

THIRD WAVE LOCAL AUTHORITIES – TARGETED FEASIBILITY STUDY TO DELIVER NITROGEN DIOXIDE CONCENTRATION COMPLIANCE IN THE SHORTEST POSSIBLE TIME

Local authorities covered	Borough of Poole Council
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Part 1: Understanding the problem

Projections for concentrations of nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x) across the UK, have been calculated as part of a Pollution Climate Mapping (PCM) model assessment. Within the Borough of Poole there are two road links (Census IDs: 28471 and 38387) that have been modelled to be in exceedance of the NO₂ limit up to and including 2019 – see Figure 1.

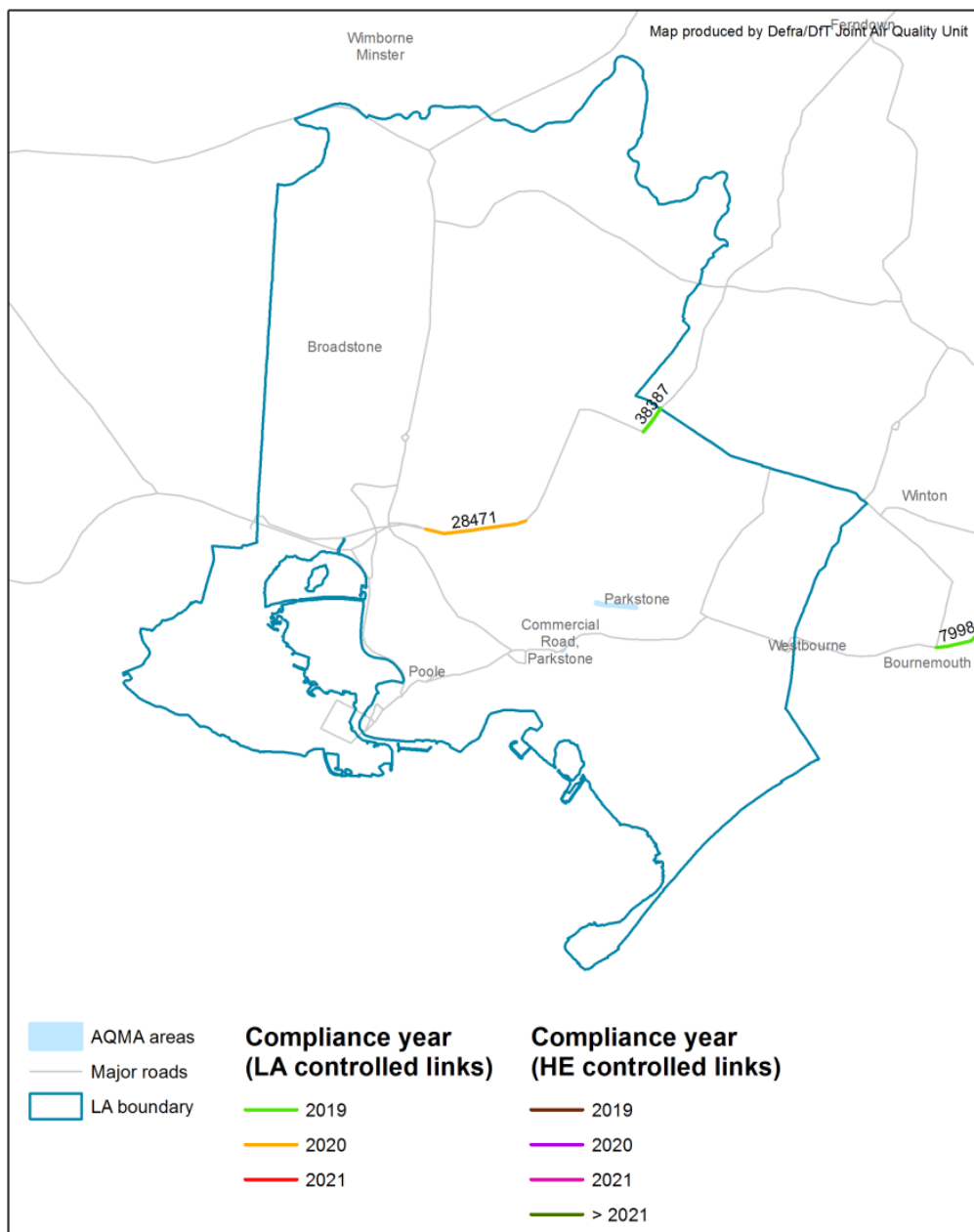


Figure 1: Mapped exceedances of NO₂ limit within Poole from PCM Model

Both road links are dual-carriageways transit routes managed by the Borough of Poole. The A3049 is major distributor road, linking with the A350 Upton Bypass (part of a primary route from the M4 to the south coast) to the east, passing through Canford Heath and then heading north-eastwards becoming the A348, forming part of the route from Poole to the A31/M27 route to London.

Poole has a population of 151600 (ONS mid-2016 population estimates), making it the second largest town in Dorset. Both identified road links pass through commercial/industrial areas, residential areas (as through-roads) with some nearby schools, hospitals and open spaces. These

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adjacent areas are expected to contribute to some of the traffic on the identified road links, but the purpose of both roads are for traffic in transit, therefore ensuring that local roads where there is higher exposure are not impacted by the traffic flow carried by the identified roads.

Road link census ID: 28471 (A3049)

This road link is a 1.325km link of dual-carriageway from on-slip from Fleets Corner/Nuffield Industrial Estate) to the roundabout with the B3036 Old Wareham Road. As can be seen from the map below the road passes the Nuffield Industrial Estate to the North and then heads past Canford Heath where there is local access to Canford Heath and Oakdale via tight slip roads. To the north are the Canford Heath Infant and Junior Schools and the Longspee Academy. To the south is residential. The A3049 then heads up the hill towards the junction with the B3036 (Old Wareham Road). The road passes St Edwards RC/CE VA School to the south and further residential areas to the north. Beyond the roundabout there is commercial use to the east and residential/open space to the west. The speed limit along the road link is 50mph.

Therefore traffic joins and exits the identified length of the A3049 from the Nuffield Industrial Estate, Canford Heath residential areas (including schools identified above), Oakdale residential areas (including the school identified above) and the Mannings Heath/Newton industrial areas and the Tower Park entertainment complex/commercial areas. The majority of traffic flow is expected to be in transit through this area since that is the purpose of this road link.

