

**Detailed modelling of NO<sub>2</sub> at  
Market Hill AQMA, Maldon**

Addendum

*Prepared for*  
Chelmsford City Council

*10<sup>th</sup> January 2020*

## Report Information

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CERC Job Number: FM1216

Job Title: Detailed modelling of NO<sub>2</sub> at Market Hill AQMA, Maldon

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# 1 Summary

This is an addendum to the Cambridge Environmental Research Consultants Ltd (CERC) report *Detailed modelling of NO<sub>2</sub> at Market Hill AQMA, Maldon*, dated 22<sup>nd</sup> October 2019, to include modelling of two additional scenarios.

The main report includes air quality modelling to support the Air Quality Action Plan (AQAP) for the new Air Quality Management Area (AQMA) at Market Hill, Maldon due to high annual average NO<sub>2</sub> concentrations. To support the AQAP, baseline modelling and detailed source apportionment was required, plus modelling of three scenarios to assist with identifying appropriate mitigation measures.

This report includes modelling to calculate NO<sub>2</sub> concentrations for two additional scenarios:

4. Exclusion of all HGV vehicles except buses on Market Hill, where all buses are to be Euro VI standard
5. Exclusion of all HGV vehicles except buses on Market Hill, where all buses are to be Euro VI standard and the fence at The Limes to be reduced by 600 mm.

Section 2 presents results of the scenario modelling, including input data used to model the scenarios. All other aspects of the model set-up are the same as outlined in the main report, dated 22<sup>nd</sup> October 2019.

For both Scenarios 4 and 5, the modelled NO<sub>2</sub> concentrations show significant reductions compared to the base case although modelled exceedences of the air quality limit value remain at some building facades on Market Hill. The modelled concentrations at the monitoring sites are all below the air quality limit value, however it should be noted that the model verification showed underprediction of concentrations at some of the sites.

There is only a small difference between Scenario 4 and Scenario 5, concentrations decrease by up to 0.3 µg/m<sup>3</sup> along the section of Market Hill road adjacent to The Limes accommodation.

## 2 Scenario Modelling

Modelling was carried out to calculate NO<sub>2</sub> concentrations for two additional scenarios:

4. Exclusion of all HGV vehicles except buses on Market Hill and all buses upgraded to Euro VI
5. Exclusion of all HGV vehicles except buses on Market Hill, all buses upgraded to Euro VI and the fence at the Limes to be reduced by 600mm.

Scenario 4 is the same as Scenario 1 in the main report but with all buses assumed to meet Euro VI standards.

In Scenario 5, street canyon data were recalculated for the road section adjacent to the Limes accommodation along Market Hill. The recalculation is based on a 600 mm reduction in fence height, reducing the total fence and bank height to 3.4 m. Note that the heights used in the canyon calculations are approximate.

Table 2.1 shows the modelled annual average NO<sub>2</sub> concentrations at the monitoring sites for the base case and the two additional scenarios.

Figure 2.1 shows the modelled annual average NO<sub>2</sub> concentrations for each of the two scenarios, Figure 2.2 shows the modelled change in annual average NO<sub>2</sub> concentrations compared with the base case for each of the two scenarios and Figure 2.3 shows this modelled change as a percentage of the annual average NO<sub>2</sub> standard of 40µg/m<sup>3</sup>.

