Air Quality Impact Assessment (AQIA) for the Eastleigh Borough Local Plan (EBLP): Addendum 1 – Updates and 2020 Model Results

Report for Eastleigh Borough Council

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Appendix 1 Tabulated detailed results for modelled receptor points

Abbreviations

Abbreviation	Explanation
AADT	Annual Average Daily Traffic
AQIA	Air Quality Impact Assessment
AQMA	Air Quality Management Area
CAZ	Clean Air Zone
EBC	Eastleigh Borough Council
EBLP	Eastleigh Borough Local Plan
EFT	Emissions Factor Toolkit
HGV(s)	Heavy Goods Vehicle(s)
LAQM	Local Air Quality Management
LGV(s)	Light Goods Vehicle(s)
NAEI	National Atmospheric Emissions Inventory
2020 NNTI	2020 No New Transport Interventions; a model scenario designed to represent 2020 conditions without the introduction of any new transport interventions, other than those related to developments under construction.
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (NO + NO_2)
PM_{10}	Particulate matter 10 micrometres or less in diameter
$PM_{2.5}$	Particulate matter 2.5 micrometres or less in diameter
PUSH	Partnership for Urban South Hampshire
SGO(s)	Strategic Growth Option(s)
SRTM	Sub-Regional Transport Model
2020 WI	2020 With Interventions; a model scenario designed to represent 2020 conditions with the addition of highway interventions which will be delivered in the short- to medium-term (e.g. either at 2020 or within a few years).

1 Introduction

This report is an Addendum to the main report 'Air Quality Impact Assessment for the Eastleigh Local Borough Plan'[1], which contains the results of an air quality impact assessment (AQIA) of road traffic emissions associated with different Strategic Growth Options (SGOs) for local plan development within Eastleigh Borough. The AQIA forms part of the evidence base supporting Eastleigh Borough Council (EBC) in connection with their emerging Eastleigh Borough Local Plan 2016-2036 (EBLP).

This Addendum report provides:

- Updates to the content of the original report (see Section 2).
- Modelling results and discussion for an additional two scenarios, examining the year 2020 (see Section 3 to 5 inclusive).

For the 2020 modelling study, a sub-regional air dispersion model (RapidAir) was used to model predicted air quality impacts at all locations within the EBLP study area at a resolution of 3m x 3m. The two 2020 scenarios were compared against a 2015 Reference Case scenario (see details in the main report[1]) and against air quality objectives.

The report considers the implications of the model results on existing declared Air Quality Management Areas (AQMAs). For areas where poor air quality is likely to remain a concern in 2020, recommendations are provided on how air quality issues may be addressed and mitigated.

[1] Ricardo Energy & Environment, "Air Quality Impact Assessment (AQIA) for the Eastleigh Borough Local Plan (EBLP)", ED11692100 Issue Number 3, 26 October 2018.

2 Updates since previous report

2.1 Consideration of the Southampton Clean Air Zone (CAZ)

The original AQIA[1] was issued in October 2018, and at the time, Southampton was investigating the implementation of a charging Clean Air Zone (CAZ) to achieve compliance with the national air quality objectives for nitrogen dioxide (NO_2). The AQIA considered possible implications of a CAZ in Southampton on air quality within Eastleigh Borough, in Section 3.6.2 of the original report. Following subsequent technical studies, Southampton City Council determined that NO_2 concentrations within Southampton should achieve compliance with the air quality objectives by 2020, without the need for a charging zone.[2] Southampton is continuing to investigate and implement various non-charging measures to improve air quality within the city. It is not anticipated that these measures would have a detrimental impact on the air quality within Eastleigh Borough.

2.2 Planning policy recommendations

The original AQIA[1] including planning policy recommendations for the EBLP in Section 4.3.3. The recommendations included strengthening of the wording in policy DM8, as follows (see page 139 of the AQIA):

> The linkages between planning and air quality are very important and integral for achieving compliance with air quality objectives, particularly within existing AQMAs and avoiding the need to declare new AQMAs. Therefore, ensuring all new developments are subject to a high level of scrutiny in this respect is essential. Policy DM8 cited above goes a significant way to provide the mechanism to achieve this, however this would be strengthened by an explicit requirement "*to provide additional information on the impact of their proposed development on air quality"* and that *"development will not be supported where it is not possible to mitigate the adverse effects of that development on air quality effectively or where development proposals cause unacceptable air quality impacts*", or similar provisions.

This recommendation was based on a previous draft version of policy DM8, which included the wording "Development will not be permitted if it is likely to cause loss of amenity or other unacceptable environmental impacts…" Policy DM8 was later updated to read "Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts…" Based on the revised wording for policy DM8, which explicitly refers to impacts on public health, no further changes are recommended for the planning policy contained within EBLP.

[2] Southampton City Council, "Clean Air Update", https://www.southampton.gov.uk/environmental-issues/pollution/air-quality/clean-air-zone.aspx, accessed 30/04/2019.

3 Method statement for 2020 modelling study

This chapter describes the air quality modelling methodology for the two 2020 scenarios, including a description of the transport model scenarios upon which the air quality model was based.

The following additional information can be found in the main report[1], where the indicated section numbers correspond to sections of that report:

- A description of the Sub-Regional Transport Model (SRTM), developed by MVA Consultancy and utilized by Systra to provide transport modelling data (Section 2.1).
- A description of the air dispersion modelling methodology (Section 2.2) used to generate the results of the main AQIA report[1] related for the local plan.

The following sections describing methodology for the main report also apply to the 2020 scenarios:

- A description of the RapidAIR air quality modelling system (Section 2.2.1).
- The model domain (Section 2.2.2).
- Emission factors (Section 2.2.3).
- Meteorological data (Section 2.2.5).
- Modelling of annual mean concentrations for NO_2, PM_{10}, $PM_{2.5}$ (Section 2.2.6)
- Modelling of short-term mean concentrations for NO_2 and PM_{10} (Section 2.2.7)
- Sources of model uncertainty (Section 2.2.8)

3.1 Model scenarios and traffic activity data for the 2020 scenarios

For this Addendum, annual average daily traffic (AADT) vehicle numbers and average vehicle speeds were extracted from the SRTM datasets provided by Systra[3] for two transport model scenarios, as described below. These model scenarios were based on a 2019 SRTM Scenario, with Eastleigh Borough land use inputs updated to correspond to those anticipated for mid-2020. Growth outside of Eastleigh Borough was updated from 2019 to 2020 using Tempro-based growth factors.

- **2020 No New Transport Interventions (2020 NNTI):** A transport model scenario designed to represent 2020 conditions without the introduction of any new transport interventions, other than those related to developments under construction. No public transport or active mode improvements were included. The following transport interventions were included:
  - A335 Leigh Road / Passfield Avenue
  - Sundays Hill Bypass
  - St Johns Link Road
  - Chestnut Avenue / Stoneham Lane roundabout
  - Chestnut Avenue / Passfield Avenue roundabout
  - Southampton Road / Chestnut Avenue junction
  - All SRTM 2019 reference schemes located outside Eastleigh Borough, including M27 Smart Motorways
- **2020 With Interventions (2020 WI):** This scenario was designed to represent 2020 conditions with the addition of highway interventions which will be delivered in the short- to medium-term

[3] Michael Hornung (Systra), "Re: Eastleigh Local Plan – 2020 Air Quality Runs". Message to Jessica Virdo (Ricardo Energy and Environment). 4 December 2018. Email.

(e.g. either at 2020 or within a few years); or other highway interventions directly related to an air quality management area (AQMA). This approach was taken to enable to Council to assess the effect of the interventions which will or could be taken within a reasonable period to address air quality. No public transport or active mode improvements were included. The schemes listed in the 2020 NNTI scenario were included, as well as the following transport interventions:

- Burnetts Lane link road and roundabout
- Botley Road / Burnetts Lane
- Allington Lane / Fair Oak Road
- Fair Oak Road / Sandy Lane / Allington Lane
- Knowle Lane / Church Lane adjustments
- Maypole roundabout
- Denhams Corner
- M3 Smart Motorways
- M27 Junction 8 / Windhover roundabout – RIS1 scheme
- M27 Junction 9
- Whiteley Way
- Bishopshtoke Road corridor improvements:
  - Eastleigh town centre Station Hill / Romsey Road roundabout improvement
  - Bishopstoke Road / Chickenhall Lane signalisation
- Botley Bypass and related improvements to Woodhouse Lane
- Botley Bypass / A334 / A3051 improvements
- A3024 Bitterne Road corridor improvements
- Hamble Lane improvements
- Link road through car boot sale (southwest of Windhover Roundabout)

The SRTM provides a fleet composition breakdown into cars, light goods vehicles (LGVs), heavy goods vehicles (HGVs) and buses. NAEI (National Atmospheric Emissions Inventory) fleet split information can be used to further split cars into petrol and diesel categories, and HGVs into rigid HGV and articulated HGV categories, based on national average fleet composition information and depending on whether the road link is categorized as rural, urban or motorway. For this study, SRTM AADT numbers for cars and HGVs were further categorized based on mapping the SRTM road types onto the NAEI road types as shown in Table 3-1. Non-motorway SRTM road types (i.e., A road, B road, shopping, buffer and other) were categorized as either rural or urban based on their location set out in the 2011 Area Classifications for Output Areas (2011 OAC).[4] The fleet compositions in Table 3-1 were calculated using the most recent set of NAEI fleet projection information available (base year 2016, published February 2017).[5]

Table 3-1 Matching SRTM fleet composition to EFT (Emission Factor Toolkit) vehicle types for 2020 model scenarios

NAEI Road Type	Petrol Car	Diesel Car	Electric Car	Rigid HGV	Articulated HGV
Urban (not London)	52.78%	46.85%	0.37%	77.89%	22.11%
Rural	45.73%	54.27%	–	51.25%	48.75%
Motorway	35.50%	64.50%	–	30.73%	69.27%

[4] The National Archives, "2011 Area Classifications", http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/ns-area-classifications/ns-2011-area-classifications/index.html, accessed 12/12/2017.

[5] National Atmospheric Emissions Inventory, "Emission factors for transport", http://naei.beis.gov.uk/data/ef-transport, accessed 28/06/2018.

4 Assessment of air quality related to human health

This section describes the air quality model results for the two 2020 scenarios in terms of air quality impacts on human health. Two scenarios for 2020 were modelled: 2020 With Interventions (2020 WI) and 2020 No New Transport Interventions (2020 NNTI).

The following additional information can be found in the main report[1], where the indicated section numbers correspond to sections of that report:

- Air quality management areas (AQMAs) within Eastleigh Borough (Section 3.2), including descriptions and a map.
- Modelled receptor points (Section 3.3), including maps showing the location of the receptor points referenced in this Addendum.
- Model results (Section 3.4), including tabulated data and mapped results for the SGO scenarios modelled for the Eastleigh Borough Local Plan.
- Summary of model results (Section 3.5) for the SGO scenarios modelled for the Eastleigh Borough Local Plan.
- Linkages to other air quality modelling studies (Section 3.6), specifically the Partnership for Urban South Hampshire (PUSH) Air Quality Impact Assessment and the Southampton Clean Air Zone (CAZ).

4.1 Overview of air quality standards for human health

Table 4-1 summarises the air quality objectives relevant in this study. For Local Air Quality Management purposes, and for the assessment of air quality against the air quality objectives, personal exposure is also important. Therefore, predicted concentrations greater than the values listed in Table 4-1 at a given location do not necessarily indicate an exceedance of the Air Quality Objective. Rather, the predicted concentrations should be considered in the context of personal exposure, with consideration given to the types of locations where the Air Quality Objectives should apply (Table 4-2).

Table 4-1 Air Quality Objectives in England

Pollutant	Air Quality Objective	Measured as
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year; equivalent to a 99.8th percentile of hourly means not exceeding 200 µg/m^3	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year; equivalent to a 90.4th percentile of daily means not exceeding 50 µg/m^3	24-hour mean
	40 µg/m^3	Annual mean
Particulate Matter ($PM_{2.5}$); to be achieved by 2020 and maintained thereafter	25 µg/m^3	Annual mean

Table 4-2 Examples of where the Air Quality Objectives should apply[6]

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

There are no current legal obligations on local authorities in relation to compliance with the $PM_{2.5}$ air quality objective. However, local authorities are expected to make efforts to reduce emissions and/or concentrations of the pollutant through the application of measures, as described in their Annual Status Report.

4.2 Air quality model results for 2020 scenarios

The annual mean model results for NO_2, PM_{10} and $PM_{2.5}$ are summarized in Table 4-3, Table 4-4 and Table 4-5 respectively. The short-term model results, for 99.8th percentile of hourly mean NO_2 concentrations and 90.4th percentile of daily mean PM_{10} concentrations, are summarized in Table 4-6 and Table 4-7 respectively. These results are expressed in terms of a percentage change in air pollution concentration between the 2015 Reference Case and the 2020 scenarios. The modelled receptor points were grouped by location, according to the split provided in Table 3-4 of the main report,[1] and the average change in concentration was calculated for each location category. Negative values indicate that the pollutant concentration in the future year scenario is lower than in the 2015 Reference Case, and therefore correspond to an improvement in air quality. Detailed results, including modelled air pollutant concentrations (µg/m^3) at each receptor point, are included in Appendix 1 of this Addendum report.

Maps displaying the modelled annual mean concentration results for the 2020 scenarios (2020 With Interventions and 2020 No New Transport Interventions) are provided in Figure 4-1 to Figure 4-36. Maps displaying the short-term model results are provided in Figure 4-37 to Figure 4-60. In all maps, the colour schemes have been set so that areas predicted to exceed the air quality objective are displayed in orange or red.

[6] Department for Environment Food and Rural Affairs, "Local Air Quality Management: Technical Guidance (TG16)", February 2018.

Table 4-3 Summary of model results for annual mean NO_2 concentrations (road contribution + background concentration): average change in concentration (%) between 2015 Reference Case and 2020 scenarios

Location of modelled receptor points	Average change in concentration (%) between 2015 Reference Case and 2020 model scenarios	
	2020 WI	2020 NNTI
In or near AQMA No. 1 (A335 / Eastleigh)	-18.0%	-18.7%
In or near AQMA No. 2 (M3)	-19.9%	-23.2%
In or near AQMA No. 3 (Hamble Lane)	-13.0%	-9.7%
In or near AQMA No. 4 (High Street Botley)	-35.9%	-18.5%
Along the A27 in Bursledon	-15.8%	-16.4%
Near roads between Eastleigh and Southampton	-17.1%	-16.9%
Near roads between Eastleigh and Fareham	-15.7%	-16.0%
Near roads between Eastleigh and Winchester	-18.2%	-21.5%
Near roads between Eastleigh and Test Valley	-16.4%	-17.1%

Table 4-4 Summary of model results for annual mean PM_{10} concentrations (road contribution + background concentration): average change in concentration (%) between 2015 Reference Case and 2020 scenarios

Location of modelled receptor points	Average change in concentration (%) between 2015 Reference Case and 2020 model scenarios	
	2020 WI	2020 NNTI
In or near AQMA No. 1 (A335 / Eastleigh)	-2.8%	-2.9%
In or near AQMA No. 2 (M3)	-6.7%	-6.8%
In or near AQMA No. 3 (Hamble Lane)	-4.5%	-0.6%
In or near AQMA No. 4 (High Street Botley)	-22.3%	-4.9%
Along the A27 in Bursledon	-3.3%	-2.9%
Near roads between Eastleigh and Southampton	-2.0%	-1.7%
Near roads between Eastleigh and Fareham	-4.2%	-4.4%
Near roads between Eastleigh and Winchester	-4.6%	-5.1%
Near roads between Eastleigh and Test Valley	-3.4%	-3.4%

Table 4-5 Summary of model results for annual mean $PM_{2.5}$ concentrations (road contribution + background concentration): average change in concentration (%) between 2015 Reference Case and 2020 scenarios

Location of modelled receptor points	Average change in concentration (%) between 2015 Reference Case and 2020 model scenarios	
	2020 WI	2020 NNTI
In or near AQMA No. 1 (A335 / Eastleigh)	-6.1%	-6.2%
In or near AQMA No. 2 (M3)	-10.4%	-10.7%
In or near AQMA No. 3 (Hamble Lane)	-7.2%	-2.7%
In or near AQMA No. 4 (High Street Botley)	-24.3%	-7.7%
Along the A27 in Bursledon	-6.3%	-6.3%
Near roads between Eastleigh and Southampton	-5.7%	-5.4%
Near roads between Eastleigh and Fareham	-7.0%	-7.3%
Near roads between Eastleigh and Winchester	-8.0%	-8.7%
Near roads between Eastleigh and Test Valley	-6.2%	-6.3%

Table 4-6 Summary of model results for 99.8th percentile of hourly mean NO_2 concentrations (road contribution + background concentration): average change in concentration (%) between 2015 Reference Case and 2020 scenarios

Location of modelled receptor points	Average change in concentration (%) between 2015 Reference Case and 2020 model scenarios	
	2020 WI	2020 NNTI
In or near AQMA No. 1 (A335 / Eastleigh)	-20.0%	-21.0%
In or near AQMA No. 2 (M3)	-17.5%	-20.3%
In or near AQMA No. 3 (Hamble Lane)	-13.3%	-10.3%
In or near AQMA No. 4 (High Street Botley)	-40.1%	-19.4%
Along the A27 in Bursledon	-16.6%	-17.9%
Near roads between Eastleigh and Southampton	-18.7%	-18.6%
Near roads between Eastleigh and Fareham	-13.7%	-14.2%
Near roads between Eastleigh and Winchester	-14.6%	-19.6%
Near roads between Eastleigh and Test Valley	-16.6%	-17.6%

Table 4-7 Summary of model results for 90.4th percentile of daily mean PM_{10} concentrations (road contribution + background concentration): average change in concentration (%) between 2015 Reference Case and 2020 scenarios

Location of modelled receptor points	Average change in concentration (%) between 2015 Reference Case and 2020 model scenarios	
	2020 WI	2020 NNTI
In or near AQMA No. 1 (A335 / Eastleigh)	-6.0%	-6.1%
In or near AQMA No. 2 (M3)	-12.0%	-12.1%
In or near AQMA No. 3 (Hamble Lane)	-6.3%	-0.5%
In or near AQMA No. 4 (High Street Botley)	-31.8%	-5.5%
Along the A27 in Bursledon	-5.3%	-4.9%
Near roads between Eastleigh and Southampton	-5.2%	-4.7%
Near roads between Eastleigh and Fareham	-5.9%	-6.6%
Near roads between Eastleigh and Winchester	-8.4%	-9.3%
Near roads between Eastleigh and Test Valley	-5.2%	-5.4%

Figure 4-1 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario

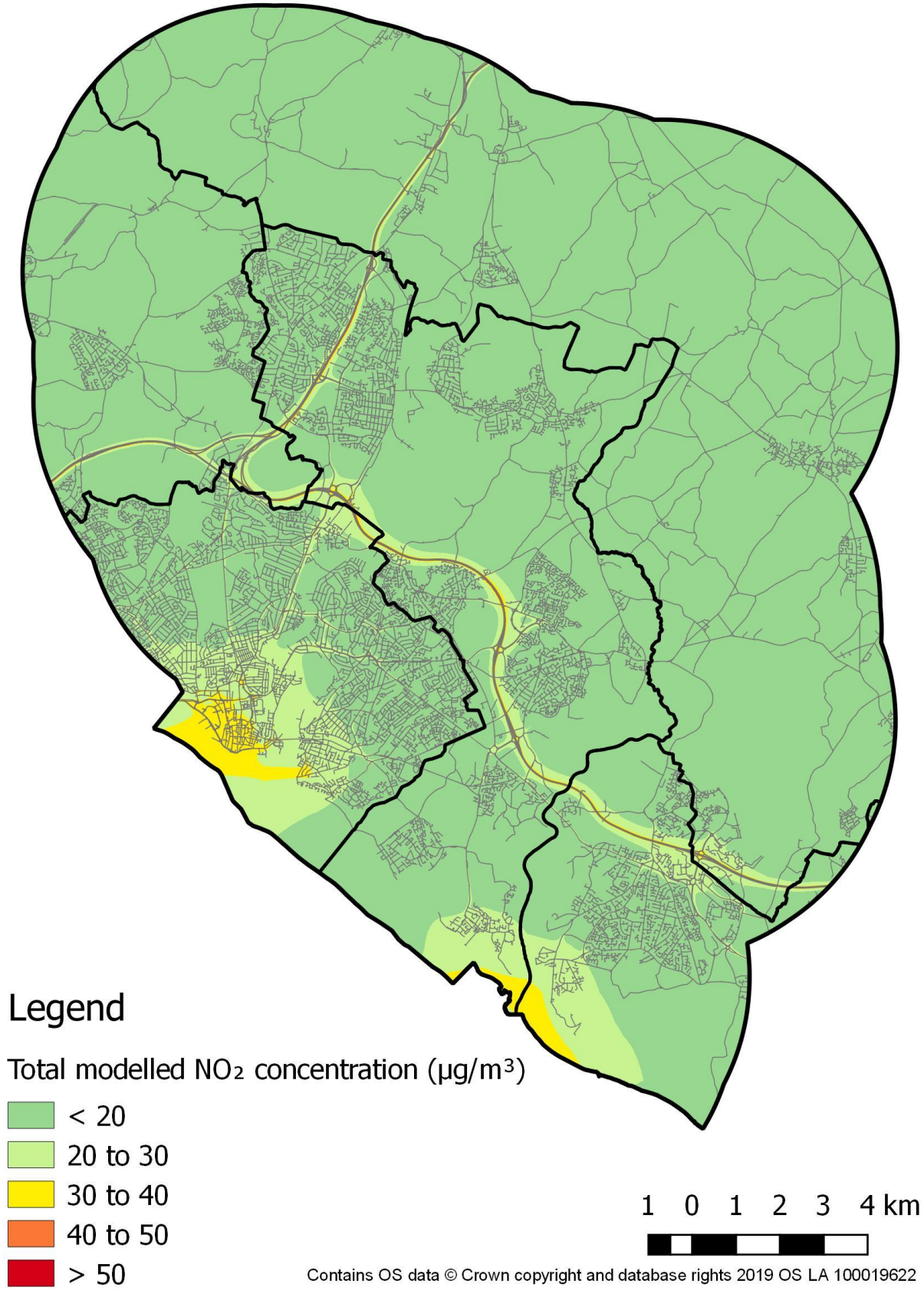


Figure 4-2 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario

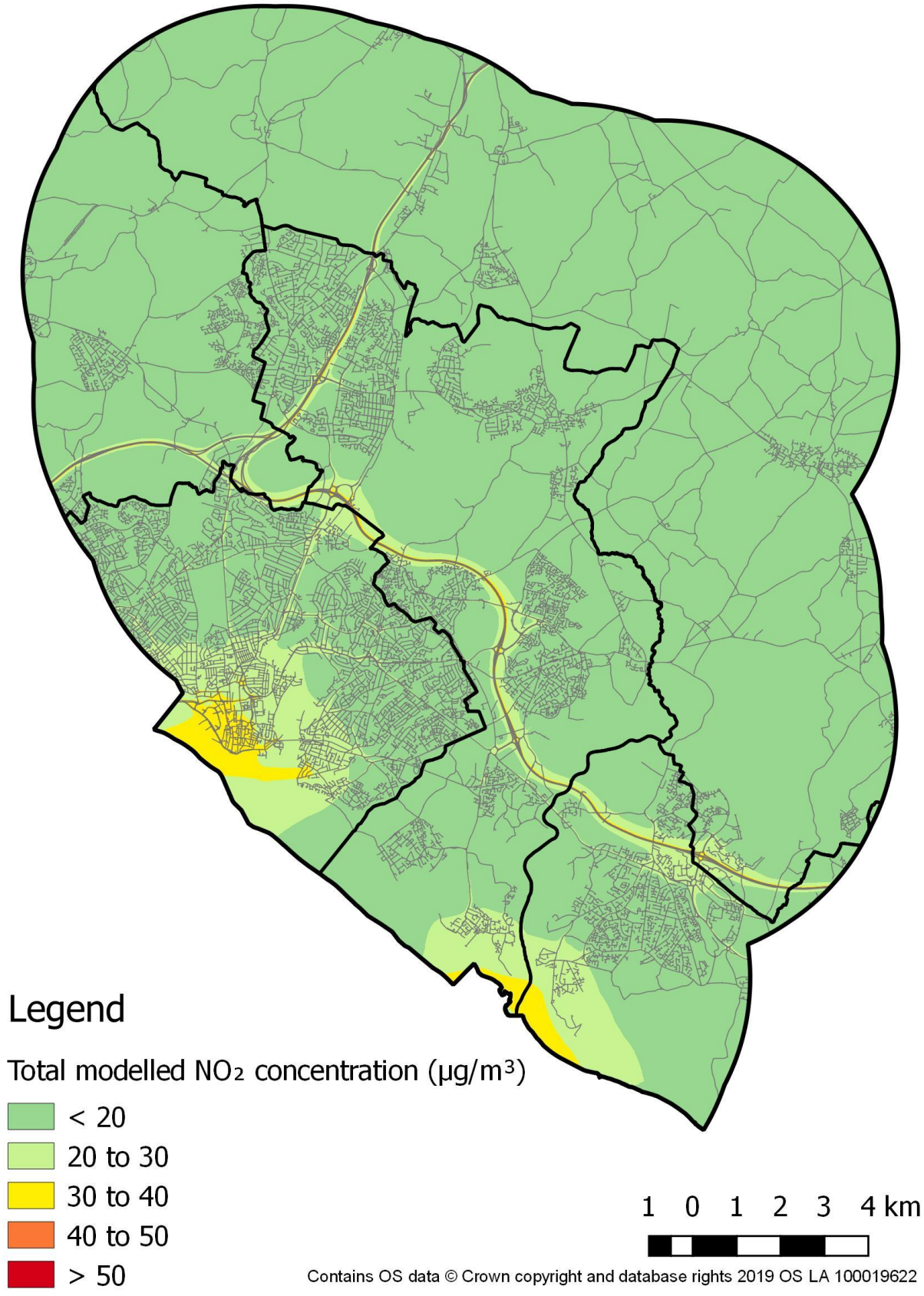


Figure 4-3 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario

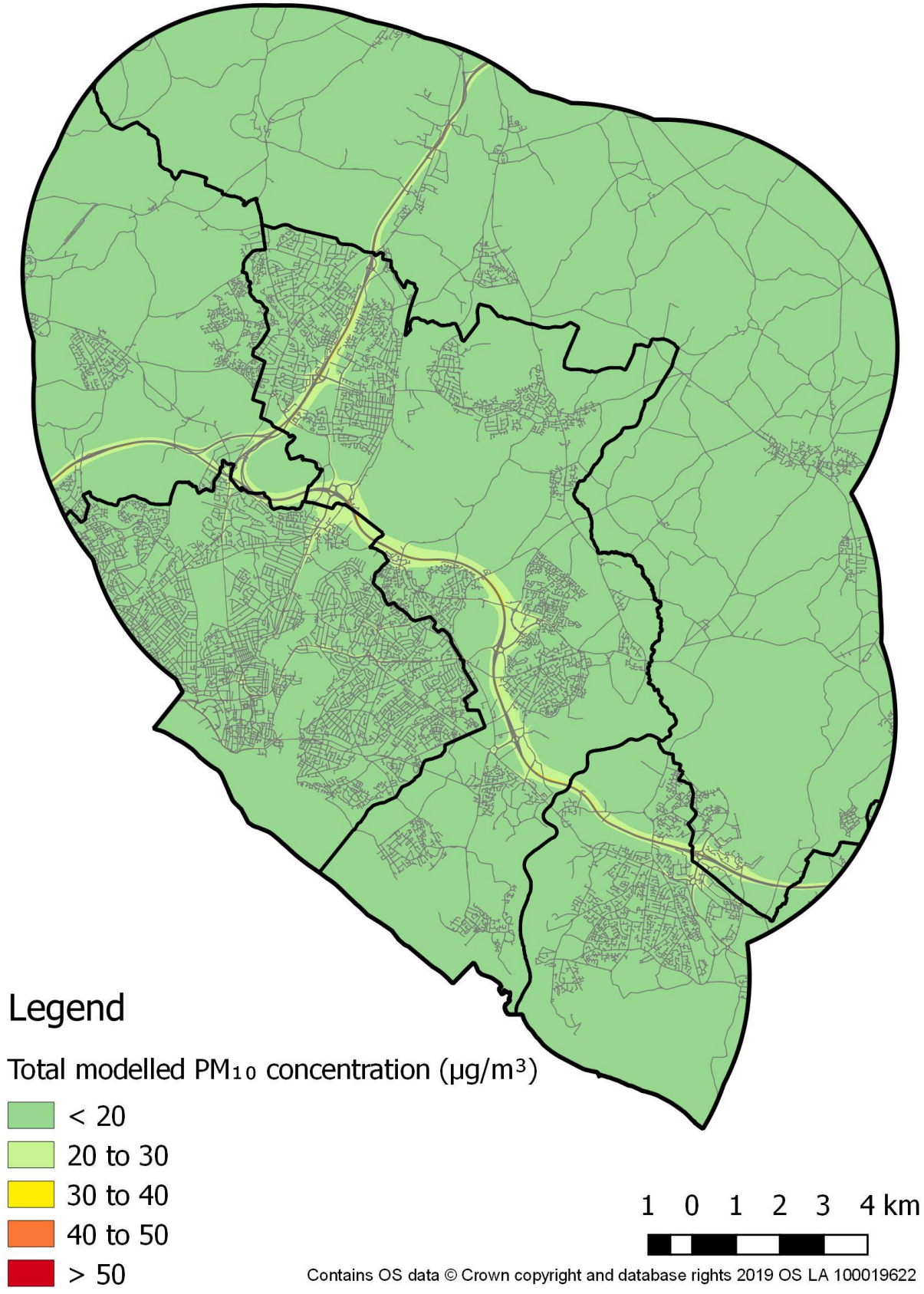


Figure 4-4 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario

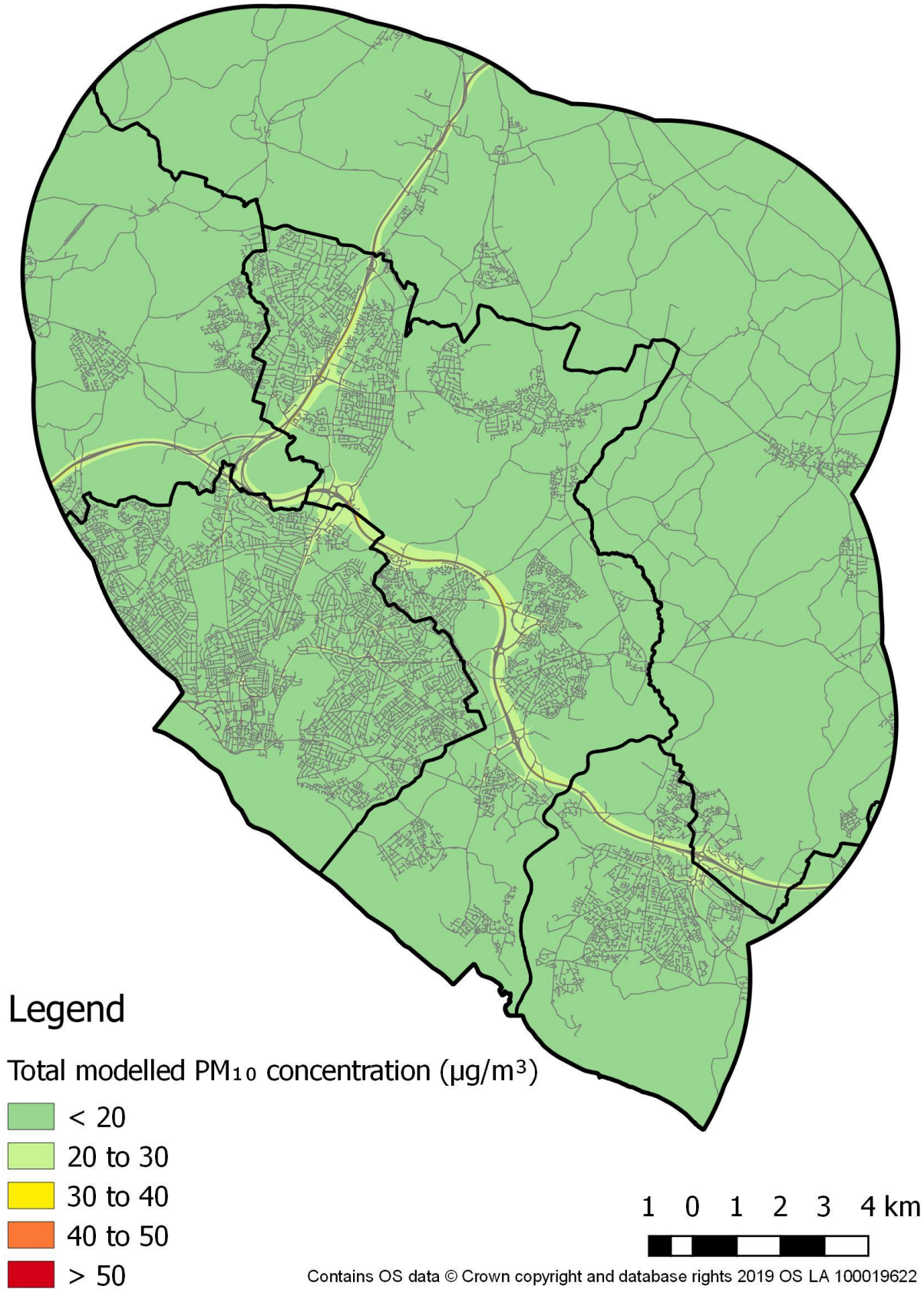


Figure 4-5 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario

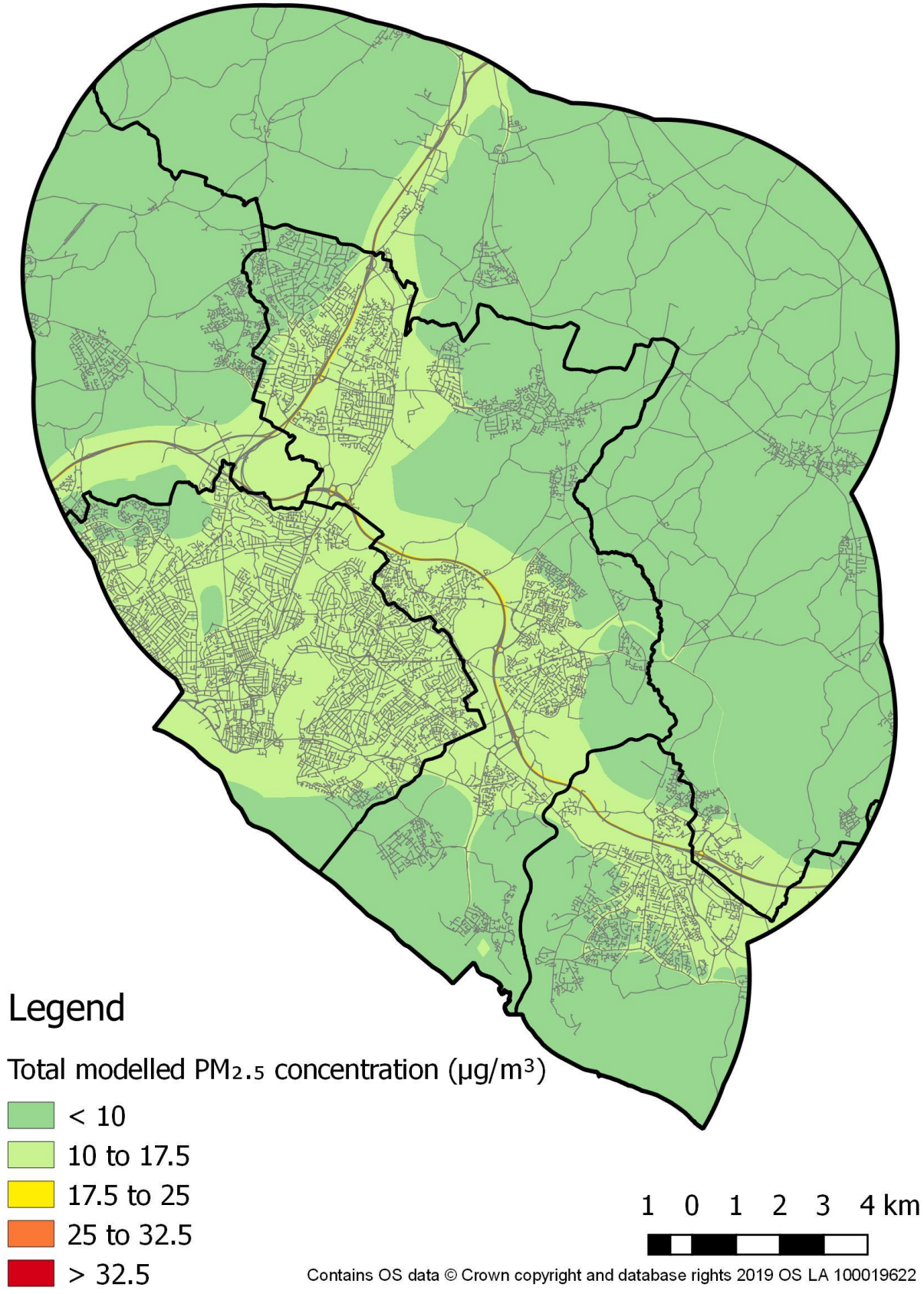


Figure 4-6 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario

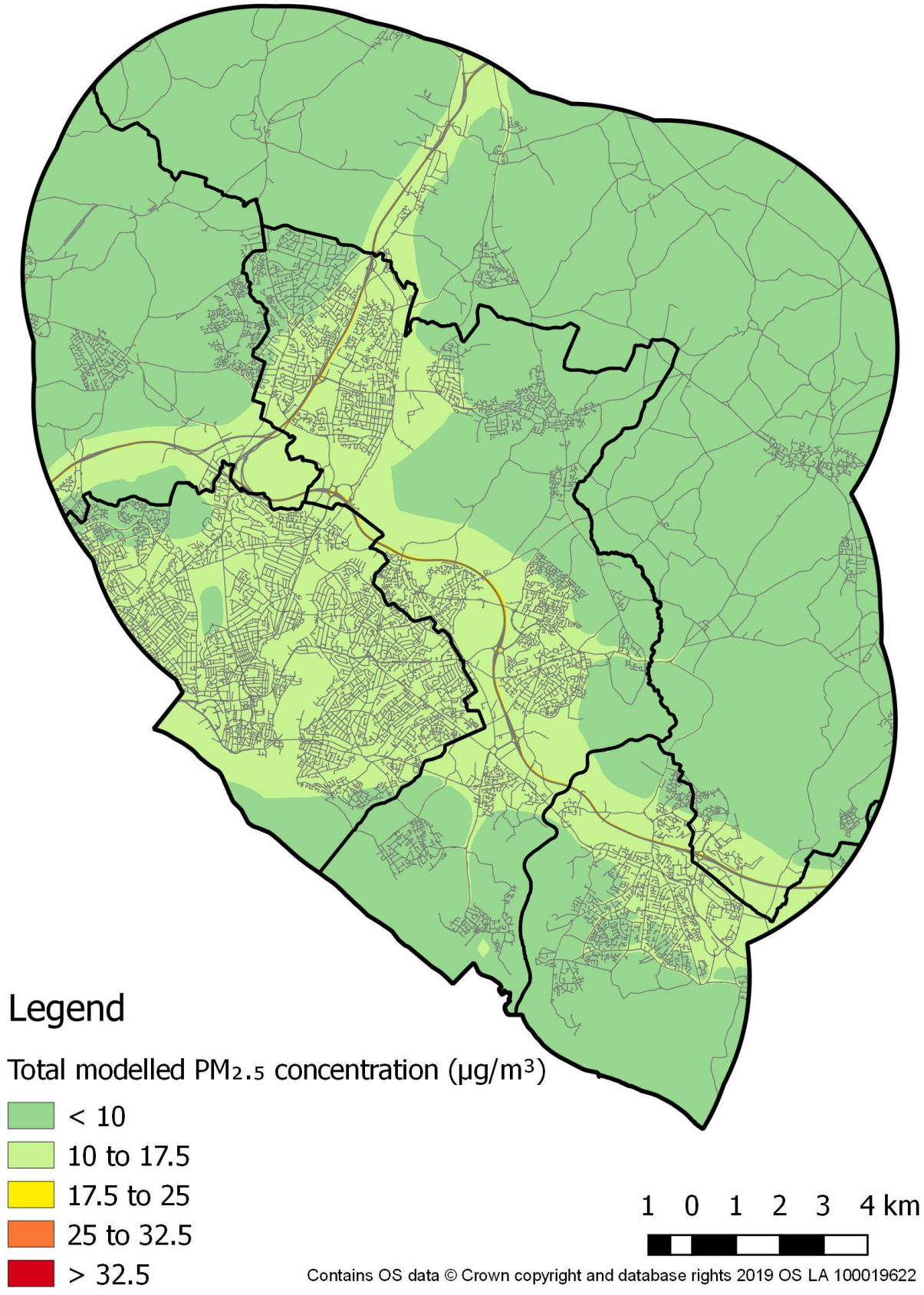


Figure 4-7 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario AQMA No. 1 (A335 / Eastleigh) (East)