Location map

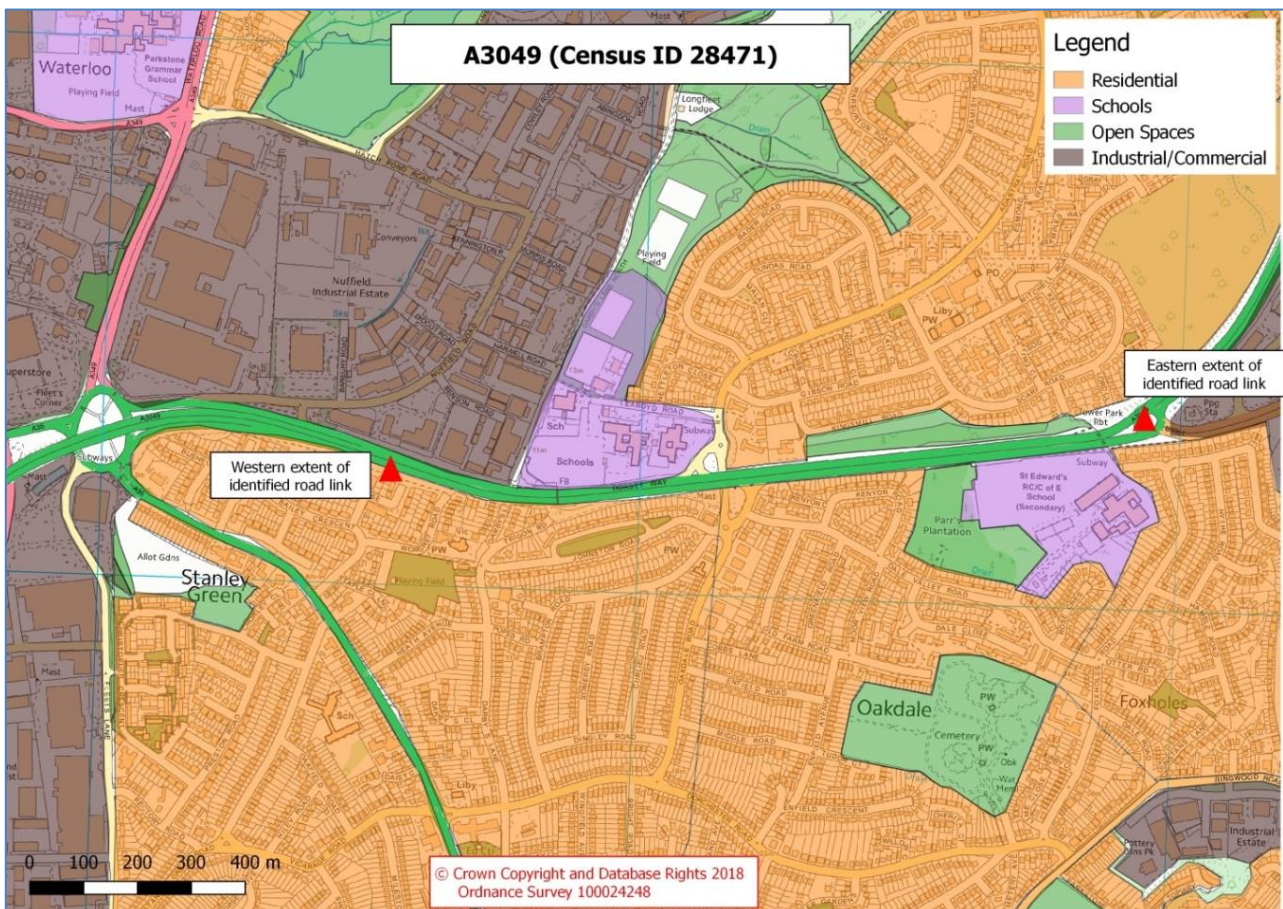


Figure 2: A3049 (Census ID 28471) Location Map

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The results from the PCM show that the road link is projected to have the follow annual mean NO₂ concentrations:

Year	2018	2019	2020	2021
NO ₂ concentration µg/m ³	43	41	40	37

Table 1: A3049 PCM modelled NO₂ concentrations

This feasibility study aims to identify measures which could reduce the concentration of NO₂ on this road link as quickly as possible with the objective of bringing forward compliance in the shortest possible time. This objective could be achieved by reducing the NO₂ concentration in 2018 by at least 3 µg/m³; if this is not achievable then compliance could be brought forward to 2019 by reducing the concentration in that year by at least 1 µg/m³.

To understand the nature of the problem on this road link we initially used the source apportionment data from the national PCM model. Subsequently, ATC data to date has been used to generate local estimates, along with speed data from the week beginning 16 April 2018. The source apportionment output from the Emissions Factor Toolkit (EFT) Version 8.0.1.a using this data has been added to Table 3 for comparison and demonstrates the high proportion of NO_x emissions from diesel cars and LGVs on this road link.

Source	Percentage	
	From JAQU data	From BoP local data
Regional background	5%	
Urban background (non-traffic)	7%	
Urban background (traffic)	9%	
Diesel cars	32%	45.2%
Petrol cars	7%	6.6%
Diesel LGVs	22%	37.9%
Petrol LGVs	0%	0.1%
HGVr	11%	5.6%
HGVa	3%	1.7%
Buses	3%	1.8%
Motorcycles		0.8%
Full hybrid diesel cars		0.2%
Plug-in hybrid petrol cars		0.1%
Full hybrid petrol cars		0.1%

Table 2: Source apportionment for A3049

Road link census ID: 38387 (A348)

This road link is a 0.378km section of dual-carriageway from the end of the Dorset Way (A3049) to the junction with Wallisdown Road (Mountbatten Arms roundabout). The road heads up the hill to the roundabout with residential and then commercial/industrial use (near the roundabout) to the western side and open space buffering residential and further commercial/industrial use to the east.

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This road brings traffic from the A31 and also traffic from Bournemouth towards Poole. The speed limit along this link is currently 40mph.

Therefore some of the traffic joining and exiting the identified length of the A348 from the adjacent residential areas and the identified industrial commercial areas, however the majority of traffic flow is expected to be in transit through this area since that is the purpose of this road link.

Location Map

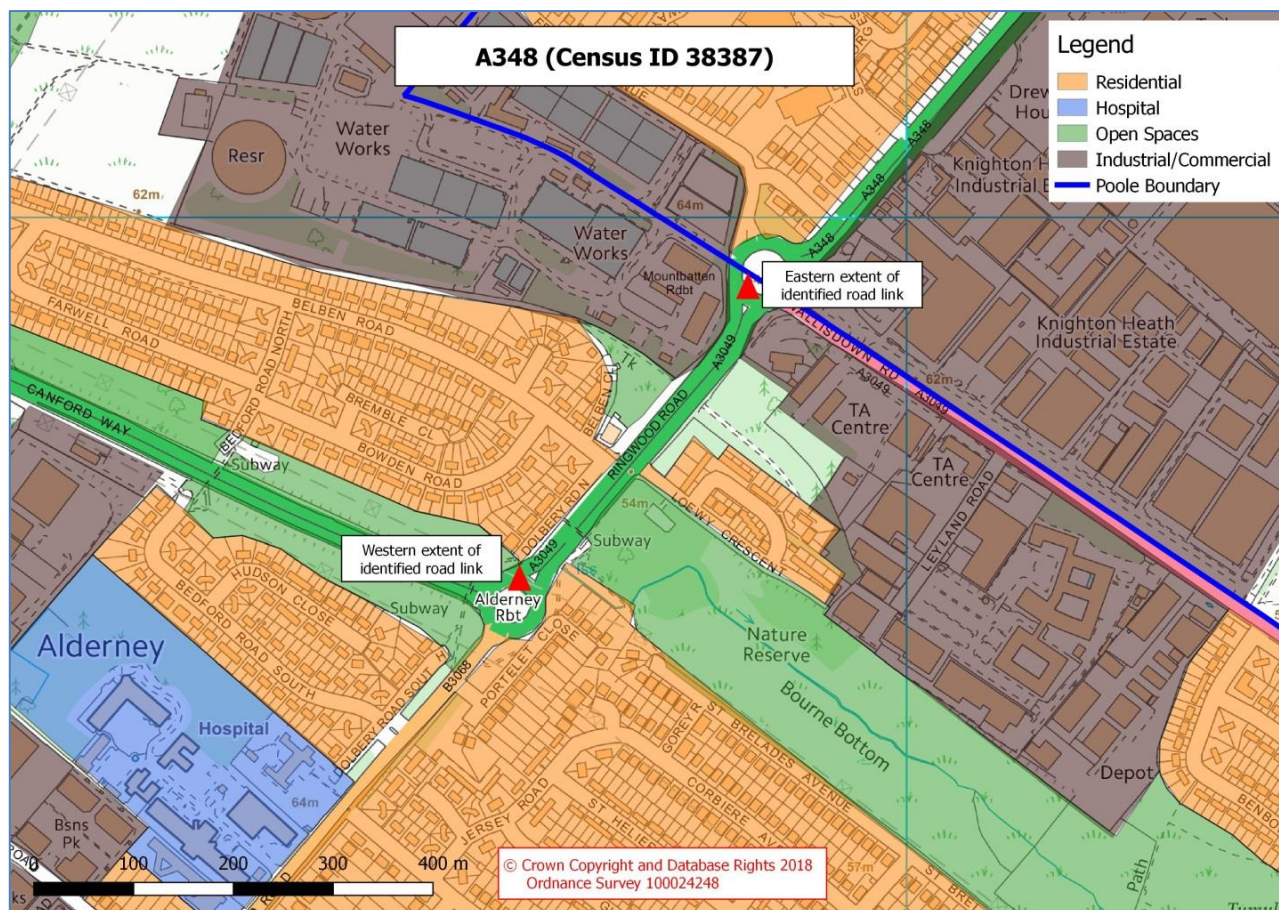


Figure 3: A348 (Census ID 38387) Location Map

The results from the PCM show that the road link is projected to have the follow annual mean NO₂ concentrations:

Year	2018	2019	2020	2021
NO ₂ concentration µg/m ³	41	39	37	35

Table 3: A348 PCM modelled NO₂ concentrations

This feasibility study aims to identify measures which could reduce the concentration of NO₂ on this road link as quickly as possible with the objective of bringing forward compliance in the shortest possible time. This objective could be achieved by reducing the NO₂ concentration in 2018 by at least 1 µg/m³.

