scale of the benefits / dis-benefits are small or very small.*

# 1. Introduction

## 1.1. Background

As part of the Outline Business Case (OBC) submission, a detailed distributional impact analysis was undertaken to determine whether the following shortlisted options / packages unduly favour or disadvantage particular social groups or businesses<sup>1</sup>. The shortlisted options were:

- **Portsea Island Clean Air Zone (CAZ) C** – identified as the ‘**Benchmark CAZ**’ of high enough class to bring about compliance in the shortest possible time; and
- **Small Area CAZ B plus non-charging measures** – an ‘**Alternative Package**’ (referred to in this report as CAZ B+) based on a lower class of CAZ with supporting non-charging measures (parking restraint measures, strategic cycling routes – *not funded*, modification to the traffic signal timings at the Alfred Road / Queen Street junction + complementary measures), which was also found to bring about compliance in the shortest possible time. **This was the preferred option.**

The assessment was undertaken in accordance with requirements set out in TAG unit A4-2 and involved a three-step approach – see the OBC version of the E3 Report.

Following submission of the OBC in October 2019, JAQU approved provisional funding (subject to submission of a Full Business Case) for a Small Area CAZ B + non-charging measures. However, funding was not received for the strategic cycle routes or travel planning for workplaces and schools.

**Table 1-1** Summary of measures approved for provisional funding by JAQU

Measure	Provisional funding
Small Area CAZ B	✓
Parking measures	N/A (no funding required)
Strategic cycling routes	✗
Alfred Road signal changes	✓
Taxi license requirements	N/A (no funding required)
EV charging points	(✓) If PCC amend the licensing policy to require use of electric vehicles before the FBC submission.
Residents Parking Zone permits	N/A (no funding required)
Travel planning for workplaces and schools	✗
Targeted communications and marketing	✓

Following further analysis and feedback from stakeholders a **Refined Alternative Package** has been developed, which replaces the Alternative Package proposed at OBC stage.

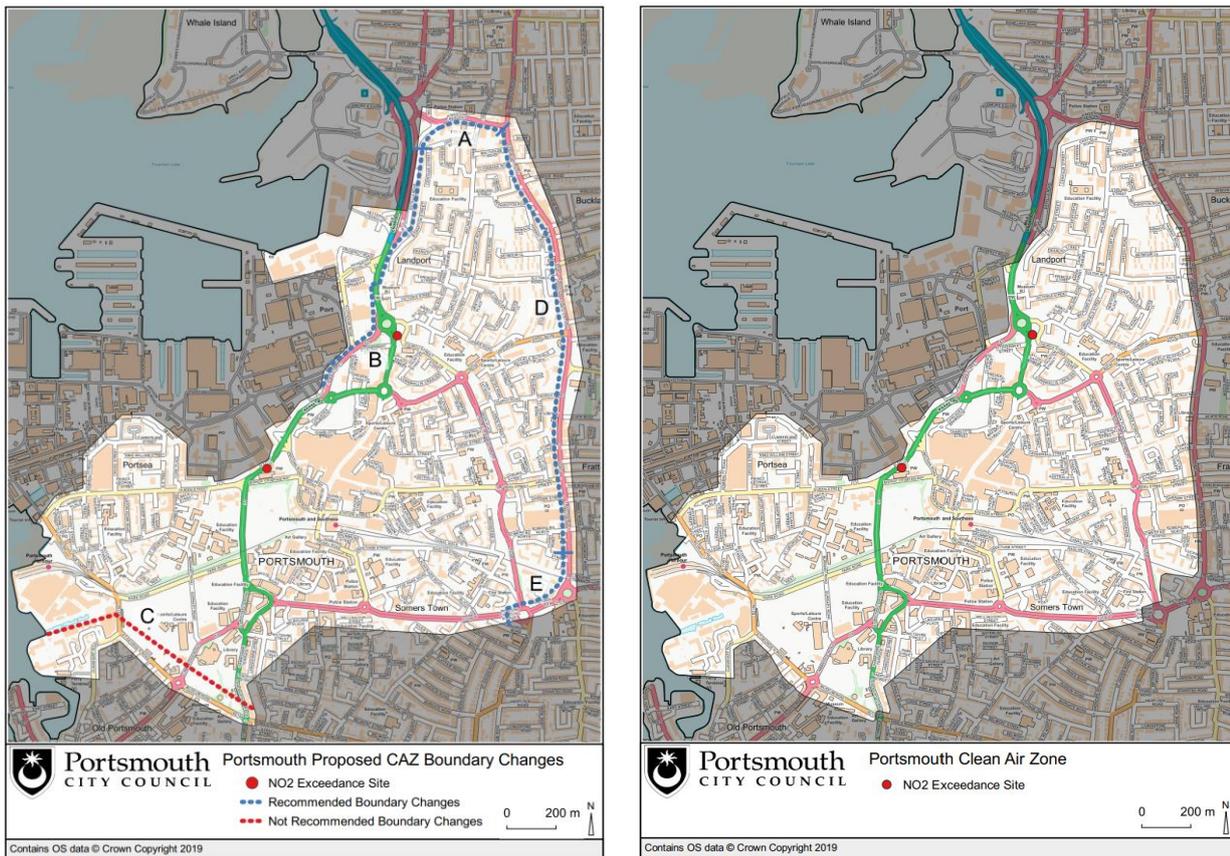
The **Refined Alternative Package** comprises the following modifications:

- Adjustments to the CAZ boundary to benefit taxis and HGVs which are not contributing to emissions at the two exceedance locations and reduce rat running (see [Figure 1](#)):
  - Removal of Kingston Crescent ('A' on map) - Allows affected vehicles to travel southbound along London Road, and then along Kingston Crescent towards the M275 without entering the CAZ, discouraging rat running through the residential roads north of Kingston Crescent. Will benefit taxis / PHVs and HGVs servicing premises in this area (offices, a supermarket, a hotel and a restaurant);
  - Removal of Princess Royal Way ('B' on map) - Allows affected vehicles to access the Naval Base, via Trafalgar Gate, without entering the CAZ. The majority of traffic using Trafalgar Gate is travelling to / from the north, so does not contribute to the high NO<sub>2</sub> concentrations on Alfred Road and Commercial Road. Will also benefit HGVs accessing the businesses along Flathouse Road (including Morrison's and Portico), whose non-compliant vehicles would otherwise be liable for the CAZ charge;

<sup>1</sup> This is in addition to the overall impact of the options on all groups, which is the main focus of economic appraisal analysis.

- Removal of Fratton Road ('D' on map) – To benefit taxis / PHV drivers serving residential areas in Fratton and the surrounding area;
- Removal of Fratton Roundabout and Holbrook Road Roundabout ('E' on map) – To allow affected vehicles to drive around Fratton Roundabout (previously inside the CAZ) from Goldsmith Avenue to Fawcett Road (both outside the CAZ) without being charged, and benefit similar movements associated with the use of Holbrook Road Roundabout. This will benefit taxis / PHV drivers as these roundabouts connect large residential areas to key routes in the city;
- Refinement of Alfred Road signal changes, to benefit both pedestrians and vehicles.

**Figure 1** Proposed and approved changes to CAZ boundary



Further detail on the above modifications is set out in the Economic Case chapter of the Full Business Case.

The **Refined Alternative Package** delivers the same scale of reduction in NO<sub>2</sub> concentrations on Alfred Road and Commercial Road (40.2 and 39.5 µg/m<sup>3</sup> respectively) as the Alternative Package proposed at OBC stage (40.1 and 39.5 µg/m<sup>3</sup> respectively).

## 1.2. Distributional Impacts (DI) assessment update

The **Refined Alternative Package** is very similar to the Alternative Package proposed at OBC stage and is expected to result in similar distributional impacts.

This assessment of distributional impacts (DIs) is based on LSOAs which fall partly or completely within the impact area defined for each indicator. The LSOAs which fall within the CAZ B boundary defined in the OBC and FBC are the same. Therefore, the DI assessment assumes the population living within the CAZ is the same for both packages, and hence the socio-demographic characteristics of the population are also the same. However, the exclusion of a number of important strategic roads from the CAZ may result in a slight re-distribution of traffic which may impact vulnerable and disadvantaged groups differently.

A high-level update of the distributional impacts associated with the Refined Alternative Package has therefore been undertaken. This involves updating some of the key tables and maps, and re-assessing the distributional impact using the updated information and referencing the more detailed analysis presented in the OBC version of this report.

## 2. Updated Distributional Impact assessment

### 2.1. Introduction

This chapter presents an updated Distributional Impact assessment for the **Refined Alternative Package (CAZ B+)**, for the following distributional impact indicators:

- Accessibility
- Severance
- Accidents
- Air Quality
- Noise
- User benefits
- Affordability.

The results presented in this chapter should be considered in conjunction with the more detailed DI assessment presented in the OBC version of the E3 Report. This report focuses on the assessment of the **Refined Alternative Package**. Corresponding results for the **Portsea Island CAZ C Benchmark** are presented for comparison, but the detailed supporting commentary is contained within the OBC version of this report.

### 2.2. Accessibility

#### 2.2.1. Nature of impact

The introduction of a charging CAZ may indirectly impact the availability of taxis and private hire vehicles inside the proposed zone, if drivers choose to stop operating in the CAZ area or increase their charges. As a result, the ability of individuals or businesses to get to places of work, social networks and public amenities can be reduced. Women and children, as well as vulnerable and isolated people (often older people or people with disabilities) are particularly vulnerable to social exclusion, due to changes in the availability of taxis and private hire vehicles, as they are more likely to rely on these services for certain trips. This situation may also particularly impact low income households who are less likely to have access to a car and may be reliant on these alternative services.

There are a small number of conventional bus services which cannot be or have not yet been retrofitted. There is a risk that operators may withdraw these vehicles from service in the short-term.

A CAZ charge may also reduce the availability of special transport services such as community bus services and school transport services. However, it is believed that in the majority of cases, these services use mini-bus style vehicles and would not be affected by the CAZ charge.

The increase in car parking charges and reduction of car parking spaces included within the CAZ B+ option may also reduce accessibility for private car users.

The OBC also identified potential beneficial impacts to accessibility as a result of the proposed strategic cycling routes. No funding has been secured for these routes, so these benefits no longer apply.