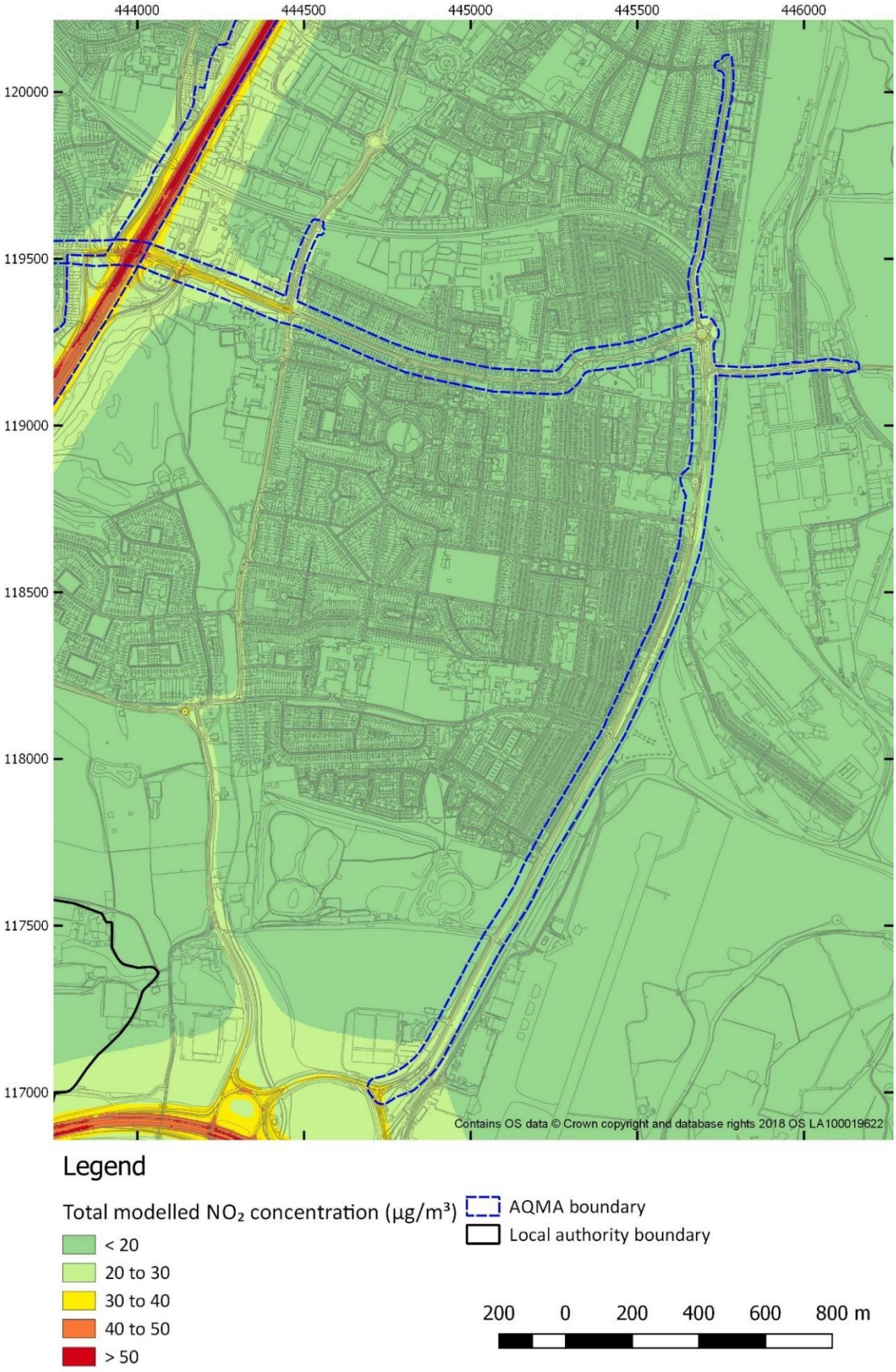


Figure 4-8 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

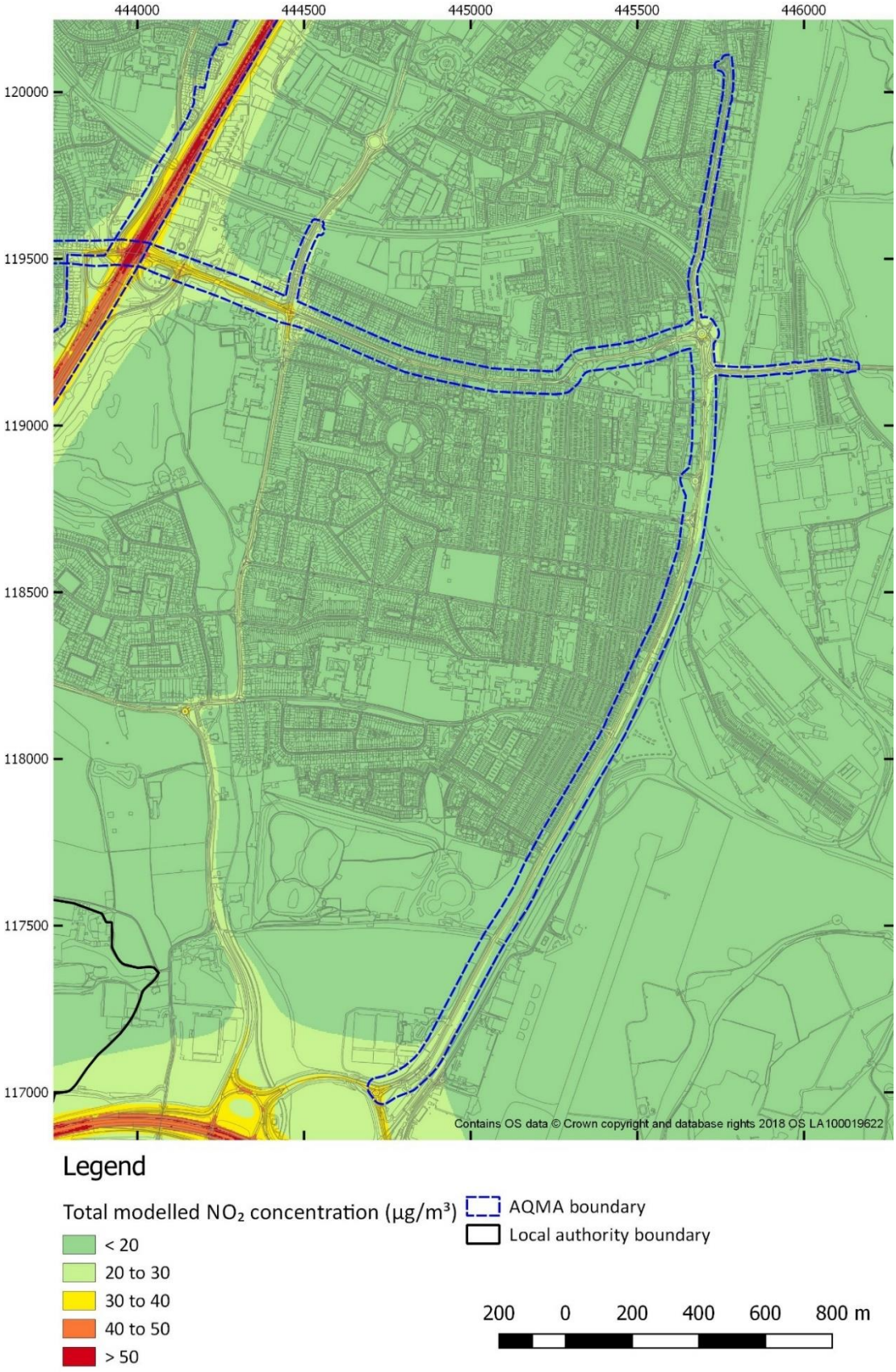


Figure 4-9 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

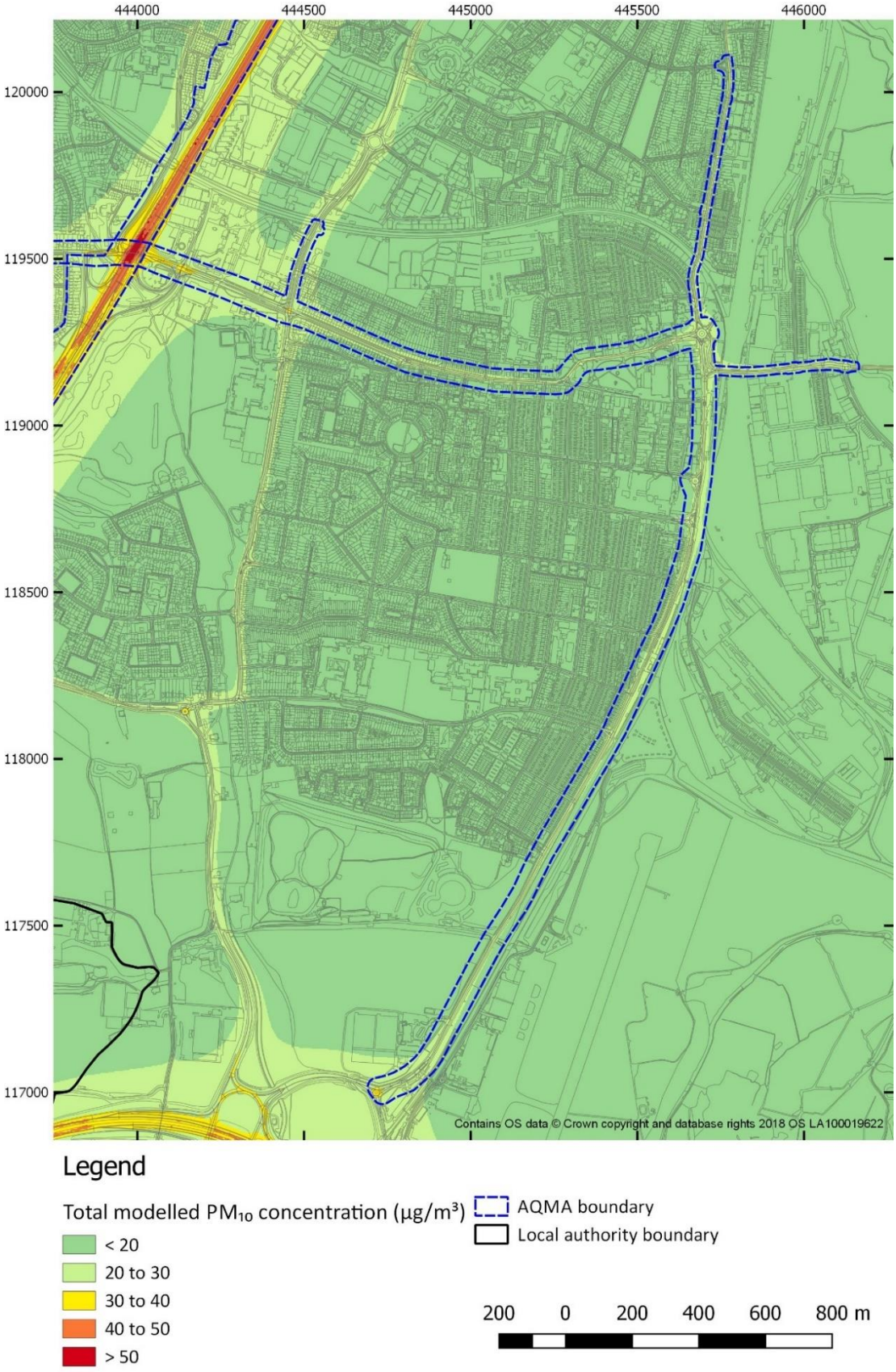


Figure 4-10 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

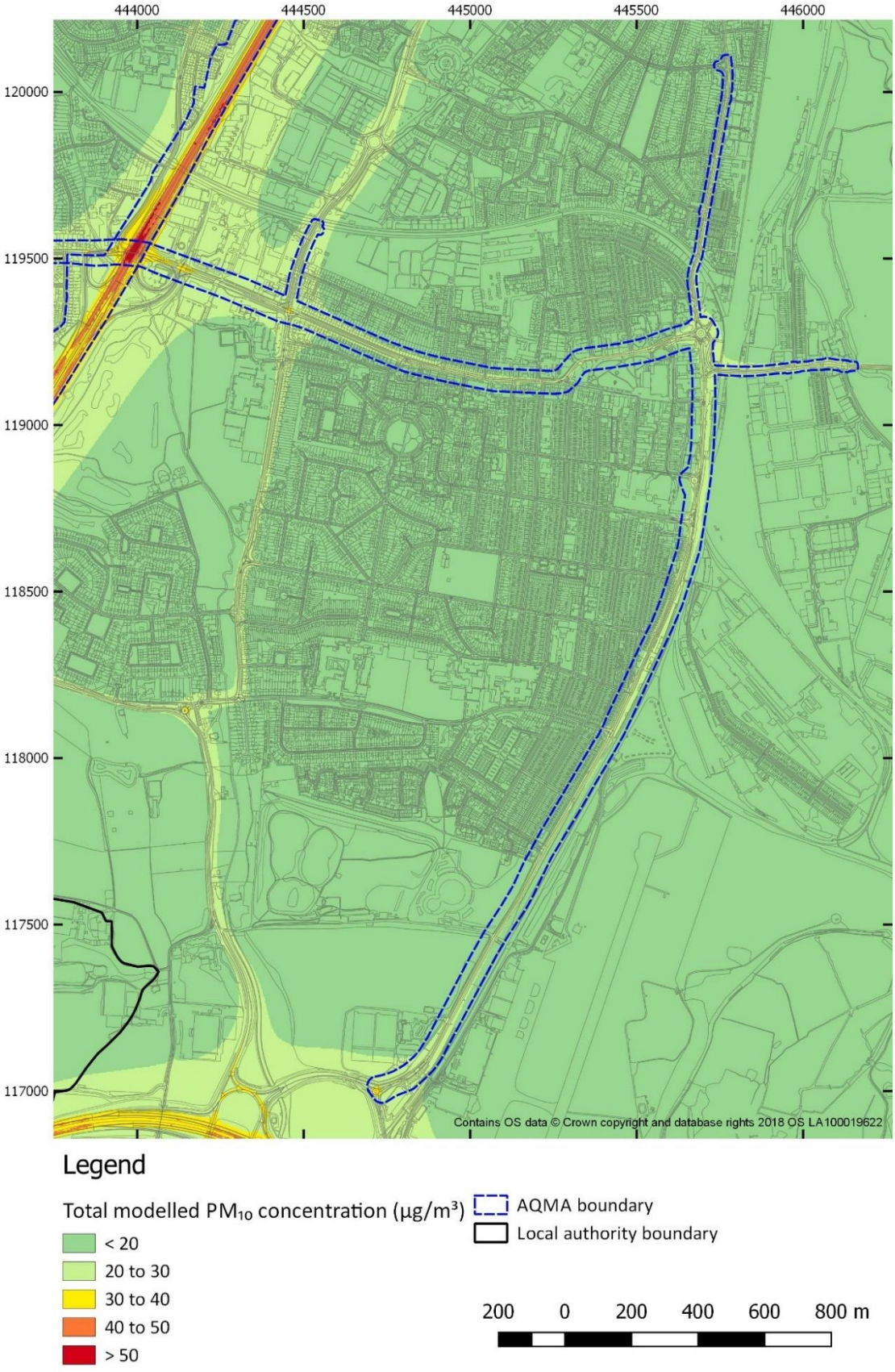


Figure 4-11 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

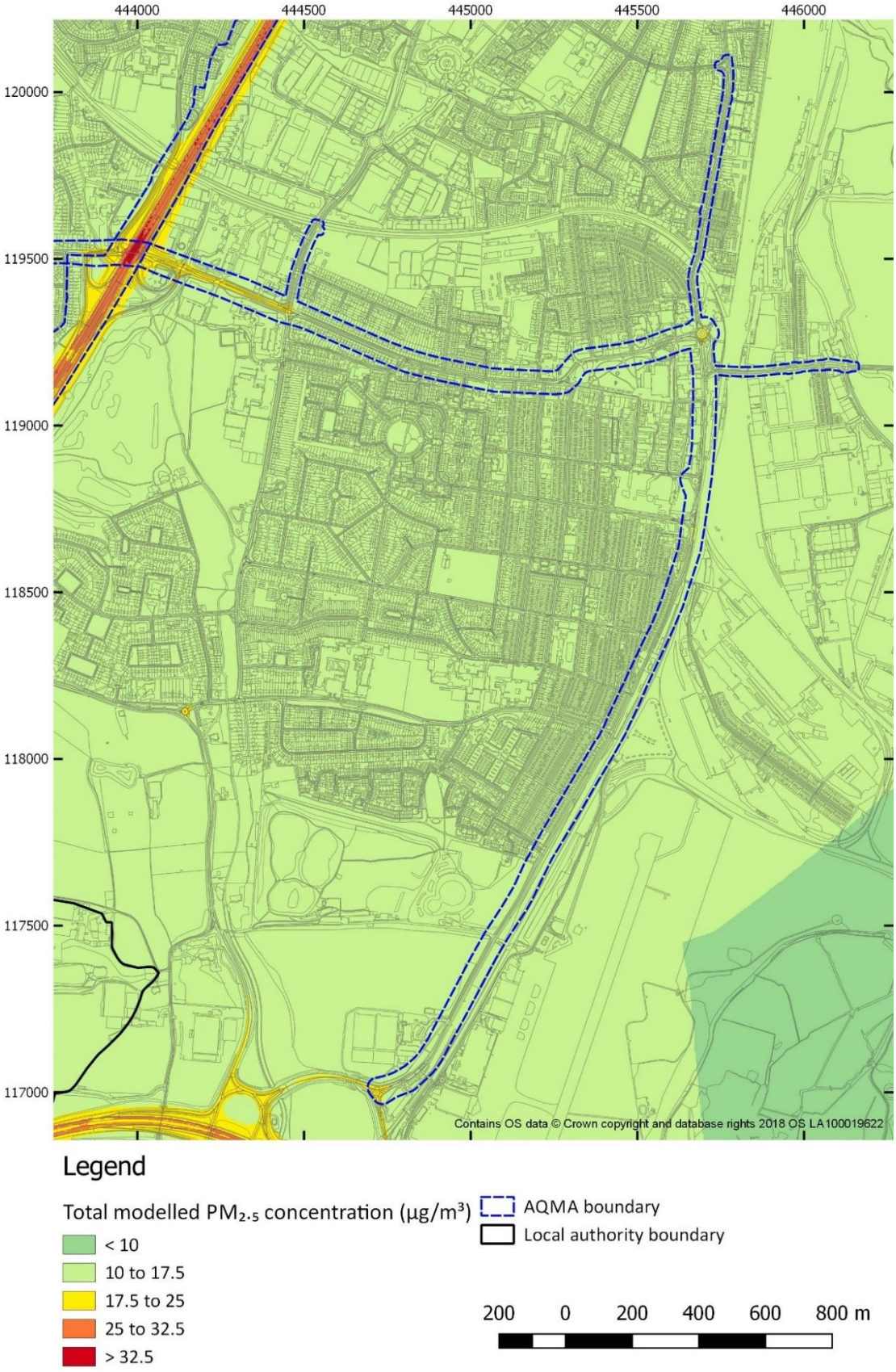


Figure 4-12 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

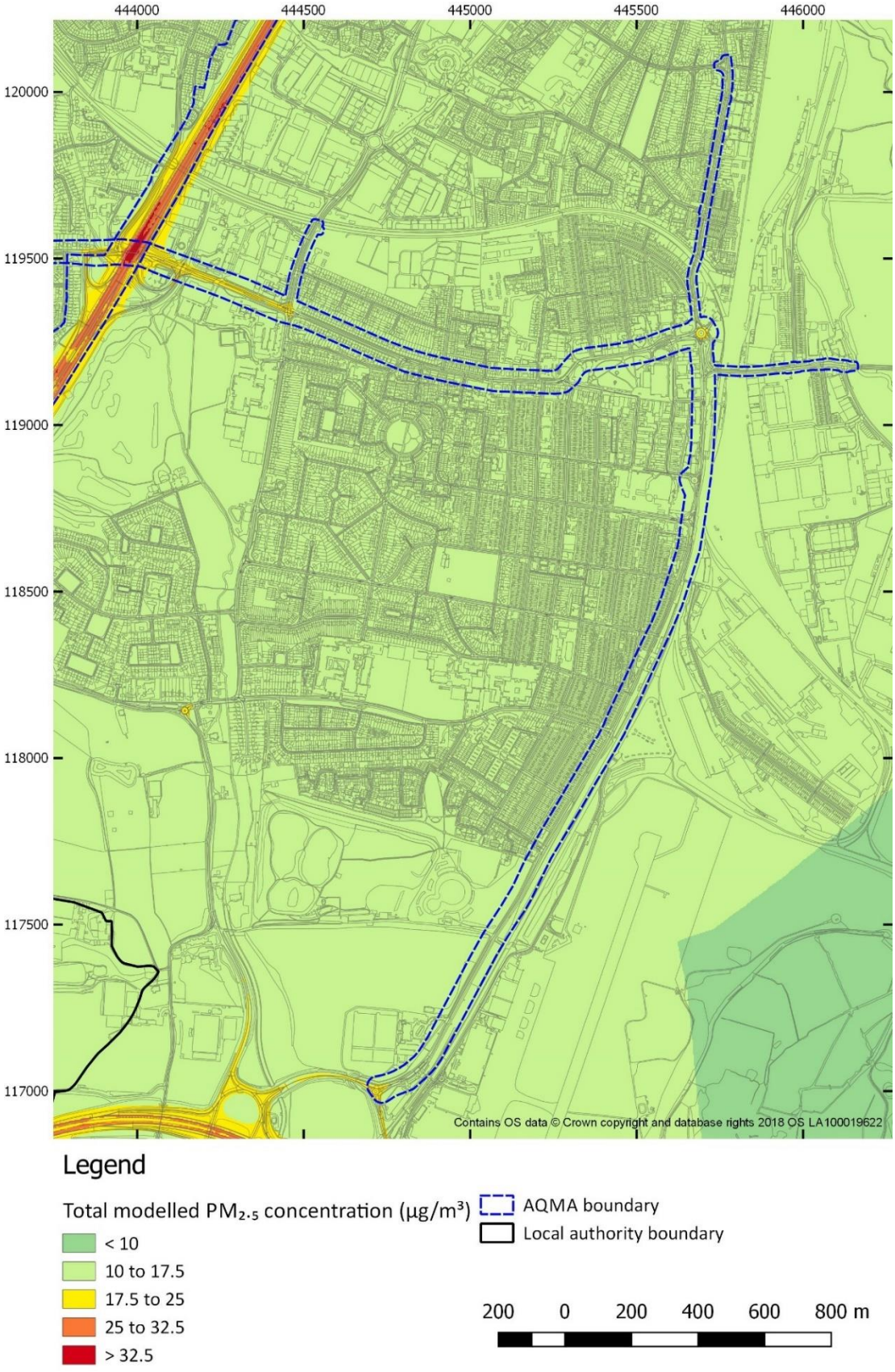


Figure 4-13 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

Figure 4-14 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

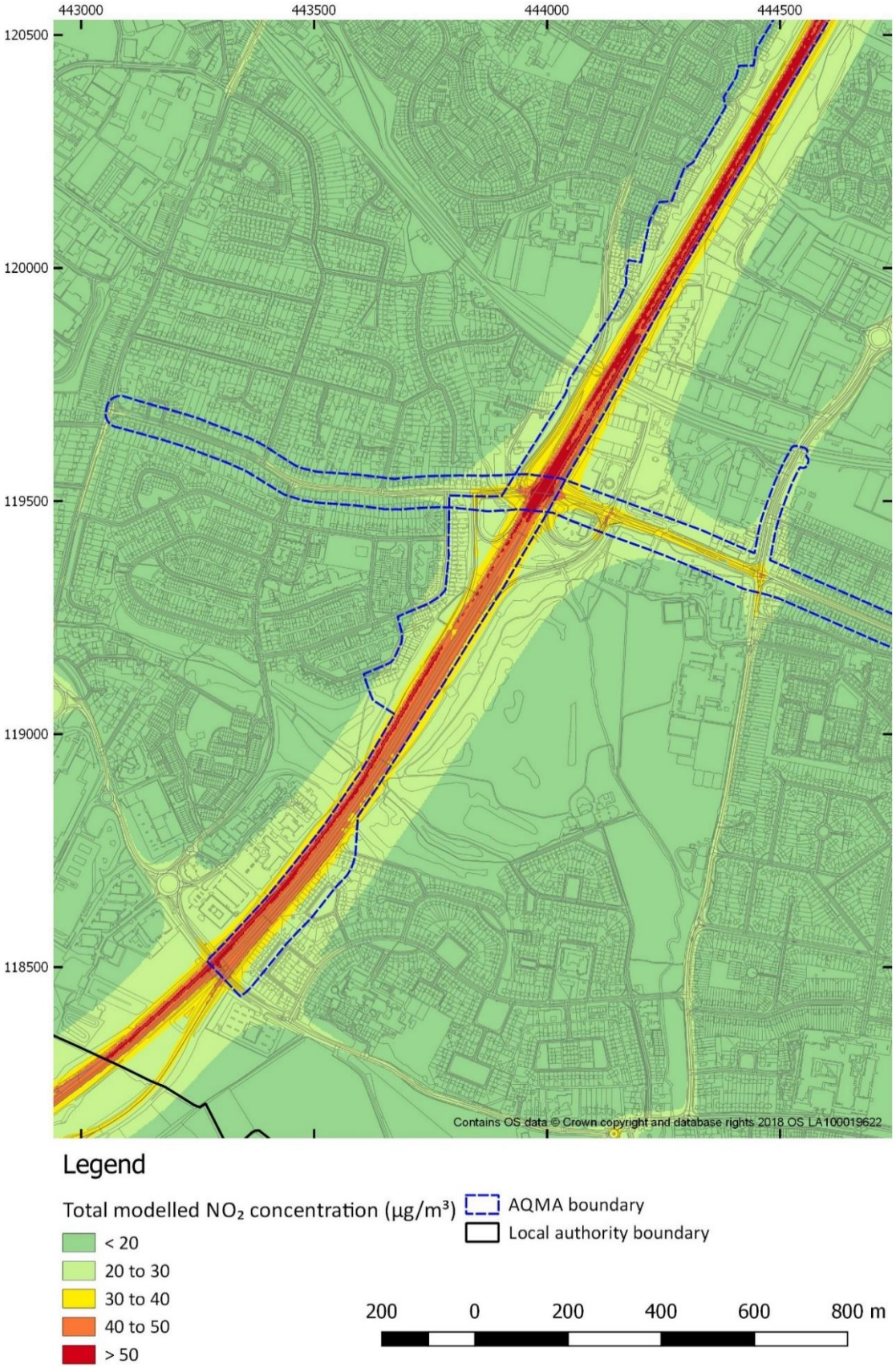


Figure 4-15 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

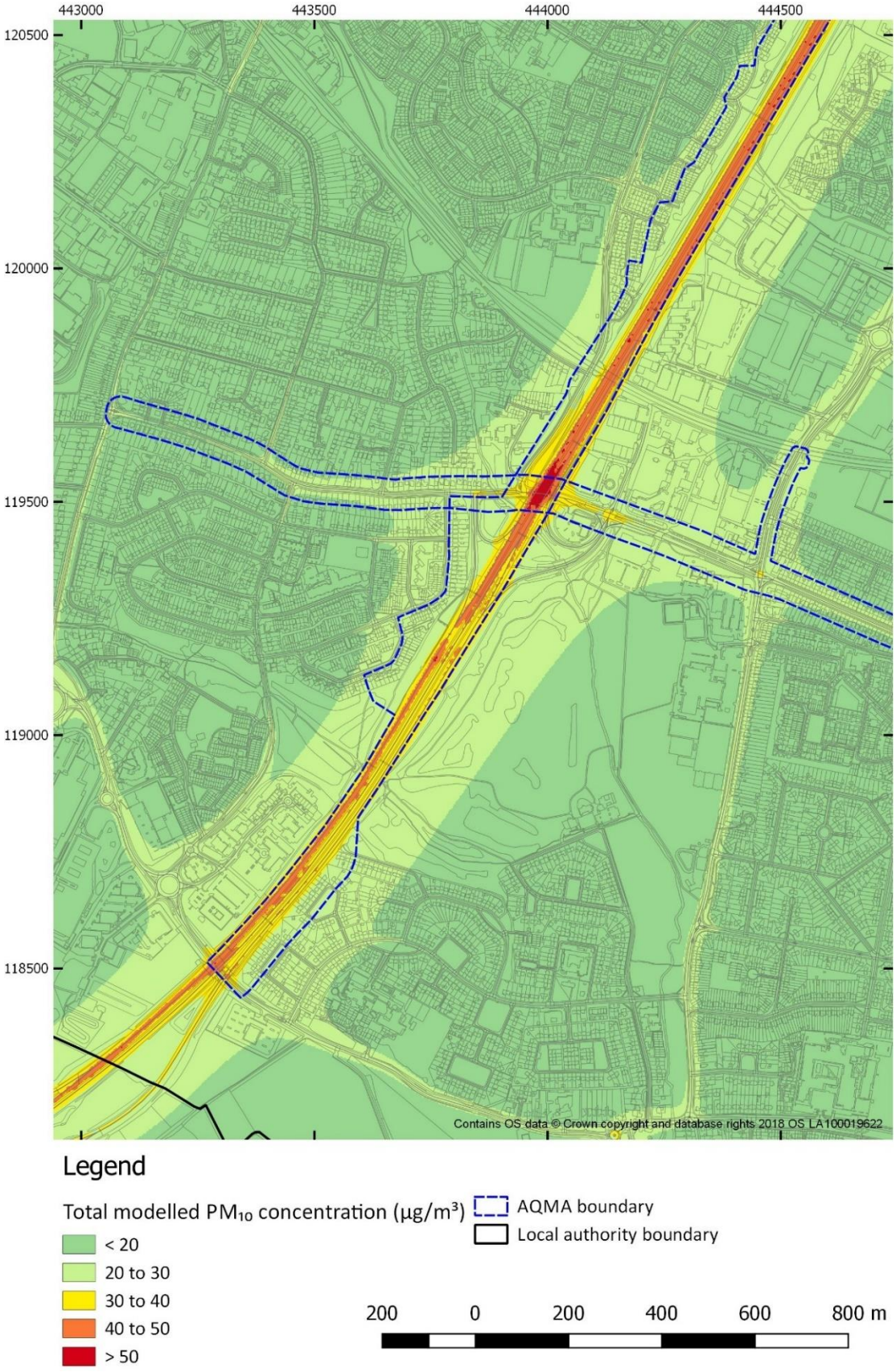


Figure 4-16 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

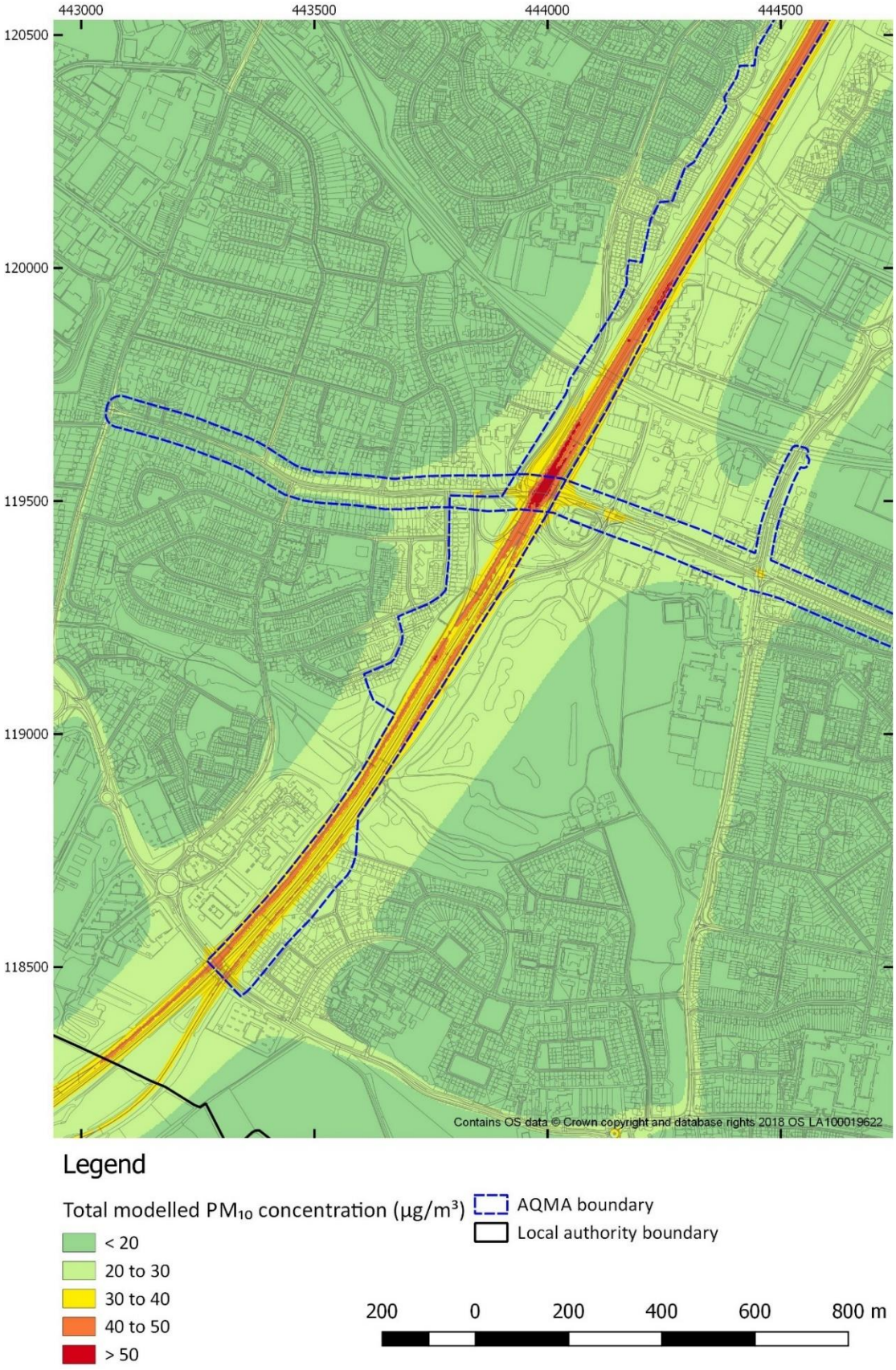


Figure 4-17 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

Figure 4-18 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

Figure 4-19 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 2 (M3) (North)