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To understand the nature of the problem on this road we initially used the source apportionment data from the national PCM model. Subsequently, data from a manual traffic count in November 2017 has been scaled to an AADT using a seasonal factor, along with speed data from the week beginning 16 April 2018. The source apportionment output from the EFT using this data has been added to Table 5 for comparison and demonstrates the high proportion of NO_x emissions from diesel cars and LGVs on this road link.

Source	Percentage	
	From JAQU data	From BoP local data
Regional background	4%	
Urban background (non-traffic)	12%	
Urban background (traffic)	9%	
Diesel cars	28%	45.3%
Petrol cars	7%	6.5%
Diesel LGVs	24%	31%
Petrol LGVs	0%	0.1%
HGVr	10%	8.9%
HGVa	4%	3.3%
Buses	1%	4.1%
Motorcycles		0.4%
Full hybrid diesel cars		0.2%
Plug-in hybrid petrol cars		0%
Full hybrid petrol cars		0.1%

Table 4: A348 Source Apportionment

Local Monitoring

Following the initial assessment, JAQU announced that local monitoring that followed LAQM TG16 and met AAQD siting requirements could be considered to demonstrate compliance. The Borough of Poole operate two monitoring sites alongside the A3049 Dorset Way (census ID: 28471) at 401810, 93156 and in Dolbery Road North, parallel to the A348 (census ID: 38387) at 404675, 94738. These are indicated in Figure 2 below as PO 03 and PO 14 on the two roads in question (marked in red).

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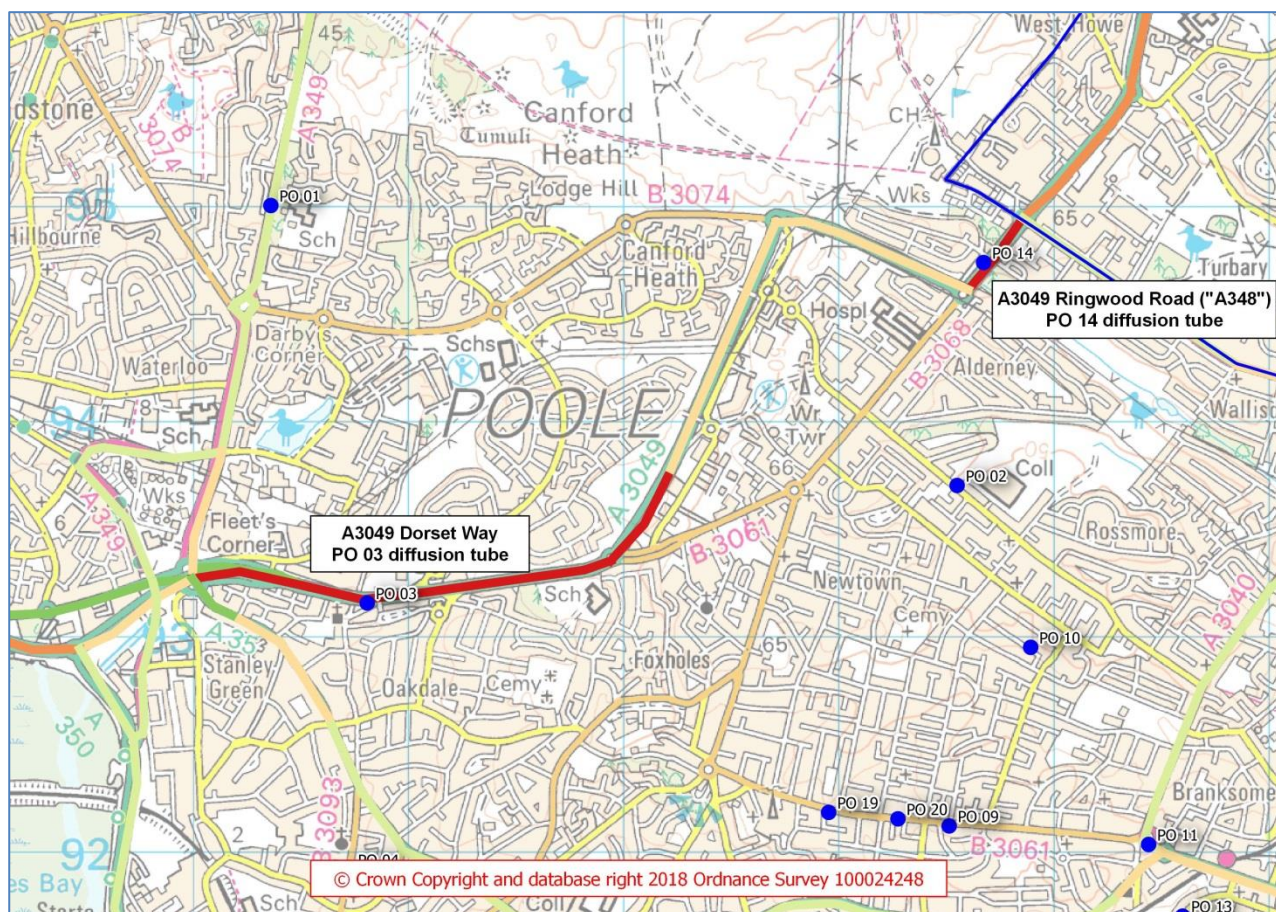


Figure 4: Location of diffusion tube monitoring

The data from diffusion tube monitoring, as reported to DEFRA in the Annual Status Reports, does not indicate that there has been an exceedance of the $40\mu\text{g}/\text{m}^3$ NO_2 limit – see Table 1.

A3049 Dorset Way NO_2 Concentrations ($\mu\text{g}/\text{m}^3$)						
Year	2012	2013	2014	2015	2016	2017
Monitored annual mean concentration	33.61	37.23	35.16	34.97	40.07	33.23
A3049 Ringwood Road ("A348") NO_2 Concentrations ($\mu\text{g}/\text{m}^3$)						
Year	2012	2013	2014	2015	2016	2017
Monitored annual mean concentration	21.21	27.79	26.15	22.84	24.40	23.77

Table 5: Borough of Poole monitoring results

The details of the diffusion tube monitoring locations are detailed in Annex: Local Air Quality monitoring Checklist (AQP1) and this information was reviewed in June 2018 by the Science Team and expert consultants at JAQU who confirmed that *"The checklist relating to census ID 28471 (A3049) was assessed as meeting the requirements set out in our guidance, meaning that measurement data from this site may be included in place of the PCM modelled concentration for census ID 28471 in your Targeted Feasibility Study."* Therefore, there is no need to proceed with further work relating to this work as the local monitoring demonstrates that this road is already complaint.

JAQU also stated that *"Unfortunately, the checklist concerning census ID 38387 (A348) was assessed as not meeting the requirements set out in the guidance. This is due to the location of this diffusion tube being non-compliant with the AAQD siting criteria, as it is within 25m from a*

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major junction and 18m from the kerbside.” Therefore this feasibility study proceeds to potential measures that could bring forward compliance on this road link in the shortest possible time. The A3049 Dorset Way (Census ID: 28471) local monitoring demonstrates that the road link is already in compliance (2017: 32.23 µg/m³) and the projected annual mean concentrations based on local monitoring data are as follows:

Year	Adjustment Factor Calculation ¹ (relative to base year of 2017)	NO ₂ concentration (µg/m ³)
2017	0.947 / 0.947 x 32.23	32
2018	0.908 / 0.947 x 32.23	31
2019	0.870 / 0.947 x 32.23	30

The monitored value in 2016 was 40.07 µg/m³ and if this is used as a worst case scenario, the projected annual mean concentrations based on local monitoring data are as follows:

Year	Adjustment Factor Calculation (relative to base year of 2016)	NO ₂ concentration (µg/m ³)
2016	0.974 / 0.974 x 40.07	40
2017	0.947 / 0.974 x 40.07	39
2018	0.908 / 0.974 x 40.07	37
2019	0.870 / 0.974 x 40.07	36

In either scenario the road link is projected to already be in compliance without any further additional measures being implemented.

The remainder of this TFS therefore concentrates on the A348 (Census ID: 38387) road link.

¹ LAQM roadside projection calculation method used here

Part 2: Developing a long list of measures for addressing the exceedances

The long list of potential measures is divided into those already delivered, those in progress and planned measures.

While it may prove challenging to identify and measure the direct impact of some measures on the identified links, there are some which will allow estimation of impacts on traffic on those links. Further detail on measures in place are given below the tables.