#### 2.2.2. Assessment information

**Impacted Area:** Small Area CAZ B (Figure 1).

**Vulnerable Groups:** Table 2-1 shows the proportions of groups vulnerable to the impacts of poor accessibility within the CAZ B impact area.

Population proportions are calculated based on LSOAs/MSOAs which fall fully or partially within the CAZ boundary. The LSOAs/MSOAs of interest are the same for both the OBC and FBC versions of the CAZ, and hence, the accessibility impact area comprises the same proportions of each vulnerable group as determined in the OBC.

**Table 2-1** Proportions of vulnerable groups within England and Wales and the accessibility impact area

Group	England and Wales	CAZ C Impact Area	OBC CAZ B+ Impact Area	FBC CAZ B+ Impact Area
20% most income deprived residents	20.0%	16.3%	<b>55.0%</b>	<b>55.0%</b>
Elderly (over 65)	18.2%	13.0%	12.1%	12.1%
Children (under 16)	19.1%	17.9%	17.5%	17.5%
Female	50.6%	48.6%	47.4%	47.4%
20% Highest Level of Illness and Disability	20.0%	14.0%	<b>66.7%</b>	<b>66.7%</b>
BAME	14.0%	13.2%	<b>17.2%</b>	<b>17.2%</b>

### 2.2.3. Appraisal update (for FBC CAZ B+ Package)

There are high proportions of income deprived residents, disabled people and BAME residents in the centre of Portsmouth (covered by both the CAZ B and CAZ C options), who may be more likely to rely on taxi, private hire or community transport services for certain trips.

Some 55% of residents within the FBC Small Area CAZ B reside within LSOAs belonging to the 20% most income deprived in England, and 67% reside within LSOAs with the 20% highest levels of illness and disability. These groups will be disproportionately affected, with potential adverse impacts on employment and education prospects, health, isolation and social inclusion.

The CAZ C Benchmark will have an adverse impact on accessibility by taxi across a larger area, but does not disproportionately impact any of the identified vulnerable groups. The overall assessment is therefore **slight adverse**.

The CAZ B+ Refined Alternative Package is smaller, so adversely impacts fewer people. However, it disproportionately affects income deprived, disability, and to a much lesser extent, BAME groups; so is considered to have a similar impact. The overall assessment is therefore **slight / moderate adverse**. The individuals concerned would also be adversely impacted by the CAZ C option.

The car parking changes relate to parking in the city centre, and the above vulnerable groups would be equally affected by both options.

**Table 2-2** Outcome of accessibility assessment

Group	CAZ C Benchmark	OBC CAZ B+ Alt. Package	FBC CAZ B+ Refined Alt. Package
20% most income deprived residents	x	xx	xx
Elderly (over 65)	x	x	x
Children (under 16)	x	x	x
Female	x	x	x
20% Highest Level of Illness and Disability	x	xx	xx
BAME	x	x	x
Overall	x	x	x

See the OBC version of the E3 Report, for further detail about the CAZ C assessment.

## 2.3. Severance

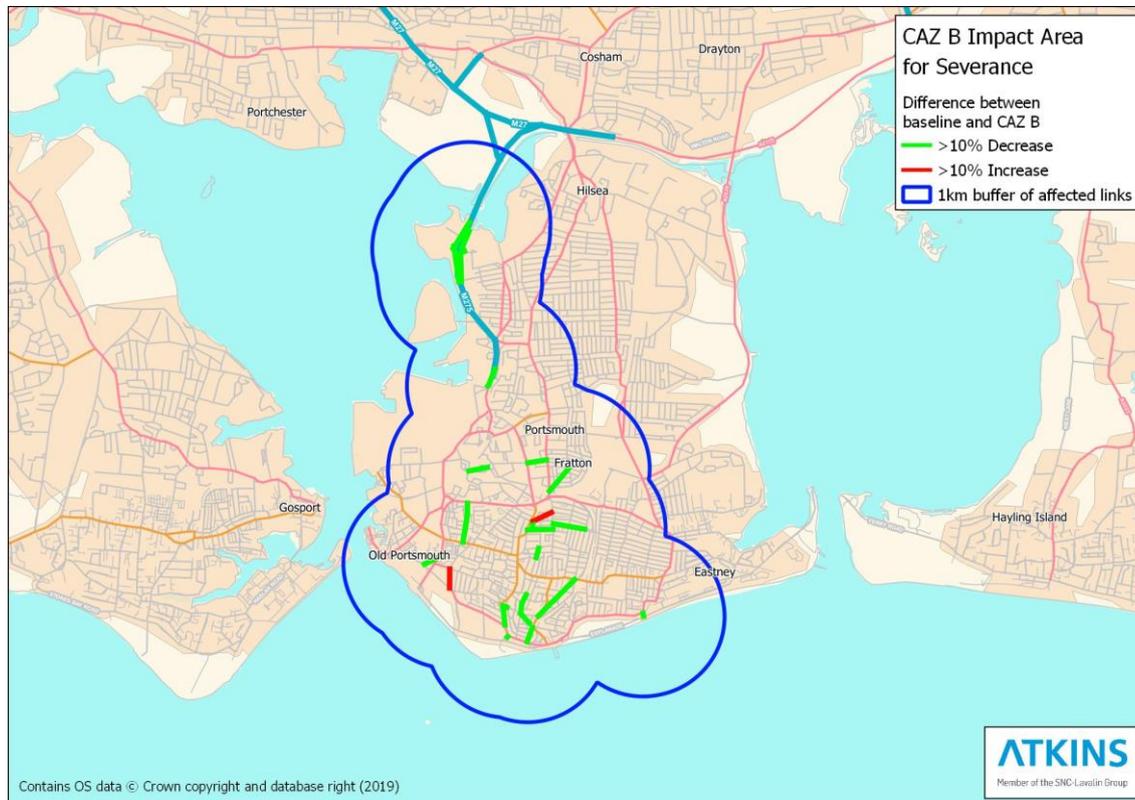
### 2.3.1. Nature of impact

Severance is often an unintended consequence of a measure intended to address other problems. The proposed CAZ B+ option (and also the CAZ C option) does not include any changes that would introduce or remove barriers or transport corridors. However, there may be changes to traffic flow and speed as a result of targeted vehicles avoiding the CAZ. An increase in traffic flow can increase perceptions of severance as vulnerable groups may find it more difficult to cross the road.

### 2.3.2. Assessment information

**Impacted Area:** The severance impact area includes LSOAs within 1km of affected links, defined as links with greater than 10% change in AADT (average annual daily traffic), as shown in [Figure 2](#).

**Figure 2** Severance impact area



**Vulnerable Groups:** [Table 2-3](#) shows the proportions of groups vulnerable to the impacts of severance. There are high proportions of no car households within the severance impact area (under both the CAZ B+ and CAZ C areas).

**Table 2-3** Proportions of vulnerable groups within England and Wales and the severance impact area

Group	England and Wales	CAZ C Impact Area	OBC CAZ B+ Impact Area	FBC CAZ B+ Impact Area
Elderly (over 65)	17.0%	12.4%	12.2%	11.5%
Children (under 16)	19.0%	17.7%	17.4%	17.3%
No Car Households	25.6%	<b>45.4%</b>	<b>38.3%</b>	<b>40.2%</b>
20% Highest Level of Illness and Disability	20.0%	<b>30.7%</b>	17.0%	17.6%

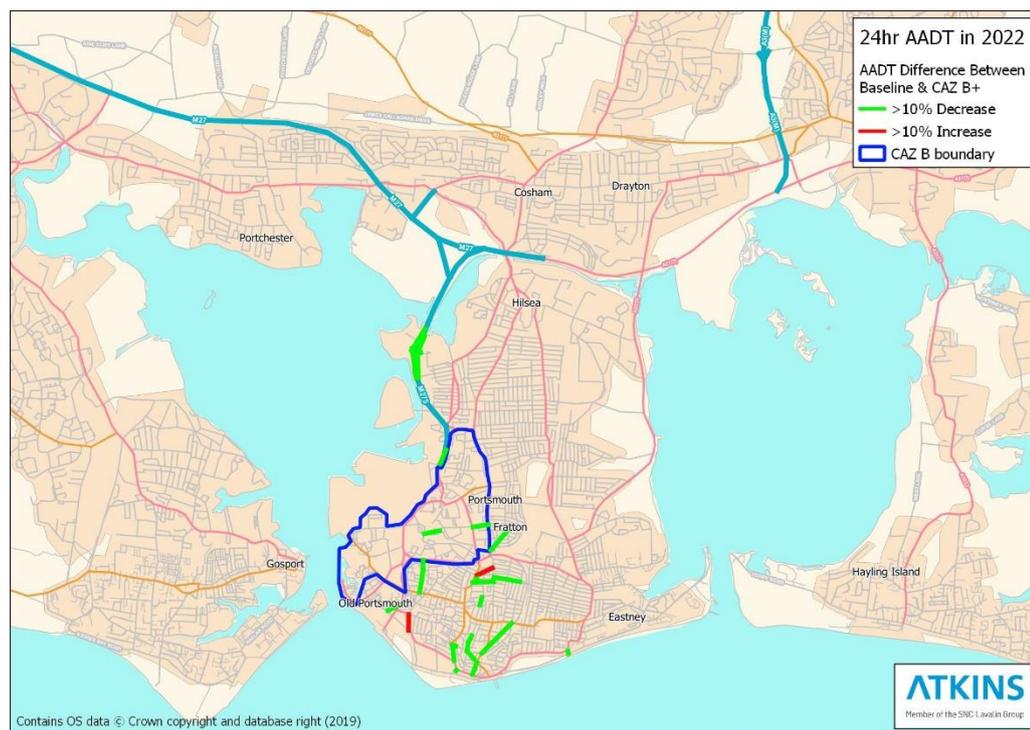
### 2.3.3. Appraisal update (for FBC CAZ B+ Package)

There are two links with a significant increase (>10%) in traffic flow (Britannia Road North/Rugby Road and Western Parade), as shown in [Figure 3](#). However, in both cases the baseline traffic flow is low, so a small increase has led to a greater than 10% change in traffic flow. The absolute increase in modelled traffic flow is just 2 vehicles on Western Parade and 30 vehicles on Britannia Road North/Rugby Road. This small increase is not expected to impact severance for pedestrians crossing these roads. Therefore, no adverse impacts to severance are anticipated as a result of the CAZ B+ scheme.