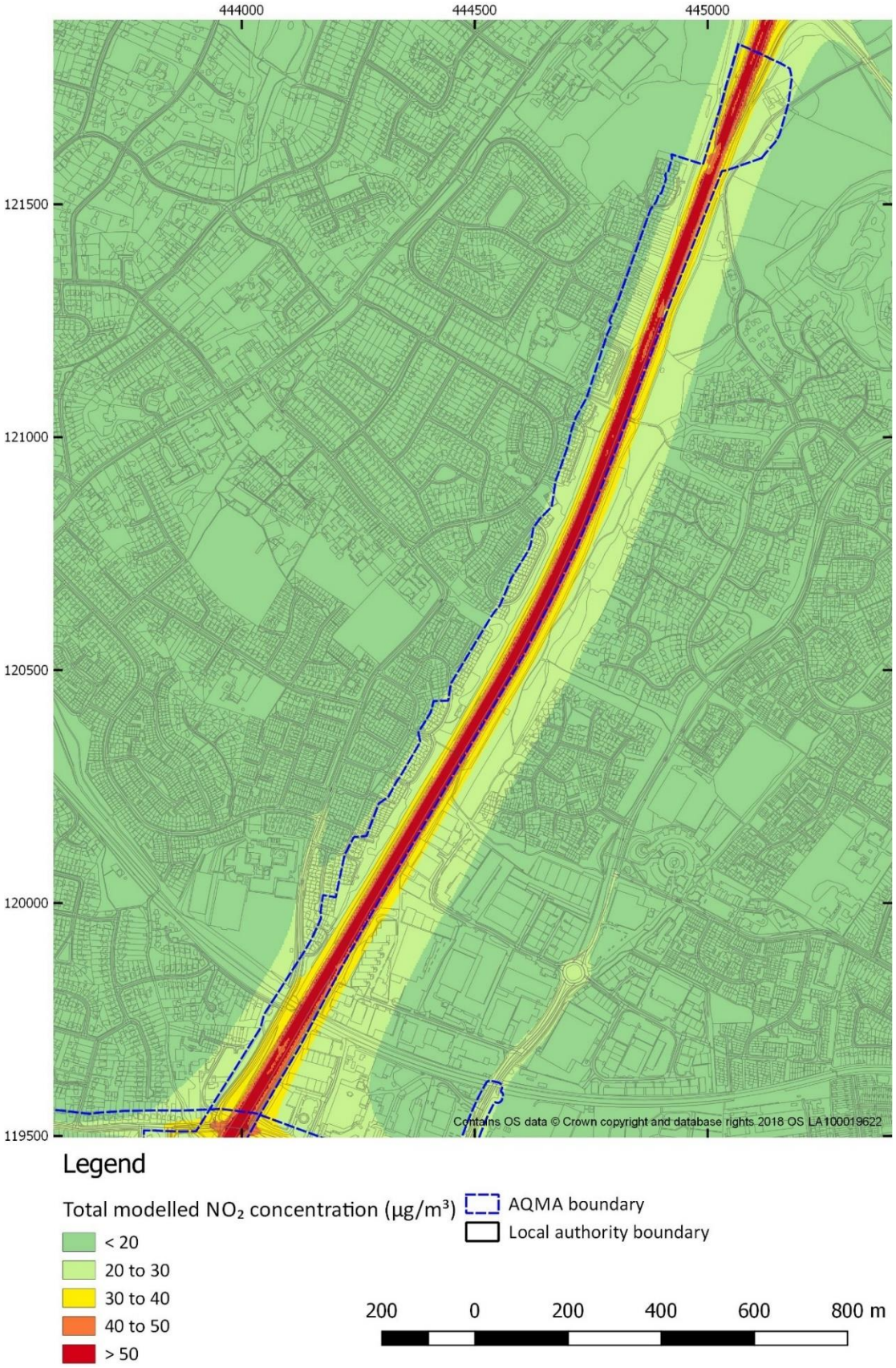


Figure 4-20 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 2 (M3) (North)

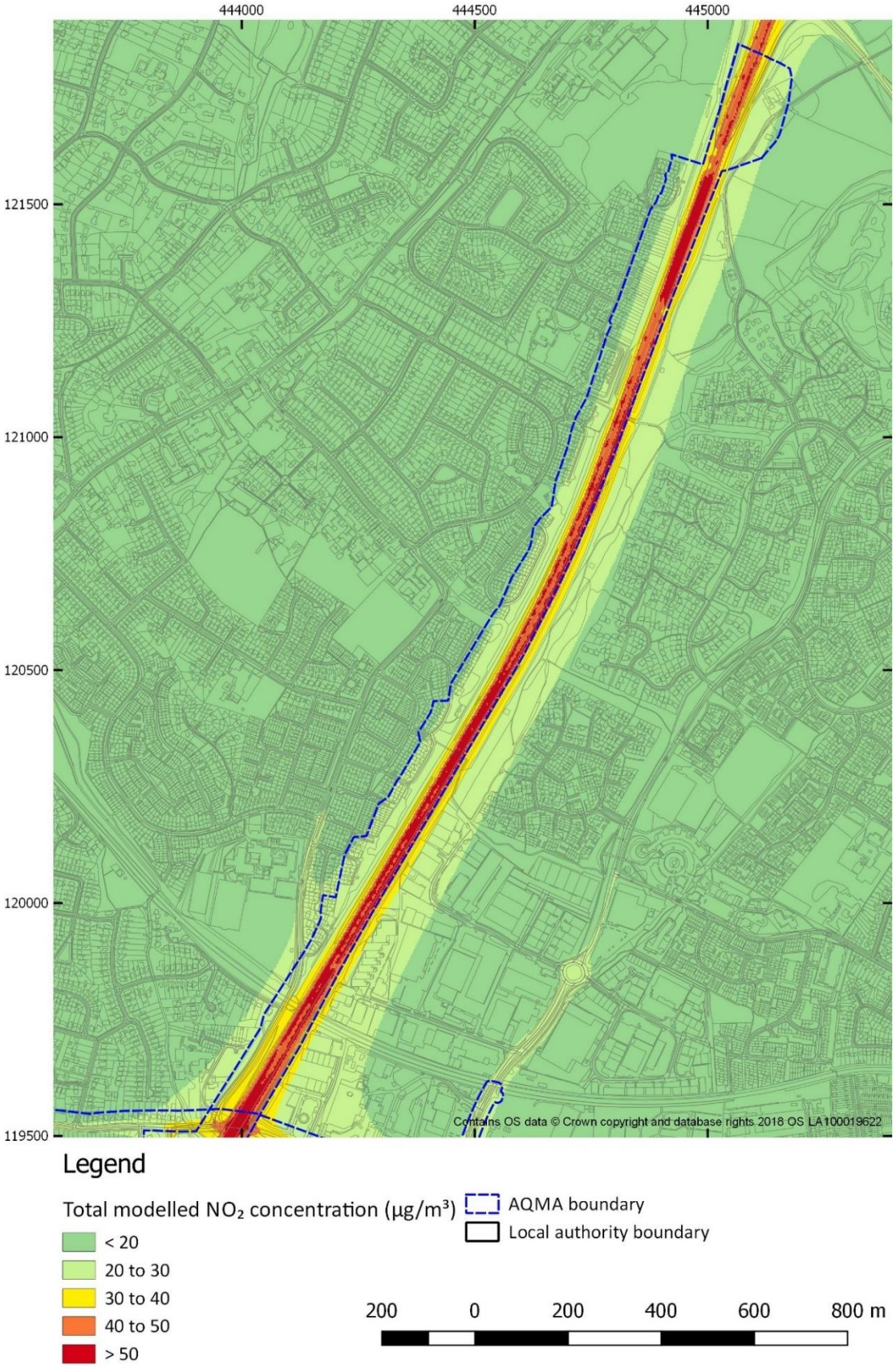


Figure 4-21 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 2 (M3) (North)

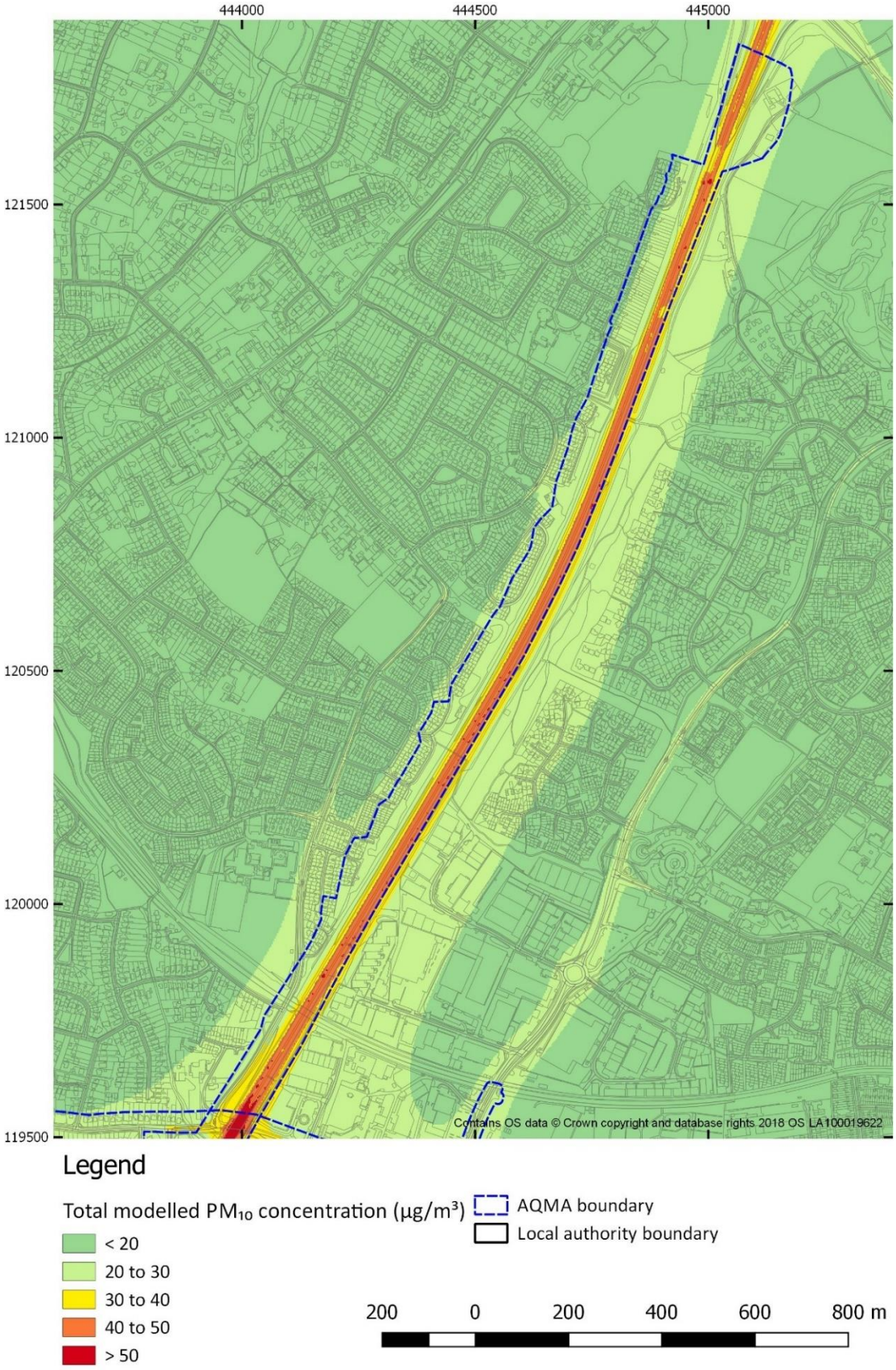


Figure 4-22 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 2 (M3) (North)

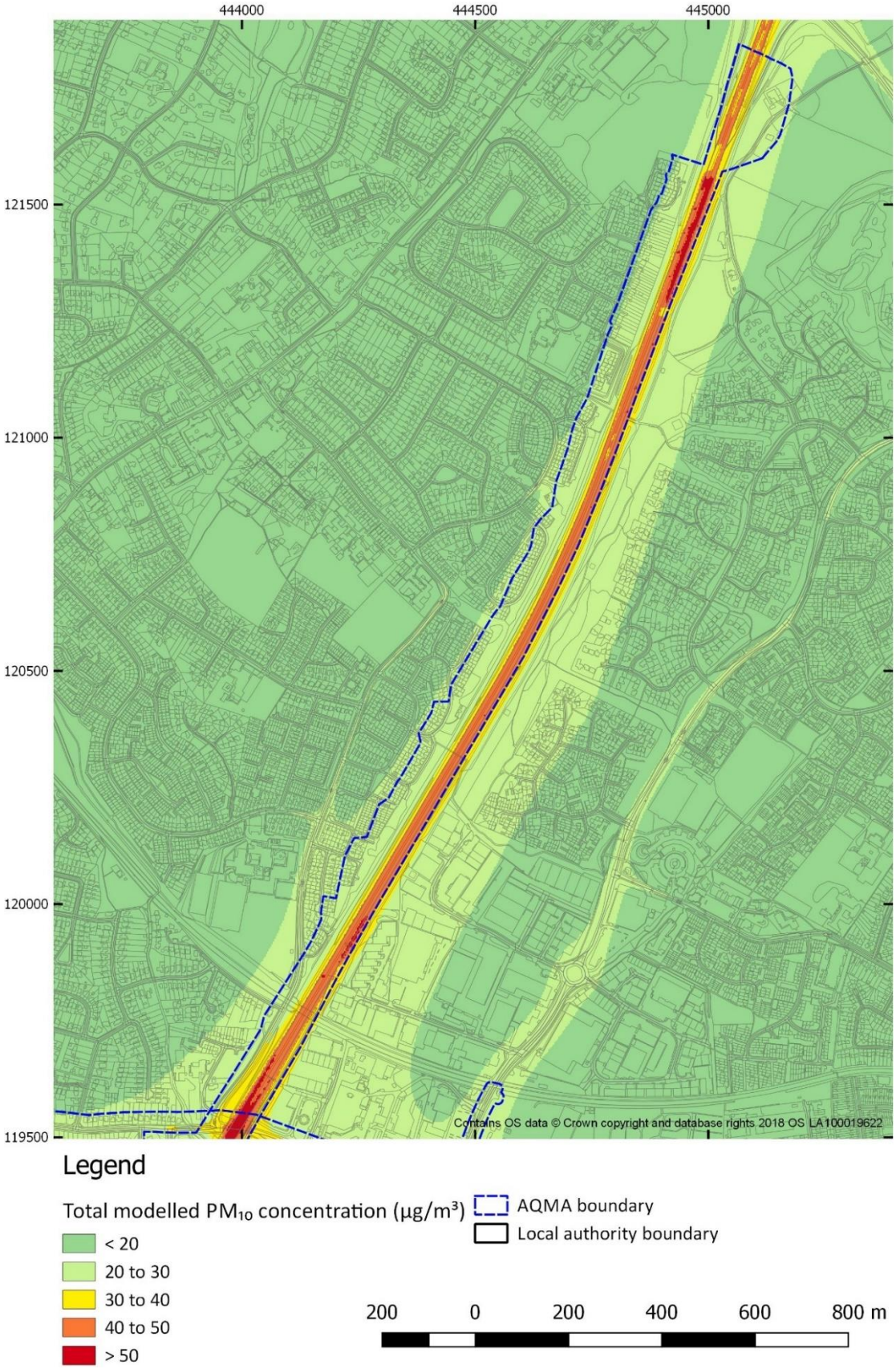


Figure 4-23 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 2 (M3) (North)

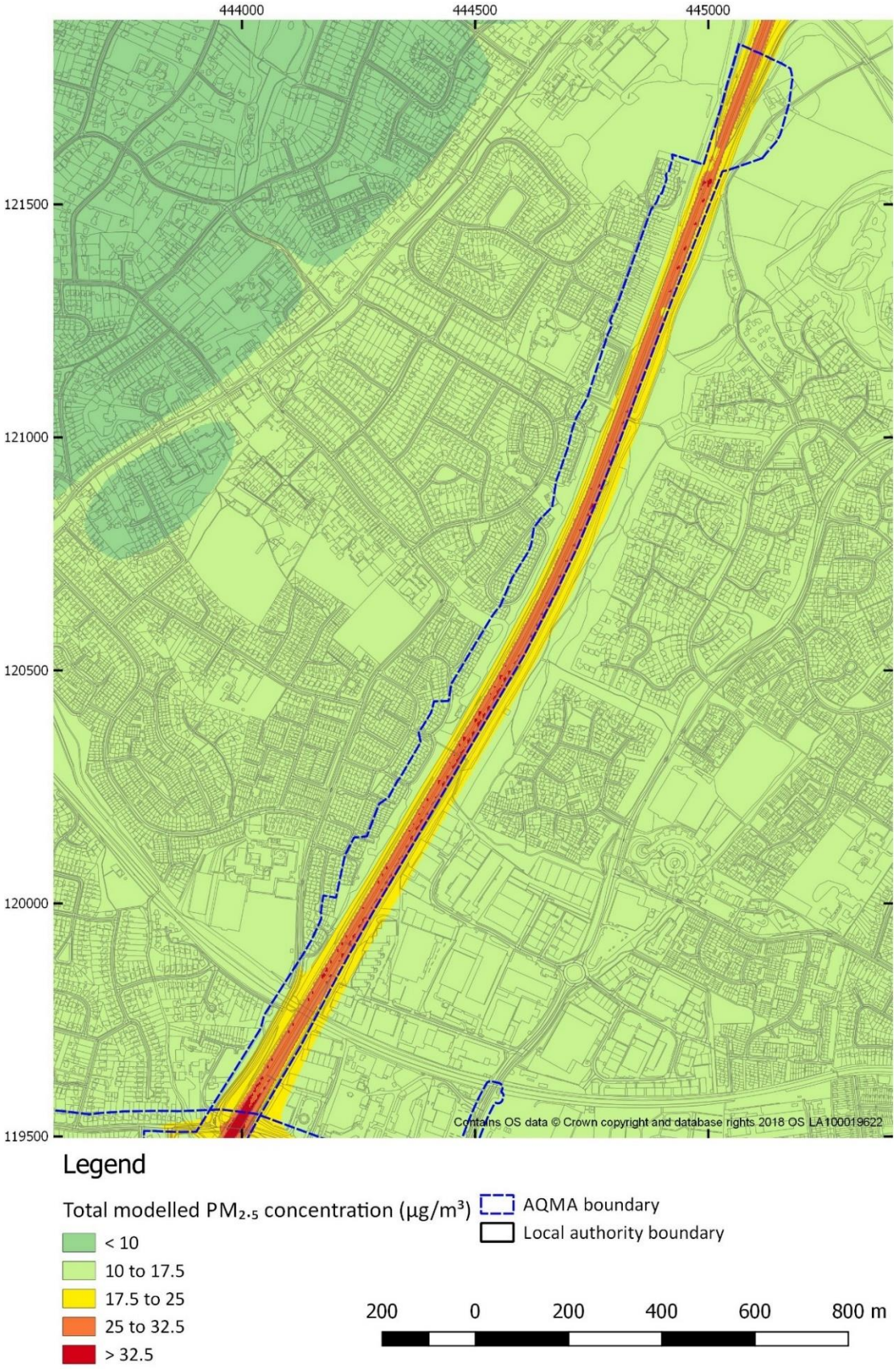


Figure 4-24 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 2 (M3) (North)

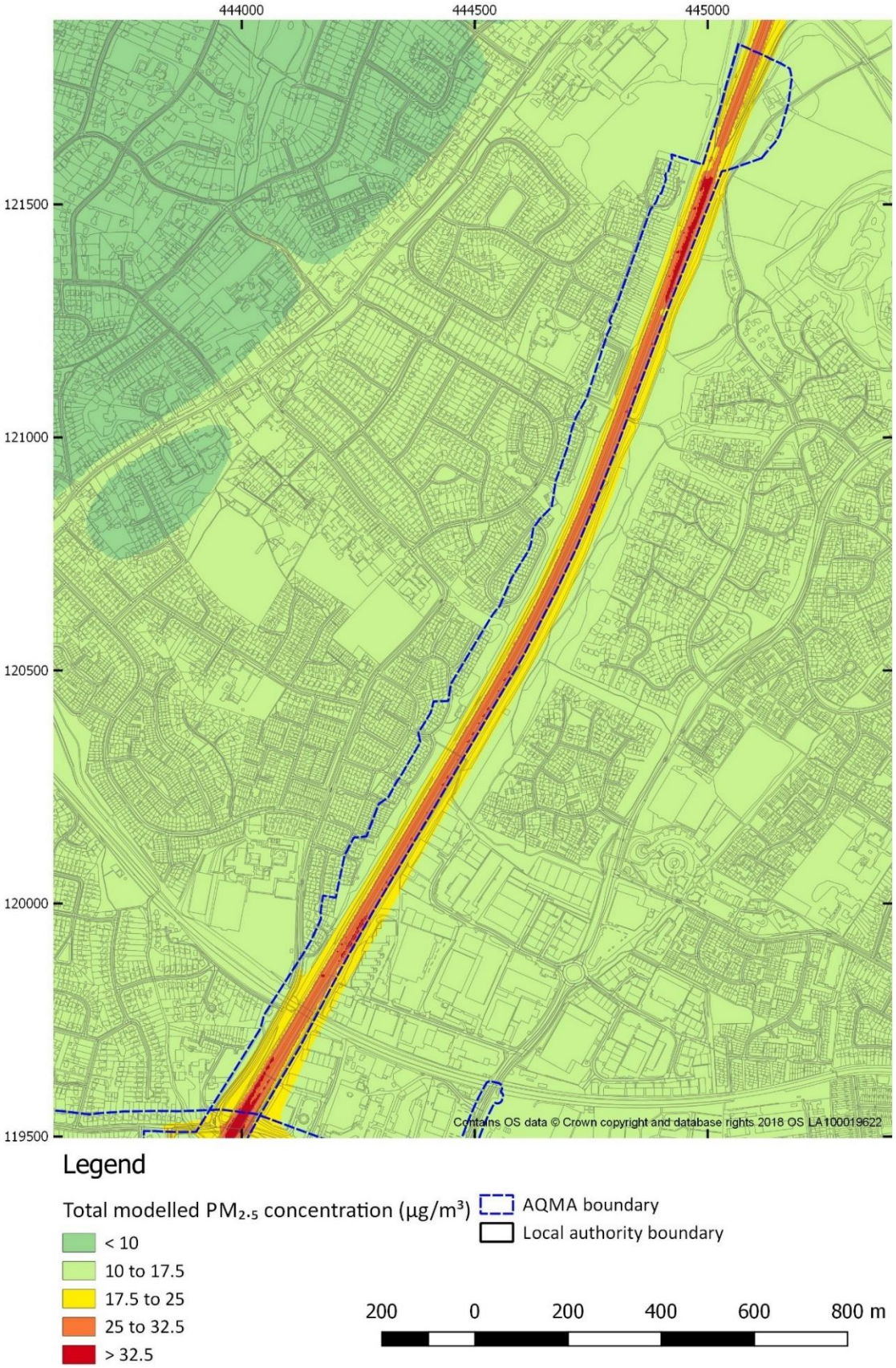


Figure 4-25 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 3 (Hamble Lane)

Figure 4-26 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 3 (Hamble Lane)

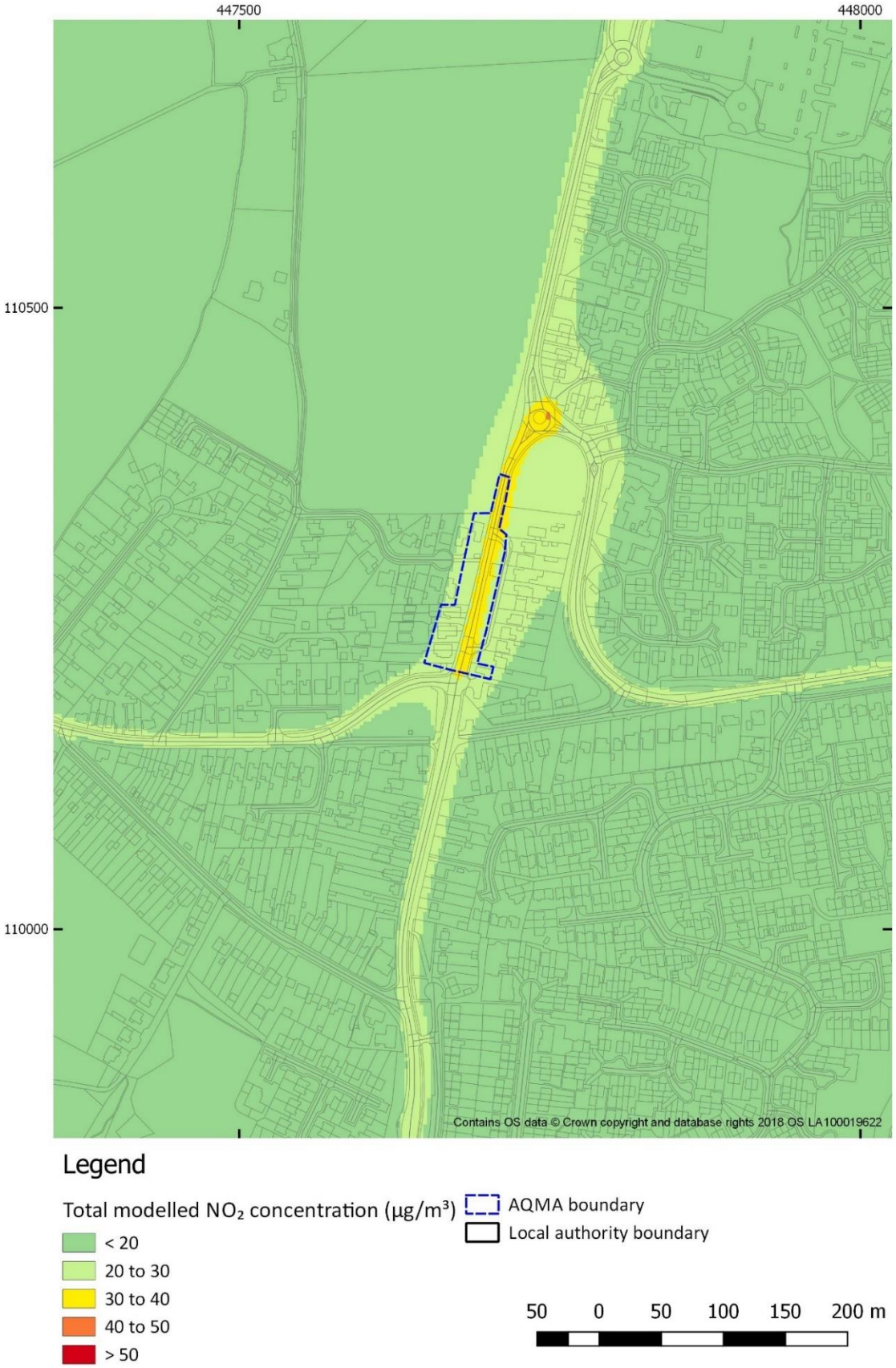


Figure 4-27 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 3 (Hamble Lane)

Figure 4-28 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 3 (Hamble Lane)

Figure 4-29 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 3 (Hamble Lane)

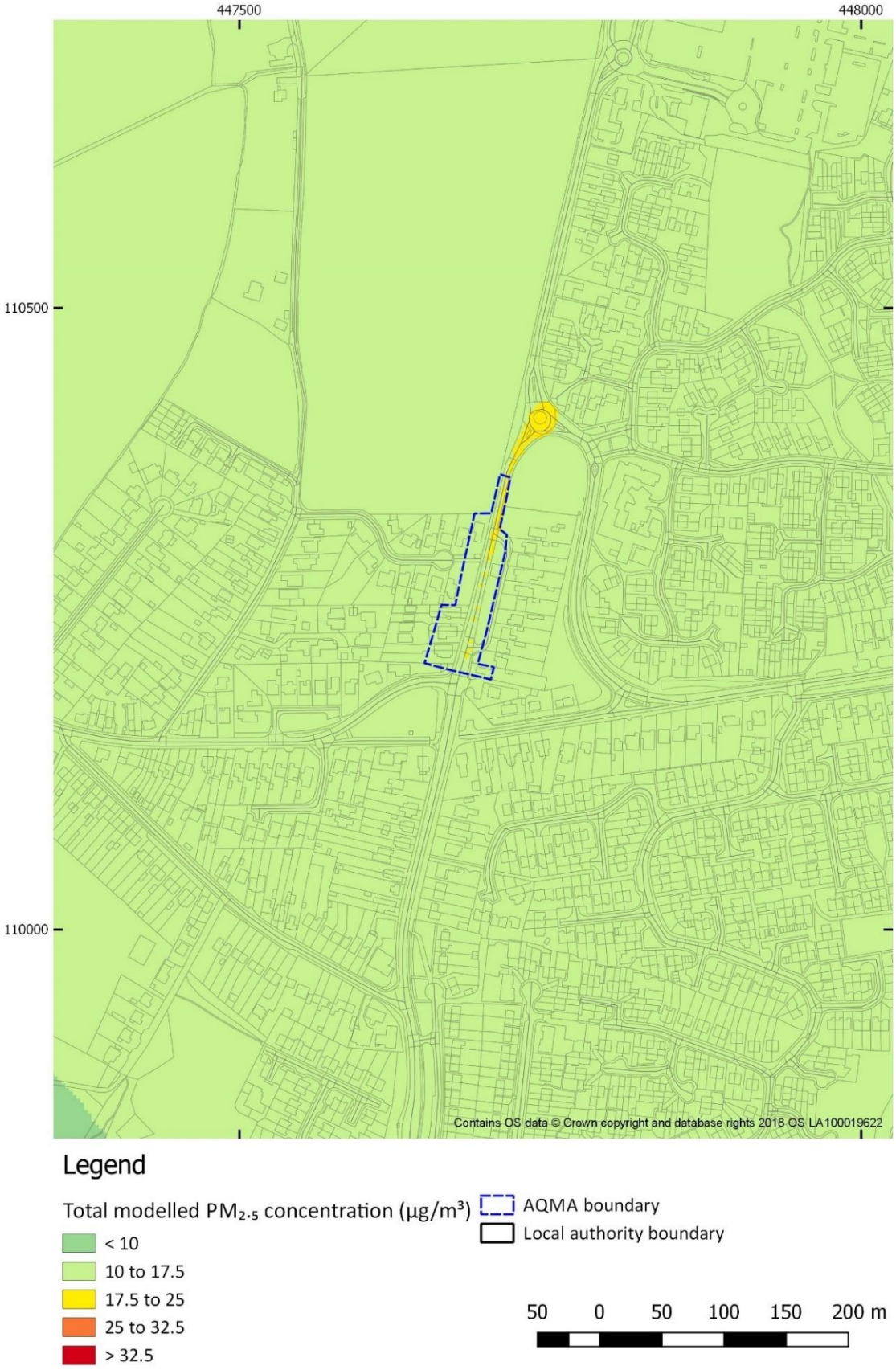


Figure 4-30 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 3 (Hamble Lane)

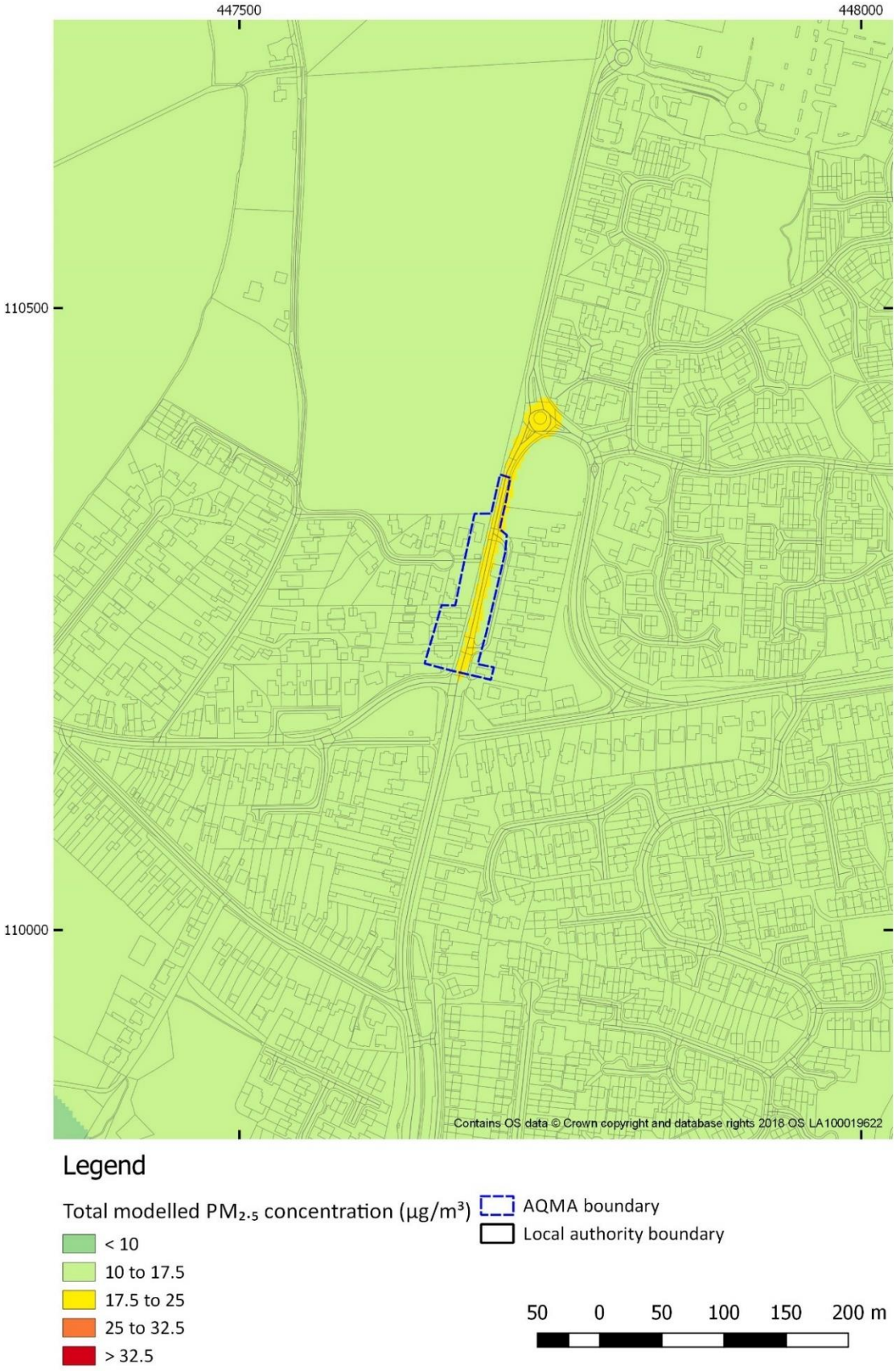


Figure 4-31 Annual mean NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 4 (High Street Botley)

