East West Rail Phase 1: Conditions 31 and 32: Draft Method Statement For Air Quality Predictions

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East West Rail Phase 1: Conditions 31 and 32: Draft Method Statement for Air Quality Predictions

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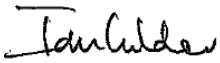
Signed: 
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1 EAST WEST RAIL PHASE1: CONDITIONS 31 AND 32: DRAFT METHOD STATEMENT FOR AIR QUALITY PREDICTIONS

1.1 INTRODUCTION

ERM, on behalf of Network Rail, submitted a baseline air quality report to the local planning authorities (Oxford City Council and Cherwell District Council), on 18 August 2015 detailing the findings of the air quality survey undertaken between April 2014 and April 2015 as part of the "*Scheme of Further Assessment of Air Quality*" under Conditions 31 item (ii) and 32 item (iii) in order to establish the baseline conditions at the designated sites in the absence of the Scheme, against which future changes can be compared.

A further report dealing with methodology relating to Conditions 31 (items (ii), (iv), (vi), (vii) and (viii)) and 32 (items (iii), (v), (vi) and (vii)) is being submitted to the LPAs alongside this Method Statement as part of the same application (*Conditions 31 and 32: Air Quality Monitoring and Mitigation Report in relation to Oxford Meadows SAC and Hook Meadow and Trap Grounds SSSI – Version 1*)

It is understood that following discussions with Oxford City Council (OCC), Network Rail is now required to discharge Condition 31 item (iii) and Condition 32 item (iv) before development begins. These conditions relate to predictions of the likely additional rates of exposure to oxides of nitrogen and inferred nitrogen deposition on the relevant parts of the Oxford Meadows SAC and the Hook and Trap Grounds SSSI, based on air quality monitoring, and for a period of 10 years after opening of the relevant sections of the development to passenger rail traffic and the development's associated road traffic.

This document sets out a methodology for performing the necessary work required to discharge these parts of the conditions described above.

1.2 METHODOLOGY

1.2.1 Overview

The impact assessment will examine the effects of the scheme on air quality at both the Oxford Meadows SAC and the Hook and Trap Grounds SSSI. The impact assessment will utilise the ADMS Roads dispersion model to predict the change in exposure of habitats to oxides of nitrogen (and inferred nitrogen deposition) as a result of changes in traffic associated with the scheme for a 10 year period. This will allow a comparison to be made of the predicted impacts with Critical Levels and Loads for the habitats. If the modelling predicts the Critical Levels and Loads will be exceeded by Year 10 after the opening of the Scheme, then the modelling data will be interrogated further to determine the dates at which the predicted Levels/Loads are exceeded.

The baseline data collected during the air quality survey will be used to define the baseline environment both during the monitoring period and for future years in order establish the significance of the impact on air quality from the proposed scheme. The baseline data collected will also be used to validate the model. More detail regarding this is set out below.

1.2.2 Defining the Background

Ambient background concentrations of Oxides of Nitrogen (NO_x) are required to predict the likely impacts on air quality and deposition as a result of changing road and rail emissions associated with the proposed development. Noting that the rail and road sources of interest will contribute to the monitored concentrations, there is a need to establish the 'true' background, this being the NO_x concentration which would remain if all local sources (eg traffic and rail) were removed.

An air quality survey has been performed to establish an air quality baseline for NO_x using diffusion tubes at the Oxford Meadows SAC and Hook Meadow and Trap Grounds SSSI. A total of eight diffusion tube transects (up to 200m in length) were established across the habitat sites with up to five sample points, as far as possible located at intervals of 10m, 20m, 50m, 100m and 200m from the respective road / railway line. The locations were located where potential impacts from rail/ road emissions could be determined.

In terms of the assessment of the A34 and A40, the findings from the air quality survey indicate that at 200m from the roadside, emissions from the A40 and the A34 have a negligible impact on air quality. These sites are also not close to other sources of emissions. It is reasonable to assume therefore that NO_x concentrations at this distance are representative of the background across the habitat site for the period sampling took place. Data will be taken from the air quality survey performed between April 2014 and the end of March 2015 and used as baseline to inform the air quality impact assessment.

When considering the transect points adjacent to the rail line, no distinctive dispersion curve away from the rail line is evident and this highlights that contributions to ambient levels of NO_x from trains is small as a proportion of total background. Given the geographical position of the monitoring points relative to any sources of NO_x other than the railways, it is reasonable to assume that concentrations along the transect points are representative of baseline conditions across the habitat. This data will therefore be used to inform the impact assessment.