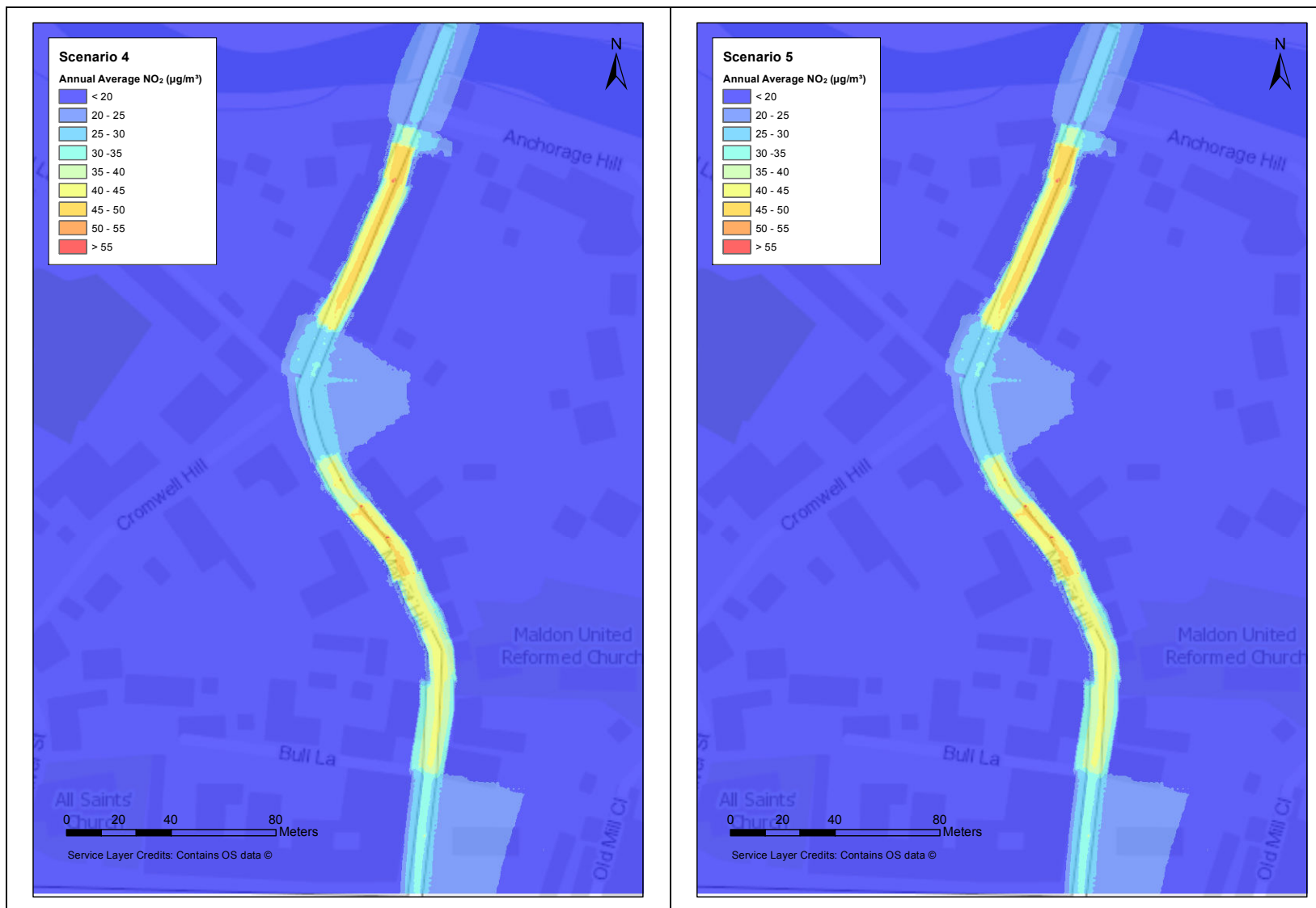
**Table 2.1: Modelled annual average NO<sub>2</sub> concentrations at monitoring sites (µg/m<sup>3</sup>)**

Receptor name	Base case	Scenario 4	Scenario 5
MD6	25.7	23.8	23.8
MD22	46.0	38.8	38.8
MD23	31.9	29.6	29.6
MD24	43.2	37.9	37.9
MD25	25.6	23.6	23.6
MD26	40.4	34.0	34.0
MD27	40.5	34.7	34.5
MD28	39.3	33.9	34.1