Table 6: Delivered Measures

Scheme description	Location	Delivery Year	Direct impact on links?	Nature of impact	Status
Alder Road/Mosley Avenue Pedestrian Crossings	Alder Road/Mosley Avenue Junction	2016/17	No	Pedestrian improvement	Delivered
Herbert Avenue Puffin Crossing (adjacent to Doctor Surgery)	Herbert Avenue (between Berkeley and Manor Avenue)	2017/18	No	Pedestrian improvement	Delivered
Alder Road Cycle Lanes	Alder Road	2017/18	No	Cycle improvement	Delivered
Hatch Pond Signal Junction Pedestrian and Cycle Improvements	Waterloo Road/Cabot Lane Junction	2015/16	No	Improved facilities for pedestrians and cyclists	Delivered
Gravel Hill off road cycle route	Gravel Hill between Dunyeats and Queen Anne Drive	2015/16	No	Improved facilities for pedestrians and cyclists	Delivered

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Ocean Academy School Zone	Ringwood Road and Constitution Hill	2015/16	No	Improved environment for pedestrians and cyclists including reduced parking adjacent to school (included 2no. pedestrian crossings)	Delivered
Fernside Road/Pound Lane Puffin Crossing	Fernside Road/Pound Lane	2016/17	No	Pedestrian improvement	Delivered
Magna Academy Zebra Crossing and School Zone	Adastral Road	2016/17	No	Pedestrian improvement	Delivered
Culliford Crescent Toucan Crossing	Culliford Crescent (near Canford Heath Road)	2017/18	No	Pedestrian and Cycle improvement	Delivered
Sherborne Crescent Parallel Zebra Crossing	Sherborne Crescent (route of yellow path)	2017/18	No	Pedestrian and Cycle improvement	Delivered
Ashmore Avenue Zebra Crossing	Ashmore Avenue (adjacent to School)	2017/18	No	Pedestrian improvement	Delivered
Entire refuse fleet operates on electric bin lift technology	Borough wide	N/A	No	Reducing NO ₂ emissions.	Delivered

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Table 7: Measures in progress

Scheme description	Location	Delivery Year	Direct impact on links?	Impact	Status
Continue to develop the Freight Quality Partnership	Borough wide	In progress	Yes	Assist businesses with travel plans reducing diesel LGV and HGV use.	Ongoing
Develop smartcard ticketing	Borough wide	In progress	No	Encourages multi journey bus trips	In progress
SE Dorset Voluntary Quality Bus Partnership	Borough wide	Delivered / In Progress	No	Replacement of fleet with Euro 6 compliant vehicles	In progress
EV Charging Network	Ashley Rd, Seldown Lane, Old Orchard, Civic Centre, Cobb Quay, The Anchorage, Westover Renault, various Hotels.	Delivered	No	18 chargers installed in public places - various private chargers at hotels etc. available to public.	In progress
Poole Car Club	Civic Centre	Delivered	No	Reduced car ownership	In progress
Continue to support Business Travel Network	Borough wide	In progress	No	Assist business with travel plans reducing single car use.	Ongoing
SAFED training across front line services plus ongoing CPC driver training	Borough wide	Since 2010	No	Reducing NO ₂ emissions.	Ongoing

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All new vehicles to meet latest Euro ratings and take into consideration EV alternatives	Borough wide	N/A	No	Reducing NO ₂ emissions.	Ongoing
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Table 8: Planned Measures

Scheme description	Location	Delivery Year	Direct impact on links?	Impact	Status
Strategic cycling improvements	Borough wide	N/A	Yes	Increased cycling trips - reduced private car trips	Planned
ITS to improve traffic flow	Borough wide	N/A	Yes	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	Planned
Junction improvements	Borough wide	N/A	Yes	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	Planned
Removal of unnecessary manoeuvres	Study - N/A	N/A	Yes:	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	Planned
NW Bournemouth to Poole QBC	A348	2014-2020	Yes	Increased bus patronage and reduced private car trips.	Planned (subject to Corridor Study outcomes)

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Ringwood Road cycle tracks/lanes	A348	2020 or later	Yes	Improved cycling facilities - reduced car journeys	Planned
Develop transport interchanges along QBCs	A348	2021	Yes	Encourages multi journey bus trips	Planned (Aspirational)
Reduce speed limits on relevant link	A348	By 2019	Yes:	Reduces permitted speed on relevant links. Should have corresponding reduction in emissions.	Potential
Increased bus frequencies	Borough wide	N/A	No	Increased bus patronage and reduced private car trips.	Planned
North Poole package of measures	North Poole - Magna Road/Ringwood road	N/A	No	Increased bus patronage, increased cycling and walking trips and reduced private car trips.	Planned
Optimisation of bus routes	Borough wide	N/A	No	Increased bus patronage and reduced private car trips.	Planned
Feasibility study of bus priority measures	Borough wide	N/A	No	Increased bus patronage and reduced private car trips.	Planned
Light Rail	Study - N/A	N/A	No	Reduced car trips within urban centres.	Planned (Aspirational)
Develop smartcard ticketing (some multi operator tickets exist but true 'Oyster Card' style not yet available)	Borough wide		No	Will encourage non car trips.	Planned.

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ITS strategy	Borough wide	Post 2020	No	More efficient traffic flows and reduced emissions.	Planned
Car parking policies	Borough wide	Post 2019	Yes	Reduced car parking town centres	Planned
Anti-idling enforcement outside adjacent schools	Borough wide	Unknown	No	Reduces emissions adjacent to schools	Planned
Bike Share	Borough wide	2018	Yes	Typically 10-15% of bike share trips replace car journeys. Scheme in Dublin reported 19.8% of trips replaced car journeys but remaining 80% were previously sustainable mode journeys. Other examples: London 2%, Lyon 7%, Barcelona 9.6%, Montreal 2%. The main weakness of this body of evidence on travel behaviour change is the lack of reliable quantitative data on the extent, in terms of frequency and magnitude, of the change in overall motorised travel on one hand and active travel on the other. https://www.carplusbikeplus.org.uk/wp-content/uploads/2015/09/Bike-sharing-a-review-of-evidence-Dr-M-Ricci-UWE-2015-shareable.pdf	Out to tender - planned

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Distribution Hub for local deliveries using low emission vehicles	Unknown	N/A	No	Reduce delivery trips usually using diesel vehicles.	Planned
Delivery vehicle emissions testing scheme	Borough wide	2020	No	Eliminates worst performing engines	Planned
Minimum engine standard for private hire taxis	Borough wide	2020	No	Eliminate worst performing diesel engines.	Planned
Review of age of new licensed vehicles (taxis)	Borough wide	2020	No	Eliminates worst performing diesel engines.	Planned
In-house annual off-road MOT and inspection (taxis)	Borough wide	By 2019	No	Eliminates worst performing diesel engines.	Planned
Review of introduction of SAFED course (taxis)	Borough wide	2020	No	Encourage fuel efficient driving	Planned
Review of policy to promote uptake of LEV/EV and reduced access to most polluting vehicles (taxis)	Borough wide	From 2020	No	Eliminates worst performing diesel engines.	Planned
Promotion of tax exemptions and grants for LEV/EV (taxis)	Borough wide	From 2020	No	Promotes low emissions vehicles	Planned

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The Borough of Poole has delivered a range of measures to improve sustainable transport provision and many of the initiatives are ongoing. Historic and ongoing schemes that will impact positively on air quality across the Borough and on the two identified road links are outlined below.

Links to Part 1 Data

The source apportionment data for Poole shows that diesel cars are the largest contributor to concentrations of NO_x on the A348 (45.3%) and is likely that a substantial proportion of the emissions of NO_x from this vehicle type comes from people commuting to work by car. Consequently we have included on our long list all measures which might reduce emissions from cars, paying particular attention to identifying measures which could target commuters.

There are however also a high proportion of LGVs responsible for NO_x emissions at both locations. The apportionment data also shows that on the identified road link, diesel LGVs are responsible for a high proportion of NO_x (31%). It is suggested that many of these vehicles are from private delivery vehicles although some will be private contractors vans accessing multiple sites per day and thus are not realistic candidates for switching to public transport or cycling. Provision of a distribution hub with local deliveries using low emission vehicles would deliver air quality improvements however the concept and governance in Poole for such an initiative is undeveloped at present.

If a distribution hub is not feasible, there may be scope for a vehicle emissions testing scheme for urban delivery vehicles in the future although the governance of such a scheme is unclear currently. In addition, there may also be scope for increasing the minimum engine standard for private hire taxi licensing within Poole

Sustainable Transport Improvements to date

The Department for Transport has already recognised that the SE Dorset conurbation has delivered the biggest percentage increase in bus patronage per head of the population (outside of London). Bus ridership in Poole has increased from 5.3 million journeys in 2004/5 to an impressive 10.2 million in 2016/17.