In order to derive representative future year baseline from the monitoring data collected, future year atmospheric concentrations and NO_x deposition will be determined by applying a factor which will be calculated using projected DEFRA background mapping. This data estimates the proportion of the projected NO_x baseline which can be attributed to specific source sectors including transport, industry and commercial from 2011 to 2030. Projections

are based on road transport forecasts, assumptions on diesel car penetration, vehicle sale projections and the introduction of standards up to Euro 6/VI and as a result baseline NO_x concentrations are predicted to decrease. With regards to nitrogen deposition, this is a product of atmospheric concentrations of both NO_x and ammonia (NH_3). The factor will only be applied to the NO_x proportion. In this instance, NH_3 is assumed to remain constant for all future years as there is no reliable method which can be used to justify any different assumption.

1.2.3 Modelling Approach

ADMS Roads will be used as the air quality model for the assessment of the long term air quality impacts. No short term impacts will be considered as the focus of the study is primarily long term deposition. The model will been used to predict the incremental impact of emissions of NO_x from road traffic associated with the Scheme, at both the SAC and the SSSIs.

A baseline year will be modelled with Annual Average Daily Traffic (AADT) traffic data from ATCs along the A34 and A40. It is known that Reading University operate a meteorological site on the SAC and if possible this data will be used. If this is unavailable, meteorological parameters from Brize Norton weather station will be used for the relevant period. The results of the base model will be compared to results from the monitoring survey. This will be used to generate validation factors, using the actual data recorded against the predicted values in the model. Future years will then be modelled, taking account of the correction factors from the validation along with the relevant changes in traffic, relevant changes in traffic emissions, and future air quality baseline derived using the methodology previously discussed. Modelled concentrations will be compared against Critical Levels and Critical Loads to identify if and where exceedances are likely to occur.

The following specific considerations will be made in the roads modelling:

- ADMS Roads v3.4 will be used.

- The roads adjacent to and within 200m of each habitat will be included in the modelling. For the A34 this is between approximately OS Grid 448000, 209100 and 448800, 210200. For the A40, this will be between 448600,210600 and 446900, 210600.

- The A34 will be modelled as two road sources: northbound carriageway and southbound carriageway. The A40 will be modelled as a single road source with combined carriageways.

- The model years will be: 2014 as the base case verification year. 2017 will be modelled as the opening year, followed by 2020, 2023 and 2027. In the future years, the model will consider Do Nothing and Do Something scenarios.

- The roads modelling will be undertaken on the basis of AADT split into LDV (<3.5 tonne) and HGV (>3.5 tonne).

- Vehicle speeds are assumed to be constant along the length of each road as there are no major junctions within the model domain.

- The vehicle fleet emissions will be derived from emissions data in UK EFT v6.01 (2VC), as built in to the ADMS model.

- The modelling and baseline data will be combined to provide a single verification factor. As there are multiple verification points available, the average from the 10m and 20m transect points will be used, as these are the most representative of the areas of the habitats most impacted.

- The assessment will consider only ambient NO_x, and derived nutrient nitrogen deposition. Therefore, no conversion of NO_x to NO_2 will be required.

Traffic data to inform the impact assessment has been provided by PFA Consulting. The method used to produce this data is presented in the attached methodology.

ADMS-Roads is proposed to be used to model rail sources and was previously used in the Environmental Statement and evidence to the TWA Inquiry. The nature of emissions from the rail sources are similar to road sources, and it is considered to be a more robust approach than using an industrial based dispersion model (for example ADMS5). The rail model will consider only the emissions arising from the additional trains generated on the Oxford Birmingham Rail line and Chilterns Branch Line by the opening of the scheme. Sufficiently detailed information on existing train movements and fleet on these lines is not available, and therefore modelling of the base case and provision of a verification factor is not possible.

The following specific considerations will be made in the rail modelling:

- ADMS Roads v3.4 will be used.

- The relevant rail lines adjacent to and within 200m of each habitat will be included in the modelling. This will include the Oxford-Birmingham main line and the Chilterns Brach Line between approximately 450300, 207100 and 449900, 209400. No modelling of the Mainline will be undertaken to the north of the junction with the Chilterns branch line.

- The rail lines will be modelled as one combined source.

- The model years will be: 2017 as the opening year, 2020 and 2027. In the future years the model will consider only the 'Do Something' scenario.

- The rail modelling will be undertaken on the basis of Annual Average Daily Rail movements that arise from the Scheme. It will be assumed that emissions from existing passenger and freight services on the Banbury to Oxford mainline are within the baseline and remain constant at all dates of assessment. No services were operating on the Bicester to Oxford route during the baseline monitoring period. The assumption will be made that in 2017, the Chiltern Railways passenger services will be operating, with the EWR Phase 2 services operating from 2020. In the case of freight, it will be assumed that in 2017, the previous BiOx freight services will have resumed. Between 2020 and 2027, it will be assumed that the freight services on BiOx will progressively increase to the full service assumption used for other assessments eg noise.

- It will be assumed that passenger trains are a mixture of Class 168 and 172 Diesel Multiple Units, as will be operated by Chiltern Railways on East West Rail Phase 1. There is no confirmation yet about the train fleet intended to be used for East West Rail Phase 2 services, but it is a reasonable assumption that similar DMU stock to that used by Chiltern Railways will be used. It will be assumed that freight trains are hauled by Class 66 locomotives.