In addition, several links show a significant reduction in vehicle flow, including the Tipner Interchange Roundabout and motorway slip roads, Clarendon Road and Arundel Street.

**Since there are significantly more links with reduced AADT (average annual daily traffic) than increased AADT, there is likely to be a beneficial impact to severance in the area following the introduction of a CAZ B+ as the pedestrian routes, in general, are expected to be easier to use.**

**Figure 3** Links with greater than 10% change in traffic flow as a result of small area CAZ B+



Comparing the location of these links with mapping showing the concentration of vulnerable groups (see Figures 7-10 of the OBC version of the E3 Report) indicates the following distributional impacts:

Vulnerable groups	Severance-related distributional impact
Elderly residents	<b>No negative impacts to severance anticipated</b> - There are relatively low proportions of older people in the areas where there are significant changes in traffic flow.
Disabled residents	<b>Slight beneficial</b> - Although there is one link (Britannia Road North/Rugby Road) which may experience a increase in traffic close to areas with the highest proportions of disability, the absolute increase in traffic flow on this link is small (30 vehicles) and is not expected to increase severance along the road. Furthermore, there are several links with reduced traffic flow in areas with high proportions of disabled residents.
Children	<b>Slight beneficial</b> - There are high proportions of children in the centre of Portsmouth where the two links with reduced traffic flow are located. There are also a number of schools and other amenities in the vicinity of links with reduced traffic flow which children may need to cross the road to access.
Households without access to a car (who are more likely to walk to local amenities)	<b>Slight beneficial</b> - There are above national average proportions of no car households across the severance impact area, with high concentrations within the CAZ. Those without access to a car may be more likely to walk to local amenities and hence perceive beneficial impacts to severance across roads with reduced traffic flow.

In conclusion, there are a large number of road links where traffic flow reduces by more than 10%, which will improve the quality of the pedestrian environment, benefiting vulnerable residents in the vicinity. There are high proportions of disabled residents, children and no car households in these areas and hence, these vulnerable groups are expected to benefit from reduced severance.

However, there are two links where traffic flow increases by more than 10% as a result of the scheme. The absolute increase on these links is less than 30 vehicles, so is not expected to impact severance in the vicinity.

As a result, the overall assessment on severance for the FBC CAZ B+ option is considered to be **slight beneficial**.

Similarly, results for the Benchmark CAZ C show a beneficial impact to severance, with no links with a significant increase in traffic flow, and small number of links with a significant reduction in traffic flow. There is a slight beneficial impact across all vulnerable group categories.

**Table 2-4 Outcome of severance assessment**

Group	OBC CAZ B+ Alt. Package	FBC CAZ B+ Refined Alt. Package	OBC CAZ B+ Alt. Package
Elderly (Over 65)	✓	0	0
Children (under 16)	✓	x	✓
No Car Households	✓	x	✓
20% Highest Level of disability	✓	✓	✓
Overall	✓	0	✓

See the OBC version of the E3 Report, for further detail about the CAZ C assessment.

## 2.4. Accidents

### 2.4.1. Nature of impact

Implementation of a CAZ may impact the amount of traffic in the area, and hence the number of accidents, due to targeted vehicles avoiding the charge. According to TAG Unit A4-2 any change in alignment of a transport corridor that may have safety impacts, or any links with significant changes (>10%) in vehicle flow, speed, % HDV content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using the road network, can give rise to a significant impact on accidents.

In addition to traffic flow changes, the reduction in car usage resulting from parking measures will generate benefits in the form of accident rates.

### 2.4.2. Assessment information

**Impacted Area:** Affected Road Network (as shown in [Figure 4](#)). Broadly covers the Portsmouth City Council boundary.

**Figure 4 Affected Road Network (ARN)**



**Vulnerable Groups:** Groups vulnerable to accidents include pedestrians, cyclists, motorcyclists, male drivers aged 16-25, under 16s, people aged 70+ and casualties from the 20% most deprived LSOA's in UK.

Data presented in the [Table 2-5](#) shows that within the impacted area, **the proportion of accidents involving cyclists, motorcyclists and young male drivers are higher than the national average**, with accidents involving cyclists over twice as prevalent as the national rate. There are below average proportion of accidents involving elderly and residents from the 20% least income deprived LSOAs within the impact area. The proportion of accidents involving pedestrians, children and residents from the 20% most income deprived LSOAs are similar to that of the national rate.

**Table 2-5** All accident casualties (2013 – 2017)

Casualty Type	All Casualties (national rate)		All Casualties (impact area)	
	Quantity	%	Quantity	%
Pedestrians	120,209	13.1%	403	13.0%
Cyclists	96,368	10.5%	809	<b>26.0%</b>
Motorcyclists	96,293	10.5%	420	<b>13.5%</b>
Male drivers aged 16-25	96,893	10.6%	452	<b>14.5%</b>
Under 16	80,117	8.7%	286	9.2%
People aged 70+	78,346	8.5%	138	4.4%
Casualties from 20% most deprived LSOA's in UK	206,883	23.9%	710	23.6%
Casualties from 20% least deprived LSOA's in UK	135,033	15.6%	298	9.9%
<b>Total Casualties</b>	<b>866,216</b>	<b>100.0%</b>	<b>3109</b>	<b>100.0%</b>

### 2.4.3. Appraisal update (for FBC CAZ B+ Package)

The number of accidents which historically occurred on links with a greater than 10% increase or decrease in AADT (average annual daily traffic) are shown in [Table 2-6](#). In accordance to TAG Unit A4-2, it is assumed that a decrease in traffic flow of greater than 10% will reduce the accident rate on a link and an increase of greater than 10% will increase accident rates. The percentages are calculated based on the total number of casualties on all links within the impact area (including increase, decrease and no change / negligible links).

**Table 2-6** Profile of existing casualties by forecast change in accidents (2013 to 2017) for FBC CAZ B+

Casualty Type	Links with >10% increase in traffic flow (Disbenefit)		Links with >10% decrease in traffic flow (Benefit)	
	Number of vulnerable casualties	Proportion of total casualties within the impact area	Number of vulnerable casualties	Proportion of total casualties within the impact area
Pedestrians	0	0.0%	15	0.4%
Cyclists	1	0.0%	32	0.8%
Motorcyclists	1	0.0%	11	0.3%
Male drivers aged 16-24	0	0.0%	11	0.3%
People aged under 16	0	0.0%	8	0.2%
People aged 70+	1	0.0%	7	0.2%
20% Most deprived LSOAs in UK	0	0.0%	31	0.8%
20% Least deprived LSOAs in UK	0	0.0%	4	0.1%
<b>Total casualties</b>	<b>2</b>	<b>0.0%</b>	<b>111</b>	<b>2.7%</b>

The analysis of road casualty data demonstrates that there are significantly more casualties involving vulnerable groups on links experiencing a decrease in traffic flow (111) than links with a forecast increase in traffic flow (2). However, the proportion of accidents involving each user is small compared to the number of

accidents across the impact area (less than 1%). Hence, any impact to accidents as a result of a CAZ B+ is not expected to be large.

There were 0.8% more cyclist casualties and casualties from the 20% most income deprived LSOAs across links with a decrease in traffic flow than links with an increase in traffic flow, as compared to all casualties across the impact area. Therefore, there is a **moderate beneficial** impact to accidents for these vulnerable groups.

The percentage difference in casualties between decreased and increased links across the impact area is less than 0.5% for all other vulnerable groups. Therefore, a **slight beneficial** impact to accidents for all other vulnerable groups as a result of a CAZ B+ is anticipated.

The overall assessment of the distributional impact of the CAZ B+ option has been appraised as **slight beneficial**.

*Overall, this option achieves only a slight reduction in veh-kms, and the net impact on all accidents (not just those involving vulnerable groups) is assumed to be negligible.*

**Table 2-7** Outcome of accident assessment

Group	CAZ C Benchmark	OBC CAZ B+ Alt. Package	FBC CAZ B+ Refined Alt. Package
Pedestrians	0	✓	✓
Cyclists	✓	✓✓	✓✓
Motorcyclists	0	✓	✓
Young male drivers	0	✓	✓
People aged under 16	0	✓	✓
People aged 70+	0	✓	✓
Most deprived residents	0	✓✓	✓✓
Overall score	<b>0</b>	✓	✓

See the OBC version of the E3 Report, for further detail about the CAZ C assessment.

For comparison, there are no links within the impacted area which experience a greater than 10% increase in AADT as a result of the CAZ C. There were only 10 casualties (0.3% of the total for the impact area) which occurred on links with greater than 10% decrease in traffic flow, of which 10 involved cyclists. There is therefore considered to be a slight beneficial impact for cyclists, but the numbers involved are very low and the overall impact is considered to be neutral.

## 2.5. Air Quality

### 2.5.1. Nature of impact

Air pollution has a significant effect on public health as long-term exposure to air pollution can cause chronic conditions such as cardiovascular and respiratory diseases. The two exceedance sites are located within the Charles Dickens ward, which also has the highest number of deaths from respiratory diseases within Portsmouth; as well as having high levels of deprivation.