This modal shift has been achieved through a successful voluntary Quality Bus Partnership with the operators. The approach taken has been to create a “virtuous circle” of improvements with the Council improving the infrastructure (bus shelters, bus priority and real time information) to enable commercial bus operation to flourish.

Operators have in return invested in new vehicles, staff training and improved service frequencies to generate a return to bus as a mode of choice. Smart ticketing is available with a multi operator smartcard introduced in 2016 and contactless payments introduced in 2017. In February 2018 Poole’s principal bus operator Morebus launched a fleet of 41 new Euro 6 buses for operation in the conurbation in a £7.2m investment. We consider that this will have major benefits for air quality in Poole from 2018 onwards.

The South East Dorset Voluntary Quality Bus Partnership was recognised in 2016 as “Partnership of the Year” in the industry’s Route One awards. In September 2017 Transport Focus undertook research on satisfaction with bus services in Poole and Bournemouth. In a survey of almost 1000 passengers 91% stated they were either very or fairly satisfied with their overall journey, which is one of the highest figures in the country. These results demonstrate the ongoing efforts and success in reducing private car traffic and facilitating the transfer onto sustainable modes delivered in Poole

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with corresponding positive impacts on air quality.

- **EV Charging network**

Investment in network of rapid EV charging points across Dorset (2015/16) has increased the network for users of low emissions vehicles. 18 chargers have been installed across Poole, Bournemouth and Dorset. OLEV grant of £900,000 was received.

- **Poole Car Club**

An Electric Car Club was launched in Poole (October 2017). Partnered with Co-Wheels, two cars are available to Council employees during office hours, then to the general public in the evenings and at weekends. The Car Club aims to reduce car ownership in Poole whilst providing zero emission options for residents for shorter journeys. The Council also aims to pilot a scheme called 'Travelmates' where employees, in return for free travel to work in a zero emission vehicle, relocate the vehicle to residential areas in order to increase evening usage by the public, this will reduce private car journeys made by council employees.

- **Bike Share**

Poole is currently tendering the opportunity to partner with a bike share operator for the conurbation.

Residents and visitors will benefit from the convenience of a fleet of new bikes available for instant hire across Bournemouth and Poole. Whilst similar to the "Boris bikes" in London, the scheme will use advances in technology and be App-based, enabling customers to easily access and unlock bikes simply using a smartphone.

This removes the need for docking stations and gives far greater flexibility for users as they are not restricted to a limited number of pick up/drop off points.

The operator will also work closely with local businesses to encourage commuters to use Bike Share and help reduce peak time congestion. Surveys of users from other Bike Share schemes across the UK has shown that typically 10-15% of journeys were previously made by car, so there is an excellent opportunity for modal shift.

- **Business Travel Planning**

The Local Authority actively engages with local businesses to encourage staff to travel sustainably. Poole also supports the conurbation's Business Travel Network to share best practice and provide advice and guidance on sustainable transport options.

- **School Travel Planning**

The Council works closely with schools to promote walking, cycling and public transport use for both pupils and staff. In 2017 the annual "Golden Shoe" competition was launched with prizes for the schools that encouraged the most pupils to travel sustainably. The winning school was Baden Powell & St Peters CE Junior School with an impressive 80% of children walking, scooting or cycling during this year's Walk to School Week.

Borough of Poole Plans and Strategies

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There are a number of strategies, studies and emerging frameworks that will deliver improvements for sustainable modes around the authority generally and also at the sites in question. These are outlined below.

Local Plan Mitigation Plan

The Poole Local Plan Mitigation Plan outlines numerous transport measures aimed at mitigating the transport impacts of development up to 2033. There are measures that apply to the whole council area but some that are focussed on specific corridors including the A348 and A3049. The joint Local Transport Plan (LTP) also has a range of measures which are outlined below.

Measures aimed at increasing the modal share of bus:

- Increasing bus frequencies on A348
- North Poole Package of measures – measures aimed at delivering improved connectivity to development site in north Poole to Poole and Bournemouth town centres, options include strategic cycle in addition to bus measures and local access to sustainable transport infrastructure to reduce need to travel by car
- Optimisation of bus routes including A348
- Feasibility study of bus priority measures on A348 corridor
- Promotion of sustainable transport and travel planning – continue to support the business travel network
- Continue to develop the freight quality partnership

A348/A3049 corridor study

There is commitment to carrying out a multi modal corridor study/programme in partnership with Bournemouth Borough Council and Dorset County Council, which will appraise options for improving sustainable transport on the two corridors. These road links may benefit from potential measures which could include:

- strategic cycling improvements
- Bus priority measures on both corridors
- ITS to improve traffic flows
- Junction improvements
- Removal of unnecessary manoeuvres on Ringwood Rd (A348)
- Park and Ride
- Light Rail

Bournemouth, Dorset and Poole – Local Transport Plan 3, 2011-2026

- North West Bournemouth to Poole Quality Bus Corridor (A348) this phase 2 QBC would provide high quality bus services through the A348 identified link.
- Develop transport interchanges along QBCs providing convenient transfer between bus services for multiple destinations and increasing the attractiveness of bus
- Develop smartcard ticketing which allows seamless transfer between services and mode, increasing attractiveness of public transport – in progress
- Package of sites for SE Dorset bus park and ride, including Creekmoor and Mannings Heath both would directly impact on traffic levels at both A348 and A3049 sites.

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- Intelligent Transport Systems strategy – this includes optimisation of traffic signals which will improve traffic flow at key junctions. This measure has particular relevance to the A348 link identified in the modelling.
- Car parking policies that promote economic vitality and support use of alternative to the car

Local Cycling Walking Infrastructure Plan

The Council is developing an LCWIP in partnership with Bournemouth Borough Council which to deliver a more connected network for walking and cycling and reduce the need for people to make private car journeys.

The following two local cycling schemes are planned for 2018/19:

- Ringwood Road (Old Wareham Road to Dorchester Road) – cycle tracks and cycle lanes

Level 3 Bikeability training for King Edward's School, potentially 40 places by 2019.

Other Potential Options

- Speed limit reductions on A348
- Distribution hub. Provision of a distribution hub with local deliveries using low emission vehicles would deliver air quality improvements however the concept and governance in Poole for such an initiative is undeveloped at present. If a distribution hub is not feasible, there may be scope for a vehicle emissions testing scheme for urban delivery vehicles in the future similar to scope for increasing the minimum engine standard for private hire taxi licensing within Poole.

Taxi Emission Improvements

We are actively working to ensure that Poole's taxi fleets will become an emission free transport system.

This will require the Council to look at the Borough's electric charging infrastructure to ensure taxis can easily and quickly charge so ensuring the existing service levels can be maintained. Getting the right infrastructure in the right place at the lowest cost will be essential to supporting the move away from diesel vehicles. We are aiming to develop a long-term strategy to work with Poole's taxi drivers as we aim to increase the electrification of Poole's taxis.

We will be looking at reviewing our existing Hackney Carriage and Private Hire Vehicle Policy to ensure that it enables and enhances the transition from existing fossil fuel taxis to hybrid and electric only vehicles.

While the move to electric vehicles brings huge benefits and opportunities, we recognise there will be a substantial change for taxi drivers. That's why we will be working with them to ensure a smooth transition to eco-friendly vehicles.

We will aim to carry out the following:

- At present new cars must be under 5 years old. This is to be reviewed to assess the feasibility of lowering the age of all new licensed vehicles.

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- We will be introducing, by 2019, that all licensed vehicles to have an in-house annual off-road MOT and Inspection carried out by the local authority – to ensure vehicles comply with the legal requirements and Licensing Authority policy requirements.
- While taxi drivers already take an enhanced drivers test we will review this and look to adopting a Safe and Fuel Efficient Driving course that includes fuel efficient driving techniques for taxi drivers.
- We already have an existing private hire operator running electric only vehicles and we are seeing an increase in the use of hybrid vehicles. However as part of our review of our existing policy we will be looking at proposals to reduce access to the most polluting vehicles while promoting the uptake of low emission and electric vehicles.
- Highlight to drivers and operators the Governments tax exemption scheme for the purchase of new electric taxis that cost over £40,000 and the £50 million Plug-in Taxi Grant programme accessible throughout the UK. This will give taxi drivers up to £7,500 off the price of a new electric vehicle.
- Advise taxi drivers of the benefit from significantly lower fuel costs of switching to new electric vehicles.
- We are monitoring other local authorities that are looking to introduce electric only vehicle policies. This includes those cities bidding for funding as part of the £14 million of investment to deliver around 400 rapid and 150 fast charge points dedicated for electric taxis. These include: Birmingham; Coventry; London; Nottingham; Dundee; The West Yorkshire Combined Authority; Oxford; Cambridge; Wolverhampton; Slough.

