PORTSMOUTH LOCAL AIR QUALITY PLAN
ANALYTICAL ASSURANCE STATEMENT

Local authorities covered	Portsmouth City Council
Main contact	Air Quality Lead
Version control	1.0

CONTENTS

1. Introduction

1.1. Purpose of document

The purpose of this document is to outline the main limitations, risks, uncertainties, and suitability for use of the evidence for the transport and air quality baseline modelling.

This document is being submitted as part of the Initial Evidence Submission, and an updated version will be resubmitted at the Outline Business Case and Full Business Case milestones covering all aspects of evidence (including economic evidence and scenario modelling), for review by the Independent Review Panel.

2. Limitations of the analysis

2.1. Has the analysis been constrained by time or cost, meaning further proportionate analysis has not been undertaken?

Transport baseline modelling

At this stage of the study the analysis has not been constrained by time or cost. However, the city-wide modelling of transport and air quality of a range of options is complex and time consuming, and the project is working to a time and cost budget that may impact on the number of scenario tests and analysis that can be undertaken as the study develops. We intend to minimise the impact of time/ budget constraints through:

- a thorough review of modelling assumptions and outputs with key stakeholders;
- a set of sensitivity tests to assess the robustness of the conclusions.

Air quality baseline modelling

The baseline air quality modelling that has been completed has used the best and most up-to-date available data and tools, including the latest emissions information from JAQU within EFT v.9.1.a which contains information on current and project vehicle fleets and emissions for different road types in urban/rural areas.

It is noted that for target determination it has not been possible to undertake sensitivity tests on model parameters and the various assumptions due to the time constraints, but a number of sensitivity tests are planned to be conducted towards the end of the programme on the options. Information will be updated in this document during the study.

Interim years between the modelled base year and projected year of compliance have been interpolated rather than explicitly modelled. This is principally due to the time and budgetary constraints.

2.2. Could this further analysis lead to a substantive change in the conclusions?

Transport baseline modelling

At this stage of the study we do not believe that further analysis would lead to different conclusions.

Air quality baseline modelling

As above, without time constraints, additional sensitivity testing could be done on model inputs and parameters (e.g. testing different meteorological years or surface roughness across the city).

These tests may have led to marginally different results but any variations may be within the uncertainty of the model. It is not expected that the sensitivity tests proposed would lead to any differing conclusions on those road links which are exceeding the EU Limit Value.

It is possible that by modelling the interim years, differing concentrations would have been reported, though this was not feasible within the time and budgetary constraints.

2.3. Does the analysis rely on appropriate sources of evidence?

Transport baseline modelling

Traffic flows have been extracted from the existing Sub-Regional Transport Model (SRTM) that covers the areas of Southampton, Portsmouth and South Hampshire which has been validated to 2015.

The data used to build, calibrate and validate the SRTM includes roadside interview surveys (RSIs), screenline, manual classified and automatic traffic counts, automatic number plate recognition (ANPR) and TrafficMaster data for journey times. More detailed information is included in document T2.

Local fleet composition data was derived from an analysis of a comprehensive automatic number plate recognition (ANPR) camera survey covering 86 sites across the city over the period of 18th to 25th March 2019. This has been used to provide both compliant/non-compliant split in the traffic model.

Air quality baseline modelling

The air quality modelling relies on modelled traffic data from the Sub-Regional Transport Model (SRTM), described above. The model has been factored up from a 2015 baseline to the air quality model years of 2018 and 2021 based on a linear extrapolation, conducted by the Systra transport team.

The vehicle fleet in Portsmouth has been obtained from the ANPR survey, which registered more than 8 million vehicle movements. This was used to provide a breakdown of vehicle type and disaggregation by Euro emission standard by matching to the DVLA database. Although this was only conducted for one neutral week of the year, this data is considered to be more reliable than using national fleet assumptions for Portsmouth. Further analysis of the ANPR data has also been conducted to gain more detailed information on specific vehicle types, for example:

- Taxis with black cab body types (e.g. LTI TX4) have been matched based on their make and model in the ANPR data Private hire and hackney carriages that have the same make and model types as private cars cannot be distinguished in the processed ANPR data. Therefore, the proportion of these vehicles in the car fleet have been identified by matching the number plates of licensed taxis against the raw ANPR data.;
- Public buses could be identified in the ANPR database based on their make and model as these were provided by the two main bus operators in Portsmouth (Stagecoach and First). The Euro emission standard of the bus fleet was further refined based on known information from the operators.