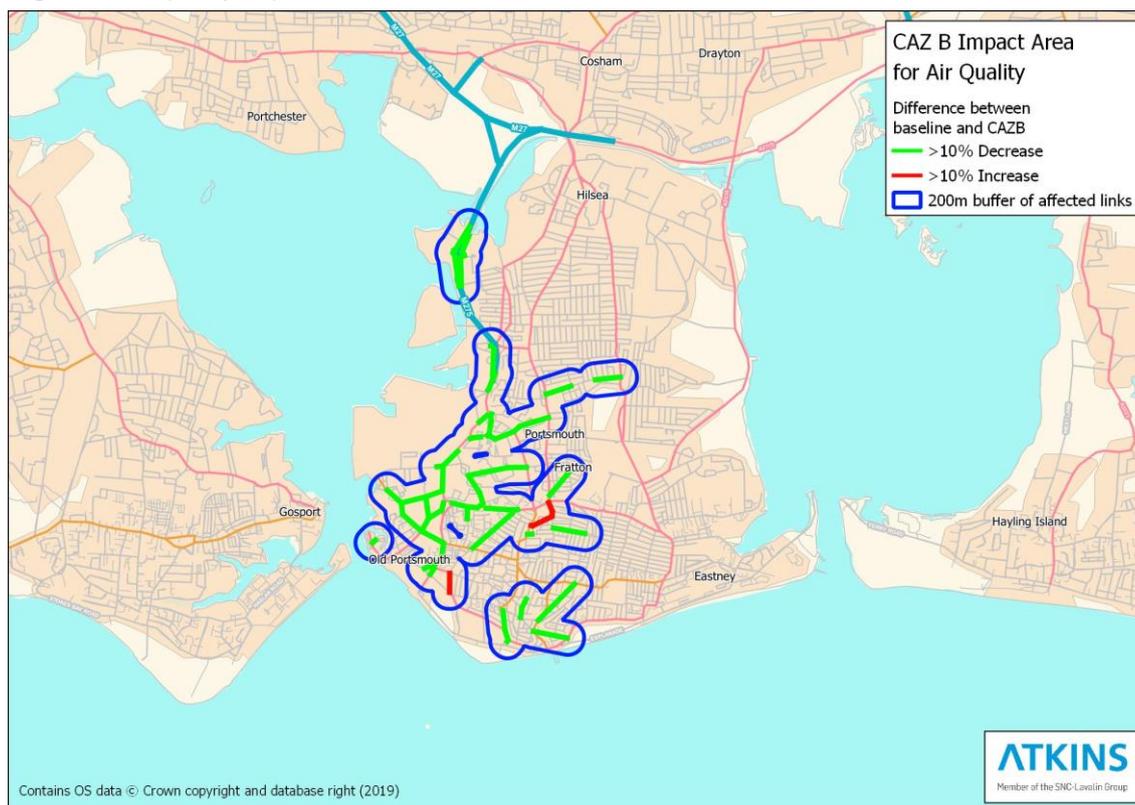
Implementation of a CAZ is anticipated to reduce the amount of high emission vehicles in the area, hence impacting ambient concentrations of air pollutants. In addition, air quality impacts are likely to occur where the CAZ results in changes to traffic flows or speed, or where the physical gap between people and traffic is altered. Parking measures will encourage mode shift which may result in a further reduction in motorised traffic.

### 2.5.2. Assessment information

**Impacted Area:** The air quality impact area includes all LSOAs within 200m of affected links – defined as links with greater than 10% change in NO<sub>x</sub> emissions, as shown in

Figure 5.

**Figure 5 Air quality impact area**



**Vulnerable Groups:** Children are particularly vulnerable to the effects of poor air quality and therefore concentrations of under 16s and the locations of schools within the assessment area have been considered to assess the likely impacts on this group. In addition, an examination of impacts by income deprivation has been undertaken.

Table 2-8 shows the proportions of groups vulnerable to poor air quality. Within the FBC CAZ B+ impact area the **proportions of income quintiles 1, 2 and 3 is higher than the England average**. The proportion of children within the air quality impact area is slightly below the average for England and Wales.

**Table 2-8 Proportions of income groups within England and children within England and Wales and the air quality impact area**

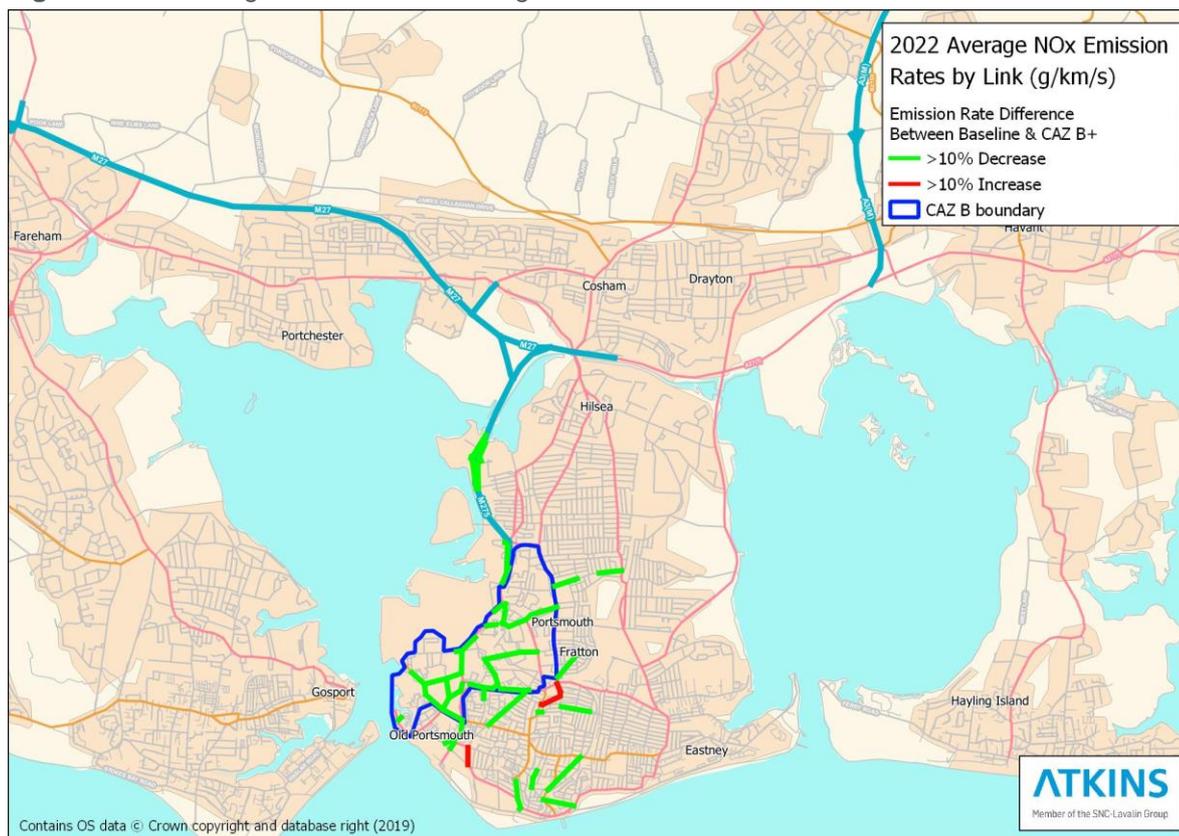
Group	England (and Wales)	CAZ C Impact Area	OBC CAZ B Impact Area	FBC CAZ B Impact Area
Quintile 1 (most deprived)	20.0%	20.1%	<b>27.9%</b>	<b>29.2%</b>
Quintile 2	20.0%	<b>24.7%</b>	<b>32.0%</b>	<b>25.5%</b>
Quintile 3	20.0%	<b>30.0%</b>	<b>28.2%</b>	<b>33.4%</b>
Quintile 4	20.0%	16.8%	8.1%	8.1%
Quintile 5 (least deprived)	20.0%	8.4%	3.9%	3.8%
Children (under 16)	19.1%	18.4%	17.4%	16.8%

### 2.5.3. Appraisal update (for FBC CAZ B+ Package)

Links with greater than 10% increase or decrease in NO<sub>x</sub> emissions caused by the CAZ B+ are shown in

Figure 6.

**Figure 6** Links with greater than 10% change in NO<sub>x</sub> emissions as a result of CAZ B+



The analysis shows that many links are likely to experience positive changes in air quality (greater than 10% decrease in NO<sub>x</sub> emissions). Examples include Commercial Road and Alfred Road exceedance locations, as well as Lake Road, Winston Churchill Avenue and Cambridge Road (all within the CAZ). There are also several links outside the boundary with decreased NO<sub>x</sub> emissions including Tipner Interchange Roundabout and motorway slip roads, Mile End Road, New Road and Lennox Road South.

However, there are **four links with a greater than 10% increase in emissions as a result of the proposed intervention**. These are Britannia Road North, Rugby Road, Fawcett Road, and Western Parade. In all cases, the modelled volumes of traffic and absolute increases in emissions are very low and absolute concentrations of NO<sub>2</sub> are well below the statutory limit. For example, the absolute increase in modelled traffic flow is just 2 vehicles on Western Parade and 30 vehicles on Britannia Road North/Rugby Road

Comparing the location of these links with mapping showing the concentration of vulnerable groups (see *Figures 21-22 of the OBC version of the E3 Report*) indicates the following distributional impacts:

Vulnerable groups	Air quality-related distributional impact
Income areas	<p>The majority of LSOAs within the CAZ belong to income quintiles 1 and 2 (the most deprived categories). No links in these areas are forecast to experience an increase in NO<sub>x</sub> emissions (&gt;10%); but a number of roads are predicted to experience reduced emissions. <b>As a result, the CAZ B+ option is considered to lead to a large beneficial change in air quality for residents in income quintiles 1 and 2.</b></p> <p>The four roads adversely affected by a change in air quality (&gt;10% increased NO<sub>x</sub> emissions) are within income quintiles 3 and 4. However, there are more links within these areas which are predicted to benefit air quality (with more than a &gt;10% decrease in NO<sub>x</sub> emissions). <b>Therefore, the beneficial air quality impacts slightly outweigh the adverse air quality impacts for income quintiles 3 and 4 and a slight beneficial impact to air quality is anticipated for these income quintiles.</b></p> <p>There are few links within income quintile 5 with a greater than 10% decrease in emissions and no links with a greater than 10% increase in emissions. <b>Hence, the air quality impact for income quintile 5 is considered slight beneficial.</b></p>

Children	<p><b>Moderate beneficial</b> - The links with a greater than 10% increase in NO<sub>x</sub> emissions are all within 200m of a school. Additionally, Britannia Road North, Rugby Road and Fawcett Road are by an LSOA with the 20% highest proportion of children in England and Wales. However, the modelled volumes of traffic and absolute increases in emissions are very low (e.g. just two additional vehicles on Western Parade), and absolute concentrations of NO<sub>2</sub> are well below the statutory limit.</p> <p>In addition, there is a greater number of links with greater than 10% decreased NO<sub>x</sub> emissions in the vicinity of schools and locations with high proportions of children. Therefore, the beneficial air quality impacts to children are expected to outweigh any adverse impacts.</p>
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Overall, the FBC CAZ B+ package results in a **beneficial air quality impact to all income groups and a large beneficial impact for income quintiles 1 and 2 (with no adverse impacts in these most income deprived areas)**. In addition, a **moderate beneficial impact to children is anticipated**. Therefore, the overall impact to air quality as a result of the Refined Alternative Package is anticipated to be **moderate beneficial**.