Borough of Poole Fleet Services

All vehicle purchases are specified to the latest available euro ratings for emissions, (currently Euro 6) and whenever we are required to supply a new vehicle, we explore electric vehicle options, although due to the nature of our services these are few and far between at this stage.

Because we have a robust vehicle replacement programme, this means the large majority of our fleet are of the latest spec, making any retro fitting of particulate traps etc. as redundant.

The Service Unit envisages alternative fuel power becoming more practical and accessible within the municipal fleet sector. We will explore these as they emerge, as well as looking to a shift towards petrol vehicles in the coming years.

The Borough of Poole led the way with operating a vegetable oil powered refuse vehicle some years ago when it was an emerging technology. Ultimately this failed only in terms of affordability where the fuel supplier lost government incentive funding (through duty) and pulled the plug on support and supply.

We also took the initiative to introduce electric bin lift technology to our fleet, back when this was considered a risk, now our entire fleet operate on electric bin lifts that improve fuel use.

Route optimisation was carried out with the roll out of Alternate Weekly Collections in 2016. This ultimately led to an overall reduction in the refuse collection fleet.

Street Scene previously rolled out fuel efficient driving training (SAFED) across the front line services in 2010. Whilst this demonstrated that fuel savings can be made in standard driving, we discovered that due to the nature of our main services (Stop-Start) and central location of our operating centre,

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the reductions were less in a practical situation. However we continue to enforce this work through on-going in house CPC driver training.

Part 3: Assessing deliverability/feasibility and delivering a short list

This section identifies those measures from the long-list that have identified impacts on the specifically identified road links. Further assessments have been made on the planned measures to assess deliverability within the required timescales for compliance. However, it should be noted that the Borough-wide and other measures will also be expected to impact (potentially only minimally) on the identified road links due to the nature of the roads as transit routes.

Existing Measures

There are no existing measures within the long list that are predicted to have beneficial impacts specifically on the A348.

In Progress

The following measures are in progress and are predicted to have potential impacts on the identified road links within the timescales for compliance on these roads. Therefore these measures are also included on the short list for further assessment of potential impacts.

Table 9: Measures in Progress on A348

Scheme description	Location	Delivery Year	Direct impact on links?	Impact	Status
A348: Compliance Year 2019					
Continue to develop the Freight Quality Partnership	Borough wide	In progress	A348	Assist businesses with travel plans reducing diesel LGV and HGV use.	Ongoing

Planned Measures

As previously discussed, the A348 is predicted to be compliant in 2019 therefore measures on this road would need to be deliverable by the end of 2018 to bring forward compliance.

The following table identifies measures that have been rejected due to deliverability issues and identifies those that are both deliverable and practically feasible and have therefore been short listed for further consideration.

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Table 10: Planned Measures on the A348

Scheme description	Location	Delivery Year	Relevant road link	Impact	Short Listed?
A348: Compliance Year 2019					
ITS to improve traffic flow	Borough wide	N/A	A348	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	Yes
Junction improvements	Borough wide	N/A	A348	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	Yes
Reduce speed limits on relevant link	A348	2019	A348	Reduces permitted speed on relevant links. Should have corresponding reduction in emissions.	No Not deliverable in required timescale
Strategic cycling improvements	Borough wide	N/A	A348	Increased cycling trips - reduced private car trips	No Not deliverable in required timescale
Removal of unnecessary manoeuvres	Study - N/A	N/A	A348	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.	No Not deliverable in required timescale
Ringwood Road cycle tracks/lanes	A348	2020 or later	A348	Improved cycling facilities - reduced car journeys	No Not deliverable

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					in required timescale
NW Bournemouth to Poole QBC	A341/ A348	2014-2020	A348	Increased bus patronage and reduced private car trips.	No Not deliverable in required timescale
Develop transport interchanges along QBCs	A348	2021	A348	Encourages multi journey bus trips	No Not deliverable in required timescale
Measure not related to identified road links					
Car parking policies	Borough wide	2019		Reduced car parking in town centres to reduce private car trips	No Not deliverable in required timescale
Bike Share	Borough wide	2018		Typically 10-15% of bike share trips replace car journeys. Scheme in Dublin reported 19.8% of trips replaced car journeys but remaining 80% were previously sustainable mode journeys. Other examples: London 2%, Lyon 7%, Barcelona 9.6%, Montreal 2%.	Yes

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Short List

The table below presents the short list of measures which have been refined from the long list. A high level review of feasibility and deliverability has sifted out those measures which are not deliverable within the timescales to result in a short list of deliverable measures that could potentially reduce emissions on the A348.

Table 11: Short List of Measures for the A348

Scheme description	Location	Delivery Year	Relevant road link	Nature of impact
A348				
Continue to develop the Freight Quality Partnership	Borough wide	In progress	A348	Assist businesses with travel plans reducing diesel LGV and HGV use.
ITS to improve traffic flow	Borough wide	N/A	A348	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.
Junction improvements	Borough wide	N/A	A348	Improved traffic flow at hotspot junctions. Optimisation of speeds, reduced idling.
Bike Share	Borough wide	2018		Typically 10-15% of bike share trips replace car journeys. Scheme in Dublin reported 19.8% of trips replaced car journeys but remaining 80% were previously sustainable mode journeys. Other examples: London 2%, Lyon 7%, Barcelona 9.6%, Montreal 2%. The main weakness of this body of evidence on travel behaviour change is the lack of reliable quantitative data on the extent, in terms of frequency and magnitude, of the change in overall motorised travel on one hand and active travel on the other.

Part 4: Evidencing the short listed measures to identify options that could bring forward compliance

In this section we quantitatively assess the possible impact of each of the shortlisted measures from Part 3. We have used the local traffic data in conjunction with the EFT to produce estimates of the total annual NO_x emissions for the identified road links to create a baseline and then assessed the impact of each proposed measure for changes in NO_x emissions compared to the baseline in each year that the identified road link is predicted to be in exceedance.

As described in guidance provided by JAQU, the emission estimate outputs were submitted to JAQU who used the streamline PCM (SLPCM) model to produce estimates of changes in NO₂ concentration as a result of the proposed measures.

As previously described, this study has used local traffic data (A348: Manual traffic count November 2017 scaled to AADT using seasonal factor, speed data April 2018). No local information on Euro standards is available, so the default composition in the EFT has been used. The following inputs have been used in the EFT to produce the estimate of current emissions on the road links, taking into account the impact of the measures on the shortlist already implemented since 2015.

	A348
Road Type	Urban (not London)
Traffic Flow (AADT)	48121
% Car	80.01
% Taxi (Black Cab)	0.00
% LGV	14.66
% Rigid HGV	2.25
% Articulated HGV	1.07
% Bus & Coach	0.65
% Motorcycle	1.36
Speed (kph)	45.06152
No. of Hours	24
Link Length (km)	0.378
Estimated NO _x emission rate (g/km)	188656

Table 12: Local Traffic Data for A348 (2018)

The A348 is expected to remain in exceedance of the limit value of 40 µg/m³ in 2018 with a NO₂ concentration of 40.54 µg/m³. If there were no further changes to the flow, composition or average

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speed in 2019 (but with the ongoing expected upgrade of vehicles to higher Euro standards, as assumed in the PCM) then this road link would be expected to come into compliance in 2019 with a NO₂ concentration of 38.93 µg/m³.

Since compliance could potentially be brought forward further (from 2019 to 2018) we consider a number of further measures on our short-list to identify if any of those could bring forward compliance to 2018.

ITS to improve traffic flow

The A348 between Mountbatten Arms and Alderney Roundabouts currently experiences high levels of congestion during the AM and PM peaks while vehicles wait at traffic signals at the busy Mountbatten Arms Roundabout on the boundary between the Borough of Poole and Bournemouth Borough Council.

The average speeds across the full 3 day period from a speed survey carried out in April 2018 show the average speed to be 45 kph (27.999 mph). Across the full 24 hour day the average speed is very similar to free flow speed suggesting there is only a problem at the AM and PM peaks. The average speed on this link during the AM peak (7-9am) and in the PM peaks together (4-6pm) is 18.8 mph.

