Ref	Requirement	LA Proposal Description	JAQU Review Comments	LA Updated Description 2	JAQU Review Comments 2	LA Updated Description 3	JAQU Review Comments 3	LA Updated Description 4	JAQU Review Comments 4	LA Comments 5
C.1	**Model selection**									
C.1.1	Details of emissions model based on COPERT 5 emissions to be used.	COPERT 5 data either in the form of an update EFT or with JAQU's agreement Ricardo's in-house emission calculation tool pyCOPERT which is fully compatible with COPERT 5.	If using EFT, please use version 8.0.1a and be aware a new version of EFT may become available in time for baseline modelling. pyCOPERT is an accepted alternative.	COPERT 5 data either in the form of an update EFT or with JAQU's agreement Ricardo's in-house emission calculation tool pyCOPERT which is fully compatible with COPERT 5.	If using EFT, please use version 8.0.1a and be aware a new version of EFT may become available in time for baseline modelling. pyCOPERT is an accepted alternative.	COPERT 5 data either in the form of an updated EFT or with JAQU's agreement Ricardo's in-house emission calculation tool pyCOPERT which is fully compatible with COPERT 5. It is understood that version 9.1 of the Emission Factor Toolkit will be released mid-May. Provided that the release is not delayed past this date, this version of the tool will be used.	new version of EFT (vs9.0.1) has been made available for baseline modelling. COPERT is an accepted alternative.	The EFT version 9.1b has been used to calculate road transport emissions. This tool uses COPERT 5 emission factors.		
C.1.2	Gradient effects included? Map included in AQ2?	Further to the update/clarification of the gradient method in LAQM.TG(16) we confirm that we will apply the gradient impact to all pre-Euro VI HGVs in the emissions processing step. In order to do this, we will carry out a GIS gradient analysis of our modelling domain to identify any road links with gradients greater 2.5%. The gradient adjustment will then be applied to the proportion pre-Euro VI HGV movements on identified links.	Green once a map is included.	Further to the update/clarification of the gradient method in LAQM.TG(16) we confirm that we will apply the gradient impact to all pre-Euro VI HGVs in the emissions processing step. In order to do this, we will carry out a GIS gradient analysis of our modelling domain to identify any road links with gradients greater 2.5%. The gradient adjustment will then be applied to the proportion pre-Euro VI HGV movements on identified links.	Green once a map detaling where gradients have been applied is included.	Further to the update/clarification of the gradient method in LAQM.TG(16) we confirm that we will apply the gradient impact to all pre-Euro VI HGVs in the emissions processing step. In order to do this, we will carry out a GIS gradient analysis of our modelling domain to identify any road links with gradients greater 2.5%. The gradient adjustment will then be applied to the proportion pre-Euro VI HGV movements on identified links. A map of modelled gradients will be provided following receipt of the updated traffic model from SWECO, in order to ascertain exact link locations for modelling.	Green once a map detaling where gradients have been applied is included.	Gradient impacts were applied to all pre-Euro VI HGVs in the emissions processing step. In order to do this, a GIS gradient analysis of our modelling domain was carried out to identify any road links with gradients greater 2.5%. A map of the modelled gradients is provided in AQ2 Section 2.	Map checked	
C.1.3	Details of air quality dispersion model to be used and any major adaptations made	RapidAir will be used for the study- this is Ricardo's proprietary modelling system developed for urban air pollution assessment. The model is based on convolution of an emissions grid with dispersion kernels derived from the USEPA AERMOD model. The physical parameterisation (release height, initial plume depth and area source configuration) closely follows guidance provided by the USEPA in their statutory road transport dispersion modelling guidance . AERMOD provides the algorithms which govern the dispersion of the emissions and is an accepted international model for road traffic studies (it is one of only two mandated models in the US and is widely used overseas for this application). The combination of an internationally recognised model code and careful parameterisation matching international best practice makes RapidAir fit for purpose for this study. The model produces high resolution concentration fields at the city scale (1 to 3m scale) so is ideal for spatially detailed compliance modelling.		RapidAir will be used for the study- this is Ricardo's proprietary modelling system developed for urban air pollution assessment. The model is based on convolution of an emissions grid with dispersion kernels derived from the USEPA AERMOD model. The physical parameterisation (release height, initial plume depth and area source configuration) closely follows guidance provided by the USEPA in their statutory road transport dispersion modelling guidance . AERMOD provides the algorithms which govern the dispersion of the emissions and is an accepted international model for road traffic studies (it is one of only two mandated models in the US and is widely used overseas for this application). The combination of an internationally recognised model code and careful parameterisation matching international best practice makes RapidAir fit for purpose for this study. The model produces high resolution concentration fields at the city scale (1 to 3m scale) so is ideal for spatially detailed compliance modelling.		