**Table 2-9** Outcome of the air quality assessment

Group	CAZ C Benchmark	OBC CAZ B+ Alt. Package	FBC CAZ B+ Refined Alt. Package
Quintile 1 (most deprived)	✓✓✓	✓✓✓	✓✓✓
Quintile 2	✓✓✓	✓✓✓	✓✓✓
Quintile 3	✓✓✓	✓	✓
Quintile 4	✓	✓	✓
Quintile 5 (least deprived)	✓	✓	✓
Children (under 16)	✓✓	✓✓	✓✓
Overall	✓✓✓	✓✓	✓✓

See the OBC version of the E3 Report, for further detail about the CAZ C assessment.

## 2.6. Noise

### 2.6.1. Nature of impact

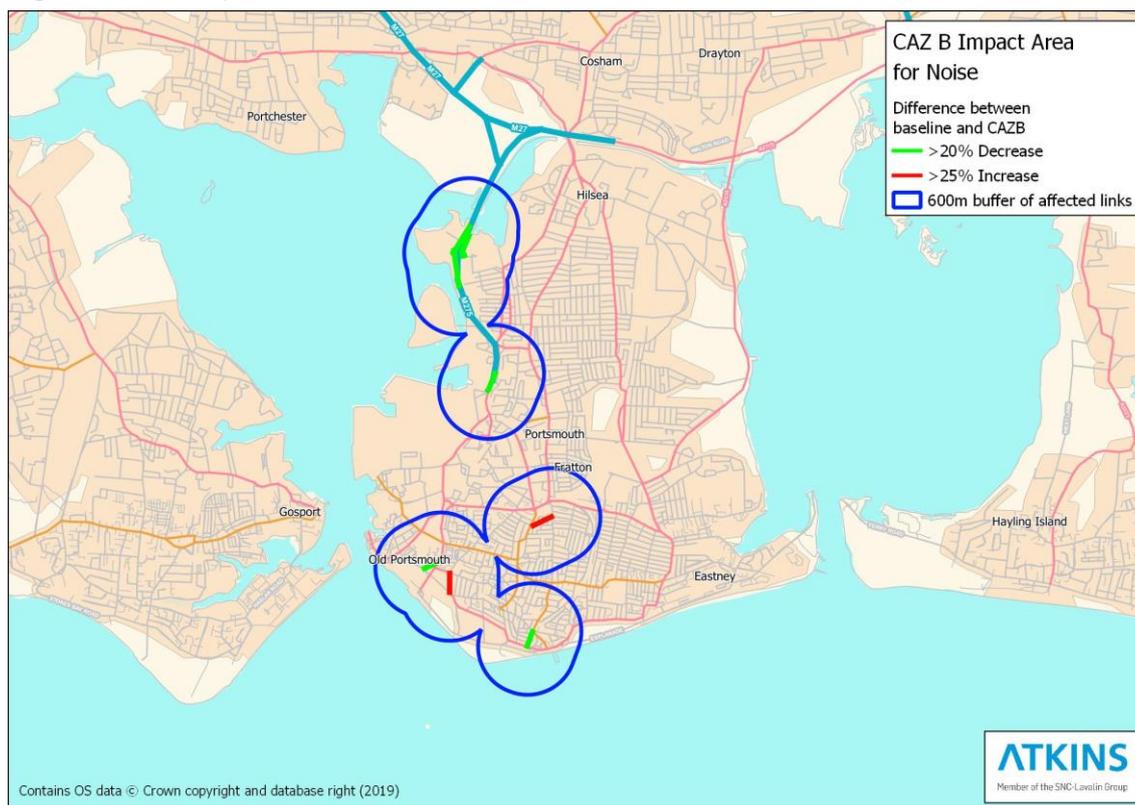
Noise impacts are likely to occur where an intervention results in changes to traffic flows or speeds, or where the physical gap between people and traffic is altered.

A Small Area CAZ B could reduce the amount of traffic within the proposed boundary, due to targeted vehicles avoiding the area, again reducing noise levels. In addition, changes in traffic on some roads may impact on noise levels for neighbouring receptors. Finally, parking measures will encourage mode shift which may result in a further reduction in motorised traffic and improving noise levels.

### 2.6.2. Assessment information

**Impacted Area:** The noise impact area includes all LSOAs within 600m of affected links – defined as links with greater than 25% increase or 20% decrease in AADT (see

Figure 7).

**Figure 7 Noise impact area**


**Vulnerable Groups:** Children are particularly vulnerable to the effects of noise and therefore concentrations of under 16s and the locations of schools within the assessment area have been considered to assess the likely impacts on this group. In addition, an examination of impacts by income deprivation has been undertaken.

Table 2-10 shows the proportions of groups vulnerable to noise. Within the FBC CAZ B+ impact area the **proportions of income quintiles 1, 2 and 3 are above the national average**. The proportion of children within the CAZ B+ impact area is below the average for England and Wales.

**Table 2-10 Proportions of income groups and children within England and Wales and the noise impact area**

Group	England (and Wales)	CAZ C Impact Area	OBC CAZ B Impact Area	FBC CAZ B Impact Area
Quintile 1 (most deprived)	20.0%	<b>47.6%</b>	<b>28.5%</b>	<b>27.2%</b>
Quintile 2	20.0%	20.9%	<b>21.4%</b>	<b>24.7%</b>
Quintile 3	20.0%	19.5%	<b>37.6%</b>	<b>38.6%</b>
Quintile 4	20.0%	6.9%	10.3%	7.5%
Quintile 5 (least deprived)	20.0%	5.1%	2.2%	2.1%
Children (under 16)	19.0%	19.1%	16.3%	16.9%

### 2.6.3. Appraisal update (for FBC CAZ B+ Package)

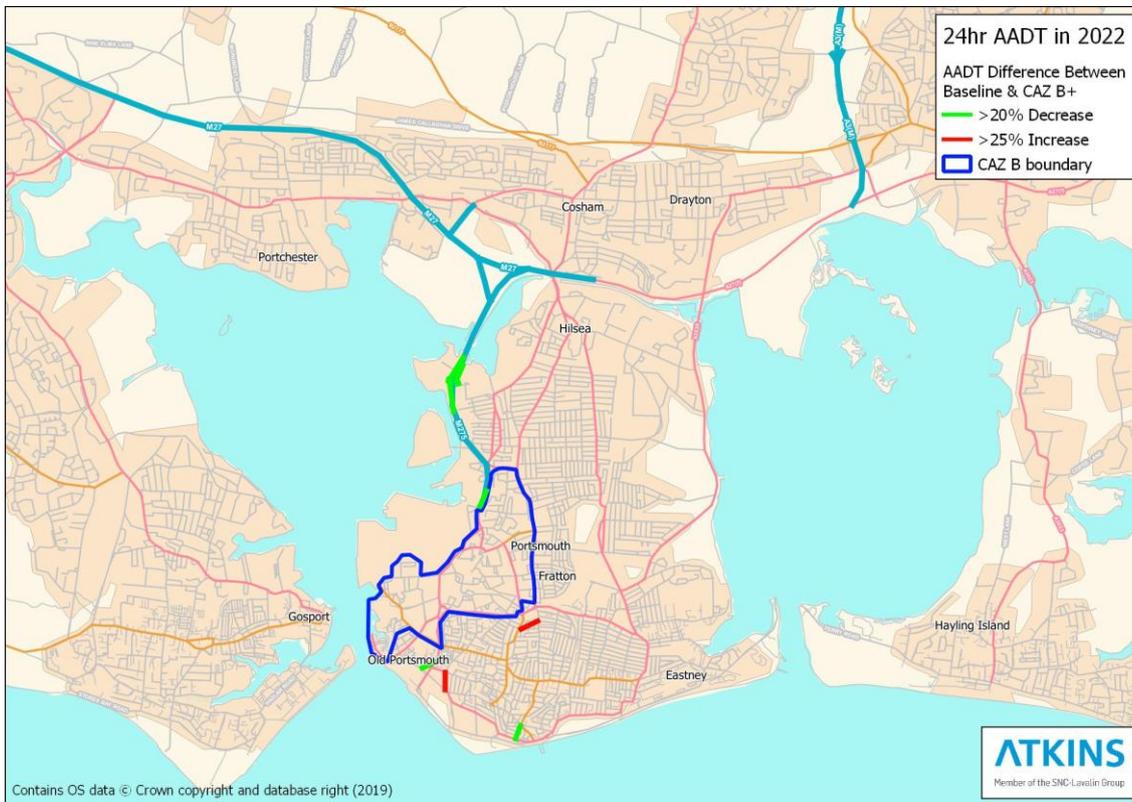
Links with either a 20% decrease or 25% increase in traffic flow are shown in [Figure 8](#).

**Two links (Brittannia Road North/Rugby Road and Western Parade) have been found to have a greater than 25% increase in AADT.** However, as described above, the absolute increase in modelled traffic flow on these links is small (just 2 vehicles on Western Parade and 30 vehicles on Britannia Road North/Rugby Road). It is unlikely that these traffic flow increases will significantly impact noise in the area.

On the other hand, there are several links anticipated to experience a greater than 20% decrease in traffic flow levels – Tipner Interchange Roundabout and the motorway slip roads, Victoria Avenue, Burgoyne Road and a section of Mile End Road by Victory Retail Park. Burgoyne Road has a low flow in the baseline, so a small increase in traffic flow (10 vehicles) has led to a greater than 20% decrease. It is not expected that this decrease in traffic flow will significantly impact noise in the vicinity. There is a larger decrease along Victoria

Avenue, Mile End Road by Victory Retail Park and through Tipner Interchange, with the absolute decrease of at least 100 vehicles.

**Figure 8** Links with greater than 20% reduction or 25% increase in traffic flow as a result of the CAZ B+ scheme



Comparing the location of these links with mapping showing the concentration of vulnerable groups (see Figures 29-30 of the OBC version of the E3 Report) indicates the following distributional impacts:

Vulnerable groups	Noise-related distributional impact
Income areas	<p>Within income quintile 1, there is a reduction in traffic flow on a section of road between Mile End Road and Victory Retail Park, resulting in a <b>slight beneficial noise impact for the 20% most income deprived residents in the area.</b></p> <p>Within income quintile 2, there is a greater than 20% reduction in traffic flow across Tipner Interchange. Victoria Avenue is within income quintile 3 and has greater than 20% reduced traffic flow. Therefore, there is a <b>slight beneficial noise impact for income quintiles 2 and 3.</b></p> <p>There are no links with a significant change in traffic flow within <b>income quintiles 4 or 5</b>, resulting in a <b>neutral noise impact.</b></p>
Children	<p><b>Slight beneficial</b> - Since there is decreased traffic flow along Mile End Road, where there are high proportions of children, there is expected to be a slight beneficial impact to children.</p> <p>The predicted increases on Britannia Road North/Rugby Road and Western Parade are close to schools, however the absolute change in traffic flow on these links are less than 30 vehicles, so are not expected to impact noise levels in the area.</p>

As there is a **slight beneficial noise impact to income quintiles 1 to 3 and for children**, the distributional impact of the FBC CAZ B+ package on noise has been appraised as **slight beneficial**.