For coaches – National Express, who operate 117 Euro 6 coaches around Gunwharf Quays/the Hard Interchange – are to provide their fleet number plates so that these may be matched within the ANPR database. This will be incorporated into any further refinements of the baseline and later iterations of the modelling when available.

The process of air quality modelling uses the latest available tools and follows the guidance given by JAQU. For example, the modelling was updated using the latest emissions factor toolkit (v9.1.a)

and the associated background maps and tools were used for the baseline modelling. These updated tools were released midway through the modelling study, so a significant amount of time and effort was required in order to incorporate these updates. However, these sets of data represent the latest available information and evidence on future vehicle fleets and background concentrations, so it was considered essential to utilise them. This also will help to ensure consistency with other 3rd wave JAQU studies.

EFT v9.1.a enables the user to define the proportion of each vehicle type that is registered as a specific Euro emission standard within the fleet, which, whilst based on the ANPR data, is for the purposes of the modelling regressed or progressed to be representative of the relevant year from the 2019-representative data that was captured within the ANPR. This tool has been provided at the request of JAQU, and is therefore considered a robust methodology. The guidance on the petrol/diesel projection tool in the EFT wasn't available at the modelling stage so this hasn't been included at TD stage. Further investigations in using this tool and impact on future car split are being undertaken as part of the model refinements.

To model the CAZ and shortlisted options, every effort will be made to obtain likely local impacts to make assumptions on model inputs (for example impacts on traffic flows or vehicle fleet composition) where possible, rather than relying on regional or national datasets. For example, this is to be achieved by collecting information from stated preference surveys, focus groups and directly from business (e.g. the Port).

2.4. How reliable are the underpinning assumptions?

Transport baseline modelling

The SRTM has been used to determine the traffic impacts within the area of interest. The SRTM is a multi-modal model developed in accordance with WebTAG guidelines. The model incorporates a Saturn Highway model, a Cube Voyager Public Transport model and a Demand model to account for demand responses. The model also utilises a DELTA land use model. Values of Time and Fuel costs are consistent with WebTAG Databook March 2017. We believe this provides a reliable basis from which to proceed.

To be expanded as scheme option testing progresses.

Air quality baseline modelling

The methodology follows a prescribed process as set out in JAQU's guidance documents. The assumptions made as part of this process are considered to be the best available at the time and are therefore considered to be appropriate and reliable for this study.

3. Risk of error / Robustness of the analysis

3.1. Has there been sufficient time and space for proportionate levels of quality assurance to be undertaken?

Transport baseline modelling

Yes, proportionate levels of QA have been undertaken on the transport modelling. Quality management for all Systra's projects (and all deliverables produced) is delivered in accordance to the requirements of the International Standard ISO 9001:2015. Systra's appointed Project Director oversees the review and sign-off of all deliverables. Principles of quality assurance (QA) are integrated in all our activities and at all levels through established and implemented procedures according to the international standard. The formally appointed Project Manager and Project

Director lead in ensuring the project is undertaken in accordance with the current Ricardo Quality Assurance processes and that the system is effective.

Air quality baseline modelling

AECOM approaches quality management in alignment with the BS EN ISO 9001:2008 International Standard. The company is fully committed to the management principles underlying the ISO 9001:2008 standard and to AECOM's quality systems.

One of the key quality aspects of our approach to quality assurance and control (QA/QC) is the technical review process which ensures that deliverables are scientifically robust, meet the client's requirements, and are suitable for the intended audience. The data inputs, calculations and outputs in this study have been reviewed by qualified technical staff and deliverables approved by AECOM's project approvers. Time for this approval process has been incorporated into the overall programme. This robust checking process has at times led to slight delays in submission of data, but this is considered worthwhile to allow a thorough QA/QC to be conducted. In addition, further checks by the wider team in Atkins are being conducted on the data.

3.2. Have sufficient checks been made on the analysis to ensure absence of errors in calculations?

Transport baseline modelling

Checks on modelling work are carried out as part of our quality assurance process. With complex models across several thousand road-links there is a large amount of data and calculations to check. With this amount of data it is not possible to check everything. Our approach has been as follows:

- Review and check all methods being used in the model set up and calculations;
- Review model input data for consistency, this has focused on samples of data and key locations;
- Check calculations in all spreadsheets, again using a sampling approach to check calculation steps;
- Sense check results using the experience of the project director and wider team to ensure that they seem reasonable.