We believe that the signalling system on this road link and surrounding areas could be better optimised to reduce queueing at signals and subsequently increase the average speed of vehicles on this road link.

The speed limit is 40 mph and the observed average speed during peak periods is lower than this because of the observed queueing. MOVA (Microprocessor Optimised Vehicle Actuation) is already in place to optimise flow however there is scope for a wider SCOOT (Split Cycle Offset Optimisation Technique) system to further improve the movement of traffic within the local system, although little detailed work to estimate the potential benefits has been carried out. For robustness we assume a minor average speed increase on the A348 of 1 mph and 4 mph is achievable. This range of assumptions is based on the expert opinion of Borough of Poole Highways Engineers who have extensive experience of operating and developing signal phasing and optimisation across the Poole highways network.

We have considered three scenarios: an increase in average speed from 28mph to 29mph (46.7 kph), an increase to 30 mph (48.2 kph) and an increase to 32 mph (51.5 kph). The table below details the results from the EFT and SLPCM based on these assumptions.

Average speed (kph)	Annual NO _x emissions (kg/year)	% emissions reduction	Estimated NO ₂ concentrations (µ/m ³)
45	18865		40.54
46.7	18582	1.5%	40.13
48.2	18320	2.89%	39.76
51.5	17870	5.27%	39.10

Table 13: Predicted impacts of ITS measures on NO₂ emissions and concentrations

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Therefore, both our high and low assumptions about the range of potential average speed changes on the A349 from traffic signal optimisation suggest that this measure could potentially reduce NO₂ concentrations and bring the road link to compliance in 2018.

Bike Share

The planned bike share scheme is a joint project with Bournemouth Borough Council. The project plans for 1000 dockless bicycles to be provided for public hire across multiple locations across Poole and Bournemouth. As the Borough of Poole has a separate Compliance target from Bournemouth, we need to make assumptions on disaggregating the 1000 bicycles and we assume 40% of bicycles will be based within Poole boundary and 60% within Bournemouth. Poole's population is 147645 and Bournemouth's is 187503; total population is 335148, therefore Poole's population is 44% of the total population. Poole has the larger total area 64.88 km² compared to Bournemouth's - 46.18km². However Bournemouth's urban geography is slightly larger and more densely populated, therefore we assume a 40/60 split. This represents circa 400 bicycles available within the Borough of Poole boundary.

Evidence on bike sharing schemes suggests – “Overall, reported usage rates vary from 3-8 trips per day per bike, and these have been found to increase significantly in conjunction with disruptions to the public transport systems. “ (Ricci 2015)²

A similar scheme in Dublin reported 6 trips per bicycle per day³ in the first year, rising to 9 trips per day per bike currently. If we make a conservative assumption of 3 trips per day per bike in Poole, this represents potential total 1200 bike share trips per day (400 bikes x 3 trips per day) or 5 trips per day per bike would constitute 2000 total trips per day (400 bikes x 5 trips per day). Although not in the town centre or along Poole Quay or sea front, the A348 is still a major route from north Poole and Bournemouth University into Poole town centre and it seems reasonable that 5-10% of bike share trips would be along the A348.

Typically 10-15% of bike share trips replace car journeys. The scheme in Dublin reported 19.8% of trips replaced car journeys, but the remaining 80% were previously sustainable mode journeys anyway.

At a usage rate of 3 trips per bike per day with 5% of these occurring on the A348 equates to 60 trips per day (400 bikes x 5% x 3 trips per bike per day). If 10% are on A348 that equates to 120 trips per day (400 bikes x 10% x 3 trips per bike per day). Further applying the potential for 20% of trips to replace car journeys that equates to 12 or 24 trips. Similarly, if we assume a usage rate of 5 trips per bike per day that equates to 100 trips per day on the A348 with a 5% assumption and 200 with a 10% assumption. Applying the 20% of trips replacing car journeys that equates to 40 or 80 trips. (See Table 14) As University students are a key component of the bike share scheme target market, the Borough of Poole Sustainable Transport team consider this to be a robust assumption.

²

<http://eprints.uwe.ac.uk/25488/2/Bike%20sharing%20a%20review%20of%20evidence%20on%20impacts%20and%20processes%20REPOSITORY.pdf>

³ <https://www.bmj.com/content/360/bmj.k94/rr-2>

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Bike Share	Usage @ 3 trips per day per bicycle	Usage @ 5 trips per day per bicycle
Total Borough-wide trips	1200	2000
If 5% of trips are on A348	60	100
If 10% of trips are on A348	120	200
Applying a factor of 20% of Bike Share trips replacing car journeys	12 trips @ 5%	40 trips @ 5%
	24 trips @ 10%	80 trips @ 10%

Table 14: Analysis of potential range of Bike Share measure impacts

Based on the outlined assumptions above, Bike Share could remove between 12 and 80 car trips per day. If we assume an expected value of approximately 40, the predicted impact of Bike Share is therefore a reduction in traffic flow of 0.1%. This equates to a reduction in circa 40 fewer car journeys.

However, it is acknowledged that the main weakness of this body of evidence on travel behaviour change generally is the lack of reliable quantitative data on the extent (frequency and magnitude) of the change in overall motorised travel on one hand and active travel on the other.

There is widely reported evidence to suggest the impact of a bike share scheme increases the wider propensity to cycle as the visibility and profile of people on bicycles increases around the local transport network. As the A348 section in question, benefits from an off road cycle way offering security and safety to less confident cyclists it seems reasonable to assume that the introduction of the bike share scheme will have beneficial knock on effects of increasing the proportion of journeys to work and education made by bicycle. Furthermore, the A348 is a key route to Bournemouth University and Bournemouth town centre to the north east and Poole town centre to the south which has many employment locations and a college. Both town centres are less than 5 km from the link in question and are within a reasonable distance from trip attractors.

Junction Improvements

It is thought to be extremely unlikely that any significant junction improvements that would subsequently improve vehicle average speeds can be achieved by the financial year 2019/2020. Therefore this measure will not be progressed further in this study.

Freight Quality Partnership

Further assessment has indicated that this has not progressed and is currently inactive therefore there are no predicted impacts to the traffic along the A348 and the measure will not be progressed further in this study.

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The following table indicates a summary of the predicted impacts of the short listed measures on the variables of speed, traffic composition or traffic flow (AADT) on the identified road links.

Scheme description	Location	Delivery Year	Predicted Impacts		
			Traffic Composition	Speed	Flow
A348: Compliance Year 2019					
ITS to improve traffic flow	Borough wide	Assumed 2018	None	1-4 mph improvement	None
Bike Share	Borough wide	2018	0.1% cars removed from Car category	None	Flow reduced as a result of the change in traffic composition
Junction improvements	Borough wide	Assumed 2018	None	None	None
Continue to develop Freight Quality Partnership	Borough wide	In progress but currently inactive	None	None	None

Table 15: Assumed impacts of short listed measures

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The table below presents the results of the EFT and the SLPCM based on the assumptions for each short listed measure as summarised in the table. Traffic growth factors of 1.0132 have been applied (highest growth factor from NTEM model forecast) to the 2018 data to obtain predicted 2019 base flows to compare the impacts of measures in 2019 if no other measures were implemented.

Scheme description	Delivery Year	Predicted Impacts			Modelled Impacts		
		Traffic Composition	Speed	Flow	NOx kg/y	% emissions change Estimated NO ₂	µg/m ³
A348: Individual Measures (Base Year 2018)					18865	-	40.54
ITS to improve traffic flow	Assumed 2018	None	1 mph improvement	None	18582	↓1.50%	40.13
ITS to improve traffic flow	Assumed 2018	None	2 mph improvement	None	18320	↓ 2.89%	39.76
ITS to improve traffic flow	Assumed 2018	None	4 mph improvement	None	17870	↓ 5.27%	39.10
Bike Share	2018	0.1% cars removed from Car category	None	Flow reduced as a result of the change in traffic composition	18849	↓0.085%	40.52
A348: Option Combinations (Base Year 2018)					18865	-	40.54
Bike Share + ITS 1mph	Assumed 2018	0.1% cars removed from Car category	1 mph improvement	Flow reduced as a result of the change in traffic composition	18567	↓ 1.58%	40.11
Bike Share + ITS 2mph	Assumed 2018	0.1% cars removed from Car category	2 mph improvement	Flow reduced as a result of the change in traffic composition	18305	↓ 2.97%	39.73
Bike Share + ITS 4mph	Assumed 2018	0.1% cars removed from Car category	4 mph improvement	Flow reduced by 0.1% cars	17855	↓ 5.35%	39.08

Table 16: EFT and SLPMC modelled impacts of measures and packages of measures

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The results of our modelling suggest that Intelligent Transport Systems to optimise flow through junctions on the identified stretch of the A348 could potentially bring forward compliance with NO₂ limit values. The Bike Share scheme in combination with the ITS measure is also predicted to have a beneficial impact on emissions although the scale of this impact alone is not modelled to bring forward compliance.