*Overall, this option achieves only a slight reduction in flow and speed, and the overall impact on noise is assumed to be negligible.*

**Table 2-11** Outcome of the noise assessment

Group	CAZ C Benchmark	OBC CAZ B+ Alt. Package	FBC CAZ B+ Refined Alt. Package
Quintile 1 (most deprived)	✓	✓	✓
Quintile 2	✓	✓	✓
Quintile 3	0	✓	✓
Quintile 4	✓	✓	0
Quintile 5 (least deprived)	0	0	0
Children (under 16)	✓	✓	✓
Overall	✓	✓	✓

See the OBC version of the E3 Report, for further detail about the CAZ C assessment.

## 2.7. User Benefits

### 2.7.1. Nature of impact

The user benefits are based on changes in journey times, vehicle operating costs, public transport costs, parking charges, and toll charges (i.e. the CAZ charge).

Transport user benefit appraisal (TUBA) software has been used to estimate user benefits. For the FBC Small Area CAZ B+ option, the results for Portsmouth (within the City Council boundary) show:

- adverse impacts for commuting and other non-business trips (primarily due to increased parking costs, outweighing time and vehicle operating cost savings resulting from small-scale re-routing of traffic and reduction in congestion as a result of cancelled trips and mode switch); and
- benefits for LGV and HGV business trips (primarily due to time and vehicle operating cost savings resulting from small-scale re-routing of traffic and decongestion, outweighing the increase in costs due to the CAZ charge paid by the limited numbers of remaining non-compliant HGVs).

These results, however, do not show whether these user benefits are distributed evenly across income groups. As a result, a further analysis has therefore been completed to quantify the potential distribution of user benefits amongst different income groups.

The benefits have been calculated using 10-year appraisal TUBA outputs, which in turn take data from the transport model (SRTM).

### 2.7.2. Assessment information

**Impacted Area:** The impacted area is defined as the whole of Portsmouth (i.e. the Portsmouth City Council boundary) in order to capture any benefits or disbenefits for individuals living in this area.

For home-based commuting and other non-business trips, the distribution of benefits across different income quintiles (at the LSOA level) has been analysed, focusing on trips undertaken within the core impact area only.

For LGV and OGV business trips, the distribution of benefits relative to the concentration of SMEs (small and medium-sized enterprises) has been analysed (at the MSOA level), focusing on all trips with a trip end within the core impact area (i.e. internal trips and internal-external trips).

**Vulnerable Groups:** Table 2-12 shows that within the impact area, there are high proportions of income quintiles 3, when compared to the national average. The proportion of income quintiles 1, 2 and 4 are in line to the national average and there is a low proportion of income quintile 5 (least income deprived).

**Table 2-12** Proportions of income groups within the user benefits impact area

Group	England (and Wales)	CAZ C Impact Area	OBC CAZ B Impact Area	FBC CAZ B Impact Area
Quintile 1 (most deprived)	20.0%	19.2%	19.2%	19.2%
Quintile 2	20.0%	22.5%	22.5%	22.5%
Quintile 3	20.0%	<b>32.7%</b>	<b>32.7%</b>	<b>32.7%</b>
Quintile 4	20.0%	17.2%	17.2%	17.2%

Quintile 5 (least deprived)	20.0%	8.4%	8.4%	8.4%
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## 2.7.3. Appraisal update (for FBC CAZ B+ Package)

### 2.7.3.1. User benefits for commuter and other non-business trips by income deprivation quintile

Table 2-13 compares the relative proportion of benefits and disbenefits (by LSOA) against the proportion of the population in each income quintile. The benefits are primarily due to small scale changes in journey times / vehicle operating costs, as a result of rerouting and reduced congestion due to cancelled trips and mode switch. The disbenefits are primarily parking charges.

**Table 2-13** Overall user benefits for commuters and other non-business trips across income quintiles for FBC CAZ B+

Option	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	39,354	46,147	67,005	35,136	17,183	204,825
Proportion of total population in each quintile in the assessment area	19.2%	22.5%	32.7%	17.2%	8.4%	-
<b>Sum of benefits</b>	<b>£18,054</b>	<b>£17,025</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>	<b>£35,078</b>
Proportion of benefits for each income quintile	51.5%	48.5%	0.0%	0.0%	0.0%	-
<b>Sum of disbenefits</b>	<b>-£235,778</b>	<b>-£361,031</b>	<b>-£854,349</b>	<b>-£457,984</b>	<b>-£397,194</b>	<b>-£2,306,335</b>
Proportion of disbenefits for each income quintile	10.2%	15.7%	37.0%	19.9%	17.2%	-
Overall sum of benefits and disbenefits for commuters and leisure users	-£217,724	-£344,006	-£854,349	-£457,984	-£397,194	-£2,271,257
Assessment	Slight Adverse	Slight Adverse	Moderate Adverse	Moderate Adverse	Large Adverse	

Note, the user benefits presented in the Economic Case do not include parking charges, as JAQU request that these are treated as a transfer payments. In addition, the figures presented in the Economic Case relate to a wider study area.

The total disbenefits are greater than the total benefits for each income quintile and hence there is an adverse impact to user benefits for each income quintile.

The proportions of the dis-benefits for each income quintile are not distributed in proportion with the population in each income quintile.

Within income quintiles 1 and 2 (most income deprived), the disbenefits are less than the proportion of the population in these income quintiles (by 9 percentage points for quintile 1 and 7 percentage points for quintile 2). Therefore, there is a **slight adverse impact** for income quintiles 1 and 2, in terms of user benefits.

For income quintiles 3, 4 and 5, the proportion of the dis-benefits is greater than the population in these income groups. For income quintile 5 (least income deprived), the difference is 9 percentage points, resulting in a **large adverse** classification. For income quintiles 3 and 4, the difference is less than 5 percentage points, so the classification is **moderate adverse**.

**In summary**, adverse impacts are anticipated for commuters and other non-business users across all income quintiles (-£2,271,257 in total), primarily due to the increased parking costs.

Based on the relative proportion of disbenefits against the population in each income quintile, the overall impact is **slight adverse**, due to the slight adverse impact for the most income deprived residents.

### 2.7.3.2. User benefits for LGV and OGV/HGV business trips by concentration of SMEs

The JAQU Guidance for Options Appraisal refers to TAG Unit A4-2 for detailed guidance on appraising the different impact variables. However, there is no guidance provided for the appraisal of user benefits for businesses. Therefore, the principles for appraising user benefits set out in TAG were applied to understand if the user benefits/disbenefits are distributed evenly across business size.

Table 2-14 compares the relative proportion of benefits and disbenefits (by MSOA) against the relative concentration of SMEs<sup>2</sup>.

The benefits are primarily due to time and vehicle operating cost savings resulting from small-scale re-routing of traffic and decongestion due to cancelled trips and mode switch. Dis-benefits are due to the increase in costs resulting from the CAZ charge.

**Table 2-14** User benefits for HGV and LGV business trips by concentration of SMEs for CAZ B+

Option	Quintiles of the number of SMEs within Portsmouth					Total
	1 (20% highest no. of SMEs)	2	3	4	5 (20% lowest no. of SMEs)	
Total number of SMEs in the assessment area	2,705	1,720	1,365	1,205	850	7,845
Proportion of total SMEs in each quintile in the assessment area	34.5%	21.9%	17.4%	15.4%	10.8%	-
<b>Sum of benefits</b>	<b>£34,521</b>	<b>£52,511</b>	<b>£49,184</b>	<b>£29,283</b>	<b>£18,942</b>	<b>£184,441</b>
Proportion of benefits for each quintile	18.7%	28.5%	26.7%	15.9%	10.3%	-
<b>Sum of disbenefits</b>	<b>-£104,948</b>	<b>-£4,275</b>	<b>-£1,759</b>	<b>-£1,201</b>	<b>-£3,466</b>	<b>-£115,649</b>
Proportion of disbenefits for each quintile	90.7%	3.7%	1.5%	1.0%	3.0%	-
Overall sum of benefits and disbenefits for business users	-£70,427	£48,235	£47,425	£28,082	£15,476	£68,792
Assessment	Large Adverse	Large Beneficial	Large Beneficial	Slight Beneficial	Slight Beneficial	

Note, the user benefits presented in the Economic Case do not include parking charges, as JAQU request that these are treated as a transfer payments. In addition, the figures presented in the Economic Case relate to a wider study area.

Within quintile 1 (representing areas with the highest proportion of SMEs), the dis-benefits are greater than the benefits. Although the scale of benefits is very small (-£104,948), these locations experience 90% of the dis-benefits. The distributional impact is therefore **large adverse**.

For quintiles 2 to 5 (representing areas with smaller proportions on SMEs), the scale of benefits is very small (£18,942 to £52,511), but still greater than the dis-benefits, resulting in a net beneficial impact in these areas. For quintiles 2 and 3, the relative proportion of benefits exceeds the relative proportion of SMEs by at least 5 percentage points, resulting in a **large beneficial impact**. For quintiles 4 and 5, the proportions are closely aligned, resulting in a **slight beneficial impact**.

**In summary**, adverse impacts are anticipated for HGV and LGV business trips in quintile 1 areas (containing 35% of SMEs). These locations experience 90% of the dis-benefits, and experience a net dis-benefit of £70,427, due to the increase in costs resulting from the CAZ charge. The remaining 65% of SMEs are located in areas which experience a net benefit (£139,218), due to time and vehicle operating cost savings resulting from small-scale re-routing of traffic and decongestion. The overall distributional impact is therefore **neutral**. The absolute scale of benefits / dis-benefits is very small across all quintiles.