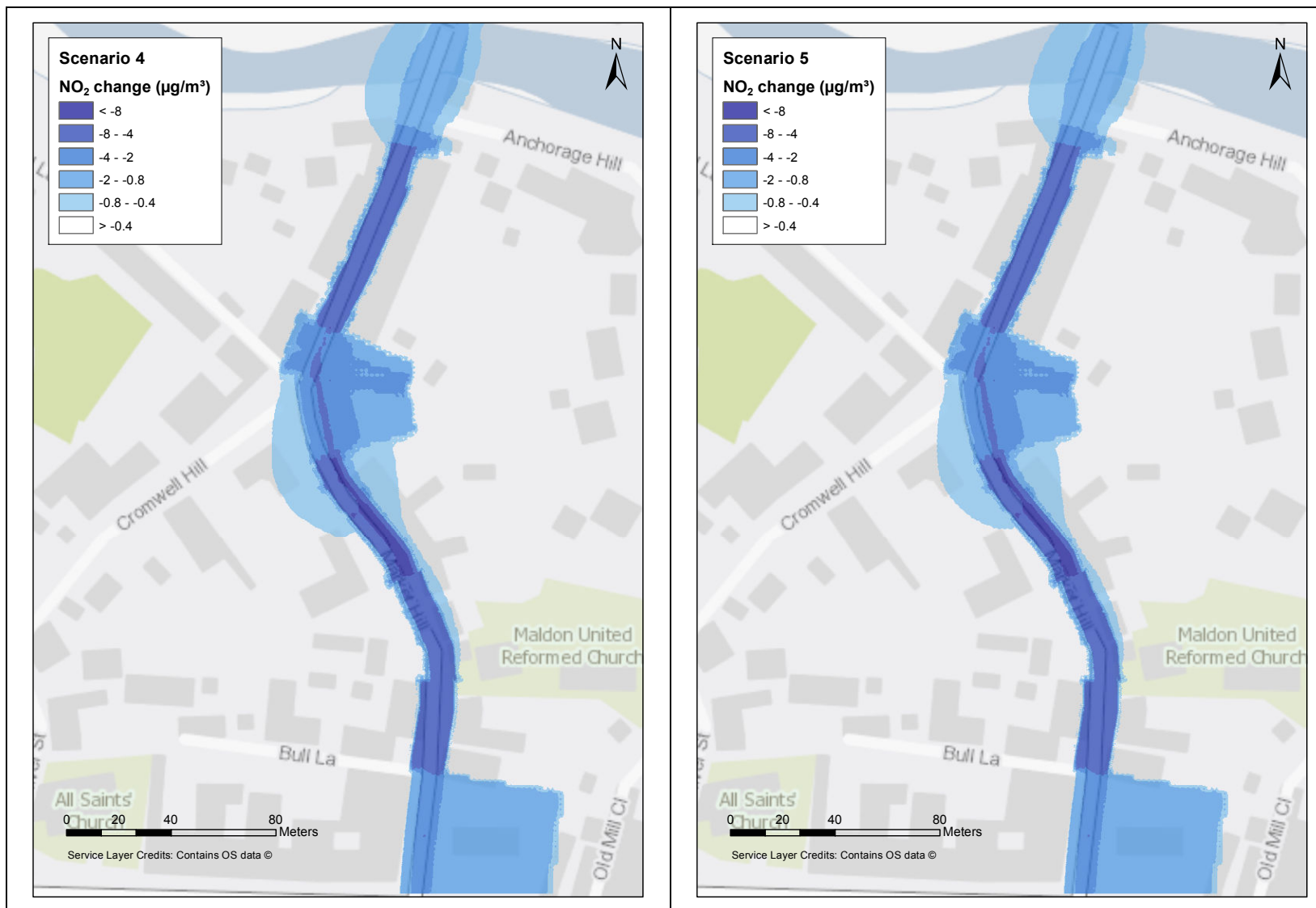
For both Scenarios 4 and 5, the modelled NO<sub>2</sub> concentrations show significant reductions compared to the base case although modelled exceedences of the air quality limit value remain at some building facades on Market Hill. The modelled concentrations at the monitoring sites are all below the air quality limit value, however it should be noted that the model verification showed underprediction of concentrations at some of the sites.

There is a small difference in NO<sub>2</sub> concentrations between Scenario 4 and Scenario 5 at the section of Market Hill road adjacent to The Limes. As a result of recalculated canyon properties, concentrations decrease by up to 0.3 µg/m<sup>3</sup> along the section of the road adjacent to the fence and increase by up to 0.2 µg/m<sup>3</sup> behind the fence.