Part 5: Setting out a preferred option

The various ITS measures and the combination of Bike Share and ITS measures have been further assessed against the following Secondary Critical Success Factors:

- **Value for money:** Does the measure deliver good value for money.
- **Affordability:** Is the measure affordable in the short/long term compared with other measures considered?
- **Distributional impacts:** Does the measure disproportionately affect one or a number of particular groups of stakeholders?
- **Strategic and wider air quality fit:** Does the measures interact well with and /or complement existing/planned policies and strategic aims?
- **Supply side capacity and capability:** Is there a sufficiently well-developed market with the capacity and capability to support efficient delivery of the measure?
- **Achievability:** Given market conditions, are adequate resources available to manage and implement the measure successfully?
- **Displacement:** Will the measure displace traffic onto other roads and/or cause potential exceedance elsewhere?

A summary of the outcome of the assessment is presented in Table 17.

ITS improvements measure

ITS improvements have been modelled to have a beneficial impact on emissions on the identified road link and are estimated to cost in the range of £10-15,000. As MOVA is already in place, additional SCOOT would need to be delivered to generate the benefits described earlier. The summary timeline for this measure is as follows:

August 2018:	brief and mobilise external contractor
September 2018:	study junction and produce design/staging diagrams
October 2018:	equipment order/programming
November 2018:	install additional loops for SCOOT monitoring
December 2018:	install loops/upgrade software and commission

However, we consider that the time required for procurement, working with external contractors, testing, works and staff resource implications for the Borough of Poole means that it will not be possible to have ITS measures in place until the end of 2018. In addition, any potential impacts of SCOOT cycle timings on cyclists and pedestrians crossing this road link would need to be further assessed to ensure there are no adverse distributional impacts on these groups.

It is therefore unlikely that there is sufficient time remaining in 2018 for the delivery of this measure in order to bring forward compliance by the end of 2018 on the A348. However, delivery of the measure could help to achieve compliance earlier within 2019 if delivery could be achieved as expected by the end of 2018.

Bike Share measure

The Bike Share measure alone is not modelled to have sufficient impact to actually bring about compliance in 2018, although it does have a beneficial impact. As the Bike Share scheme progresses

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both Poole and Bournemouth authorities are confident that increased visibility of bicycles on the network will stimulate journeys made by bike and reduce single car occupancy journeys. However, given the short timescale involved, it has been demonstrated that the expected uptake in 2018 following implementation would not lead to a sufficient reduction in NO₂ concentration to bring about compliance in 2018.

Bike Share + ITS improvements package

This package is modelled to produce NO₂ emission reduction sufficient to bring forward compliance. However, given the timescales for implementation of the ITS element, this package could not be expected to achieve the required emission reductions before the end of 2018. However, the combination of the two measures could be expected to bring about compliance sooner within 2019, the year of modelled compliance, given that ITS measures could be in place at the start of 2019 and would be further enhanced by the beneficial impacts of the Bike Share scheme.

Conclusions

Although no particular measure was identified in this TFS that could bring forward compliance on the A348 before the end of 2018, the Borough of Poole is committed to progressing the long list of measures in progress and planned options aimed at reducing congestion, flow, speeds and facilitating a cleaner fuel mix, with positive impacts also expected on air quality across the Borough, including the A348. The identified measures of ITS improvements and Bike Share could have a beneficial impact on NO₂ emissions from early 2019. In particular as Poole and Bournemouth form a new unitary authority, there is scope for greater partnership working making delivery of an ITS strategy considerably simpler.

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Summary table of individual measures assessed against Critical Success Factors

Scheme		Bike Share	ITS 1-4 mph	Bike Share + ITS 1 -4 mph
Timescale for Implementation		2018	2018	2018
Primary Critical Success Factor	Deliver compliance with NO ₂ air quality limit values in the shortest possible time	-1	1	1
Secondary Critical Success Factor	Value for Money		1	1
	Affordability		1	1
	Distributional Impacts		0	0
	Strategic & wider Air Quality fit		1	1
	Supply side capacity and capability		0	0
	Achievability		-1	-1
	Displacement		0	0
	Decision	Eliminate	Eliminate	Eliminate

Scoring Scale	
1	Positive
0	Neutral or N/A
-1	Negative

Table 17: Summary of measures assessed against Critical Success Factors

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Summary

Table 18 summarises the conclusion of this Study.

Road link	PCM identified link?	Summary of exceedance	Measures identified that could bring forward compliance	For any new measures, please set out costs and timeframe
A3049 Census ID: 28471	Yes – this link was identified as having an exceedance in the national PCM modelling	We have updated the baseline data using our local monitoring data which shows that the link is already compliant. 2015 data: 34.97 µg/m ³ 2016 data: 40.07 µg/m ³ 2017 data: 32.23 µg/m ³	N/A	N/A
A348 Census ID: 38387	Yes – this link was identified as having an exceedance in the national PCM modelling	The national PCM modelling has projected that this link will be compliant in 2019. Summary of NO ₂ concentration projections: 2018: 41 µg/m ³ 2019: 39 µg/m ³	We have not identified any measures that could bring forward compliance on this road link	N/A

Table 18: Summary of recommended measures to bring forward compliance

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Annex A: EFT Input Data

A348	Base 2018	ITS +1mph speed	ITS +2mph speed	ITS+4mph speed	Bike Share -0.1% cars
Road Type	Urban (not London)	Urban (not London)	Urban (not London)	Urban (not London)	Urban (not London)
Traffic Flow	48121	48121	48121	48121	48083
% Car	80.01	80.01	80.01	80.01	80.00
% Taxi (black cab)	0.00	0.00	0.00	0.00	0.00
% LGV	14.66	14.66	14.66	14.66	14.67
% Rigid HGV	2.25	2.25	2.25	2.25	2.25
% Artic HGV	1.07	1.07	1.07	1.07	1.07
% Bus and Coach	0.65	0.65	0.65	0.65	0.65
% Motorcycle	1.36	1.36	1.36	1.36	1.36
Speed(kph)	45.06152	46.671	48.2803	51.49889	45.06152
No of Hours	24	24	24	24	24
Link Length (km)	0.378	0.378	0.378	0.38	0.378

A348 packages	Base 2018	BS + ITS (1 mph)	BS + ITS (2 mph)	BS + ITS (4 mph)
Road Type	Urban (not London)	Urban (not London)	Urban (not London)	Urban (not London)
Traffic Flow	48121	48083	48083	48083
% Car	80.01	80.00	80.00	80.00
% Taxi (black cab)	0.00	0.000	0.00	0.00
% LGV	14.66	14.67	14.67	14.67
% Rigid HGV	2.25	2.25	2.25	2.25
% Artic HGV	1.07	1.07	1.07	1.07
% Bus and Coach	0.65	0.65	0.65	0.65
% Motorcycle	1.36	1.36	1.36	1.36
Speed(kph)	45.06152	46.671	48.2803	51.49889
No of Hours	24	24	24	24
Link Length (km)	0.378	0.378	0.378	0.378

Glossary

AADT	Annual Average Daily Traffic
AAQD	Ambient Air Quality Directive
BoP	Borough of Poole Council
DEFRA	Department for Environment, Food & Rural Affairs
DFT	Department for Transport
CPC	Certificate of Professional Competence
EFT	Emission Factor Toolkit
EV	Electric Vehicle
HGV	Heavy Goods Vehicle
HGV _a	Articulated HGV
HGV _r	Rigid HGV
ITS	Intelligent Transport System
JAQU	Joint Air Quality Unit at DEFRA
LAQM	Local Air Quality Management
LGV	Light Goods Vehicle
MOVA	Microprocessor Optimised Vehicle Actuation
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
ONS	Office for National Statistics
PCM	Pollution Climate Mapping model
SCOOT	Split Cycle Offset Optimisation Technique
SLPCM	Streamlined PCM
TFS	Targeted Feasibility Study