Air quality baseline modelling

The air quality model domain is large and contains over 800 road links and the data inputs and spreadsheets used to feed into this network are sizeable – for example the ANPR database with 8 million vehicle captures is too large to open within Excel and needed to be broken down within a statistical analysis programme, 'R1'. Therefore during the process of data analysis, model setup and processing, it is possible that that there are a number of steps which may introduce errors into the process, though these errors are minimised as far as possible using the quality assurance principles described above.

The data templates provided by JAQU have been used as required, though as these differ to the standard processing sheets set up by AECOM, these required further checks.

AECOM technical reviewers have undertaken checking during each stage of the data processing and modelling as part of the QA/QC process and the baseline modelling has been re-run a number

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of times before the final version in order to account for improvements and updates to input information as and when it was received.

3.3. Have sufficiently skilled staff been responsible for producing the analysis?

Transport baseline modelling

The transport modelling team at SYSTRA has significant experience in the modelling of transport networks in general and specifically providing outputs that feed into Air Quality models for other consultants. Systra's project team draws on individuals who have been involved with the SRTM since its development in 2009/10 and the team has an excellent understanding of the model and the Portsmouth transport networks. The Systra Project Director has 20 years' experience in highway scheme design and transport modelling.

SYSTRA has also been able to draw on support and share best practices from other project teams that have been working on CAZ projects elsewhere in the country, such as Southampton, Fareham, Nottingham and Derby.

Air quality baseline modelling

The air quality modelling is led by experienced air quality specialists who have worked on large scale assessments for many years. The project is managed by Anna Savage, an Associate Director with 18 years' experience in air quality management, and supported by Alistair Thorpe and Max Nancarrow, who are senior members of staff within the team. These staff members have previous experience working for Portsmouth in conducting their Local Air Quality Management duties for the last few years, and have also been involved in JAQU studies with authorities in earlier waves and the current 3rd wave (Leicester and Liverpool). These experienced staff members supervise junior staff to do the day-day data inputs and process.

AECOM has a large air quality team with almost 40 members of staff and can draw upon additional resources with specific expertise if necessary. All staff within the team are members of the Institute of Air Quality Management (IAQM)

4. Uncertainty

4.1. What is the level of residual uncertainty (the level of uncertainty remaining at the end of the analysis)?

Transport baseline modelling

The level of uncertainty included within the transport modelling is undertaken in the base year model, as part of the validation process comparing the modelled and observed data (model validation is covered in detail in document T2 as part of this study).

The validation for Cordon and Screenline totals meets WebTAG requirements and confirms a high degree of certainty in base year trip demand.

The base year link flow validation for vehicle totals in the local area do not meet WebTAG requirements, and while the vast majority of locations pass the % requirements there are a number that fail to be within a GEH of 5 of the observed flow. However, these overall criteria mask a reasonable performance which is close to meeting the acceptability guidelines with the majority of link flows being within a GEH of 10 of observed values.

The SRTM scenarios representing forecast year conditions include both new transport infrastructure schemes and land-use development assumptions to represent expected changes in conditions compared to the Base year.

For proposed Transport infrastructure not related to this AQ study, only those schemes that have received the necessary planning approvals and are fully funded are included. This provides a high degree of certainty that the schemes will be constructed.

Forecast year land-use inputs (sqm floorspace) are consistent with PCC's ongoing update to the development Local Plan and are considered the best representation of currently anticipated growth in the area of interest.

Air quality baseline modelling

Through a process of model verification, the model NO_x outputs are compared with measured concentrations at fixed points. These are used to provide adjustment factors which are applied to all model outputs. Two model verification zones were used in the modelling – zone 1 for the majority of the internal city centre roads and zone 2 for the motorway and main route along the A3 into the port. Following model verification, the level of residual uncertainty as measured by the RMSE (root mean squared error) value for modelled NO_2 concentration was 3.2 µg/m^3 for zone 1 and 2.9 µg/m^3 for zone 2. Both of these values are less than 10% of the EU Limit Value and are therefore considered to be acceptable for this purpose according to the methodology specified in LAQM.TG(16), which provides the technical specifications for local authority air quality modelling within the UK.

5. Use of analysis

5.1. Does the evidence provided support the business case?

Transport baseline modelling

To be completed once scheme option outputs become available

Air quality baseline modelling

The outputs from the air quality modelling directly feed into the business case as they provide the predicted NO_2 concentrations for the future baseline target year of 2021. This is required to determine what road links are likely to experience an exceedance of the EU Limit Value and what level of reduction is likely to be required to achieve the EU Limit Value in this year. The results from the options modelling will demonstrate whether each one or combination of measures are able to result in sufficient emissions reductions to reduce NO_2 concentrations to below the EU Limit Value in the shortest possible time – i.e. meeting the primary objective of the study. At Target Determination stage, it is not possible to determine whether the business case will be supported, as only the baselines have been modelled, though these results do support the need for a business case to be produced, as exceedances have been identified in future years.