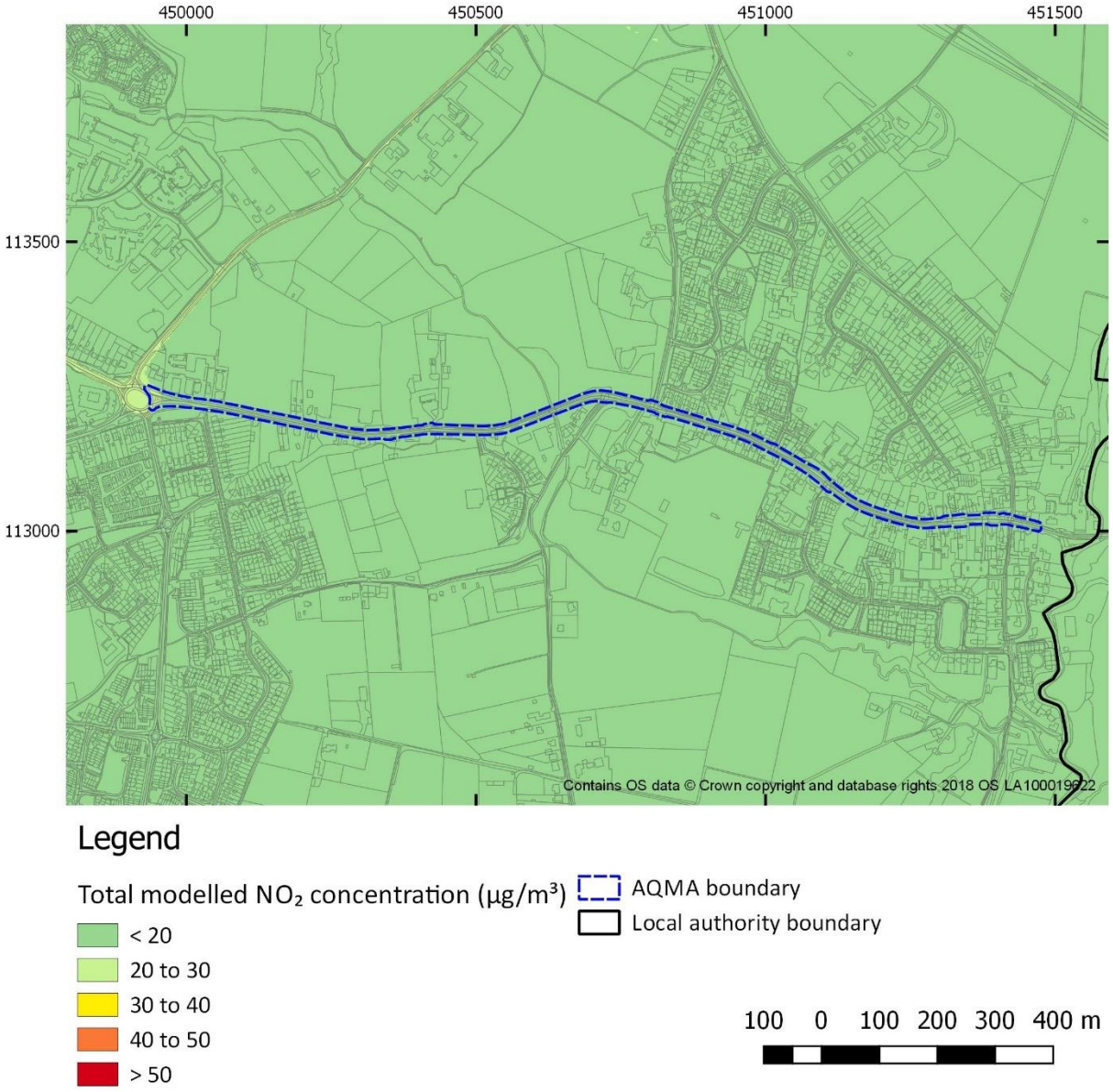


Figure 4-32 Annual mean NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 4 (High Street Botley)

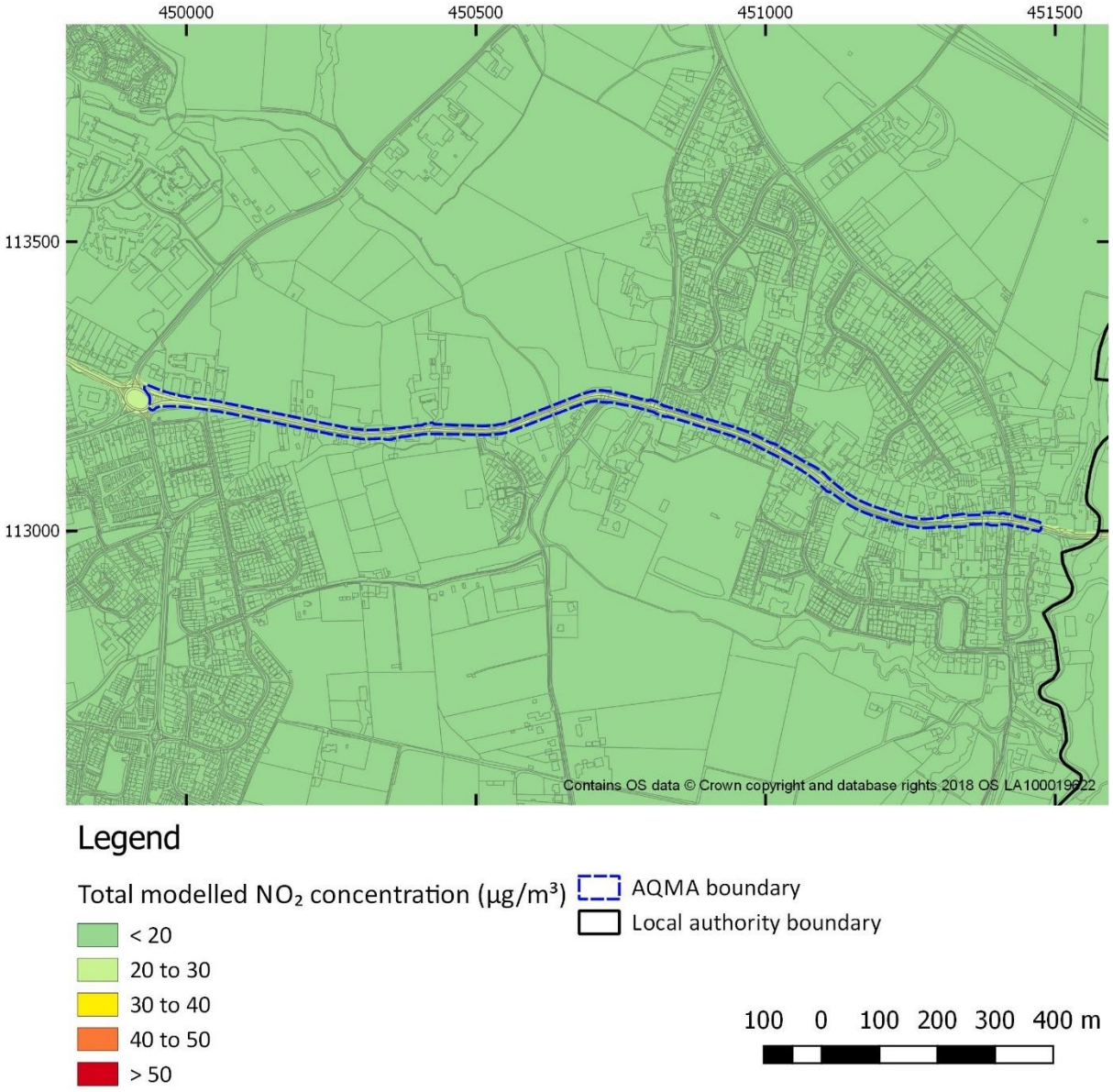


Figure 4-33 Annual mean PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 4 (High Street Botley)

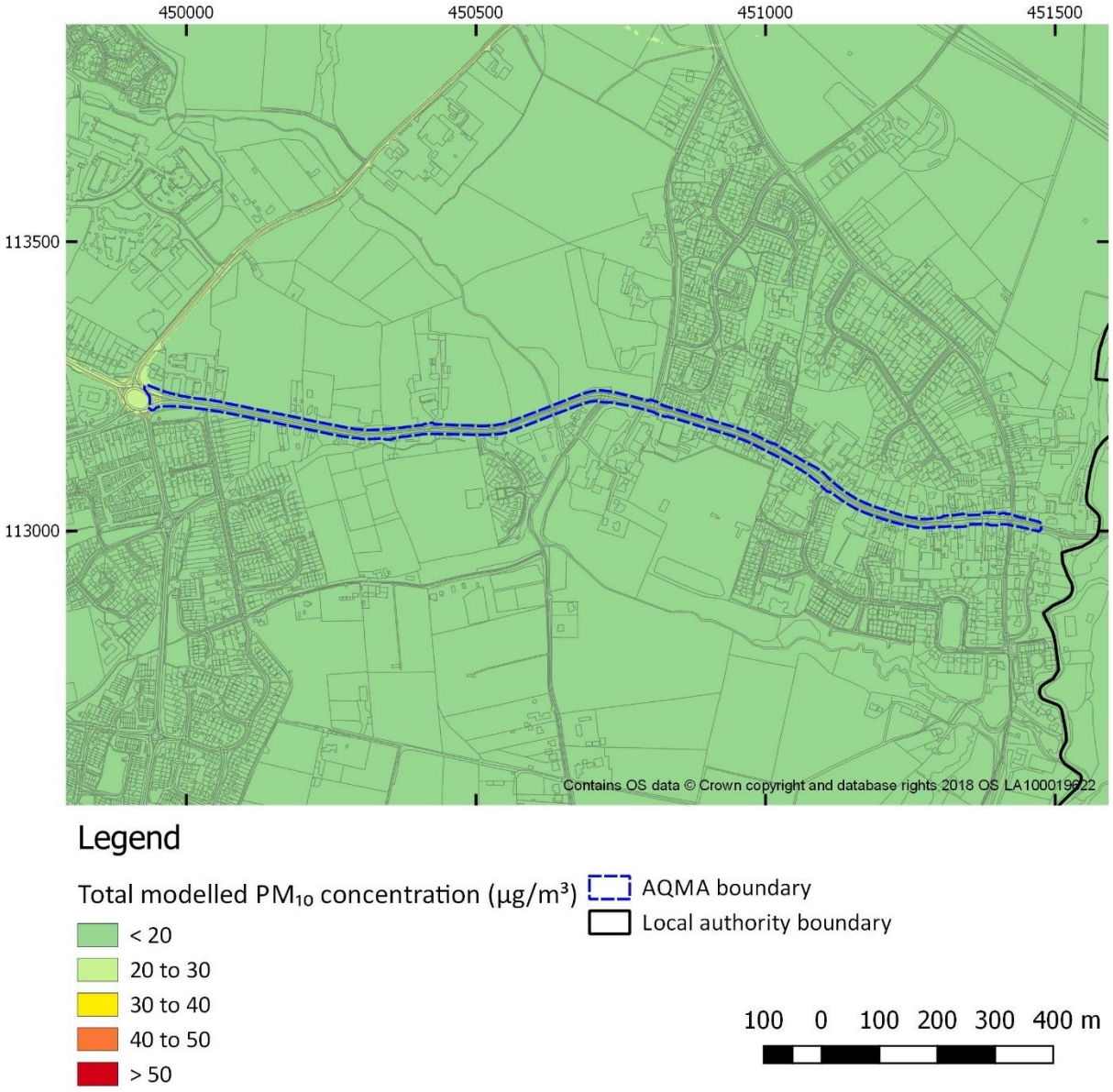


Figure 4-34 Annual mean PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 4 (High Street Botley)

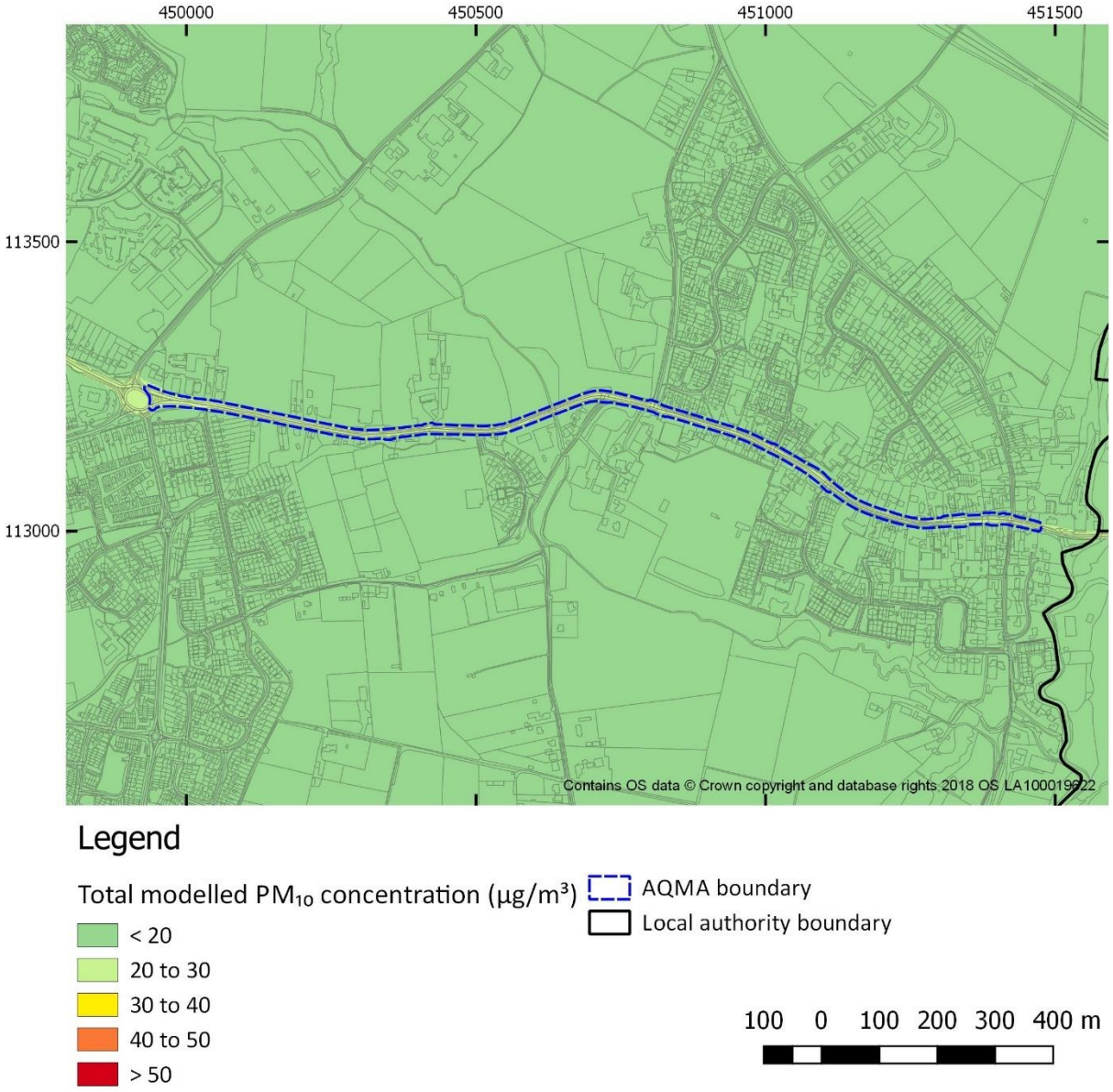


Figure 4-35 Annual mean $PM_{2.5}$ concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 4 (High Street Botley)

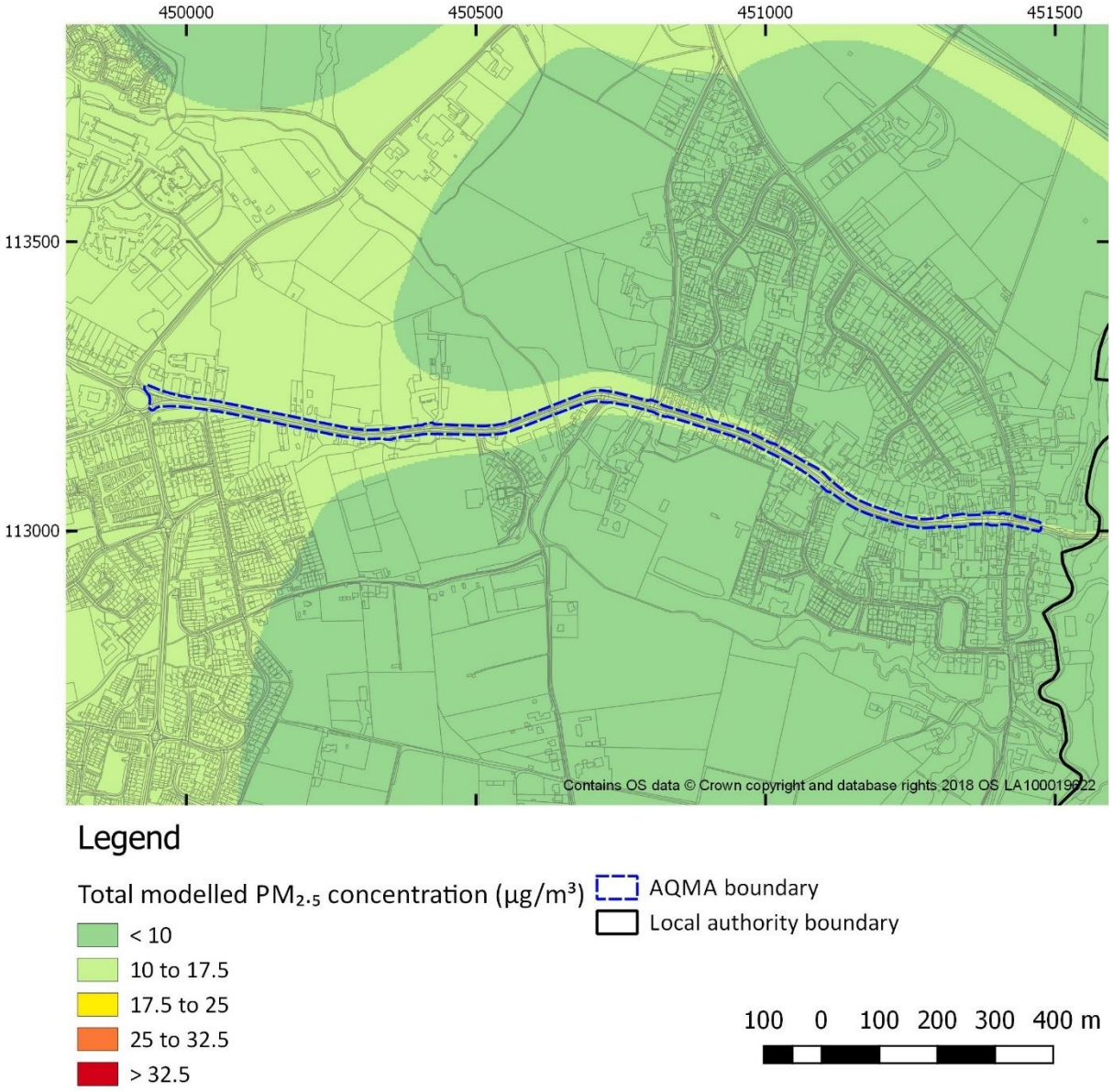


Figure 4-36 Annual mean $PM_{2.5}$ concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 4 (High Street Botley)

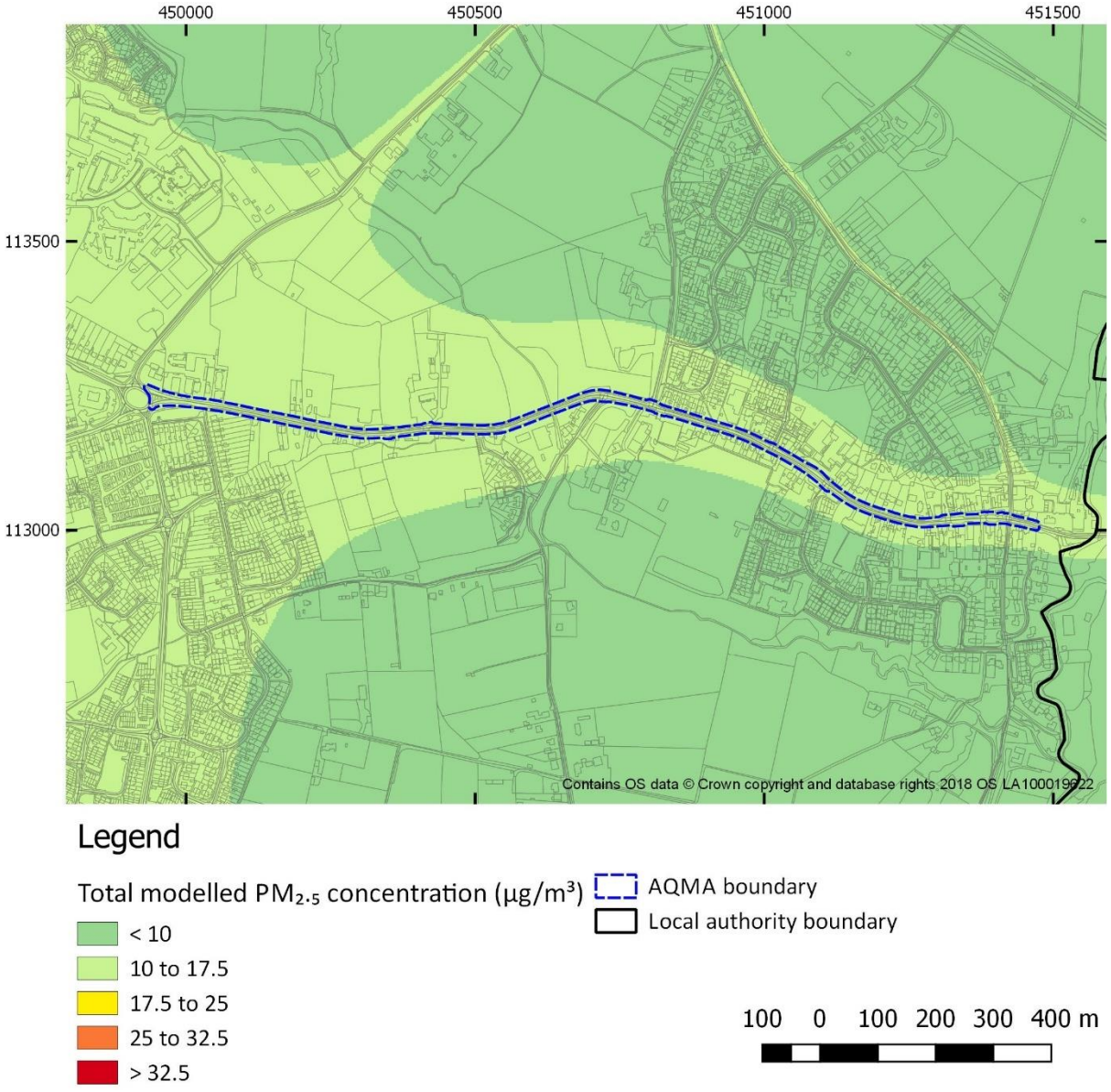


Figure 4-37 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario

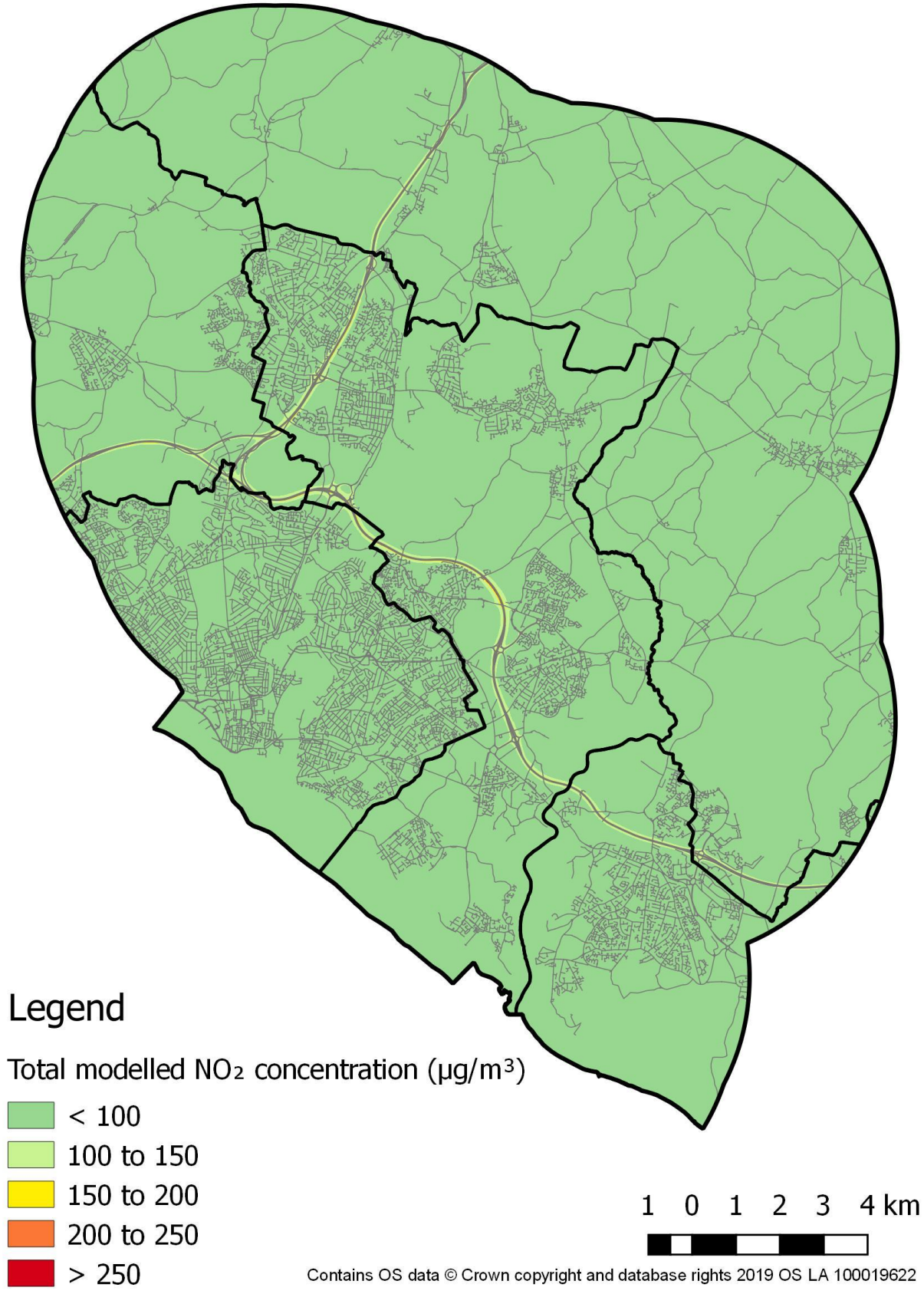


Figure 4-38 Short-term NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario