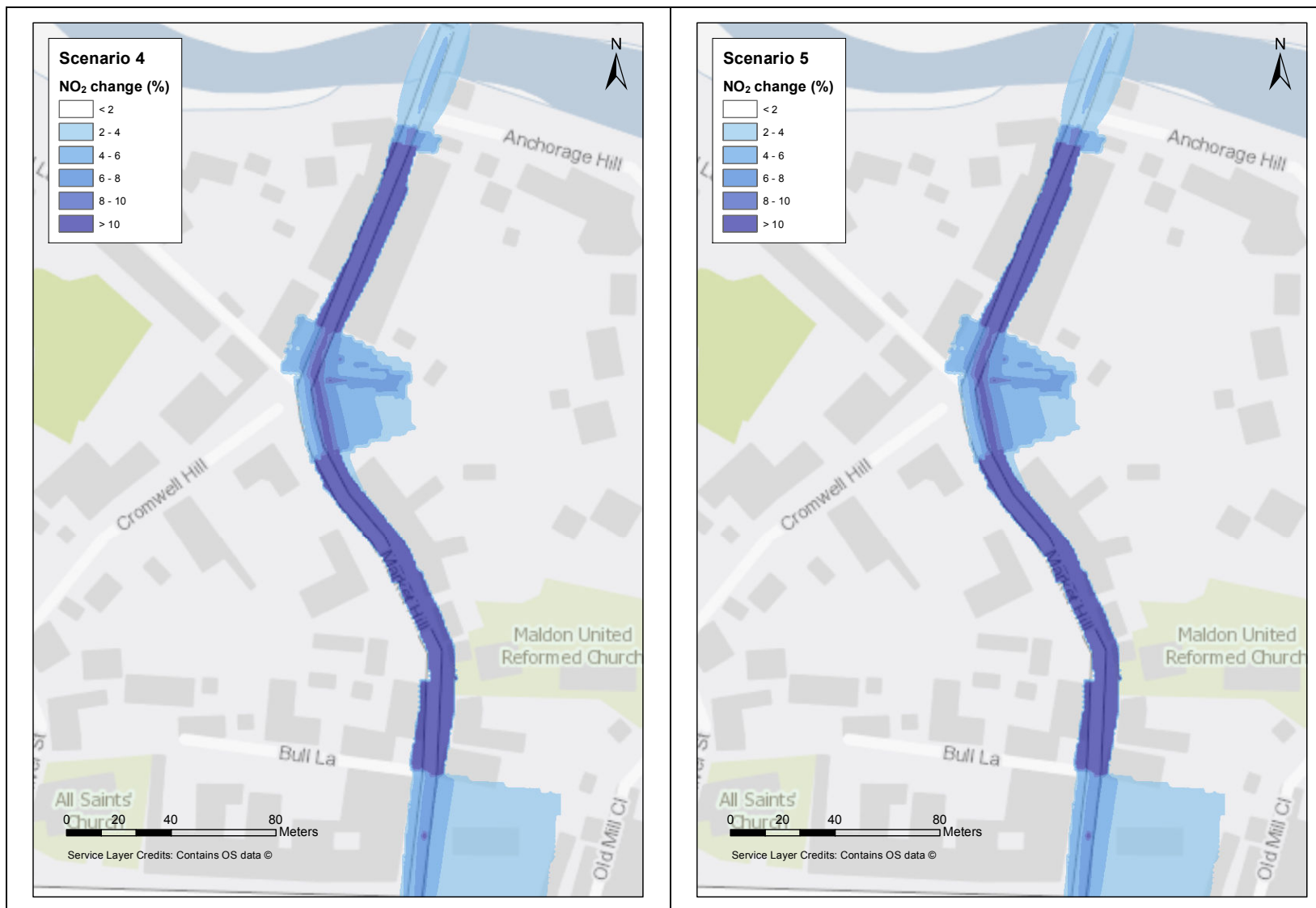
It should be noted that the various areas of uncertainty outlined in Section 10.2 of the main report are also relevant for scenarios 4 and 5.



**Figure 2.1: Modelled annual average NO<sub>2</sub> concentrations for Scenarios 4 and 5**



**Figure 2.2: Modelled change in annual average NO<sub>2</sub> concentrations for Scenarios 4 and 5**



**Figure 2.3: Modelled change in annual average NO<sub>2</sub> concentrations for Scenarios 4 and 5, as a percentage of the air quality standard**