<sup>2</sup> Disbenefits and benefits associated with trips from each model zone have been translated to each MSOA based on the distribution of the population within the intersection of each zone and MSOA.

## 2.8. Affordability

### 2.8.1. Nature of impact

The affordability impacts take into account vehicle operating costs, public transport costs, parking charges, and toll charges (i.e. the CAZ charge).

For home-based commuting and other non-business trips, personal affordability will be affected by the changes to parking charges and availability (associated with the parking measures), changes in vehicle operating costs associated with any re-routing, and changes to taxis fares which may occur if PHV drivers pass the charge onto the user.

In addition to the above impacts, businesses within Portsmouth that use goods vehicles or are reliant on goods vehicles to deliver stock may be particularly impacted by a charging CAZ, if they are required to pay the CAZ charge.

Transport user benefit appraisal (TUBA) software has been used to estimate affordability impacts. The benefits have been calculated using 10-year appraisal TUBA outputs, which in turn take data from the model. The assessment considers all modelled modes and has been carried out on the following user classes separately:

- Home-based commuting and other trips; and
- LGV and HGV/OGV business trips.

### 2.8.2. Assessment information

**Impacted Area:** The impacted area is defined as the whole of Portsmouth (i.e. the Portsmouth City Council boundary) in order to capture any benefits or disbenefits for individuals living in this area.

For home-based commuting and other non-business trips, the distribution of benefits across different income quintiles (at the LSOA level) has been analysed, focusing on trips undertaken within the core impact area only.

For LGV and OGV business trips, the distribution of benefits relative to the concentration of SMEs (micro, small and medium-sized enterprises) has been analysed (at the MSOA level), focusing on all trips with a trip end within the core impact area (i.e. internal trips and internal-external trips).

**Vulnerable Groups:** Table 2-15 shows that within the impact area, there are high proportions of residents within the impacted area in income quintile 3, when compared to the national average. The proportion of income quintiles 1, 2 and 4 are in line with the national average and there is a low proportion of residents in income quintile 5 (least income deprived).

**Table 2-15** Proportions of income groups within the user benefits impact area

Group	England (and Wales*)	OBC CAZ B Impact Area	FBC CAZ B Impact Area
Quintile 1 (most deprived)	20.0%	19.2%	19.2%
Quintile 2	20.0%	22.5%	22.5%
Quintile 3	20.0%	<b>32.7%</b>	<b>32.7%</b>
Quintile 4	20.0%	17.2%	17.2%
<b>Quintile 5 (least deprived)</b>	20.0%	<b>8.4%</b>	<b>8.4%</b>

### 2.8.3. Appraisal update (for FBC CAZ B+ Package)

#### 2.8.3.1. Personal affordability (commuter and other non-business trips) by income deprivation quintile

Table 2-16 shows the benefits and disbenefits accumulated for fuel, non-fuel, public transport costs, parking charges, and toll charges (i.e. the CAZ charge) for commuting and other trips. In accordance with TAG Unit A4-2, this considers the distribution of user charge changes relative to the population distribution. A change in cost is considered to be significant if there is greater than £0.60 change per head.

Beneficial impacts to affordability may occur as a result of reduced congestion within the CAZ boundary as vehicles respond to the measures, which may reduce fuel consumption. Within the impacted area, none of the quintile groups experience a reduction in cost of £0.60 per head or more, indicating no significant affordability benefits.

Conversely, affordability dis-benefits affect each of the quintile groups, primarily due to the increases in parking charges and reduction in parking availability. The 20% most income deprived residents (income quintile 1) experience 13.3% of the overall affordability disbenefit, which is 6 percentage points less than the proportion of the population within this income group (19.2%). Therefore, there is a **slight adverse** affordability impact for income quintile 1. Within income quintiles 2-5 the proportion of the disbenefit received is within 5 percentage points of the population in each income quintile (within 5%). Therefore, there is a **moderate adverse** impact to affordability for income quintiles 2-5.

**Table 2-16** Affordability impacts for commuter and other non-business trips across all income quintiles for CAZ B+

	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population in the assessment area	39,354	46,147	67,005	35,136	17,183	204,825
Proportion of population in each quintile in the assessment area	19.2%	22.5%	32.7%	17.2%	8.4%	-
<b>Sum of benefits</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>
Proportion of benefits for each income quintile	N/A	N/A	N/A	N/A	N/A	-
<b>Sum of disbenefits</b>	<b>-£427,802</b>	<b>-£626,237</b>	<b>-£1,167,619</b>	<b>-£567,452</b>	<b>-£421,326</b>	<b>-£3,210,436</b>
Proportion of disbenefits for each income quintile	13.3%	19.5%	36.4%	17.7%	13.1%	-
Overall sum of benefits and disbenefits for leisure and commuting users	-£427,802	-£626,237	-£1,167,619	-£567,452	-£421,326	-£3,210,436
Assessment	Slight Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	

Note, the affordability benefits presented in the Economic Case do not include parking charges, as JAQU request that these are treated as a transfer payments. In addition, the figures presented in the Economic Case relate to a wider study area.

**In summary**, the analysis shows an adverse affordability impact for each income quintile, primarily due to the increase in parking costs. The overall distributional impact is **slight adverse**, based on the slight adverse impact for the most income deprived residents. This group receive a disproportionately small disbenefit, relative to their population.

### 2.8.3.2. Business affordability (HGV and LGV business trips) by concentration of SMEs

The JAQU Guidance for Options Appraisal refers to TAG Unit A4-2 for detailed guidance on appraising the different impact variables including accessibility, affordability and user benefits. However, there is no specific guidance provided for the appraisal of businesses affordability. Therefore, the principles for appraising personal affordability set out in TAG were applied to understand if affordability benefits/disbenefits are distributed evenly across business size.

Table 2-17 compares the relative proportion of benefits and disbenefits (by MSOA) against the relative concentration of SMEs<sup>3</sup>. This highlights whether the benefits are evenly distributed based on the prevalence of SMEs across the impact area.

<sup>3</sup> Disbenefits and benefits associated with trips from each model zone have been translated to each MSOA based on the distribution of the population within the intersection of each zone and MSOA.

Beneficial affordability impacts may occur as a result of reduced congestion within the CAZ; adverse affordability impacts may be due to users paying for the CAZ charge, traveling further in order to avoid the charge.

**Table 2-17** Affordability impacts for HGV and LGV business trips by concentration of SMEs for CAZ B+

Option	Quintiles of the number of SMEs within Portsmouth					Total
	1 (20% highest number of SMEs)	2	3	4	5 (20% lowest number of SMEs)	
Total number of SMEs in the assessment area	2,705	1,720	1,365	1,205	850	7,845
Proportion of total SMEs in each quintile in the assessment area	34.5%	21.9%	17.4%	15.4%	10.8%	-
<b>Sum of benefits</b>	<b>£447</b>	<b>£1,218</b>	<b>£3,350</b>	<b>£190</b>	<b>£755</b>	<b>£5,959</b>
Proportion of benefits for each quintile	7.5%	20.4%	56.2%	3.2%	12.7%	-
<b>Sum of disbenefits</b>	<b>-£92,870</b>	<b>-£19,387</b>	<b>-£3,553</b>	<b>-£4,572</b>	<b>-£1,677</b>	<b>-£122,058</b>
Proportion of disbenefits for each quintile	76.1%	15.9%	2.9%	3.7%	1.4%	-
Overall sum of benefits and disbenefits for business users	-£92,423	-£18,169	-£202	-£4,382	-£923	-£116,099
Assessment	Large Adverse	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse	

Note, the affordability benefits presented in the Economic Case do not include parking charges, as JAQU request that these are treated as a transfer payments. In addition, the figures presented in the Economic Case relate to a wider study area.

The total affordability disbenefits outweigh the benefits across each of the quintiles representing different concentrations of SMEs, however, the scale of dis-benefit is very small (just £122,058 across all quintiles).

The majority of the affordability dis-benefits (76.1%) occur within areas with the highest proportion of SMEs. This is disproportionately large, compared to the concentration of SMEs within this quintile. Therefore, there is a **large adverse** impact for business trips within this quintile. For quintiles 2 to 5 (representing areas with smaller proportions on SMEs), the proportion of dis-benefits is much less than the proportion of SMEs, so the distributional impact on SMEs is **slight adverse**.

**In summary**, the CAZ B+ option has an overall adverse impact on affordability across all areas, due to users paying for the CAZ charge. The distribution of disbenefits for HGV and LGV business trips are disproportionately concentrated within areas with highest proportion of SMEs (35%). These locations experience 76% of the dis-benefits, and experience a net dis-benefit of £92,423. The remaining 65% of SMEs are located in areas which experience a net dis-benefit of £23,676. The overall distributional impact is therefore **moderate adverse**.

## 2.9. Summary of Distributional Impact assessment

A summary of the findings of the **Refined Alternative Package** (FBC CAZ B+) is provided in [Table 2-18](#), along with the assessment results for the Portsea Island CAZ C (Benchmark).

The CAZ C Benchmark option and the Refined Alternative Package (CAZ B + non-charging measures) option are shown to have a **slight adverse and slight / moderate impact on accessibility**, as taxi drivers may increase their charges or chose to stop operating in the CAZ area, limiting the availability of hackney carriages and private hire vehicles and disproportionately impacting on income deprived residents and disabled people living in the centre of Portsmouth.

For both options, the impact of the proposed CAZ on traffic flow and re-routing is small. The overall impact in terms of **severance, accidents and noise**, is therefore limited, and the change which is predicted is found to have a **neutral / slight beneficial** impact on relevant vulnerable groups.

In terms of air quality, both options benefit the high proportion of children and low income households in central Portsmouth, who will benefit from reduced emissions. The impact is considered **large beneficial** for the CAZ C Benchmark, and **moderate beneficial** for the CAZ B+ Refined Alternative Package, reflecting the smaller scale of the CAZ area.

The overall impact on **user benefits** for non-business trips is **slight adverse**. Increased parking costs outweigh time and vehicle operating cost savings resulting from small-scale re-routing of traffic and reduction in congestion as a result of cancelled trips and mode shift, but in relative terms the most income-deprived areas experience less dis-benefit than other income groups. Similarly, the overall impact on **personal affordability** (for non-business trips) is **slight adverse**, as the income-deprived areas experience less dis-benefit than other income groups.