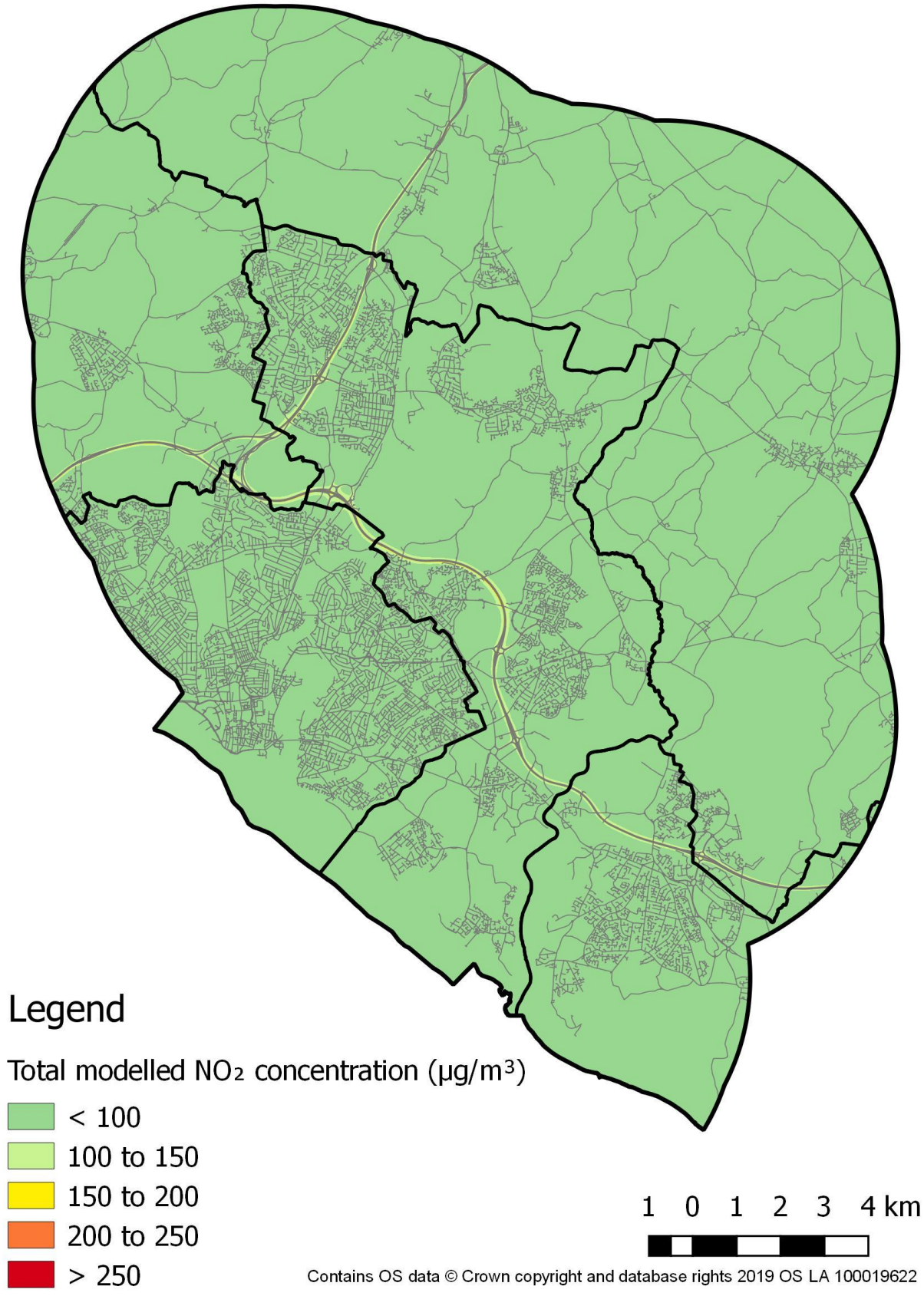


Figure 4-39 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario

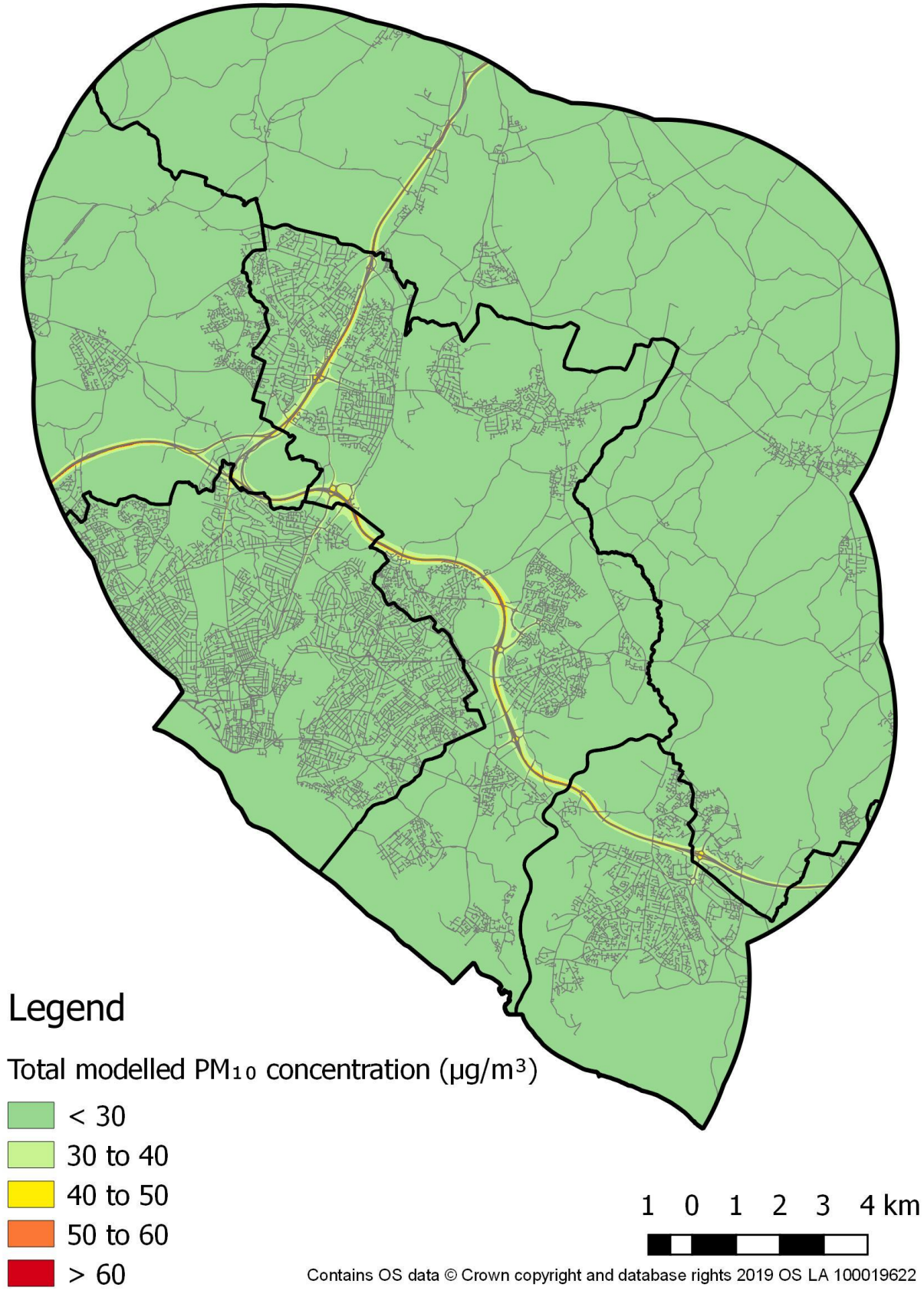


Figure 4-40 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario

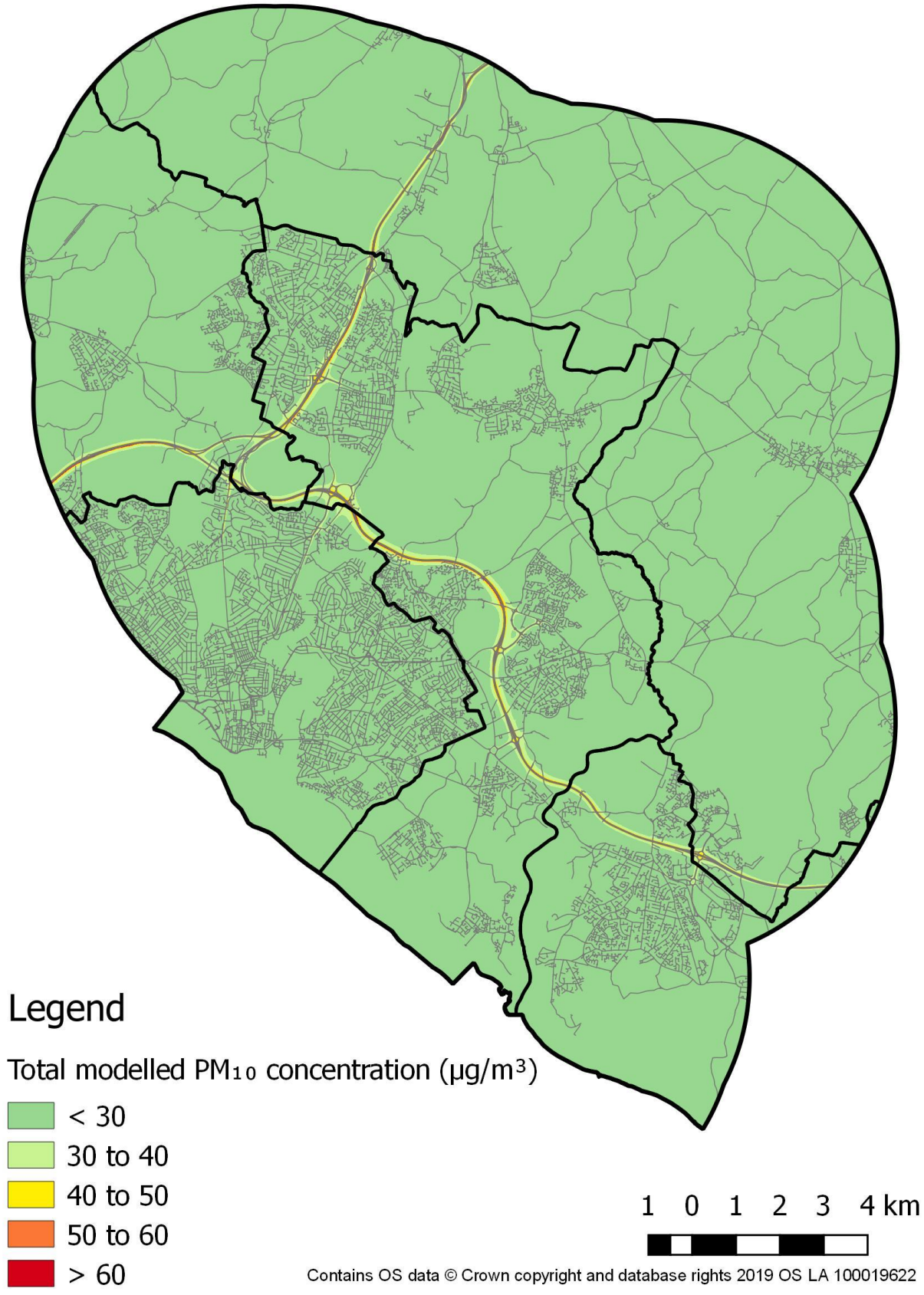


Figure 4-41 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

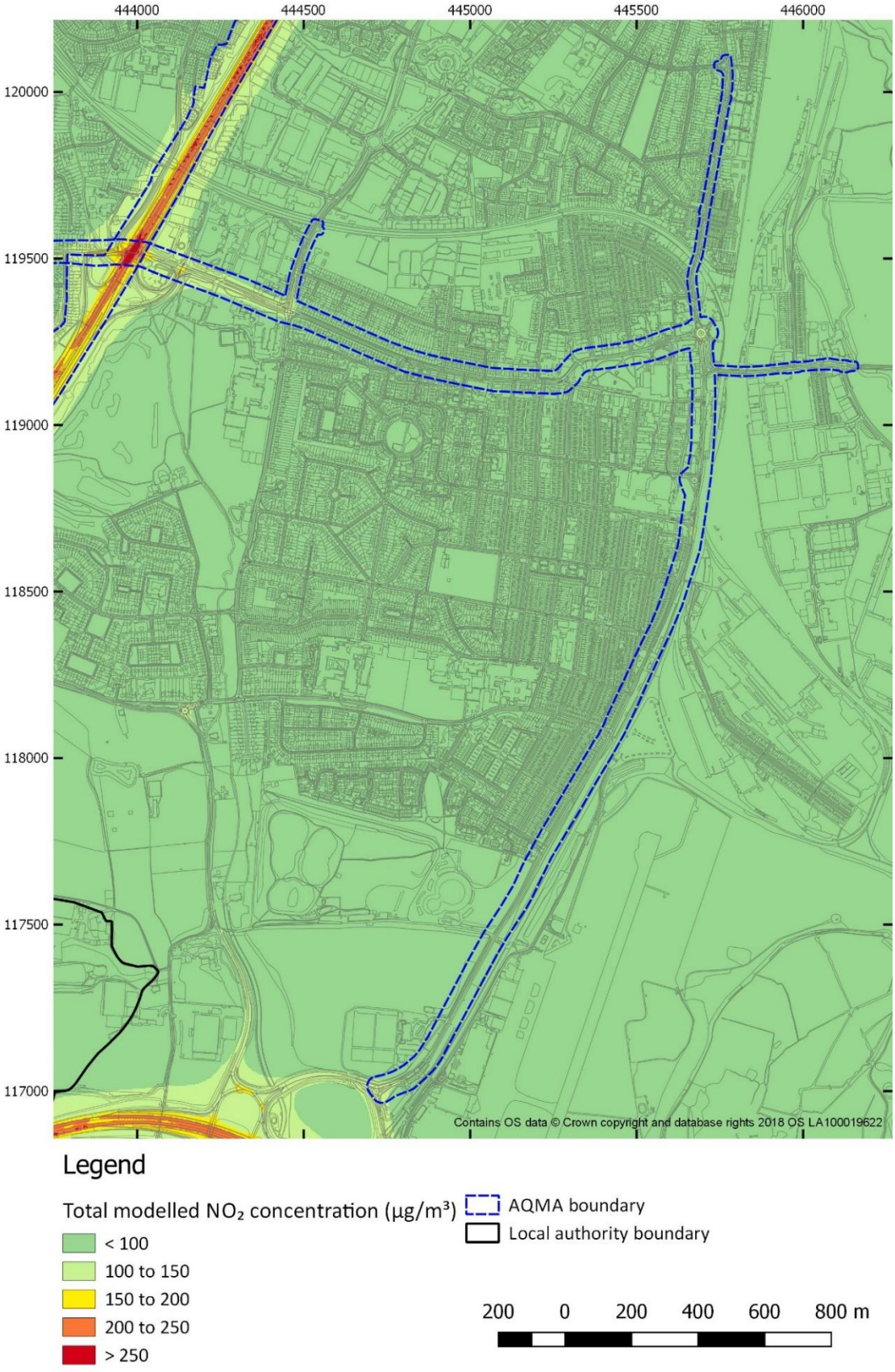


Figure 4-42 Short-term NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

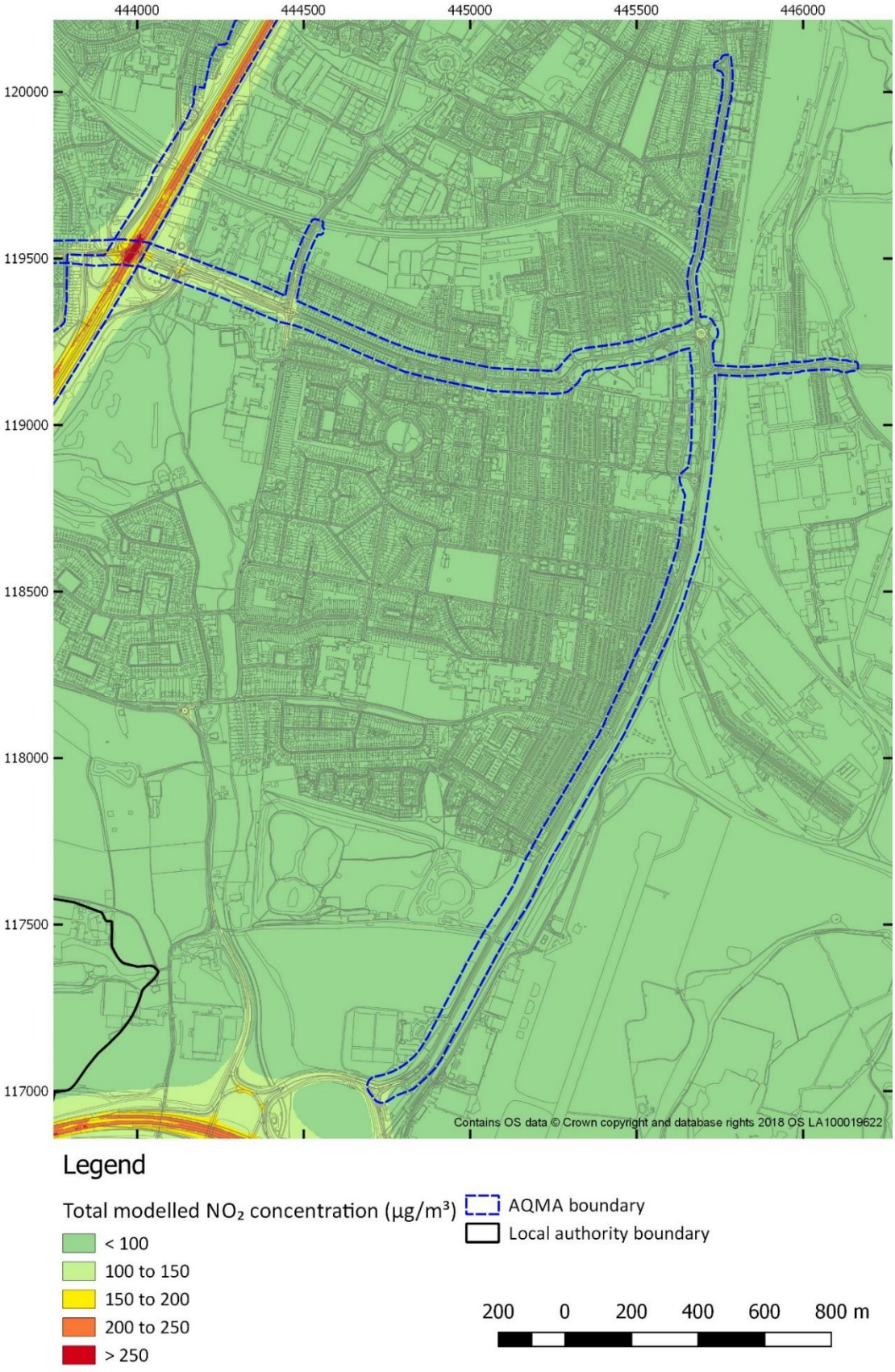


Figure 4-43 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

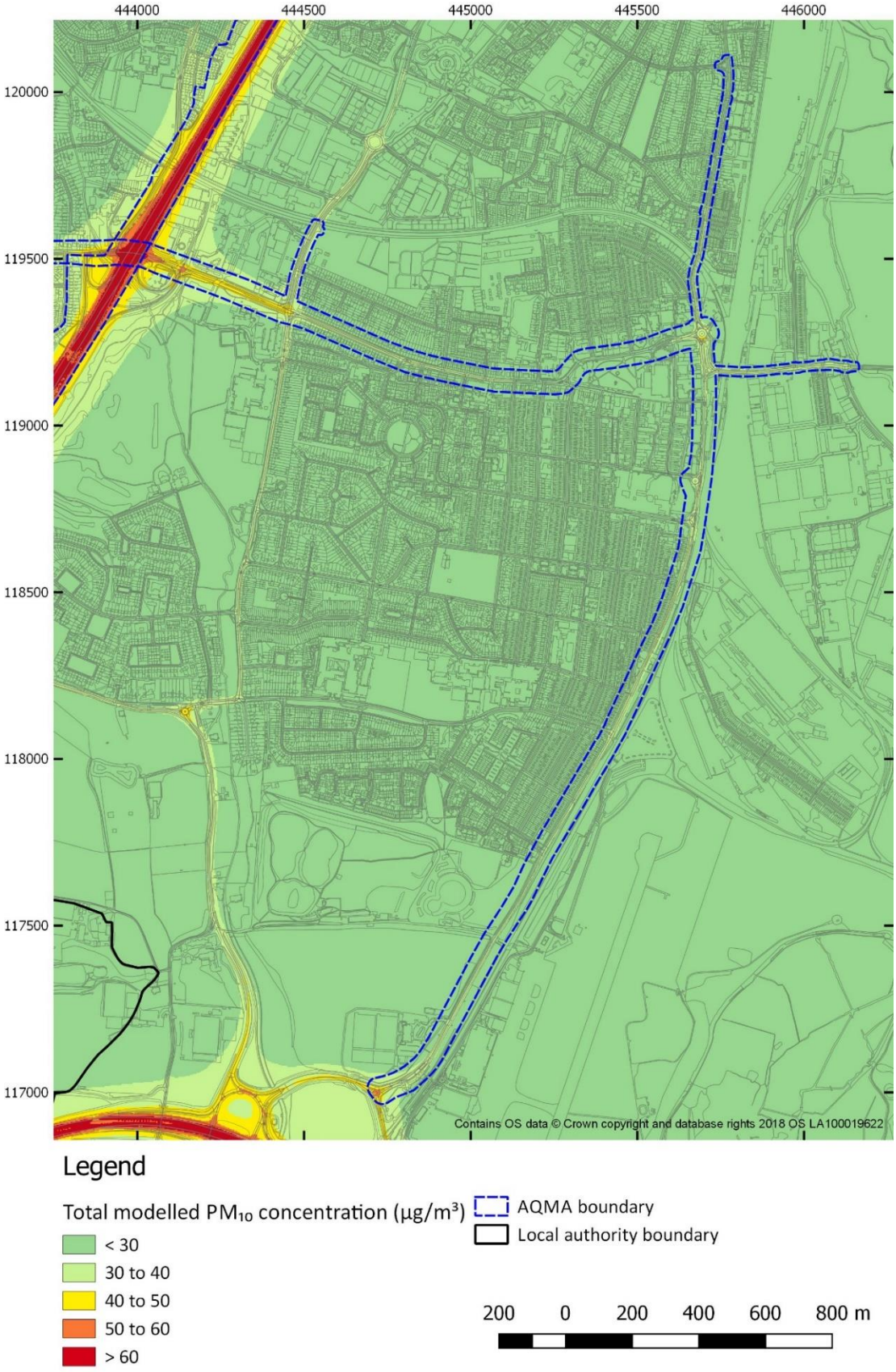


Figure 4-44 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (East)

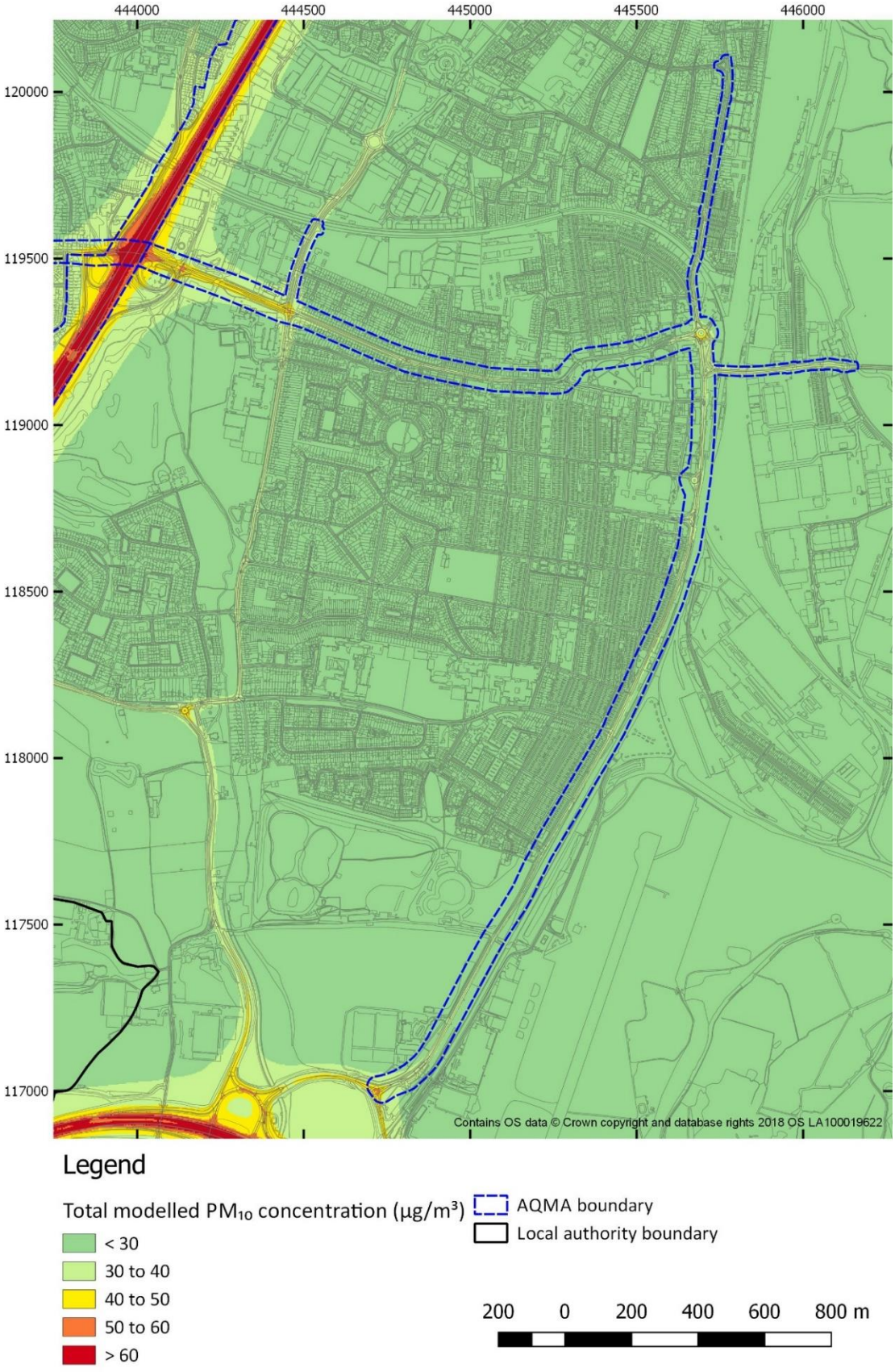


Figure 4-45 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

Figure 4-46 Short-term NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

Figure 4-47 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

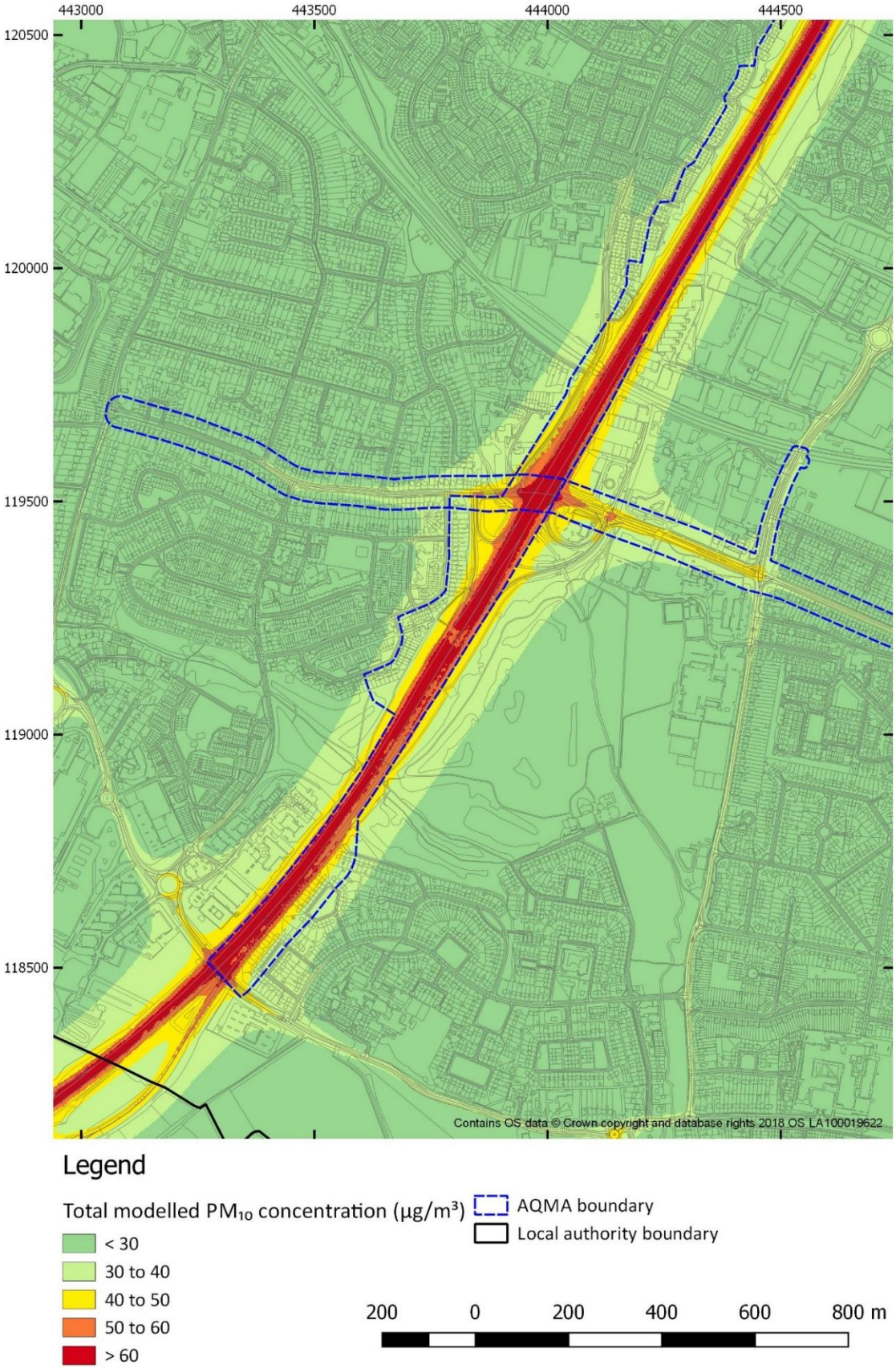


Figure 4-48 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 1 (A335 / Eastleigh) (West)

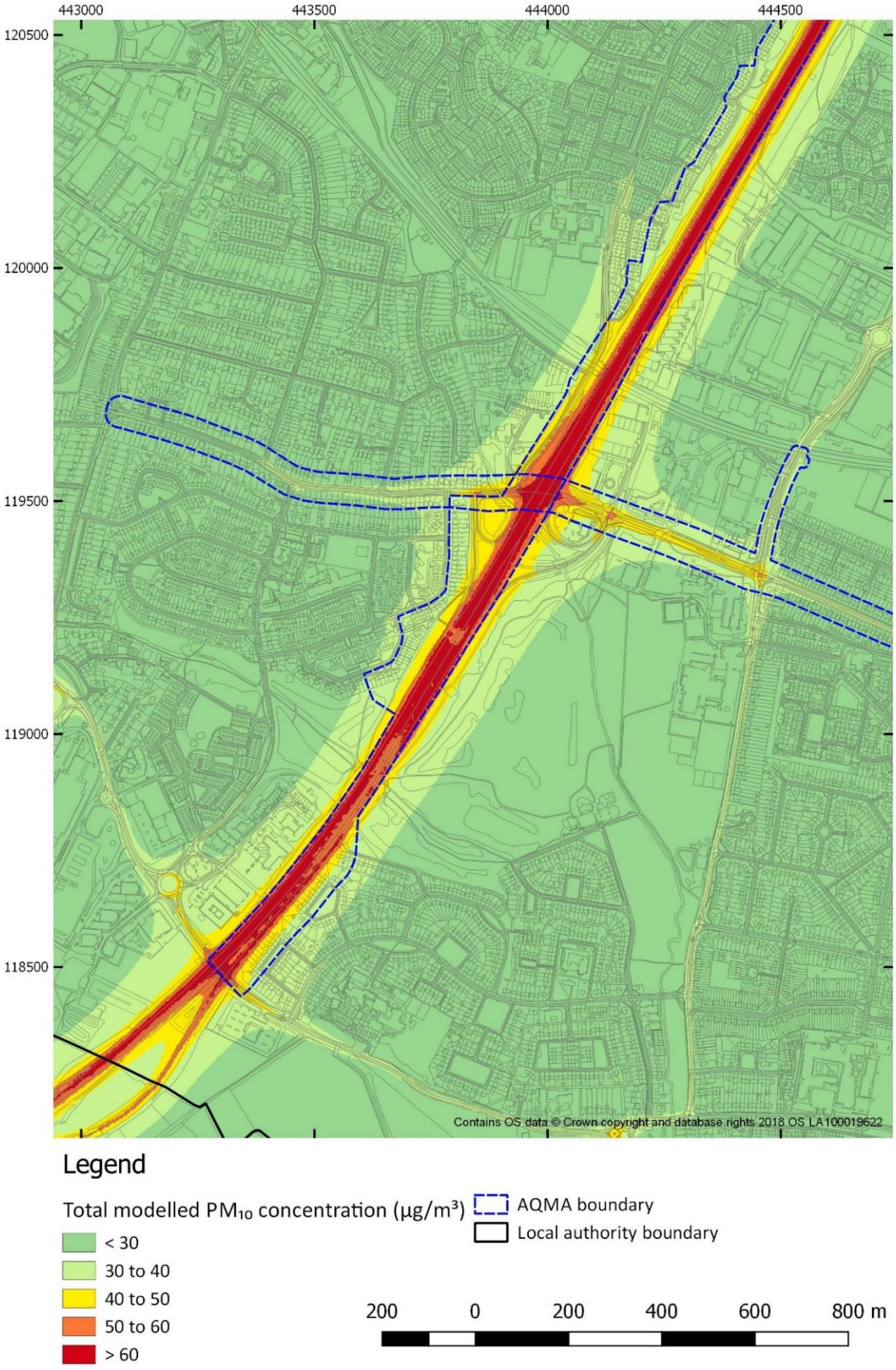


Figure 4-49 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 2 (M3) (North)

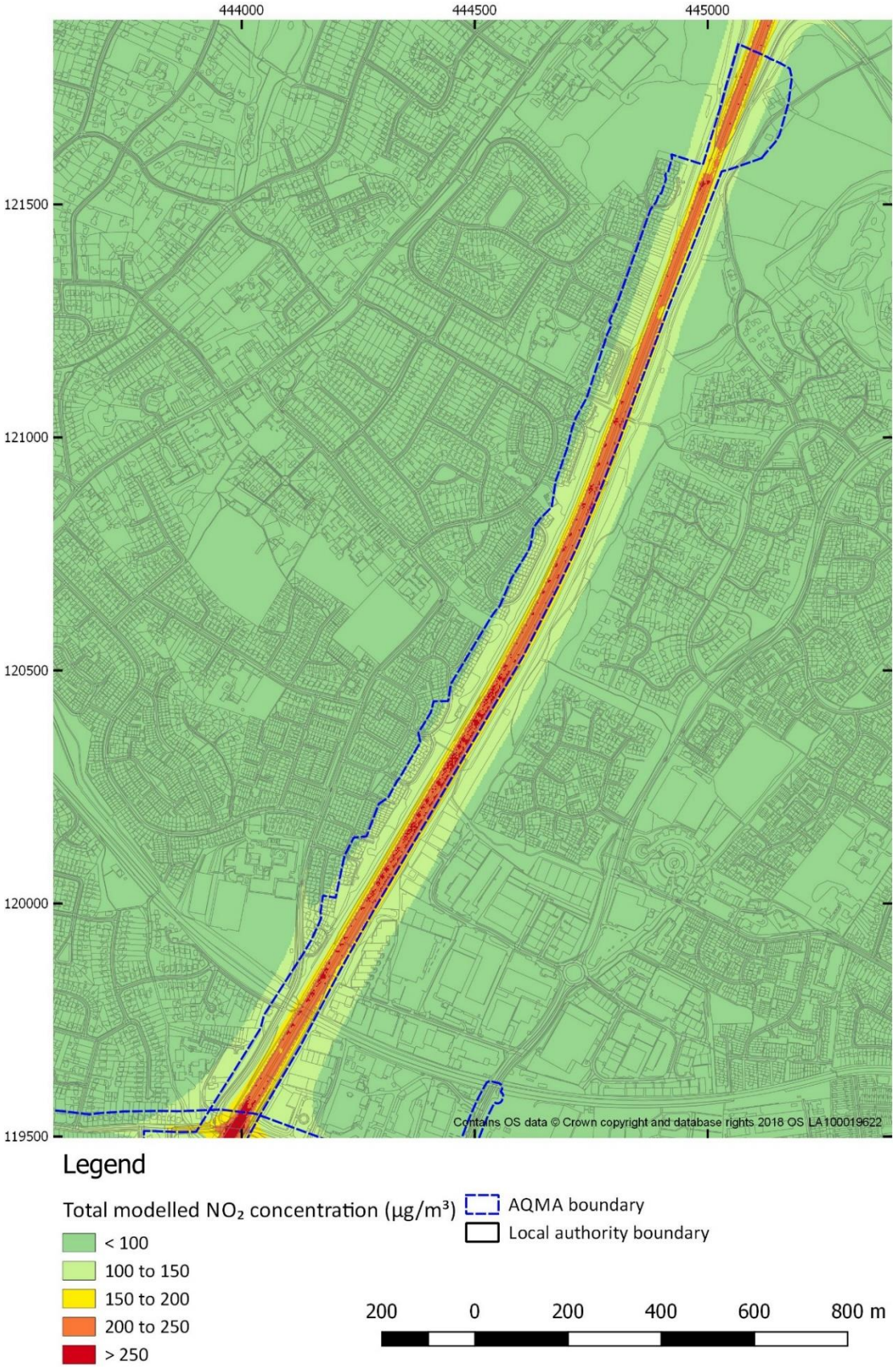


Figure 4-50 Short-term NO_2 concentration model results for 2020 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 2 (M3) (North)

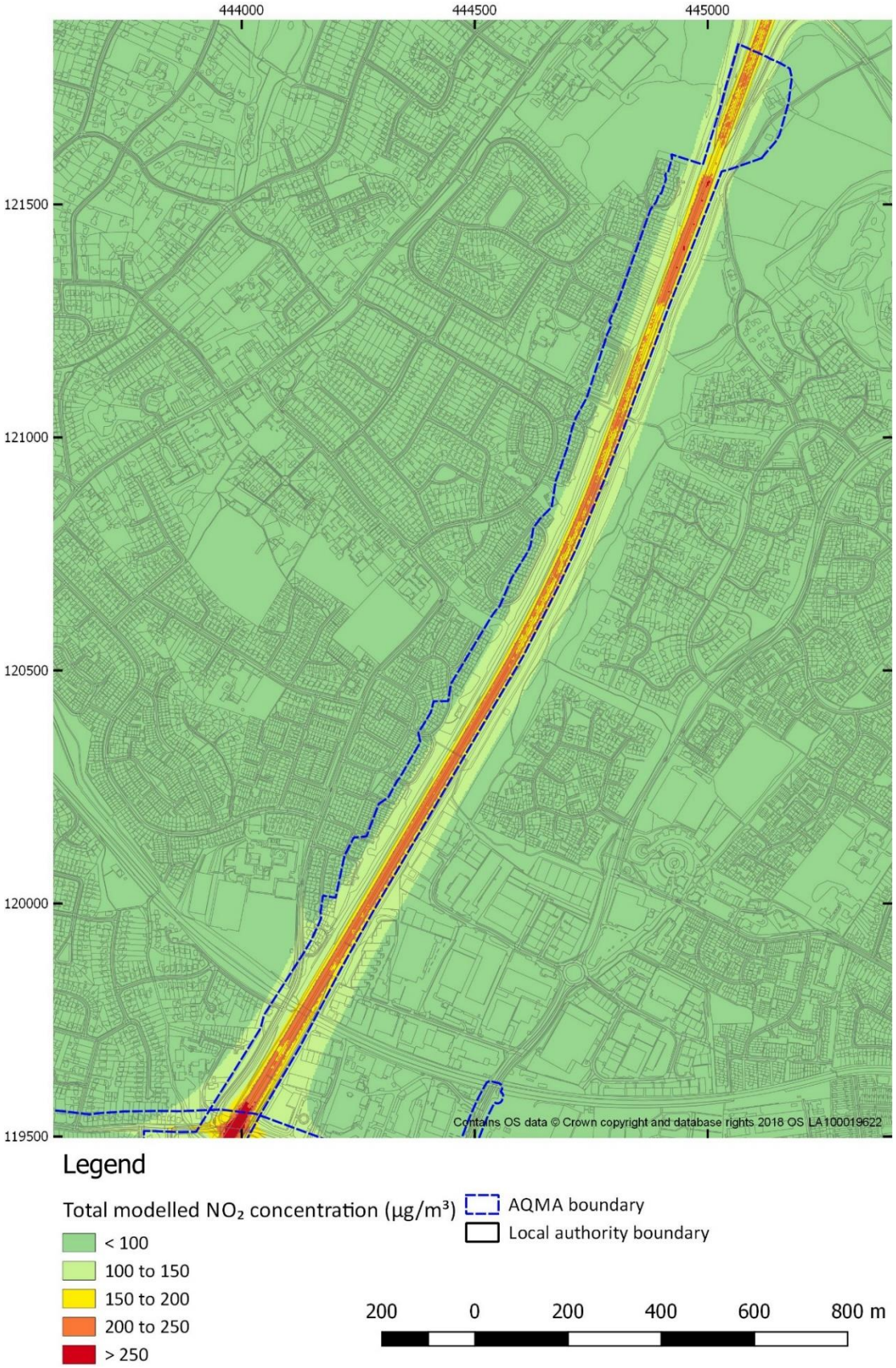


Figure 4-51 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 2 (M3) (North)