- Train speeds and engine power settings will be assumed to be the same as those used for the noise and vibration Schemes of Assessment in Section H.

- The train emission data will be derived from published emissions data [1].

- The future train fleet will be assumed to consist of the currently available DMUs and locomotives. This is a cautious assumption, since any changes to the fleet are likely to be new designs, which are either more efficient or will incorporate ammonia abatement.

- The assessment will again consider only ambient NO_x, and derived nutrient nitrogen deposition. Therefore, no conversion of NO_x to NO_2 will be required.

The modelling methodology that will be applied for the future years will incorporate validation of the approach in line with nationally agreed methods and practice. This includes TG(09); Defra guidance on undertaking Local Air Quality Management Air Quality Assessments; guidance from the Environment Agency; and Natural England. The assessment will ascertain significance based upon the thresholds of significance set out by the Environment Agency in the H1 guidance document, and aligned with Natural England guidance.

[1] Class 66 - Rail Emission Model (2001) for the Strategic Rail Authority, Class 168/ 170 and Class 220 - Estimation of Rail Environmental Costs (2007) for the Department of Transport

1. *INTRODUCTION*

1.1. A previous report E142-DOC01 was issued in April 2015, setting out baseline road traffic data at the relevant sections of the A34(T) and A40 to inform the baseline air quality assessment for Condition 31. Condition 32 requires no road traffic data input.

1.2. The baseline road traffic data was calculated based on traffic counts and rail passenger surveys undertaken over a period of one year. The baseline traffic data provided monthly AADT traffic flows, HGV%, traffic speeds, and impacts on the A34(T) and A40 sites by existing rail users at Bicester and Oxford stations.

1.3. It was previously understood that future monitoring data to inform the air quality assessment for conditions 31 (ii) and 32 (iii) was to be established from traffic counts and passenger survey following opening of the rail scheme.

1.4. Oxford City Council has since confirmed that they require all information to discharge conditions 31 (iii) and 32 (iv) to be issued before operation of the development commences.

1.5. This document sets out a methodology for producing traffic data to inform the air quality assessment to discharge the conditions set out above.

2. *METHODOLOGY*

2.1. Baseline data collected during 2014/2015 will inform the baseline assessment.

2.2. To inform the air quality assessment data will also be required for 2017 as the 'opening year', 2020, 2023 and 2027.

2.3. As no monitoring data with the scheme operational is as yet available, it is proposed to use modelled data. The modelled data was calculated using the cordoned Oxfordshire County Council Saturn model, Central Oxfordshire Transport Model (COTM) and development related highway traffic derived from Steer Davis Gleave (SDG) rail passenger demand forecasts.

2.4. The above modelled data previously informed the Proof of Evidence of Paul Tregear of PFA Consulting with respect to Condition 31, dated April 2012, and provided 'without' and 'with' scheme scenarios for 2016 and 2026.

2.5. It is proposed to use the modelled with scheme data, factored to the appropriate assessment years as set out in paragraph 2.2.

2.6. Without scheme data trips will be taken from the model and distributed using the distribution of existing rail trips at Bicester and Oxford from the rail passenger surveys undertaken for the baseline assessment.

2.7. The future year data, both 'with' and 'without' scheme will provide data in a comparable format as provided for the baseline assessment, as set out in paragraph 1.2.

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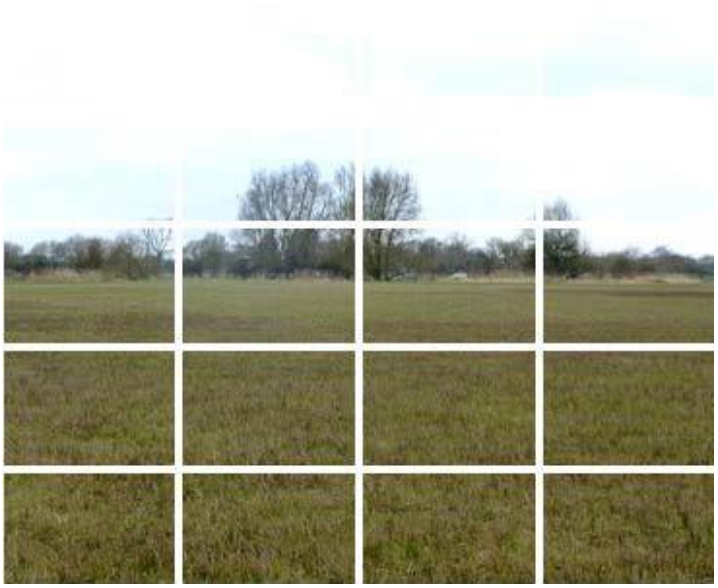

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