The **majority of SMEs** (65%) are located in areas where business trips experience net user benefits, due to small scale re-routing of traffic; but very small adverse impact on journey affordability, due to users paying for the CAZ charge. Areas with the highest proportion of SMEs experience a disproportionally high level of user and affordability dis-benefits, although the absolute scale of the dis-benefits is very small.

*The above assessment focuses on how the benefits and dis-benefits of the Refined Alternative Package are distributed across vulnerable groups, in relative terms. In all cases, the absolute scale of the benefits / dis-benefits are small or very small.*

**Table 2-18 Summary of Distributional Impact assessment**

Impact variables	Portsea Island CAZ C (Benchmark)	Small Area CAZ B + non-charging measures (FBC Alternative Package)
Accessibility	<p><b>Slight adverse</b></p> <p>The option may indirectly impact the availability of taxis/PHVs, as drivers may increase their charges or choose to stop operating. There are a small number of conventional bus services which cannot be or have not yet been retrofitted; and there is a risk that operators may withdraw these vehicles from service in the short-term.</p> <p>There are high proportions of income deprived residents and disabled people in the centre of Portsmouth, who are more likely to rely on these services for certain trips and will be disproportionately affected. This may reduce their ability to access key services and amenities, jobs, and social networks, and could result in isolation and social exclusion.</p>	<p><b>Slight / moderate adverse</b></p> <p>Similar impacts to the CAZ C option are expected. Some 55% of residents within the Small Area CAZ B are amongst the 20% most income deprived in England, and 67% are within LSOAs with the 20% highest level of illness and disability within England. These groups will be adversely affected, with potential adverse impacts on employment and education prospects, health, isolation and social inclusion.</p> <p>The CAZ B+ option is smaller, so adversely impacts fewer people. However, it disproportionately affects income deprived, disability, and to a much lesser extent, BAME groups; so is considered to have a similar impact, or greater disproportionate impact. The individuals concerned would also be adversely impacted by the CAZ C option.</p>
Severance	<p><b>Slight beneficial</b></p> <p>There are a small number of road links where traffic flow reduces by &gt;10%, which will improve the quality of the pedestrian environment. There is a higher than average proportion of no car households and disabled persons in the CAZ area, who will disproportionately benefit from any change in severance. Elderly and children will also benefit.</p> <p>There are no road links where traffic flow is expected to increase by &gt;10%, hence there are no potential adverse impacts to severance for this option.</p> <p><i>In virtually all cases the flow on the roads concerned is less than 1500 per day, often much less, so the overall level of severance is limited.</i></p>	<p><b>Slight beneficial</b></p> <p>There are a number of road links where traffic flow reduces by &gt;10%, which will improve the quality of the pedestrian environment, benefiting vulnerable residents in the area who may be more likely to walk to local amenities, including the high proportion of no car households, disabled persons, and children.</p> <p>There are two links where traffic flow increases by &gt;10% due to the scheme. However, the absolute increased AADT is less than 30 vehicles on these links, so is not expected to significantly impact severance in the area.</p> <p><i>However, in both cases the daily flow is very low and the increase is less than 30 vehicles, so the overall level of severance is limited.</i></p>
Accidents	<p><b>Neutral</b></p> <p>There are no road links where traffic flow increases by &gt;10%, which could lead to an increase in collisions. There are a small number of road links where flow reduces by &gt;10%, which could lead to a reduction in collisions.</p> <p>Historically, there have been relatively few casualties (10 over 5 years, 7 involving cyclists) from vulnerable groups on these links. The impact on vulnerable groups is therefore considered neutral on these links.</p>	<p><b>Slight beneficial</b></p> <p>There are two road links where traffic flow increases by &gt;10%, but the absolute increase is less than 30 vehicles. Historically, there have been few casualties (2 over 5 years) involving vulnerable groups on these links.</p> <p>There are more links where flow reduces by &gt;10%, which could lead to a reduction in collisions. Historically, there has been a relatively high number of casualties (111 over 5 years) involving vulnerable groups on these links (especially cyclists and income deprived groups).</p>

	<i>Overall, this option achieves only a slight reduction in veh-kms, and the overall impact on all accidents (not just those involving vulnerable groups) is assumed to be negligible (see Table 3-14).</i>	<i>Overall, this option achieves only a slight reduction in veh-kms, and the overall impact on all accidents (not just those involving vulnerable groups) is assumed to be negligible.</i>
Air quality	<p><b>Large beneficial</b></p> <p>Air quality modelling shows a decrease (&gt;10%) in NO<sub>2</sub> levels across a large number of links in Portsmouth. There are a high proportion of children and low income households in central Portsmouth, who will disproportionately benefit from reduced emissions. These groups are particularly vulnerable to air quality impacts as low income households are more likely to live on a main road and children tend to spend more time outside.</p>	<p><b>Moderate beneficial</b></p> <p>Air quality modelling shows a decrease (&gt;10%) in NO<sub>x</sub> levels across a moderate number of links in Portsmouth. There are a high proportion of low income households in this area, and children attending nearby schools, who will disproportionately benefit from reduced emissions. The magnitude of overall benefit for vulnerable groups is expected to be proportional to the size of the CAZ.</p>
Noise	<p><b>Slight beneficial</b></p> <p>There are a moderate number of links where traffic flow has decreased by &gt;20%, which is generally indicative of a reduction in noise levels. These links are in the vicinity of low income households and several amenities such as schools and playgrounds which children may attend.</p> <p>There are no links where traffic flow has increased by &gt;25%, which is generally assumed to indicate an increase in noise levels.</p> <p><i>Overall, this option achieves only a slight reduction in flow and speed, and the overall impact on noise is assumed to be negligible (see Table 3-14).</i></p>	<p><b>Slight beneficial</b></p> <p>There are a moderate number of links where traffic flow has decreased by &gt;20%, which is generally indicative of a reduction in noise levels. This is expected to result in greater than average benefits for the most deprived residents and the high proportion of children in the area.</p> <p>There are two links where traffic flow has increased by &gt;25%, which is generally assumed to indicate an increase in noise levels, however, the absolute change is very small.</p> <p><i>Overall, this option achieves only a slight reduction in flow, and the overall impact on noise is assumed to be negligible.</i></p>
User benefits (commuter and other non-business trips)	<p><b>Large adverse</b></p> <p>The CAZ C benchmark has a very small negative impact (-£41,397) on these users, due to small scale increases in travel time and associated vehicle operating costs. Based on the relative proportion of disbenefits (by LSOA) against the population in each income quintile (by LSOA), the distributional impact is large adverse for the most deprived income quintiles, and moderate adverse for other income quintiles.</p> <p><i>The distributional impact is large adverse, but the absolute scale of the net impact is very small.</i></p>	<p><b>Slight adverse</b></p> <p>The CAZ B+ has an adverse impact (-£2,271,257 overall) on these users. This is primarily due to increased parking costs, outweighing time and vehicle operating cost savings resulting from small-scale re-routing of traffic and reduction in congestion due to cancelled trips and mode switch.</p> <p>Based on the relative proportion of disbenefits against the population in each income quintile, the overall impact is slight adverse, due to the slight adverse impact for the most income deprived residents (income quintiles 1 and 2).</p> <p><i>The distributional impact is slight adverse, but the absolute scale of the net impact is small.</i></p>

<p>User benefits (HGV and LGV business trips)</p>	<p><b>Large adverse</b></p> <p>There is a dis-benefit across all SME quintiles (-£6,662,834), as a result of the CAZ charge paid by the remaining non-compliant HGVs and LGVs (with a larger number of LGVs paying the charge relative to HGVs). However, the dis-benefits are disproportionately focused on the areas with the highest concentration of SMEs, resulting in a large adverse impact on SMEs.</p> <p><i>The absolute scale of benefits / dis-benefits is small across all quintiles.</i></p>	<p><b>Neutral</b></p> <p>Adverse impacts are anticipated for HGV and LGV business trips in quintile 1 areas (containing 35% of SMEs). These locations experience 90% of the dis-benefits, and experience a net dis-benefit of £70,427, due to the increase in costs resulting from the CAZ charge. The remaining 65% of SMEs are located in areas which experience a net benefit (£139,218), due to time and vehicle operating cost savings resulting from small-scale re-routing of traffic and reduction in congestion. The overall distributional impact is therefore neutral.</p> <p><i>The absolute scale of benefits / dis-benefits is very small across all quintiles.</i></p>
<p>Personal affordability</p>	<p><b>Moderate adverse</b></p> <p>The CAZ C benchmark has a very small negative impact (-£791) on affordability, as a result of re-routing effects on vehicle operating costs, with specific income groups experiencing benefits and dis-benefits. Based on the relative proportion of dis-benefits against the population in each quintile, there is a neutral affordability impact for the most income deprived residents, and a large adverse affordability impact for income quintile 2, with other income groups experiencing a large adverse or large beneficial impact.</p> <p><i>The absolute scale of benefits / dis-benefits is very small across all quintiles.</i></p>	<p><b>Slight adverse</b></p> <p>The analysis shows an adverse impact overall of -£3,210,436, due to the increase in parking costs. Based on the relative proportion of impacts against the population in each income quintile, there is a slight adverse affordability impact for the 20% most income deprived residents (income quintile 1). This group receive a disproportionately small disbenefit, relative to their population.</p> <p><i>The absolute scale of dis-benefits is small across all quintiles.</i></p>
<p>Business affordability (HGV and LGV business trips)</p>	<p><b>Large adverse</b></p> <p>The CAZ C benchmark has a negative impact (-£6,662,834) on affordability, with all concentrations of SMEs experiencing disbenefits. There is a disproportionately large disbenefit in areas where there are a high number of SMEs.</p> <p><i>The absolute scale of dis-benefits is small across all quintiles.</i></p>	<p><b>Moderate adverse</b></p> <p>The CAZ B+ option has an overall adverse impact on affordability across all areas, due to users paying for the CAZ charge and small-scale re-routing impacts. The distribution of dis-benefits for HGV and LGV business trips are disproportionately concentrated within areas with highest proportion of SMEs (35%). These locations experience 76% of the dis-benefits, and experience a net dis-benefit of £92,423. The remaining 65% of SMEs are located in areas which experience a net dis-benefit of £23,676. The overall distributional impact is therefore moderate adverse.</p> <p><i>The absolute scale of benefits / dis-benefits is very small across all quintiles.</i></p>