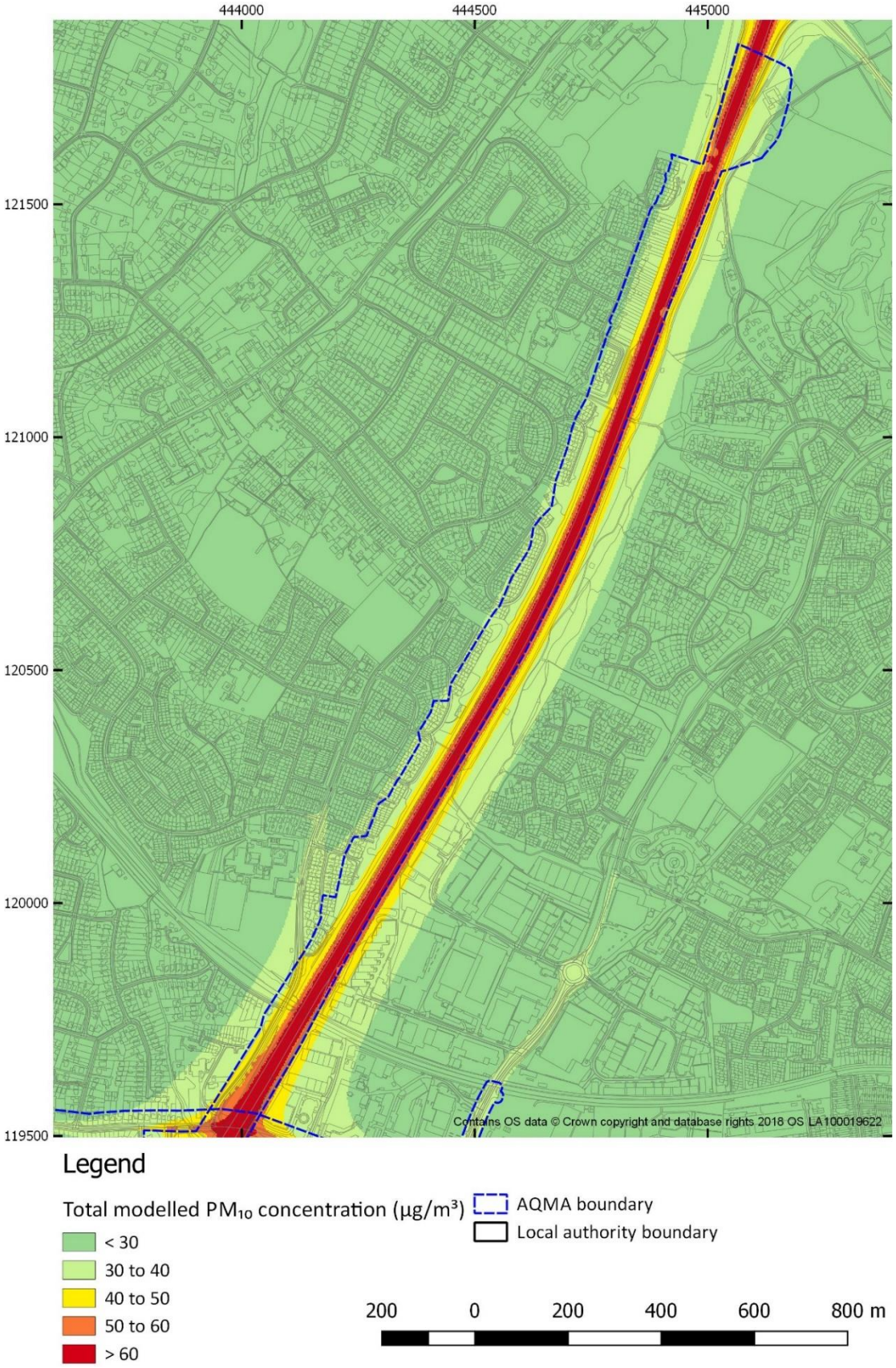


Figure 4-52 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 2 (M3) (North)

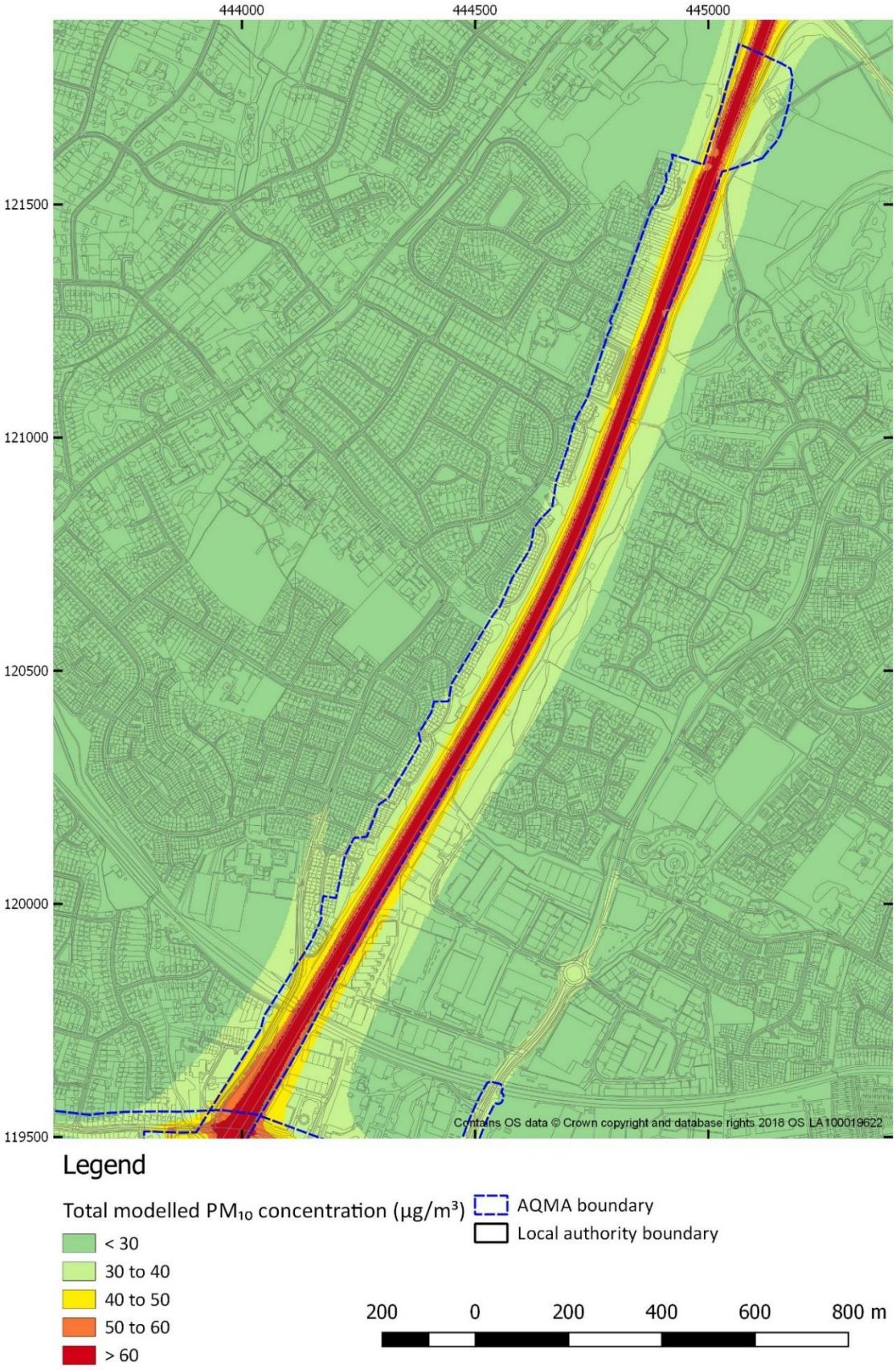


Figure 4-53 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 3 (Hamble Lane)

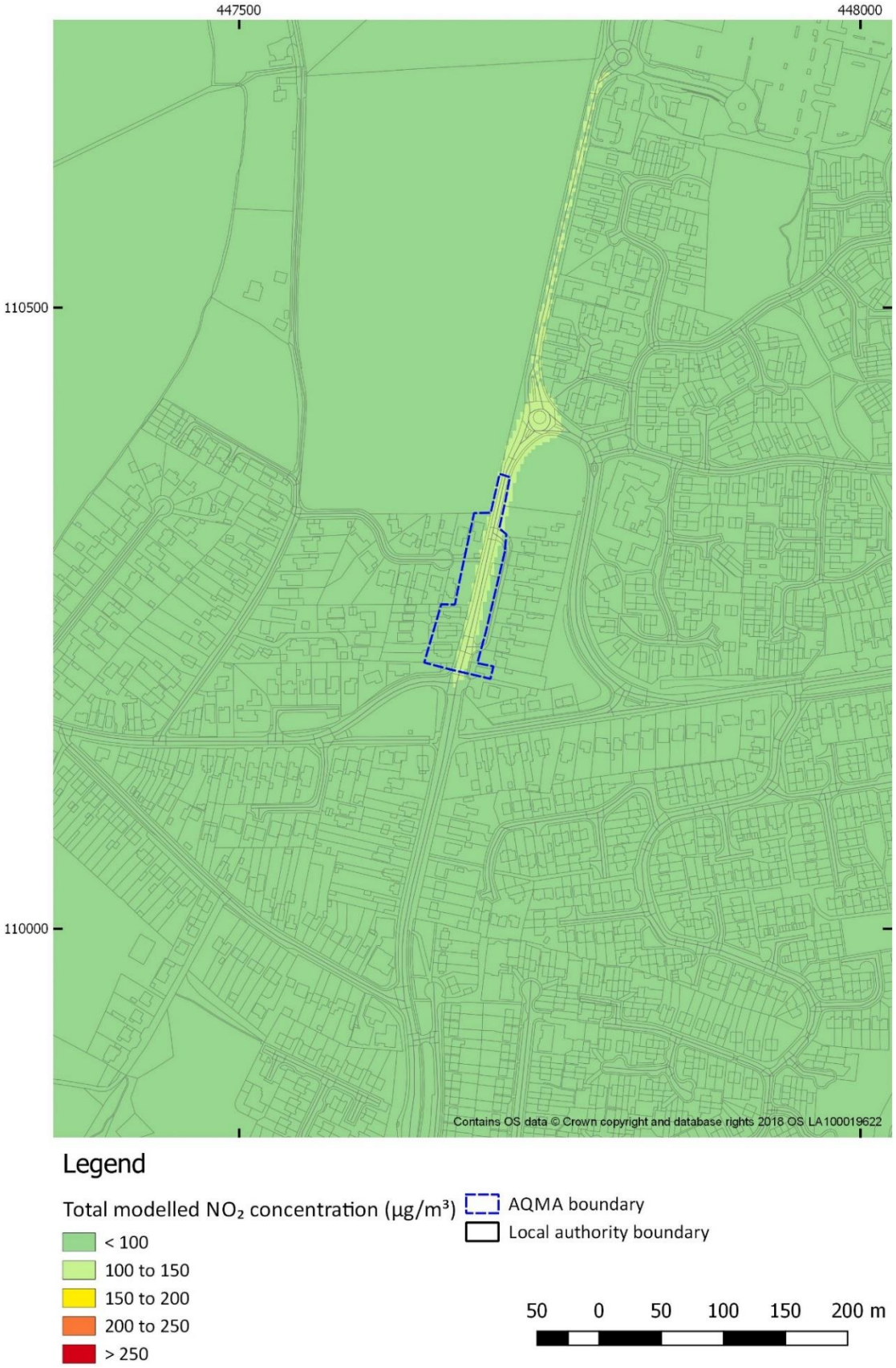


Figure 4-54 Short-term NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 3 (Hamble Lane)

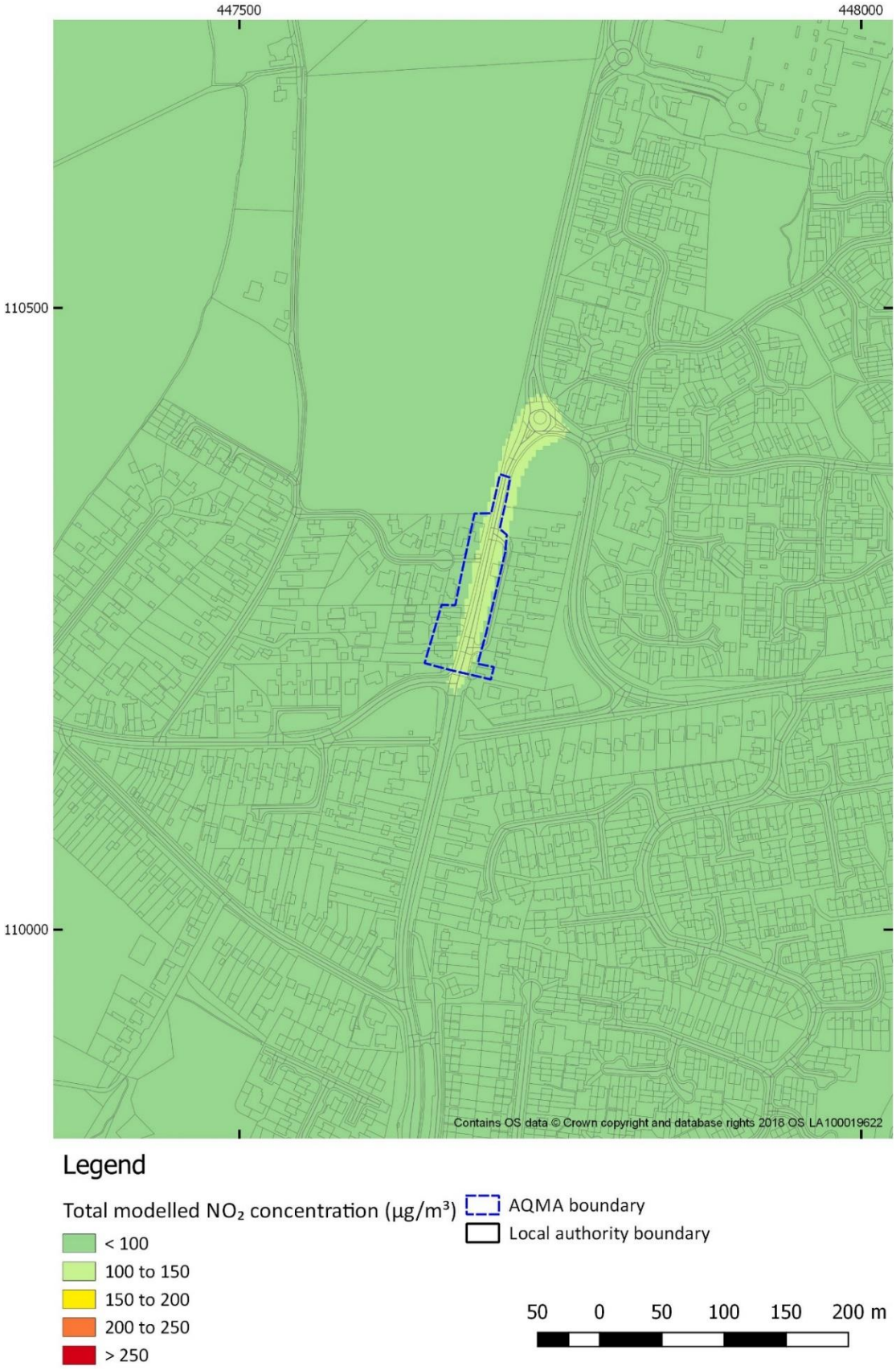


Figure 4-55 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 3 (Hamble Lane)

Figure 4-56 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 3 (Hamble Lane)

Figure 4-57 Short-term NO_2 concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 4 (High Street Botley)

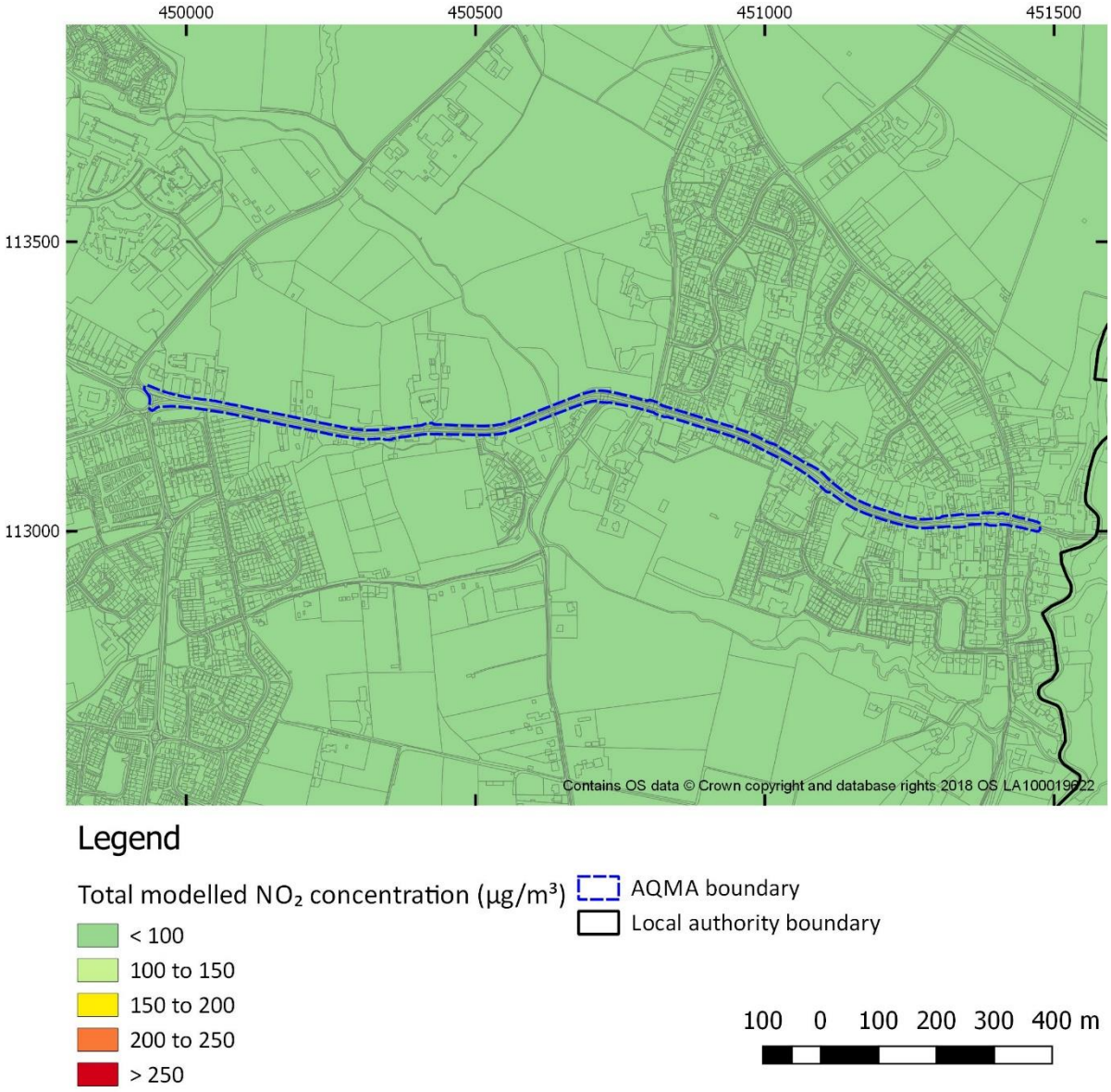


Figure 4-58 Short-term NO_2 concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 4 (High Street Botley)

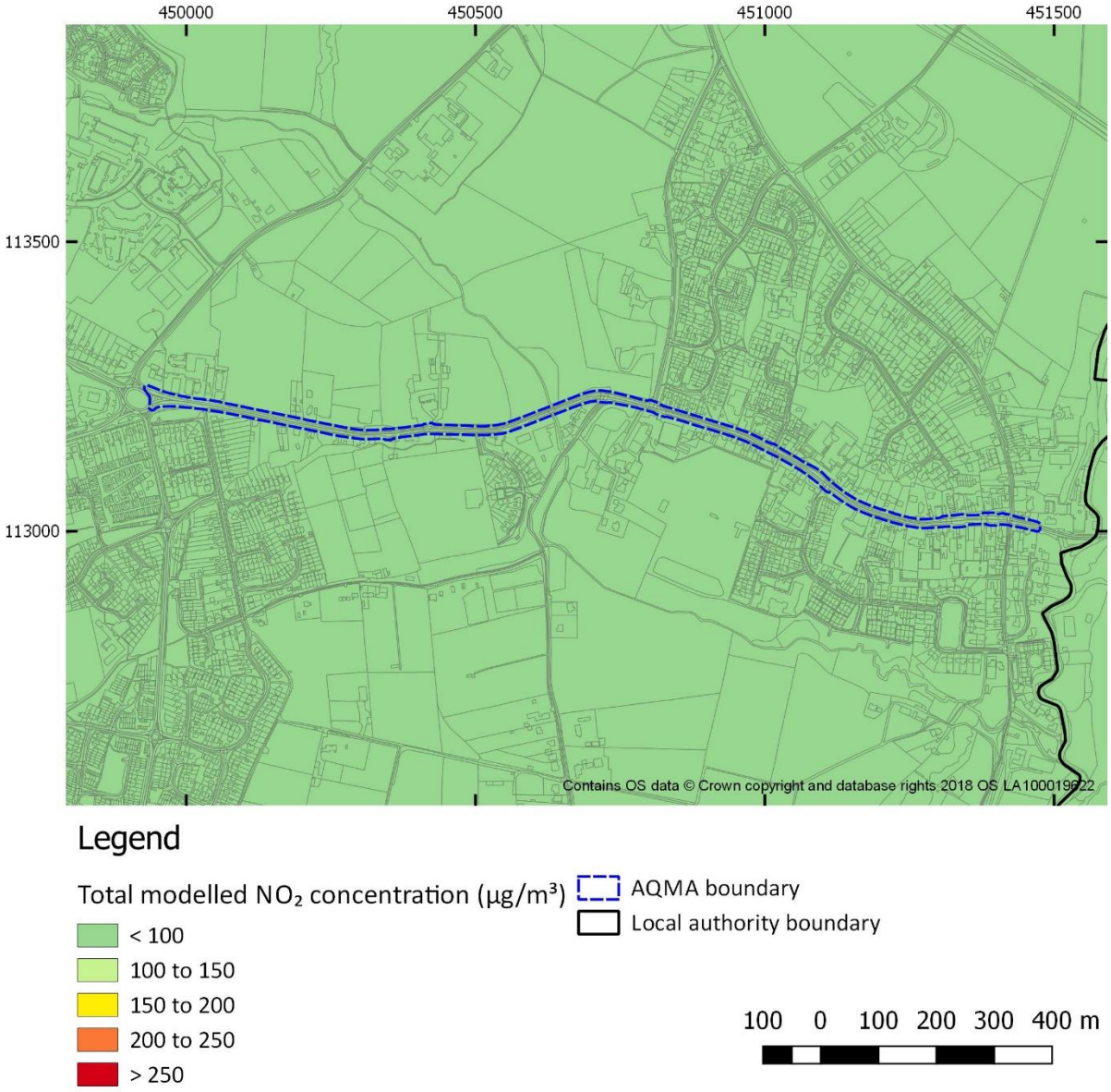


Figure 4-59 Short-term PM_{10} concentration model results for 2020 With Interventions (2020 WI) scenario - AQMA No. 4 (High Street Botley)

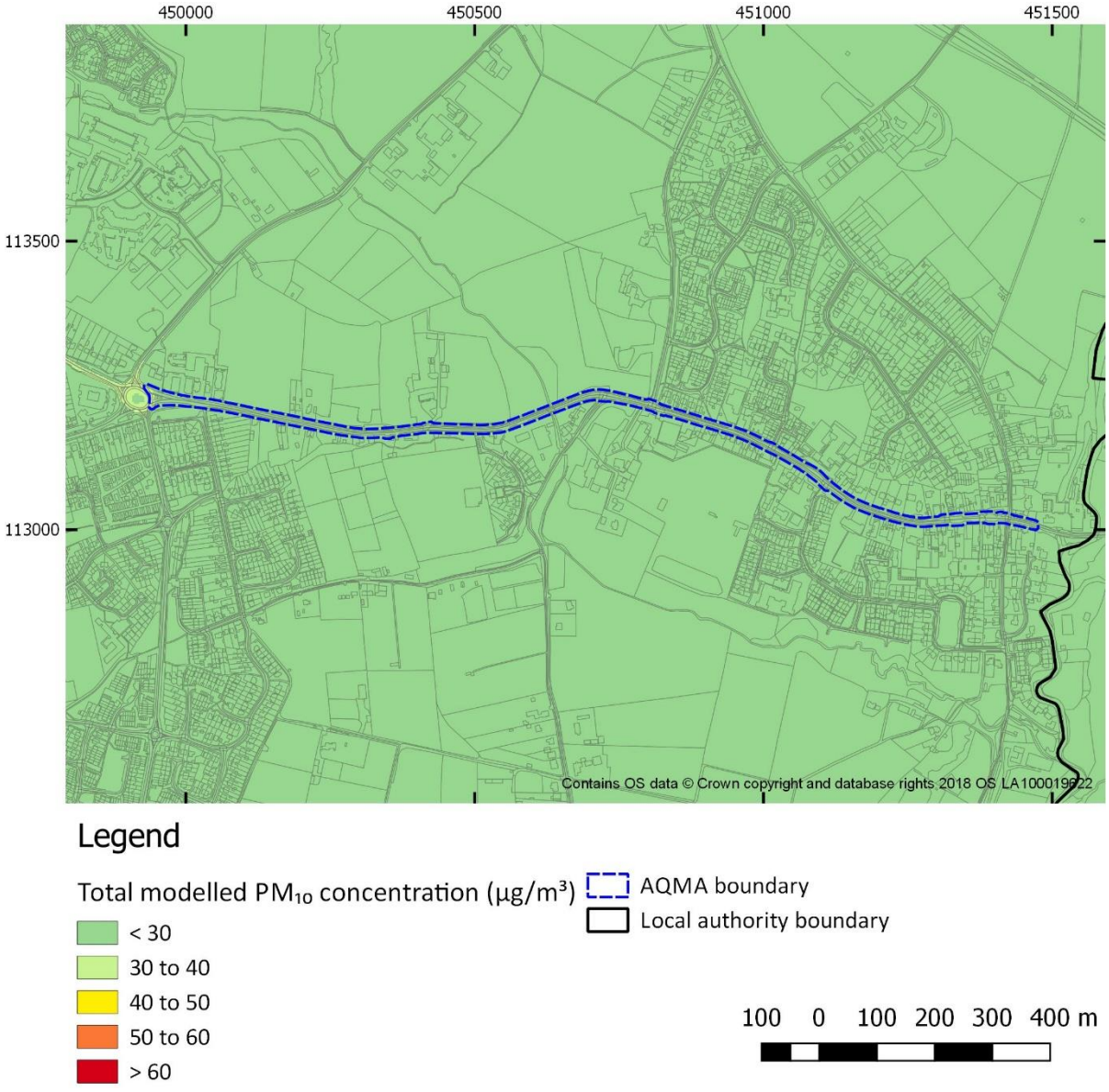
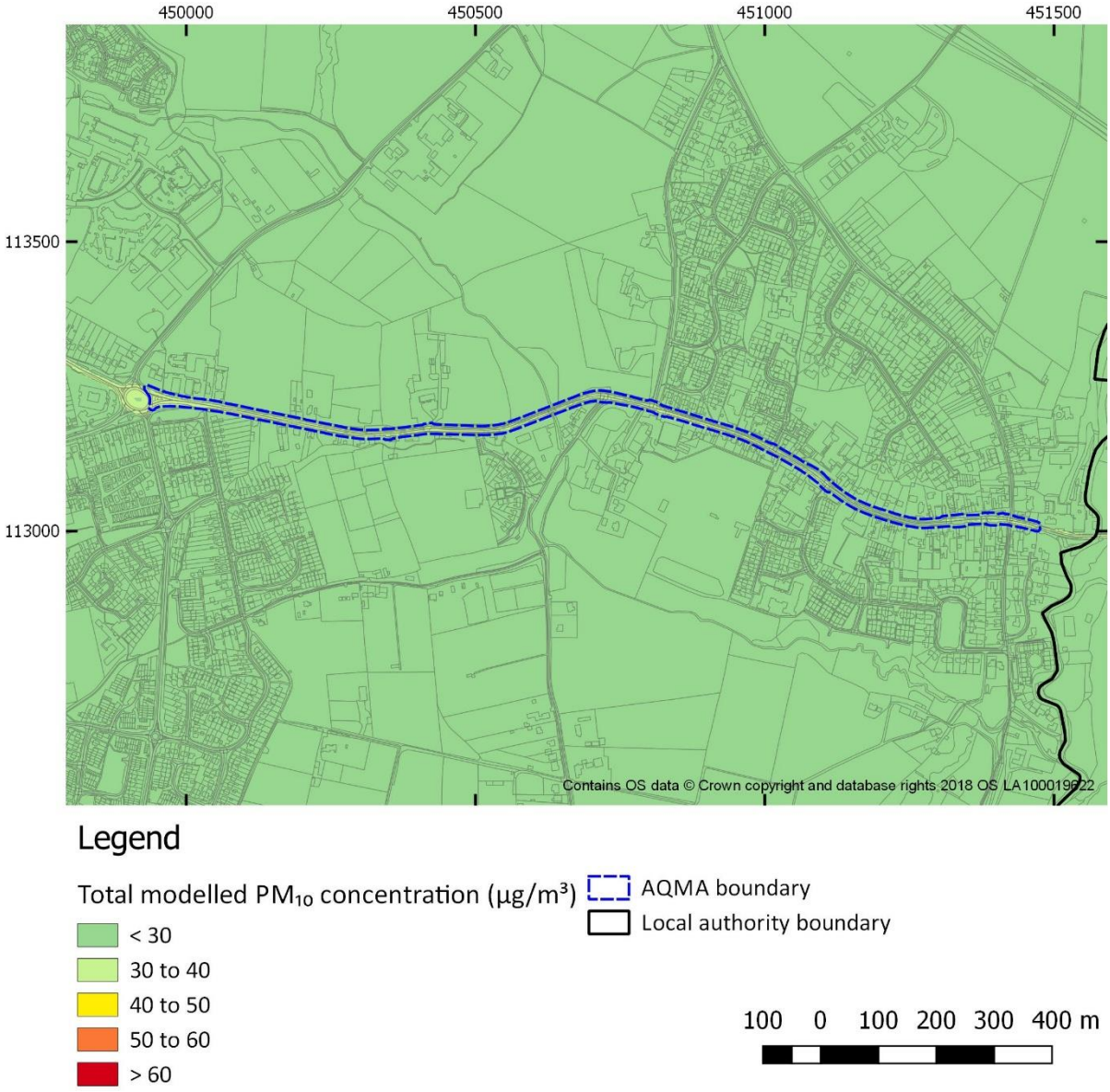


Figure 4-60 Short-term PM_{10} concentration model results for 2020 No New Traffic Interventions (2020 NNTI) scenario - AQMA No. 4 (High Street Botley)



4.3 Summary and discussion of 2020 model results

4.3.1 Air quality modelling results for 2020

The results in Table 4-3 to Table 4-7 and the more detailed results in Appendix 1 Table A1-1 to Table A1-5 indicate that:

- Both 2020 scenarios show a general improvement across all three pollutants (NO_2, PM_{10} and $PM_{2.5}$) when compared to the 2015 Reference Case.
- Using the modelled receptor points (Section 3.3 of the main report) as a guide, none of the modelled receptor points are predicted to exceed the annual air quality objectives for NO_2, PM_{10} or $PM_{2.5}$ in the 2020 dispersion models.
- None of the modelled receptor points are predicted to exceed the short-term air quality objectives for NO_2 or PM_{10} in the 2020 dispersion models.

These results and their implications for future air quality within Eastleigh Borough are discussed in greater detail in the following sections. This discussion will focus on the results for annual mean NO_2 concentrations, as that was the reason the AQMAs within Eastleigh Borough were declared.

In the following sections, modelled results from the 2020 scenarios are compared to trends in measured annual mean NO_2 concentrations from 2014 to 2018. While measured NO_2 concentrations generally show a gradual improvement from 2014 to 2018, real-world improvements in air quality over this period tended to lag behind expectations due to a mismatch between anticipated emission improvements from Euro 5/VI vehicles and real-world emissions from these vehicles. The 2020 model results suggest a faster rate of improvement from 2015 to 2020, due to an increased uptake of Euro 6/VI vehicles meeting higher emission standards. Some of the uncertainty in the 2020 model results is therefore related to uncertainties in the real-world emissions from vehicles complying with the currently applicable Euro 6/VI vehicle emissions standards. Early real-world emission test results of Euro 6 vehicles indicate mixed results, ranging from vehicles which met the Euro 6 standards under real-world driving emissions to vehicles which displayed NOx emissions up to 12 times higher than the Euro 6 standard.[7,8] However, the increasing use of real-world emissions tests is likely to intensify pressure on vehicle manufacturers to comply with these more stringent Euro standards, and results to date do show a real-world emissions reduction between Euro 5 and Euro 6 vehicles.

The discussion of model results for each AQMA includes some consideration of the likely implementation timeline for traffic interventions. Specifically, the 2020 WI scenario includes interventions which will be delivered in the short- to medium-term (e.g. either at 2020 or within a few years; refer to Section 3.1). Not all of the transport interventions included in the 2020 WI scenario will be implemented by 2020, and the implications of an extended timeline are considered for each AQMA.

4.3.2 Air quality in AQMA No. 1 (A335/Eastleigh)

The detailed model results listed in Appendix 1 predict that air quality in AQMA 1 will be roughly comparable in both of the 2020 scenarios. For most modelled receptors and pollutants, the predicted concentration for 2020 WI is within 1% of the predicted concentration for 2020 NNTI. Averaged across all of the modelled receptors within the AQMA, annual mean NO_2 concentrations in both 2020 scenarios are predicted to be approximately 18-19% lower than NO_2 concentrations in 2015 (Table 4-3). The model results suggest that annual mean NO_2 concentrations within AQMA 1 should fall below the air quality objective by 2020. As the model results are similar for both the 2020 NNTI and WI scenarios, the implementation timeline of the transport interventions will not have a significant effect on the air quality in this AQMA.

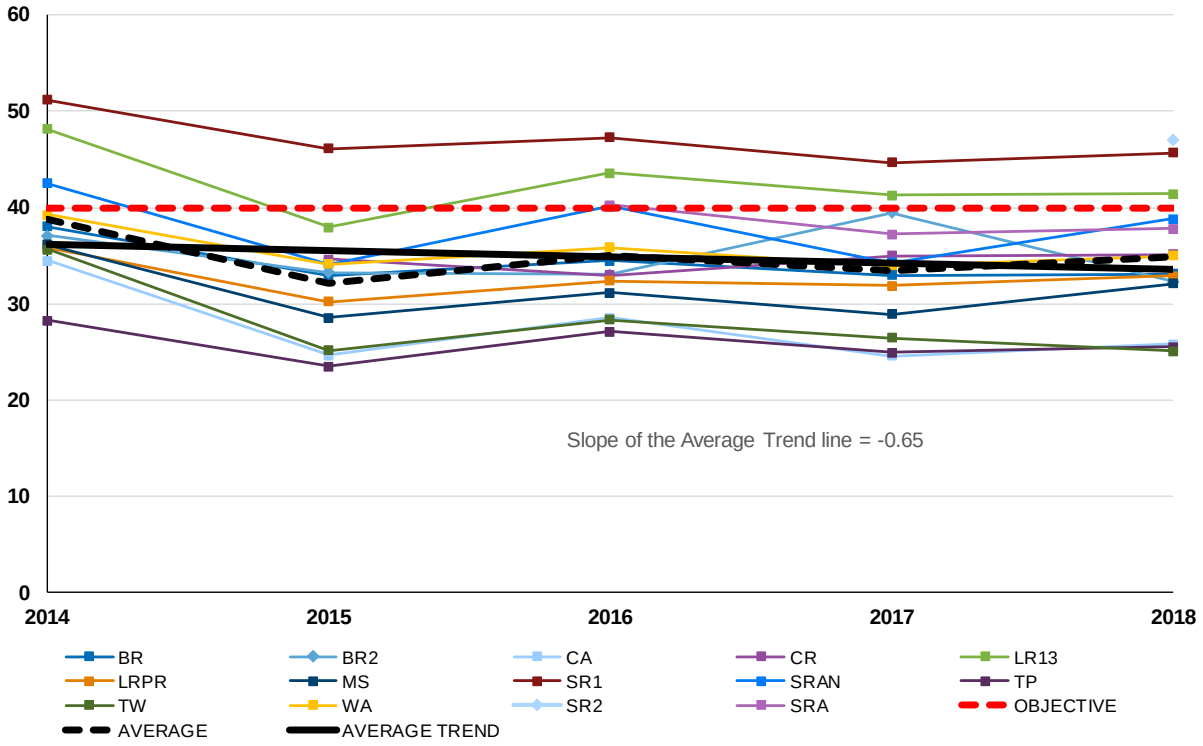
[7] The Real Urban Emissions Initiative, https://www.trueinitiative.org/, accessed 14/03/2019.

[8] Emissions Analytics, EQUA Index, https://equaindex.com/equa-air-quality-index/, accessed 13/03/2019.

The measured annual mean NO_2 concentrations from monitoring sites located within and near AQMA 1, between 2014 and 2018, are shown in Figure 4-61. The measured data indicates that NO_2 annual mean concentrations have been improving by approximately 0.65 µg/m^3 each year, and there has been an average total improvement of approximately 10% between 2014 and 2018. This is a slower rate of improvement than is predicted by the dispersion modelling results, and in contrast to the model results, the measured data does not suggest that the annual mean NO_2 concentrations will fall below the air quality objective by 2020. This discrepancy is discussed further in Section 5. In particular, annual mean NO_2 measurements at Southampton Road 1 (SR1), Southampton Road 2 (SR2) and Leigh Road / Junction 13 (LR13) have been above 40 µg/m^3 in 2018 and in other recent years. Measurements from other monitoring locations have also been above 35 µg/m^3 in recent years, including locations along Bishopstoke Road 2 (BR2), Campbell Road (CR), and other locations along Southampton Road (SRAN and SRA).