5.2. Is there evidence the agreed target will be achieved?

Transport baseline modelling

To be completed once scheme option outputs become available

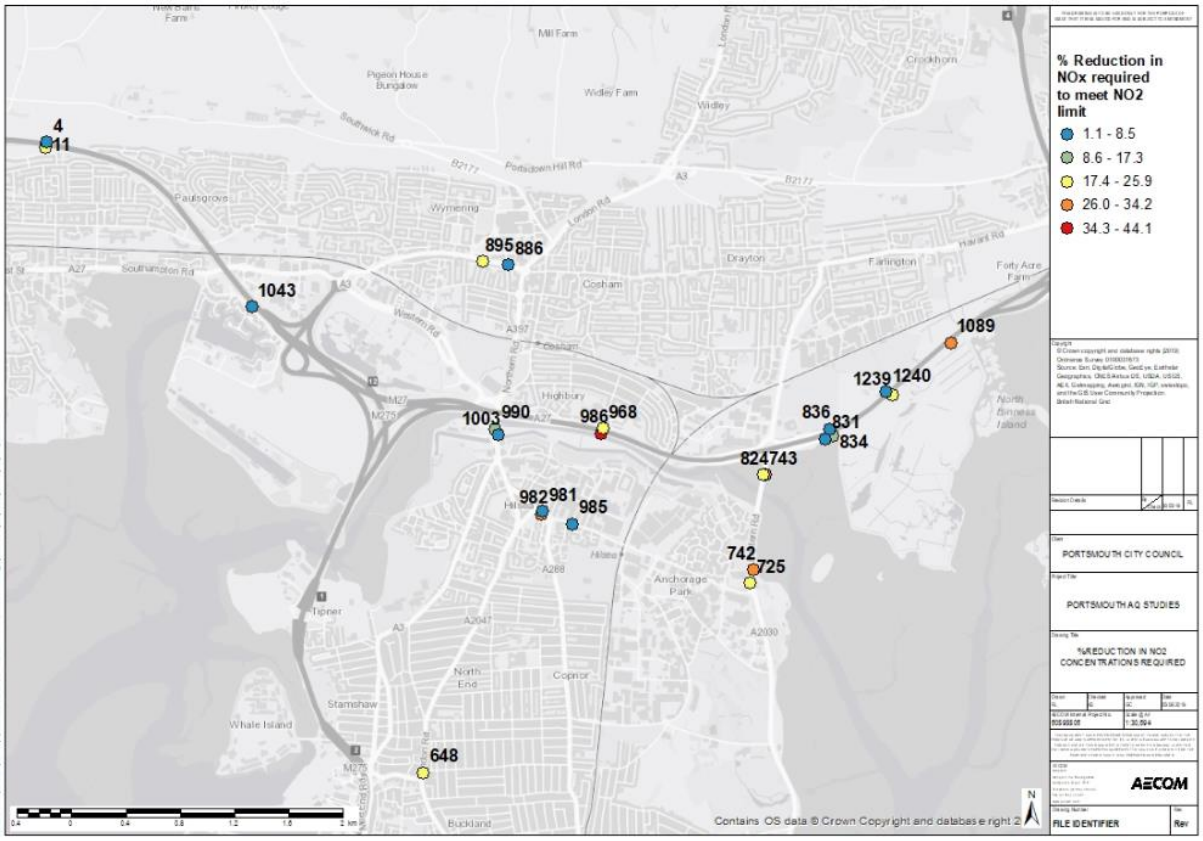
Air quality baseline modelling

The 2021 future baseline shows that the maximum predicted NO_2 concentration at receptors located 4m from the road links and 2m high is 53.4 µg/m^3 on road link 51387 (Church Street).

The figure below provide an indication of the required reductions in road NO_x that may be required to achieve the EU Limit Value for NO_2 at selected locations that are exceeding in 2021. As stated in section 5.1, the CAZ or shortlisted options will therefore need to achieve this level of reduction to meet the EU Limit Value across the city.

Figure 1. Percentage reduction in NO_x required to meet EU Limit Value at selected receptors

a) North of City



b) South of City