Based on the available evidence, comprising the 2020 model results as well as recent air quality monitoring information, the existing AQMA 1 designation should be maintained. Eastleigh Borough should continue to investigate and implement air quality measures to improve the air quality within AQMA 1. Recommendations for understanding and improving the air quality within AQMA 1 are discussed in Section 5.1.

Figure 4-61 Annual mean NO_2 concentrations measured in AQMA 1 from 2014 to 2018



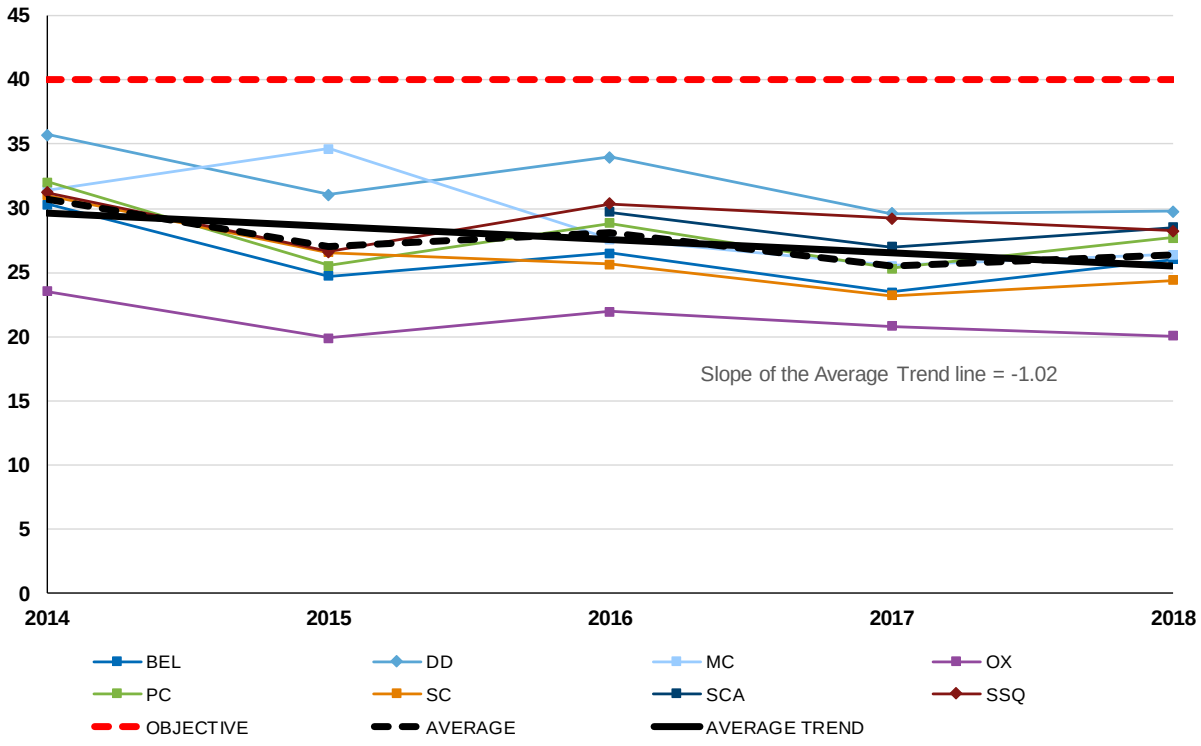
4.3.3 Air quality in AQMA No. 2 (M3)

The detailed model results listed in Appendix 1 predict that annual mean NO_2 concentrations in AQMA 2 will improve to a greater extent under the 2020 NNTI scenario (average 23.2% improvement) than under the 2020 WI scenario (average 19.9% improvement). This appears to be due to an increase in total vehicles (AADT) and average vehicle speed in the 2020 WI scenario, suggesting that with the additional WI scenario transport improvements, vehicles move more quickly along the M3, and greater numbers of vehicles travel on the M3, causing an increase to total emissions. Nonetheless, the model results suggest that annual mean NO_2 concentrations within AQMA 2 should be well below the air quality objective by 2020, under both the WI and NNTI scenarios.

The measured annual mean NO_2 concentrations from monitoring sites located within and near AQMA 2, between 2014 and 2018, are shown in Figure 4-62. The measured data indicates that NO_2 annual mean concentrations have been improving by approximately 1.02 µg/m^3 each year, and there has been an average total improvement of approximately 14% between 2014 and 2018. From 2015 onward, none of the monitoring sites located within AQMA 2 have measured an annual mean NO_2 concentration exceeding 35 µg/m^3. As the recent monitoring data and both 2020 model scenarios suggest that annual mean NO_2 concentrations will be below 35 µg/m^3 in 2020, the implementation timeline of the transport interventions is not expected to have an impact on the ability of this AQMA to comply with the air quality objectives.

Based on the available evidence, comprising the 2020 model results as well as recent air quality monitoring information, it is recommended that EBC should consider revoking the existing AQMA 2 designation once sufficient evidence has been gathered. The portion of AQMA 2 that does not overlap with AQMA 1 has not exceeded the annual mean NO_2 air quality objective for a number of years, and the model results predict that this will continue to be the case under both 2020 scenarios. It is recommended that EBC continue to monitor air quality within AQMA 2 until sufficient evidence has been gathered to demonstrate consistent compliance with the air quality objectives. Due to the inherent inaccuracy of diffusion tubes as a monitoring method, it is recommended that this evidence includes at least 5 sequential years of annual mean NO_2 concentrations below 35 µg/m^3, alongside a review of whether the diffusion tube monitoring locations are representative of locations where the air quality standards for human health apply.

Figure 4-62 Annual mean NO_2 concentrations measured in AQMA 2 from 2014 to 2018



4.3.4 Air quality in AQMA No. 3 (Hamble Lane)

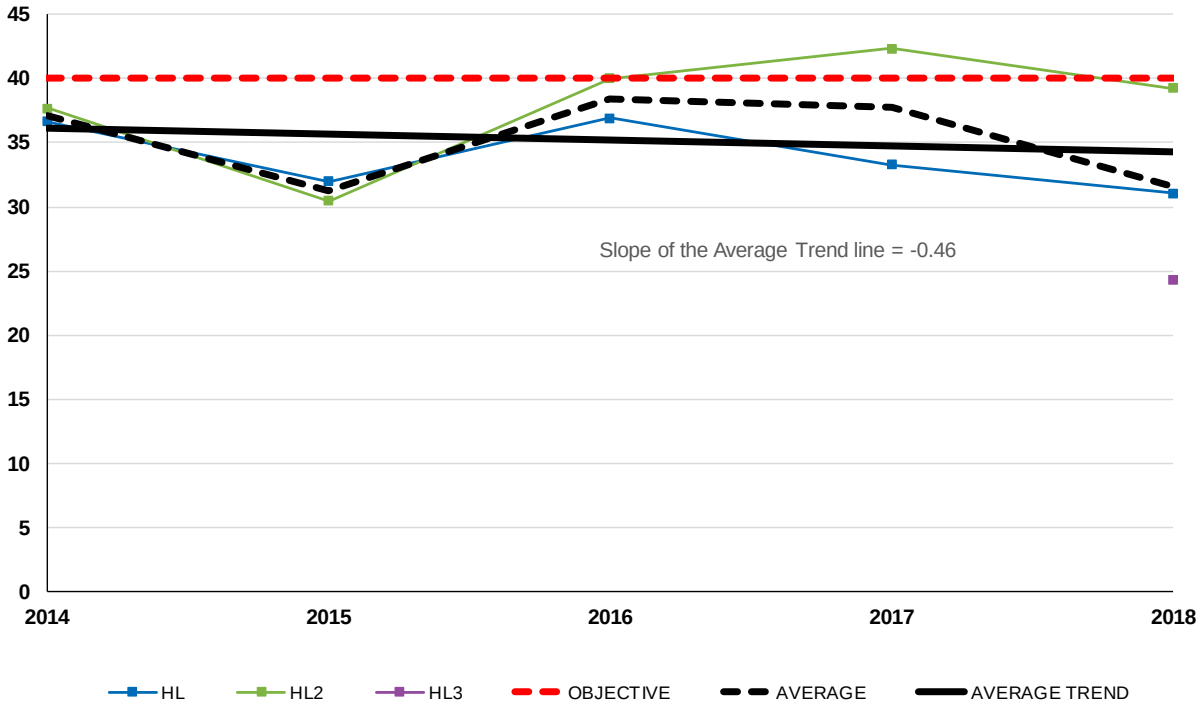
The detailed model results listed in Appendix 1 predict that annual mean NO_2 concentrations in AQMA 3 will improve to a greater extent under the WI scenario (average 13% improvement) than under the NNTI scenario (average 9.7% improvement). This appears to be due to a redistribution of traffic emissions within the locality. Specifically, when comparing the WI to the NNTI scenario, the WI scenario has an increase in emissions on Hamble Lane north of Hamble Ln / Lionheart roundabout, and a

decrease in emissions south of the roundabout. Nonetheless, the model results predict that NO_2 concentrations within AQMA 3 will be compliant with the annual objective by 2020 under both the WI and NNTI scenarios.

The measured annual mean NO_2 concentrations from monitoring sites located within AQMA 3, between 2014 and 2018, are shown in Figure 4-63. If the HL3 monitoring site is included in the analysis, the measured data indicates that NO_2 annual mean concentrations have been improving by an average of approximately 0.46 µg/m^3 each year, and there has been a total average improvement of approximately 15% between 2014 and 2018. However, monitoring began at HL3 in 2018 and the concentration measured at HL3 was significantly lower than the concentration measured at HL or HL2. If HL3 is excluded from the analysis, then NO_2 annual mean concentrations have increased by approximately 5.4% from 2014 to 2018. The annual mean NO_2 concentration at monitoring site HL2 exceeded the air quality objective in 2017 and was close to exceeding the air quality objective in 2016 and 2018.

The available evidence, comprising the 2020 model results as well as recent air quality monitoring information, is inconclusive as to whether or not the annual mean NO_2 concentrations within AQMA 3 will achieve compliance with the air quality objective by 2020. The existing AQMA 3 designation should be maintained and air quality should continue to be monitored. It is possible that the annual mean NO_2 concentration will fall below the air quality objective in the near future, particularly if the transport measures included in the 2020 WI scenario are implemented in the near future. However, until there is more conclusive evidence to indicate that concentrations within AQMA 3 will fall below the air quality objective, it is recommended that Eastleigh Borough continue to investigate and implement further air quality measures to improve the air quality within AQMA 3. Recommendations for understanding and improving the air quality within AQMA 3 are discussed in Section 5.2.

Figure 4-63 Annual mean NO_2 concentrations measured in AQMA 3 from 2014 to 2018



4.3.5 Air quality in AQMA No. 4 (High Street Botley)

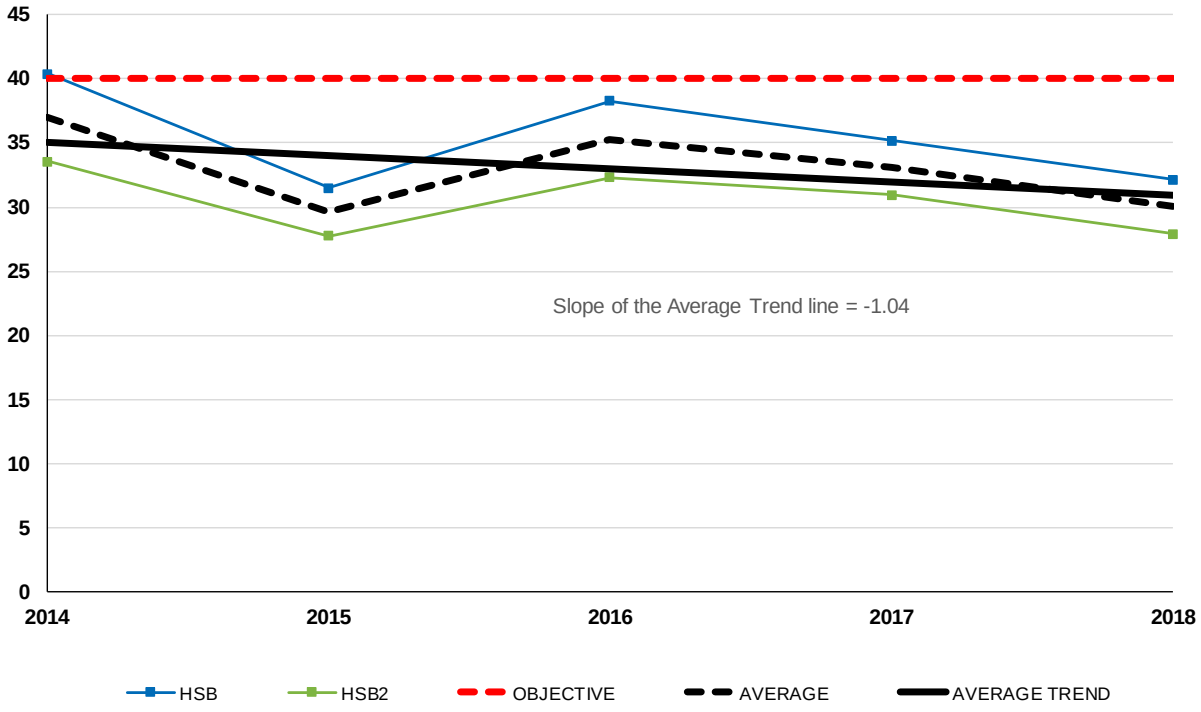
The model results suggest that annual mean NO_2 concentrations within AQMA 4 should be well below the air quality objective by 2020, under both the WI and NNTI scenarios. The detailed model results listed in Appendix 1 predict that annual mean NO_2 concentrations in AQMA 4 will improve to a greater extent under the 2020 WI scenario (average 35.9% improvement) than under the 2020 NNTI scenario

(average 18.5% improvement). This is due to a redistribution of traffic to a new road north of the Botley High Street as a result of the construction of the Botley Bypass. It is understood that the Botley Bypass intervention will not be constructed by 2020, and therefore the 2020 NNTI scenario is a more realistic forecast for air quality concentrations in 2020. Even so, the NNTI results suggest that NO_2 concentrations within AQMA 4 will be below the air quality objective by 2020.

The measured annual mean NO_2 concentrations from monitoring sites located within AQMA 4, between 2014 and 2018, are shown in Figure 4-64. The measured data indicates that NO_2 annual mean concentrations have been improving by approximately 1.04 µg/m^3 each year, and there has been an average total improvement of approximately 18.7% between 2014 and 2018. From 2015 onward, none of the monitoring sites located within AQMA 4 have measured an annual mean NO_2 concentration exceeding 40 µg/m^3.

Based on the available evidence, comprising the 2020 model results as well as recent air quality monitoring information, it is recommended that EBC should consider revoking the existing AQMA 4 designation once sufficient evidence has been gathered. The measured annual mean NO_2 concentrations within AQMA 4 have not exceeded the annual mean NO_2 air quality objective for a number of years, and the model results predict that this will continue to be the case under both 2020 scenarios. It is recommended that EBC continue to monitor air quality within AQMA 4 until sufficient evidence has been gathered to demonstrate consistent compliance with the air quality objectives. Due to the inherent inaccuracy of diffusion tubes as a monitoring method, it is recommended that this evidence includes at least 5 sequential years of annual mean NO_2 concentrations below 35 µg/m^3, alongside a review of whether the diffusion tube monitoring locations are representative of locations where the air quality standards for human health apply.

Figure 4-64 Annual mean NO_2 concentrations measured in AQMA 4 from 2014 to 2018

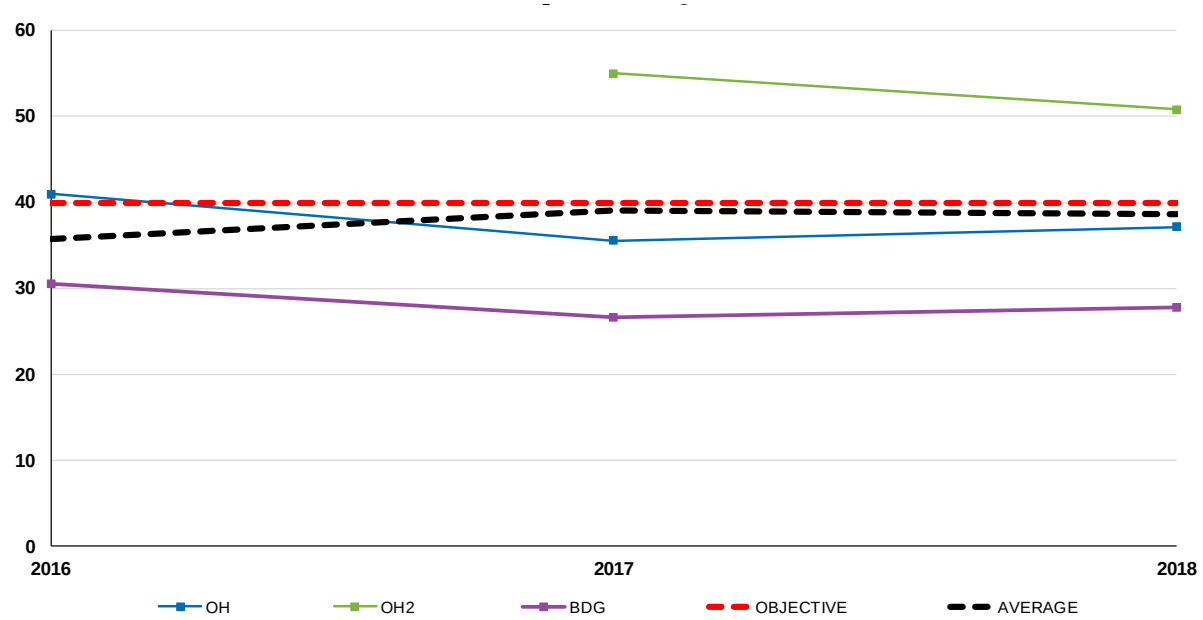


4.3.6 Air quality along the A27 in Bursledon

Monitoring of annual mean NO_2 concentrations began along the A27 in Bursledon in 2016, and the annual mean concentrations between 2016 and 2018 are shown in Figure 4-65. Exceedances of the

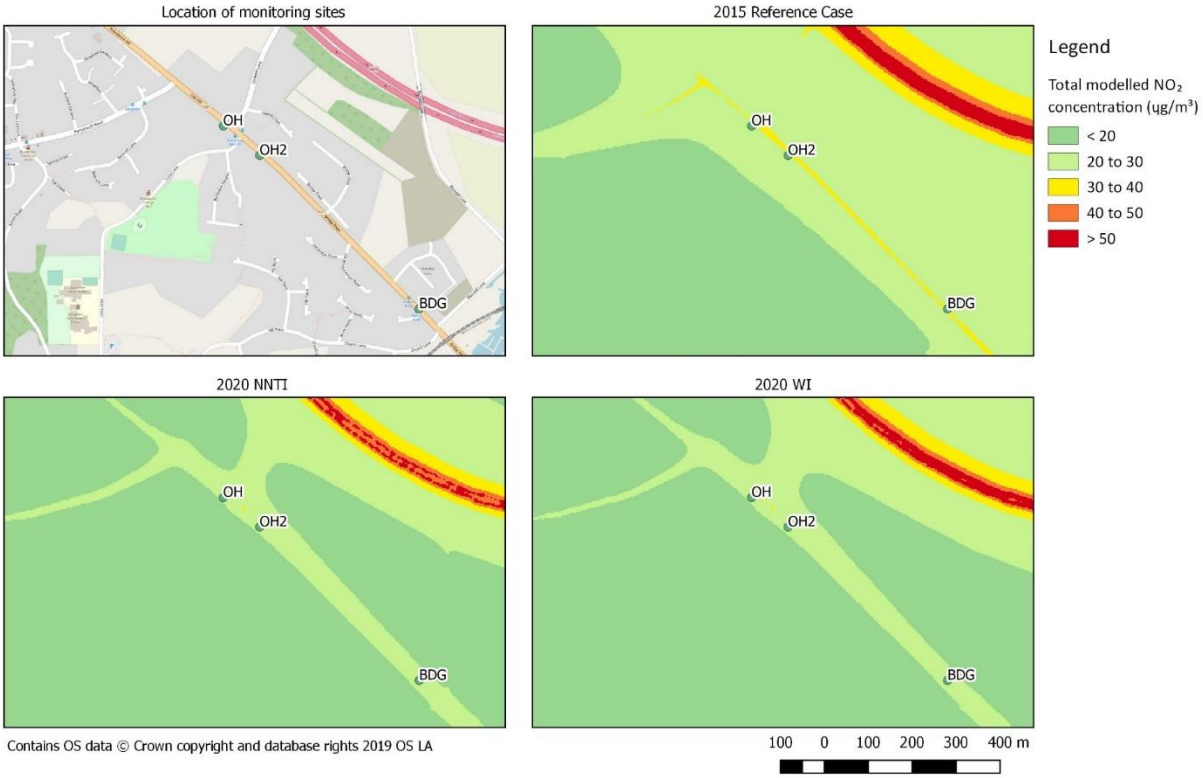
air quality objective have recently been measured at two of these sites: Oak Hill (OH) and Oak Hill 2 (OH2).

Figure 4-65 Annual mean NO_2 concentrations measured along the A27 in Bursledon



The model results for annual mean NO_2 concentration along the A27 in Bursledon, for the 2015 Reference Case as well as both 2020 scenarios, are shown in Figure 4-66.

Figure 4-66 Total modelled annual mean NO_2 concentrations along the A27 in Bursledon



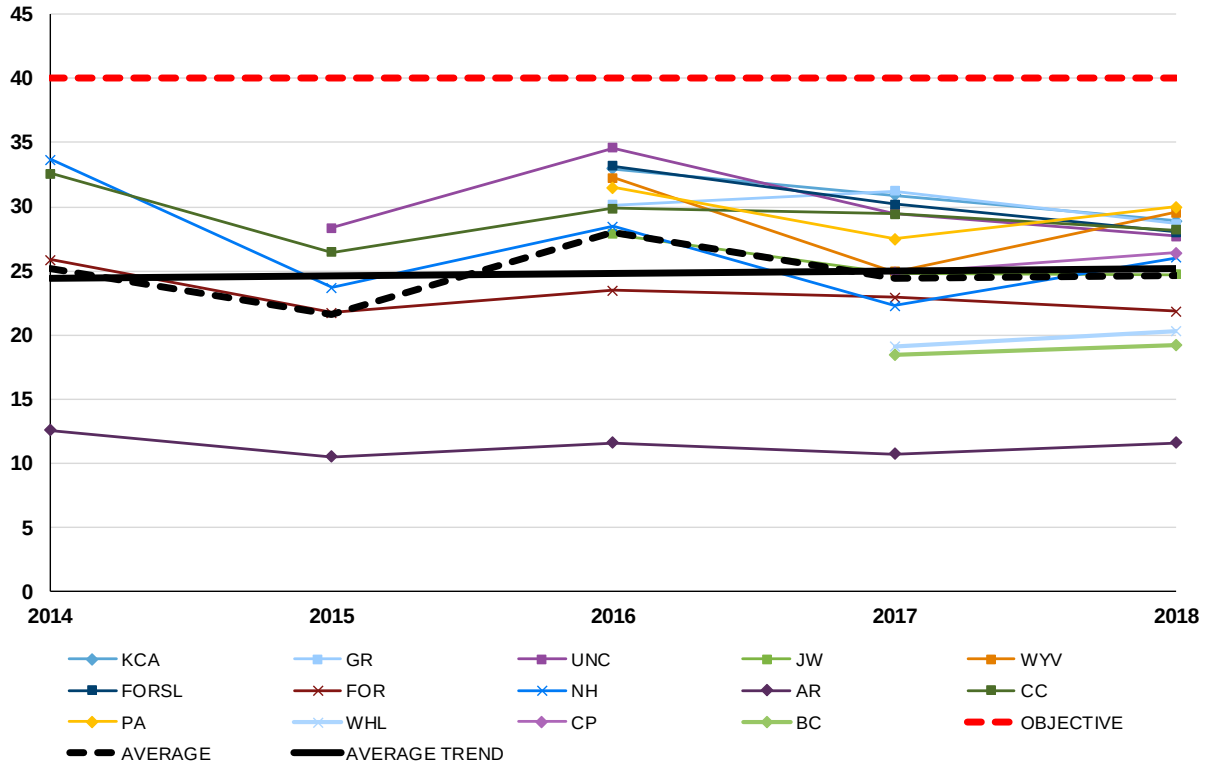
The detailed model results listed in Appendix 1 predict that air quality along this section of the A27 will be roughly comparable in both of the 2020 scenarios. The model results do not predict an exceedance of the annual NO_2 air quality objective in any of the modelled scenarios. However, based on the recent air quality monitoring information, it is recommended that Eastleigh Borough consider declaring a new AQMA along this section of the A27. Recommendations for understanding and improving the air quality within AQMA 3 are discussed in Section 5.3.

4.3.7 Air quality elsewhere in Eastleigh Borough

Air quality elsewhere in Eastleigh Borough is monitored by additional diffusion tubes monitoring sites and has also been modelled as part of this study. Aside from those areas already discussed, the model results do not predict any exceedances of the annual mean NO_2 concentration, at locations where the annual air quality objectives apply, in the 2015 or 2020 model scenarios.

The measured annual mean NO_2 concentrations from monitoring sites located outside of existing AQMAs and outside of the area around the A27 in Bursledon, are shown in Figure 4-67. These measured concentrations do not indicate any exceedances of the annual NO_2 air quality objective.

Figure 4-67 Annual mean NO_2 concentrations measured elsewhere in Eastleigh Borough (not in AQMAs or near the A27 in Bursledon) from 2014 to 2018



5 Recommendations for mitigation measures

This chapter considers the key influences on air quality within the AQMAs in Eastleigh Borough with respect to the 2020 model scenarios and suggests options for mitigation to help ensure that Eastleigh Borough meets the air quality objectives.

The following additional information can be found in the main report[1], where the indicated section, figure and table numbers correspond to that report:

- General mitigation options for consideration (Section 4.1)
- Further information regarding the AQMAs within Eastleigh Borough (Section 4.2), including vehicle source apportionment information based on the 2015 Reference Case model results (Figure 4-1) and mitigation options for each AQMA (Table 4-1).

This chapter focuses on areas within Eastleigh Borough where air quality is likely to remain a concern in the near future, based on the discussion of model results and monitoring data from the previous chapter. These areas are:

- AQMA No. 1 (A335/Eastleigh)
- AQMA No. 3 (Hamble Lane)
- Sections of the A27 in Bursledon

In all three of these cases there is an apparent discrepancy between the model results, which predict that the air quality objectives will be met throughout Eastleigh Borough by 2020; and the recent monitoring data, which indicates that air quality in these three areas is not improving as quickly as predicted by the model results. This discrepancy suggests that, in these areas, some of the assumptions in the modelling process are not being realized in the real world. For example, it may be that the vehicle fleet within these areas is, on average, older than that assumed by the modelling process; that the fleet is not being replaced by newer vehicles at the anticipated fleet turnover rate; that congestion levels are not being adequately captured by the transport and/or air dispersion modelling process; etc. In all three cases, it may be useful to carry out further studies on topics such as the fleet composition in order to gain a better understanding of the factors contributing to the elevated NO_2 concentrations.

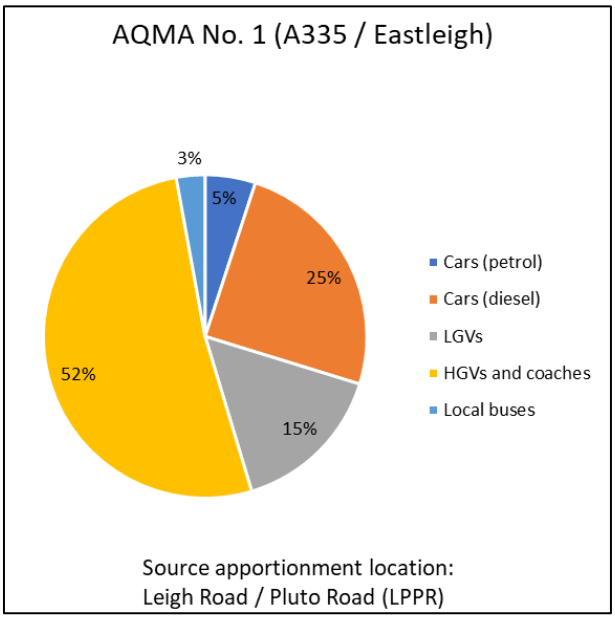
5.1 AQMA No. 1 (A335/Eastleigh)

Eastleigh AQMA No. 1 (A335) was declared in 2005. The AQMA boundary currently includes corridors of land extending approximately 30-40m of either side of the following roads:

- A335 / Wide Lane from the Wide Lane roundabout at Southampton Airport Parkway Station northwards up A335 / Southampton Road to the junction with St Catherine's Road.
- A335 / Romsey Road and A335 / Leigh Road, between the junction with Bournemouth Road to the west and the Bishopstoke Road roundabout to the east.
- Woodside Avenue, From the junction with A335 / Leigh Road to the south and extending to approximately 65m north of the junction with Judd Close.
- B3037 / Bishopstoke Road, between the roundabout at the A335 to the west and Chickenhall Lane roundabout.

Figure 5-1 provides source apportionment information for the NOx emissions within AQMA 1, based on the 2015 Reference Case model results.

Figure 5-1 Source apportionment of NOx emissions for AQMA No. 1 (A335 / Eastleigh)



These specific challenges were identified for AQMA No. 1 in the 2018 Annual Status Report (ASR)[9]:

- Traffic growth in combination with a substantial proportion of the fleet comprising of diesel LGV and HGV's.
- Limited scope for traffic improvements in the area.
- Cost and complexity of implementing the Chickenhall Lane Link Road.
- Constraints of surrounding transport infrastructure including road, rail and airport.

Eastleigh Borough Council have investigated and implemented (where possible) a number of air quality mitigation measures[9,10,11] to improve local air quality within AQMA 1 and within Eastleigh Borough more generally, including but not limited to:

a. A joint bid to provide financial support to replace older, more polluting taxis in Eastleigh Borough in partnership with Southampton City Council (SCC), which was successful. In February 2017, £350,000 was approved to be spilt approximately 2:1 between SCC & EBC. The scheme will be administered by Southampton Licensing Team as they currently manage the taxi licensing for both authorities. To date there has been one grant awarded for an Eastleigh based taxi (a Euro 5 diesel replaced with a petrol electric hybrid vehicle). The scheme is to be further publicised with information on the licensing website, leafletting of taxi stands across the two authorities and further forums. EBC estimate that the vehicle replacement scheme can reduce the Eastleigh fleet of PH/Hackney carriages NOx output by approximately 23.5%.

b. The airAlert service has continued to operate since its launch in October 2016. There are now 450 active subscribers across both Eastleigh and Southampton who receive the free alerts of potential air pollution events ahead of time. The service is designed to help those with health problems effectively manage their condition. It is also a tool to help raise awareness of air quality in general and encourage more sustainable and active forms of travel.

[9] Eastleigh Borough Council, "2018 Air Quality Annual Status Report (ASR)", June 2018.

[10] Eastleigh Borough Council, "Eastleigh AQ Action Plan 2015-2020", 2015.

[11] Eastleigh Local Area Committee, "Eastleigh Air Quality Management Area Action Plan- Update; Report of the Environmental Lead Specialist", 20 March 2018.

c. Since November 2017, EBC have been working with Hampshire County Council Schools Travel Planning Officer to promote awareness and understanding of the issues around air pollution with school children across the Borough. The children have been, and continue to, monitor air pollution using tubes provided by EBC, and now they are working to plan their own Air Quality (AQ) Campaign that will inform people about air pollution and the problems associated with it, and persuade them to change their behaviour to help to improve air quality.

d. In December 2017, EBC started working with a local business Iknaia, to help trial new low cost technology to measure vehicle speeds and numbers and to monitor air quality. Sensors have been located within the Eastleigh AQMA at The Point and Eastleigh House. The objective of the project is to see how well their pollution monitor performs when compared to the laboratory standard equipment that we operate, and to look to see how pollution levels relate to traffic counts and average road speeds recorded.

e. SCC have been successful in attracting £2.6M funding from the Clean Bus Technology Fund to retrofit around 145 buses with pollution abatement equipment, which can reduce NOx emissions from each bus by up to 99%. Eastleigh will benefit from improved buses which operate out of the Hants and Dorset depot on Chickenhall Lane and which pass along Southampton Road within the Eastleigh AQMA every day.

f. Planning and Development Management – promoting low emissions infrastructure, e.g. Electric Charging Points, minimising journeys, promoting alternate to car usage, siting sensitive new development away from busy roads, avoiding creating street canyons, promoting vegetation in open spaces.

g. Voluntary Clean Air Zone measures, including considerations such as restrictions on vehicle types (use of traffic orders), increasing parking charges for most polluting vehicles, reduce parking charges for ULEV vehicles, encouragement and promotion of walking and cycling and facilitating this. Encouraging low emissions deliveries, support for park and ride schemes, support for school and business Travel Plans, driver training and awareness schemes.

h. Reducing emissions from Public Sector vehicles, including training for staff that drive for work on fuel efficient driving, vehicles to display real time fuel efficiency data.

i. Promoting walking and cycling by providing support for active travel; providing a choice of cycle routes avoiding highly polluted roads, improving cycle lanes on busy roads, and using foliage to screen busy roads.

j. Awareness raising, including working with health professionals to raise awareness and share information on air pollution, providing updates on air pollution through local media, and considering initiatives such as Clean Air Day (21/6/18) or car free days.

k. Continuing consideration of a Chickenhall Lane Relief Road to reduce traffic along the A335, although at this time, EBC is not aware of any funding available to implement this in the short term.

l. Consideration of a charging Clean Air Zone, similar to the schemes being considered and, in some cases, implemented to reduce air pollution in large cities. However, this option is only open to nominated cities and areas, of which Eastleigh Borough is not included, and then only allowable if a detailed assessment of all the other viable options to reduce air pollution have been considered and shown to be ineffective.

Despite the development of an Air Quality Action Plan (AQAP) for this AQMA[10], and the investigation and implementation of mitigation measures over several years, air quality continues to be a concern within AQMA 1. Based on the modelling and monitoring results discussed in Section 4.3.2, it is likely that additional mitigation measures, beyond those considered in the two 2020 scenarios, will need to

be investigated and implemented in order to achieve compliance with the air quality objectives in AQMA 1 in as short a timeframe as possible. We recommend the following:

1. Consideration of studies to measure and investigate factors such as the fleet composition, fleet age and real-world vehicle emissions (e.g. using the OPUS remote sensing system)[12], to inform development of additional mitigation measures.
2. According to the source apportionment for this AQMA (Figure 5-1), the majority of the NOx emissions (52%) are associated with HGVs and coaches. We recommend assessment of origin/destination of HGVs and purpose of use of the AQMA, to determine if it is possible to limit HGV activity through re-routing of HGVs and better coordination of loading/unloading activities (if applicable).
3. Continuing promotion of modal shift from cars to public transport, walking and cycling. This may include investment in public transport, walking and cycling infrastructure.
4. Due to the high volume of vehicles that travel along the A335, and the continuing air quality issues within this AQMA, it is likely that the single most effective mitigation measure would be construction of a link road to reduce the traffic volumes along the A335. It is our understanding that the Chickenhall Lane Relief Road has been identified as a potential mitigation measure to improve the air quality along the A335, however there are ongoing funding constraints. We recommend that funding options for this link road continue to be investigated, with appropriate consideration given to UK's obligation to comply with national air quality standards as soon as possible.
5. Consideration should also be given to improving transport to and from the Southampton Airport, particularly in light of potential future growth in airport activities.[13] The Chickenhall Lane Relief Road would offer improvements in this area, however, consideration should also be given to construction of a by-pass linking the M3 to the airport, and improving the attractiveness of public transport options for accessing Southampton Airport.
6. We would not recommend implementation of a charging scheme along the A335 as a workable solution, as it is possible that this would cause a displacement of vehicles from the A335 to other surrounding roads.

5.2 AQMA No. 3 (Hamble Lane)

Eastleigh AQMA No. 3 (Hamble Lane) was declared in 2006. The AQMA boundary currently encompasses a number of properties located along Hamble Lane, Bursledon, between the junctions with Jurd Way and Portsmouth Road.

These specific challenges were identified for AQMA No. 1 in the 2018 Annual Status Report (ASR)[9] and the 2012 Air Quality Action Plan (AQAP) for this AQMA[14]:

- Limited scope for traffic improvements due to constraints of surrounding residential development.
- In the vicinity of a large supermarket.
- Few alternative routes for vehicles.

[12] Ricardo Energy and Environment, "Vehicle emissions monitoring", https://ee.ricardo.com/transport/vehicle-emissions-monitoring, accessed 08/05/2019.

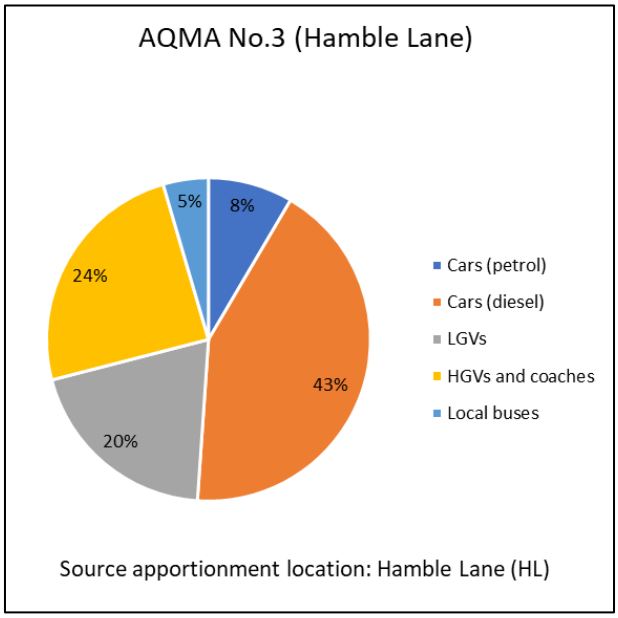
[13] Southampton Airport, "Southampton Airport Draft Master Plan: Consultation 2018", https://www.southamptonairport.com/media/4908/southampton-airport-draft-masterplan.pdf, accessed 30/01/2019.

[14] Eastleigh Borough Council, "Hamble Lane Air Quality Management Area: Action Plan 2012-2017", 17/02/2017.

- High volume, low capacity road.
- The Hamble peninsula only has Hamble Lane to service it. There are major employers to the south of the AQMA and the road is also used by motorists to access Southampton at peak times. Combined with a large retail unit at the north end of the AQMA, this makes for a maximum annual average daily traffic flow of 29,500 (measured in 2007). The road is very narrow in places leading to poor air pollution dispersion and there are residential properties within 5m of the kerbside.

Figure 5-2 provides source apportionment information for the NOx emissions within AQMA 3, based on the 2015 Reference Case model results.

Figure 5-2 Source apportionment of NOx emissions for AQMA No. 3 (Hamble Lane)



Eastleigh Borough Council have investigated and implemented (where possible) a number of air quality mitigation measures[9,11,14] to improve local air quality within AQMA 1 and within Eastleigh Borough more generally, including but not limited to:

- Improving the cycle network, and increasing the use and provision of cycleways to avoid Hamble Lane.
- Encouraging school travel planning.
- Supporting the Hampshire County Council (HCC) car share scheme.
- Traffic study to better understand traffic movements in area.
- Real time & passive AQ monitoring.
- Increase use of public transport.
- Improve & maintain footpath network to encourage walking.
- Develop individual & workplace travel plans for local businesses, and work with local employers to stagger times of employees leaving work.
- Increase use of local rail network.
- Enforce left-turn only out of Portsmouth Rd.
- Improvements to HL-PR junction.

- Car park/drop off at Hamble rail station.
- Improved route signage for Hamble rail station.
- Improve traffic management using Park & Ride at Bursledon Car Boot.
- Work with Tesco to encourage shoppers to use alternative transport.
- Improve road signage to encourage greater use of Bursledon Rd.
- Local commuter education.
- Work with local HGV businesses to move towards newest Euro fleet.
- Improve local awareness of air pollution levels.
- Work with VOSA to carry out local vehicle emissions testing.
- Reduction of vegetation/replace with pollution absorbing species.
- Work with local businesses to reduce vehicle movement through effective fleet management.
- Work with public transport services to maintain & improve local services.
- Work with Highways Agency to improve traffic light phasing on Windhover roundabout.

Based on the modelling and monitoring results discussed in Section 4.3.4, it is uncertain whether compliance with the air quality objectives in AQMA 3 will be achieved by 2020. We recommend additional measures be considered:

1. Consideration of studies to measure and investigate factors such as the fleet composition, fleet age and real-world vehicle emissions, to inform development of additional mitigation measures.
2. Continuing promotion of modal shift from cars to public transport, walking and cycling. This may include investment in public transport, walking and cycling infrastructure.
3. Investigation of the vehicle emissions associated with buses along Hamble Lane, and consideration as to whether any of those buses can be replaced with lower emission buses.
4. It is possible that tall and dense vegetation along sections of Hamble Lane is creating a street canyon effect, where rather than dispersing effectively, vehicle emissions are circulated in close proximity to the road and cause elevated pollution concentrations. Consideration should be given to reducing some of the vegetation, or shortening it to allow more effective dispersion of pollutants.
5. Further congestion management, through smoothing traffic flows i.e., suggestions already identified by EBC but possibly not yet implemented, such as improving light phasing at roundabouts, enforcing one-way vehicle movements, etc.

5.3 A27 in Bursledon

Exceedances of the air quality objectives for annual mean NO_2 have been measured at the Oak Hill (OH) and Oak Hill 2 (OH2) monitoring sites between 2016 and 2018.

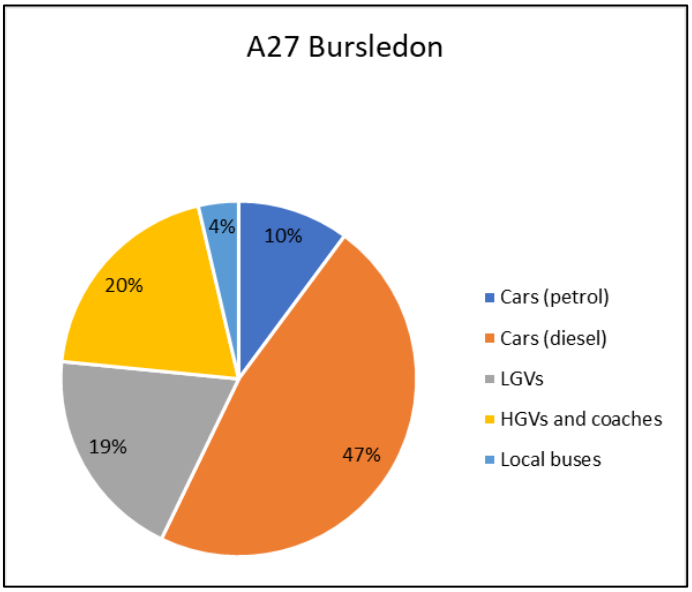
Possible factors contributing to elevated concentrations of NO_2 in this area are:

- Heavy congestion along the A27 during morning and evening rush hour, most notably in the West to East direction.
- Local hotspots occur in the modelling results where Portsmouth Road, Dodwell Lane and Long Lane join the A27. Congestion as vehicles wait to turn on to the A27 may be contributing to the NO_2 concentrations.

- This section of the A27 is a hill with gradient (in some sections) >2.5%, which according to guidance in TG16[15] can significantly increase vehicle emissions - especially exhaust emissions from HGVs, as the engine power demand for vehicles going uphill can increase significantly.
- This section of the A27 is also located within relatively close proximity (approximately 300m) from the M27. The M27 would contribute to generally elevated background levels of NO_2 in the area, and the busy A27 would contribute a localized high concentration on top of that elevated background.

Figure 5-3 provides source apportionment information for the NOx emissions within AQMA 3, based on the 2015 Reference Case model results.

Figure 5-3 Source apportionment of NOx emissions for along the A27 in Bursledon



Based on the monitoring results discussed in Section 4.3.6, it is unlikely that compliance with the air quality objectives along this section of the A27 will be achieved by 2020. We recommend the following:

1. EBC should consider the declaration of a new AQMA in this area. Although the model results do not predict an exceedance of the air quality objectives along the A27 in this area, the model results (Figure 4-66) suggest that the highest concentrations along the A27 occur between the junction with Portsmouth Road and the junction with Old Bridge Road, and this may serve as the initial boundary for the AQMA.
2. Consideration of studies to measure and investigate factors such as the fleet composition, fleet age and vehicle emissions, to inform development of additional mitigation measures.
3. Consideration of traffic smoothing and congestion management measures along this section of the A27, particularly to manage congestion of vehicles queuing to turn onto the A27.
4. Promotion of modal shift from cars to public transport, walking and cycling. This may include investment in public transport, walking and cycling infrastructure.
5. Consideration of the applicability of other transport and air quality measures that have been investigated and implemented elsewhere in Eastleigh Borough, and whether those are likely to offer benefits for this area. In particular, it may be beneficial to extend any applicable measures listed for AQMA No. 3 in the previous section to this area. This area of the A27 is located near

[15] Department for Environment, Food & Rural Affairs, "Local Air Quality Management Technical Guidance (TG16)", February 2018.

AQMA 3 and it is possible that both areas share similar factors leading to elevated levels of NO_2.

Appendix 1 - Tabulated detailed results for modelled receptor points

Table A1-1: Detailed model results for annual mean NO_2 concentrations (road contribution + background concentration, µg/m³) at receptor points for 2020 model scenarios

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Modelled receptors located in or near AQMA No. 1 (A335 / Eastleigh)							
BR2	25.7	20.8	52.0	-19.2	20.6	51.5	-19.7
CA	21.2	17.8	44.5	-16.0	17.6	44.0	-16.9
CR	18.1	15.4	38.5	-14.7	15.4	38.5	-15.1
LR13	37.1	29.2	73.0	-21.3	28.8	72.0	-22.4
LRPR	28.5	20.8	52.0	-27.1	20.8	52.0	-27.1
MS	26.6	22.3	55.8	-16.0	22.1	55.3	-16.5
SR1	25.9	22.4	56.0	-13.6	22.0	55.0	-15.0
SRAN	26.3	22.7	56.8	-13.7	22.3	55.8	-15.1
TP	21.9	17.5	43.8	-20.3	17.5	43.8	-20.1
TW	21.1	18.8	47.0	-10.8	18.4	46.0	-13.0
WA	32.9	24.4	61.0	-25.8	24.9	62.3	-24.3
Average				**-18.0**			**-18.7**
Modelled receptors located in or near AQMA No. 2 (M3)							
BEL	29.7	23.4	58.5	-21.2	22.7	56.8	-23.4
DD	36.7	28.2	70.5	-23.1	27.3	68.3	-25.5
MC	29.3	23.8	59.5	-18.9	22.5	56.3	-23.1
OX	24.3	20.0	50.0	-17.8	19.0	47.5	-21.7
PC	29.9	24.7	61.8	-17.5	22.9	57.3	-23.6
SC	26.6	21.1	52.8	-20.5	20.7	51.8	-22.2
SSQ	31.2	24.8	62.0	-20.6	24.0	60.0	-23.0
Average				**-19.9**			**-23.2**
Modelled receptors located in or near AQMA No. 3 (Hamble Lane)							
HL	32.4	28.7	71.8	-11.4	31.5	78.8	-2.9
HL2	31.2	24.9	62.3	-20.2	23.1	57.8	-25.8
HL3*	27.3	25.3	63.3	-7.3	27.2	68.0	-0.4
Average				**-13.0**			**-9.7**
Modelled receptors located in or near AQMA No. 4 (High Street Botley)							
HSB	25.5	14.6	36.5	-42.8	20.8	52.0	-18.4
HSB2	25.0	14.9	37.3	-40.4	19.7	49.3	-21.1
HSB3*	20.5	15.5	38.8	-24.6	17.2	43.0	-16.1

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Average				**-35.9**			**-18.5**
Modelled receptors located along the A27 in Bursledon							
OH	25.6	21.9	54.8	-14.5	21.6	54.0	-15.6
OH2	28.1	23.5	58.8	-16.4	23.4	58.5	-16.7
BDG	29.9	24.9	62.3	-16.7	24.9	62.3	-16.7
Average				**-15.8**			**-16.4**
Modelled receptors located near roads between Eastleigh and Southampton							
M27-1*	29.4	22.1	55.3	-24.7	22.2	55.5	-24.6
M27-2*	32.2	24.6	61.5	-23.7	24.6	61.5	-23.6
M27-3*	33.3	24.7	61.8	-25.9	24.4	61.0	-26.7
M27-4*	28.1	23.7	59.3	-15.7	23.6	59.0	-15.9
A3024-1*	24.4	20.5	51.3	-16.1	20.3	50.8	-16.6
A3024-2*	24.4	20.8	52.0	-15.0	20.5	51.3	-16.0
A27-1*	21.8	18.6	46.5	-14.8	18.7	46.8	-14.0
A27-2*	26.0	21.4	53.5	-17.6	18.7	46.8	-17.9
A3025-1*	20.3	18.3	45.8	-9.7	18.7	46.8	-7.8
A3025-2*	20.0	18.2	45.5	-8.9	18.6	46.5	-6.9
A334	24.3	20.4	51.0	-16.2	20.4	51.0	-16.2
Average				**-17.1**			**-16.9**
Modelled receptors located near roads between Eastleigh and Fareham							
M27-5*	28.5	24.5	61.3	-13.9	24.0	60.0	-15.8
M27-6*	28.0	24.5	61.3	-12.6	24.1	60.3	-14.1
A27-3*	27.1	21.6	54.0	-20.2	21.8	54.5	-19.4
A27-4*	27.9	23.4	58.5	-16.0	23.8	59.5	-14.5
Average				**-15.7**			**-16.0**
Modelled receptors located near roads between Eastleigh and Winchester							
B3335*	20.7	17.0	42.5	-18.0	16.4	41.0	-20.6
NH	25.7	20.3	50.8	-21.1	19.6	49.0	-24.0
M3-1*	20.1	17.0	42.5	-15.4	16.7	41.8	-16.7
M3-2*	27.5	22.5	56.3	-18.4	20.7	51.8	-24.7
Average				**-18.2**			**-21.5**
Modelled receptors located near roads between Eastleigh and Test Valley							
TW2*	20.7	17.1	42.8	-17.3	16.8	42.0	-18.6
SL*	17.2	14.5	36.3	-15.5	14.5	36.3	-15.5
Average				**-16.4**			**-17.1**

*Denotes a custom location used for modelling purposes; this site is not a monitoring location.

Table A1-2: Detailed model results for annual mean PM_{10} concentrations (road contribution + background concentration, µg/m³) at receptor points for 2020 model scenarios

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Modelled receptors located in or near AQMA No. 1 (A335 / Eastleigh)							
BR2	22.6	21.0	52.5	-7.3	21.5	53.8	-4.7
CA	18.7	18.4	46.0	-1.8	18.3	45.8	-2.3
CR	16.8	16.4	41.0	-2.1	16.4	41.0	-2.1
LR13	27.8	26.8	67.0	-3.5	26.7	66.8	-3.9
LRPR	23.7	22.1	55.3	-6.6	22.2	55.5	-6.5
MS	23.5	22.6	56.5	-3.8	22.3	55.8	-5.1
SR1	21.9	22.3	55.8	2.0	22.1	55.3	1.0
SRAN	22.4	22.8	57.0	1.7	22.5	56.3	0.7
TP	19.6	18.8	47.0	-4.1	18.9	47.3	-3.4
TW	19.8	19.9	49.8	0.5	19.6	49.0	-0.9
WA	25.4	24.0	60.0	-5.5	24.3	60.8	-4.2
Average				**-2.8**			**-2.9**
Modelled receptors located in or near AQMA No. 2 (M3)							
BEL	25.3	23.6	59.0	-6.7	23.6	59.0	-6.6
DD	29.1	25.7	64.3	-11.7	26.0	65.0	-10.8
MC	24.4	22.9	57.3	-6.2	22.8	57.0	-6.5
OX	21.8	20.9	52.3	-4.3	20.8	52.0	-4.6
PC	25.0	23.6	59.0	-5.8	23.3	58.3	-6.7
SC	22.9	21.8	54.5	-4.9	21.8	54.5	-4.8
SSQ	25.4	23.5	58.8	-7.6	23.5	58.8	-7.6
Average				**-6.7**			**-6.8**
Modelled receptors located in or near AQMA No. 3 (Hamble Lane)							
HL	26.6	24.5	61.3	-7.8	26.6	66.5	0.0
HL2	23.6	23.0	57.5	-2.6	23.0	57.5	-2.7
HL3*	23.0	22.3	55.8	-3.0	24.0	60.0	4.6
Average				**-4.5**			**0.6**
Modelled receptors located in or near AQMA No. 4 (High Street Botley)							
HSB	21.9	15.7	39.3	-28.3	20.8	52.0	-4.9
HSB2	21.7	15.9	39.8	-26.6	20.2	50.5	-6.9
HSB3*	18.6	16.4	41.0	-12.0	18.1	45.3	-2.8
Average				**-22.3**			**-4.9**
Modelled receptors located along the A27 in Bursledon							
OH	22.2	21.7	54.3	-2.3	21.7	54.3	-2.3
OH2	24.1	23.2	58.0	-3.7	23.3	58.3	-3.3

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
BDG	24.7	23.7	59.3	-4.0	23.9	59.8	-3.2
Average				**-3.3**			**-2.9**
Modelled receptors located near roads between Eastleigh and Southampton							
M27-1*	24.1	23.8	59.5	-1.3	23.9	59.8	-0.9
M27-2*	25.4	25.1	62.8	-1.2	25.2	63.0	-0.8
M27-3*	25.2	23.8	59.5	-5.7	23.8	59.5	-5.5
M27-4*	23.1	23.0	57.5	-0.6	22.9	57.3	-0.9
A3024-1*	20.1	19.3	48.3	-3.8	19.2	48.0	-4.4
A3024-2*	20.5	20.1	50.3	-2.1	19.9	49.8	-3.1
A27-1*	19.6	19.2	48.0	-2.0	19.4	48.5	-1.2
A27-2*	22.9	22.1	55.3	-3.4	22.1	55.3	-3.6
A3025-1*	17.5	17.6	44.0	0.7	18.0	45.0	2.7
A3025-2*	17.2	17.4	43.5	0.9	17.7	44.3	3.0
A334	21.3	20.5	51.3	-3.6	20.6	51.5	-3.4
Average				**-2.0**			**-1.7**
Modelled receptors located near roads between Eastleigh and Fareham							
M27-5*	24.2	23.5	58.8	-3.1	23.1	57.8	-4.6
M27-6*	21.5	21.4	53.5	-2.5	20.9	52.3	-4.5
A27-3*	21.6	20.2	50.5	-6.7	20.4	51.0	-5.8
A27-4*	21.9	20.9	52.3	-4.5	21.3	53.3	-2.7
Average				**-4.2**			**-4.4**
Modelled receptors located near roads between Eastleigh and Winchester							
B3335*	19.8	19.0	47.5	-3.8	18.8	47.0	-5.1
NH	21.9	20.4	51.0	-6.8	20.4	51.0	-6.7
M3-1*	20.1	20.1	50.3	-0.2	20.1	50.3	0.2
M3-2*	23.6	21.8	54.5	-7.6	21.5	53.8	-8.7
Average				**-4.6**			**-5.1**
Modelled receptors located near roads between Eastleigh and Test Valley							
TW2*	19.2	18.6	46.5	-3.3	18.5	46.3	-3.6
SL*	16.7	16.1	40.3	-3.4	16.2	40.5	-3.1
Average				**-3.4**			**-3.4**

*Denotes a custom location used for modelling purposes; this site is not a monitoring location.

Table A1-3: Detailed model results for annual mean $PM_{2.5}$ concentrations (road contribution + background concentration, µg/m³) at receptor points for 2020 model scenarios

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Modelled receptors located in or near AQMA No. 1 (A335 / Eastleigh)							
BR2	15.4	13.9	55.6	-10.0	14.2	56.8	-7.7
CA	12.8	12.2	48.8	-4.9	12.1	48.4	-5.5
CR	11.5	11.0	44.0	-4.2	11.0	44.0	-4.3
LR13	18.8	17.3	69.2	-7.8	17.3	69.2	-8.2
LRPR	15.8	14.2	56.8	-10.1	14.2	56.8	-9.9
MS	16.1	15.0	60.0	-7.0	14.8	59.2	-8.2
SR1	15.0	14.7	58.8	-2.0	14.5	58.0	-3.0
SRAN	15.3	15.0	60.0	-1.8	14.9	59.6	-2.9
TP	13.3	12.4	49.6	-7.0	12.5	50.0	-6.4
TW	13.6	13.2	52.8	-2.8	13.0	52.0	-4.1
WA	16.9	15.4	61.6	-9.1	15.5	62.0	-8.0
Average				**-6.1**			**-6.2**
Modelled receptors located in or near AQMA No. 2 (M3)							
BEL	17.0	15.3	61.2	-10.2	15.3	61.2	-10.3
DD	19.7	16.7	66.8	-15.4	16.8	67.2	-14.9
MC	16.5	14.9	59.6	-9.5	14.8	59.2	-10.2
OX	14.7	13.5	54.0	-7.9	13.4	53.6	-8.6
PC	17.0	15.4	61.6	-9.6	15.1	60.4	-10.9
SC	15.4	14.1	56.4	-8.4	14.1	56.4	-8.4
SSQ	17.1	15.1	60.4	-11.5	15.1	60.4	-11.7
Average				**-10.4**			**-10.7**
Modelled receptors located in or near AQMA No. 3 (Hamble Lane)							
HL	17.7	15.9	63.6	-9.9	17.2	68.8	-2.9
HL2	16.0	15.0	60.0	-6.5	14.9	59.6	-6.9
HL3*	15.3	14.5	58.0	-5.1	15.5	62.0	1.6
Average				**-7.2**			**-2.7**
Modelled receptors located in or near AQMA No. 4 (High Street Botley)							
HSB	14.6	10.2	40.8	-30.4	13.5	54.0	-7.8
HSB2	14.4	10.3	41.2	-28.4	13.0	52.0	-9.8
HSB3*	12.4	10.6	42.4	-14.2	11.7	46.8	-5.5
Average				**-24.3**			**-7.7**
Modelled receptors located along the A27 in Bursledon							
OH	14.9	14.1	35.3	-5.4	14.1	35.3	-5.4
OH2	16.2	15.1	37.8	-6.8	15.1	37.8	-6.8

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
BDG	16.4	15.3	38.3	-6.7	15.3	38.3	-6.7
Average				**-6.3**			**-6.3**
Modelled receptors located near roads between Eastleigh and Southampton							
M27-1*	16.2	15.0	60.0	-7.4	15.1	60.4	-7.1
M27-2*	17.2	15.9	63.6	-7.4	16.0	64.0	-7.1
M27-3*	16.7	15.1	60.4	-9.6	15.1	60.4	-9.5
M27-4*	15.5	14.8	59.2	-4.2	14.8	59.2	-4.4
A3024-1*	13.7	12.8	51.2	-6.7	12.7	50.8	-7.4
A3024-2*	13.9	13.2	52.8	-5.1	13.1	52.4	-5.9
A27-1*	13.3	12.6	50.4	-5.0	12.7	50.8	-4.4
A27-2*	15.4	14.3	57.2	-6.8	14.3	57.2	-7.1
A3025-1*	11.8	11.6	46.4	-1.8	11.8	47.2	-0.1
A3025-2*	11.5	11.3	45.2	-1.8	11.5	46.0	0.2
A334	14.5	13.5	54.0	-6.8	13.5	54.0	-6.7
Average				**-5.7**			**-5.4**
Modelled receptors located near roads between Eastleigh and Fareham							
M27-5*	16.4	15.4	61.6	-6.1	15.1	60.4	-7.7
M27-6*	14.6	13.8	55.2	-5.2	13.6	54.4	-6.9
A27-3*	14.5	13.1	52.4	-9.6	13.2	52.8	-9.0
A27-4*	14.6	13.6	54.4	-7.2	13.8	55.2	-5.7
Average				**-7.0**			**-7.3**
Modelled receptors located near roads between Eastleigh and Winchester							
B3335*	13.3	12.4	49.6	-6.9	12.2	48.8	-8.2
NH	14.7	13.2	52.8	-10.1	13.2	52.8	-10.3
M3-1*	13.2	12.7	50.8	-3.5	12.8	51.2	-3.2
M3-2*	16.0	14.1	56.4	-11.6	13.9	55.6	-13.1
Average				**-8.0**			**-8.7**
Modelled receptors located near roads between Eastleigh and Test Valley							
TW2*	12.6	11.8	47.2	-6.5	11.7	46.8	-6.9
SL*	11.0	10.4	41.6	-5.9	10.4	41.6	-5.7
Average				**-6.2**			**-6.3**

*Denotes a custom location used for modelling purposes; this site is not a monitoring location.

Table A1-4: Detailed model results for 99.8th percentile of hourly mean NO_2 concentrations (road contribution + background concentration, µg/m³) at receptor points for 2020 model scenarios

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Modelled receptors located in or near AQMA No. 1 (A335 / Eastleigh)							
BR2	92.4	73.1	36.6	-20.9%	72.4	36.2	-21.6%
CA	71.8	60.5	30.3	-15.7%	59.5	29.8	-17.1%
CR	55.6	48.8	24.4	-12.2%	48.4	24.2	-12.9%
LR13	173.6	119.2	59.6	-31.3%	115.8	57.9	-33.3%
LRPR	108.8	76.1	38.1	-30.1%	75.8	37.9	-30.3%
MS	87.8	72.8	36.4	-17.1%	72.1	36.1	-17.9%
SR1	96.4	76.2	38.1	-21.0%	74.4	37.2	-22.8%
SRAN	97.3	76.7	38.4	-21.2%	74.9	37.5	-23.0%
TP	74.8	59.6	29.8	-20.3%	59.7	29.9	-20.2%
TW	74.1	64.4	32.2	-13.1%	62.4	31.2	-15.8%
WA	112.2	92.8	46.4	-17.3%	94.5	47.3	-15.8%
Average				**-20.0%**			**-21.0%**
Modelled receptors located in or near AQMA No. 2 (M3)							
BEL	135.3	109.9	55.0	-18.8%	107.5	53.8	-20.5%
DD	142.5	110.5	55.3	-22.5%	109.5	54.8	-23.2%
MC	128.6	110.0	55.0	-14.5%	104.5	52.3	-18.7%
OX	99.6	78.4	39.2	-21.3%	72.9	36.5	-26.8%
PC	135.2	109.7	54.9	-18.9%	107.4	53.7	-20.6%
SC	116.3	100.8	50.4	-13.3%	97.1	48.6	-16.5%
SSQ	120.5	104.9	52.5	-12.9%	101.4	50.7	-15.9%
Average				**-17.5%**			**-20.3%**
Modelled receptors located in or near AQMA No. 3 (Hamble Lane)							
HL	110.3	102.0	51.0	-7.5%	109.8	54.9	-0.5%
HL2	108.4	85.7	42.9	-20.9%	78.2	39.1	-27.9%
HL3*	107.6	95.1	47.6	-11.6%	104.9	52.5	-2.5%
Average				**-13.3%**			**-10.3%**
Modelled receptors located in or near AQMA No. 4 (High Street Botley)							
HSB	82.2	43.7	21.9	-46.8%	65.6	32.8	-20.2%
HSB2	83.9	46.4	23.2	-44.7%	65.9	33.0	-21.5%
HSB3*	70.5	50.3	25.2	-28.7%	58.9	29.5	-16.5%
Average				**-40.1%**			**-19.4%**
Modelled receptors located along the A27 in Bursledon							
OH	107.3	88.5	44.3	-17.5	85.6	42.8	-20.2
OH2	110.3	95.7	47.9	-13.2	94.4	47.2	-14.4

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
BDG	108.5	87.9	44.0	-19.0	87.7	43.9	-19.2
Average				**-16.6**			**-17.9**
Modelled receptors located near roads between Eastleigh and Southampton							
M27-1*	120.9	99.4	49.7	-17.8%	99.8	49.9	-17.5%
M27-2*	133.9	107.0	53.5	-20.1%	107.1	53.6	-20.0%
M27-3*	154.8	110.5	55.3	-28.6%	110.2	55.1	-28.8%
M27-4*	107.9	87.9	44.0	-18.5%	87.4	43.7	-19.0%
A3024-1*	88.5	69.2	34.6	-21.8%	67.9	34.0	-23.3%
A3024-2*	91.7	73.7	36.9	-19.6%	71.9	36.0	-21.6%
A27-1*	84.2	68.2	34.1	-19.0%	69.0	34.5	-18.1%
A27-2*	102.5	81.7	40.9	-20.3%	81.2	40.6	-20.8%
A3025-1*	57.4	51.8	25.9	-9.8%	53.2	26.6	-7.3%
A3025-2*	57.4	51.8	25.9	-9.8%	53.2	26.6	-7.3%
A334*	98.1	78.0	39.0	-20.5%	77.9	39.0	-20.6%
Average				**-18.7%**			**-18.6%**
Modelled receptors located near roads between Eastleigh and Fareham							
M27-5*	110.9	106.0	53.0	-4.4%	103.1	51.6	-7.0%
M27-6*	111.2	108.1	54.1	-2.8%	106.0	53.0	-4.7%
A27-3*	108.1	78.6	39.3	-27.3%	79.5	39.8	-26.5%
A27-4*	98.2	78.3	39.2	-20.3%	79.8	39.9	-18.7%
Average				**-13.7%**			**-14.2%**
Modelled receptors located near roads between Eastleigh and Winchester							
B3335*	73.0	62.7	31.4	-14.1%	60.3	30.2	-17.4%
NH	119.5	104.2	52.1	-12.8%	98.4	49.2	-17.7%
M3-1*	79.9	64.7	32.4	-19.0%	62.8	31.4	-21.4%
M3-2*	110.3	96.6	48.3	-12.4%	86.4	43.2	-21.7%
Average				**-14.6%**			**-19.6%**
Modelled receptors located near roads between Eastleigh and Test Valley							
TW2*	80.2	64.8	32.4	-19.2%	63.5	31.8	-20.8%
SL*	63.0	54.2	27.1	-14.0%	53.9	27.0	-14.4%
Average				**-16.6%**			**-17.6%**

*Denotes a custom location used for modelling purposes; this site is not a monitoring location.

Table A1-5: Detailed model results for 90.4th percentile of daily mean PM_{10} concentrations (road contribution + background concentration, µg/m³) at receptor points for 2020 model scenarios

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
Modelled receptors located in or near AQMA No. 1 (A335 / Eastleigh)							
BR2	32.4	29.7	59.4	-8.3%	31.0	62.0	-4.3%
CA	25.3	24.2	48.4	-4.3%	23.9	47.8	-5.5%
CR	20.4	19.7	39.4	-3.4%	19.7	39.4	-3.4%
LR13	46.5	41.9	83.8	-9.9%	41.6	83.2	-10.5%
LRPR	34.9	31.6	63.2	-9.5%	31.7	63.4	-9.2%
MS	31.4	30.0	60.0	-4.5%	29.5	59.0	-6.1%
SR1	31.7	30.5	61.0	-3.8%	30.1	60.2	-5.0%
SRAN	32.2	31.1	62.2	-3.4%	30.6	61.2	-5.0%
TP	26.0	24.2	48.4	-6.9%	24.6	49.2	-5.4%
TW	27.2	26.2	52.4	-3.7%	25.6	51.2	-5.9%
WA	36.8	33.6	67.2	-8.7%	34.2	68.4	-7.1%
Average				**-6.0%**			**-6.1%**
Modelled receptors located in or near AQMA No. 2 (M3)							
BEL	42.0	36.8	73.6	-12.4%	36.9	73.8	-12.1%
DD	46.1	38.5	77.0	-16.5%	39.2	78.4	-15.0%
MC	40.2	35.6	71.2	-11.4%	35.3	70.6	-12.2%
OX	31.2	28.4	56.8	-9.0%	28.2	56.4	-9.6%
PC	41.8	37.0	74.0	-11.5%	36.4	72.8	-12.9%
SC	36.9	33.0	66.0	-10.6%	33.2	66.4	-10.0%
SSQ	39.7	34.7	69.4	-12.6%	34.7	69.4	-12.6%
Average				**-12.0%**			**-12.1%**
Modelled receptors located in or near AQMA No. 3 (Hamble Lane)							
HL	37.5	34.6	69.2	-7.7%	38.4	76.8	2.4%
HL2	32.7	31.8	63.6	-2.8%	31.8	63.6	-2.8%
HL3*	35.1	32.2	64.4	-8.3%	35.8	71.6	2.0%
Average				**-6.3%**			**0.5%**
Modelled receptors located in or near AQMA No. 4 (High Street Botley)							
HSB	29.7	18.6	37.2	-37.4%	27.9	55.8	-6.1%
HSB2	30.8	19.5	39.0	-36.7%	29.0	58.0	-5.8%
HSB3*	25.9	20.4	40.8	-21.2%	24.7	49.4	-4.6%
Average				**-31.8%**			**-5.5%**
Modelled receptors located along the A27 in Bursledon							
OH	34.8	33.1	66.2	-4.9	33.2	66.4	-4.6
OH2	38.9	36.8	73.6	-5.4	36.8	73.6	-5.4

Receptor	2015 Reference Case concentration (µg/m³)	2020 With Interventions			2020 No New Transport Interventions		
		µg/m³	% of limit value	% change from 2015	µg/m³	% of limit value	% change from 2015
BDG	37.2	35.1	70.2	-5.6	35.4	70.8	-4.8
Average				**-5.3**			**-4.9**
Modelled receptors located near roads between Eastleigh and Southampton							
M27-1*	38.6	37.5	75.0	-2.8%	37.8	75.6	-2.1%
M27-2*	39.8	38.4	76.8	-3.5%	38.6	77.2	-3.0%
M27-3*	44.1	38.8	77.6	-12.0%	38.9	77.8	-11.8%
M27-4*	34.1	32.2	64.4	-5.6%	32.1	64.2	-5.9%
A3024-1*	28.5	26.1	52.2	-8.4%	25.8	51.6	-9.5%
A3024-2*	30.0	28.9	57.8	-3.7%	28.3	56.6	-5.7%
A27-1*	28.4	26.7	53.4	-6.0%	27.1	54.2	-4.6%
A27-2*	33.3	30.8	61.6	-7.5%	30.7	61.4	-7.8%
A3025-1*	22.0	21.9	43.8	-0.5%	22.5	45.0	2.3%
A3025-2*	21.7	21.6	43.2	-0.5%	22.3	44.6	2.8%
A334*	32.3	30.2	60.4	-6.5%	30.3	60.6	-6.2%
Average				**-5.2%**			**-4.7%**
Modelled receptors located near roads between Eastleigh and Fareham							
M27-5*	38.6	36.4	72.8	-5.7%	35.3	70.6	-8.5%
M27-6*	35.3	34.6	69.2	-2.0%	33.4	66.8	-5.4%
A27-3*	33.8	30.2	60.4	-10.7%	30.6	61.2	-9.5%
A27-4*	31.8	30.1	60.2	-5.3%	30.8	61.6	-3.1%
Average				**-5.9%**			**-6.6%**
Modelled receptors located near roads between Eastleigh and Winchester							
B3335*	26.7	25.7	51.4	-3.7%	25.1	50.2	-6.0%
NH	37.5	33.3	66.6	-11.2%	33.3	66.6	-11.2%
M3-1*	27.7	25.7	51.4	-7.2%	25.8	51.6	-6.9%
M3-2*	35.9	31.8	63.6	-11.4%	31.2	62.4	-13.1%
Average				**-8.4%**			**-9.3%**
Modelled receptors located near roads between Eastleigh and Test Valley							
TW2*	27.2	25.6	51.2	-5.9%	25.4	50.8	-6.6%
SL*	22.1	21.1	42.2	-4.5%	21.2	42.4	-4.1%
Average				**-5.2%**			**-5.4%**

*Denotes a custom location used for modelling purposes; this site is not a monitoring location.

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