RapidAir will be used for the study- this is Ricardo's proprietary modelling system developed for urban air pollution assessment. The model is based on convolution of an emissions grid with dispersion kernels derived from the USEPA AERMOD model. The physical parameterisation (release height, initial plume depth and area source configuration) closely follows guidance provided by the USEPA in their statutory road transport dispersion modelling guidance . AERMOD provides the algorithms which govern the dispersion of the emissions and is an accepted international model for road traffic studies (it is one of only two mandated models in the US and is widely used overseas for this application). The combination of an internationally recognised model code and careful parameterisation matching international best practice makes RapidAir fit for purpose for this study. The model produces high resolution concentration fields at the city scale (1 to 3m scale) so is ideal for spatially detailed compliance modelling.		RapidAir was used for the study- this is Ricardo's proprietary modelling system developed for urban air pollution assessment. The model is based on convolution of an emissions grid with dispersion kernels derived from the USEPA AERMOD model. The physical parameterisation (release height, initial plume depth and area source configuration) closely follows guidance provided by the USEPA in their statutory road transport dispersion modelling guidance . AERMOD provides the algorithms which govern the dispersion of the emissions and is an accepted international model for road traffic studies (it is one of only two mandated models in the US and is widely used overseas for this application). The combination of an internationally recognised model code and careful parameterisation matching international best practice makes RapidAir fit for purpose for this study. The model produces high resolution concentration fields at the city scale (1 to 3m scale) so is ideal for spatially detailed compliance modelling.		
C.1.4	Canyon effects included? Map included in AQ2?	Yes, a canyon effect will be modelled in the southwestern edge of the modelling domain, along Etruria Road according to the recommendations made by the local authority (Newcastle-under-Lyme). The model includes a canyon treatment based on the USEPA 'Stanford' model . The canyon model algorithms are essentially the same as those recommended by the European Environment Agency for modelling canyons in compliance assessment . Our model has terms to deal with canyon height, width, vehicle length, receptor height, emission strength, wind speed and direction (taken from the same met record as the main RapidAir model).	Please provide a map. Are there any other areas where canyon effects need to be included? Canyon effects are necessary where the height of buildings is larger than the width of the road.	Yes, a canyon effect will be taken into consideration. The model includes a canyon treatment based on the USEPA 'Stanford' model . The canyon model algorithms are essentially the same as those recommended by the European Environment Agency for modelling canyons in compliance assessment . Our model has terms to deal with canyon height, width, vehicle length, receptor height, emission strength, wind speed and direction (taken from the same met record as the main RapidAir model).	Please provide a map. Are there any other areas where canyon effects need to be included? Canyon effects are necessary where the height of buildings is larger than the width of the road.	Yes, canyon effects will be taken into consideration across the model domain, using OS Mastermap data for building footprints and heights, augmented with high-resolution LIDAR data published by the Environment Agency where appropriate. The model includes an advanced canyon calculation tool and model treatment based on the USEPA 'Stanford' model . The canyon model algorithms are essentially the same as those recommended by the European Environment Agency for modelling canyons in compliance assessment . Our model has terms to deal with canyon height, width, vehicle length, receptor height, emission strength, wind speed and direction (taken from the same met record as the main RapidAir model). A map of modelled canyons will be provided following receipt of the updated traffic model from SWECO, in order to ascertain exact link locations for modelling.	Map of canyons provided. Are there any other areas where canyon effects need to be included in consideration of TG16, 7.408? i.eCanyon effects are necessary where the height of buildings is larger than the width of the road. Green once info provided	Canyon effects were taken into consideration across the model domain, using OS Mastermap data for building footprints and heights, augmented with high-resolution LIDAR data published by the Environment Agency where appropriate. RapidAir includes an advanced canyon calculation tool and model treatment based on the USEPA 'Stanford' model . The canyon model algorithms are essentially the same as those recommended by the European Environment Agency for modelling canyons in compliance assessment . The model has terms to deal with canyon height, width, vehicle length, receptor height, emission strength, wind speed and direction. A complete map of modelled canyon locations is provided in AQ2 Section 2.		
C.1.5	Tunnels and flyovers included? Map included in AQ2?	No.	Please clarify whether there are no tunnels or flyovers, or whether these are not modelled as such.	Tunnels and flyovers will not be modelled. If modelling of flyovers will be considered to be beneficial for this assessment, we could model road links at a higher elevation using a dispersion kernel created with a different source height in AERMOD. It will not however be considered beneficial for this assessment.		Tunnels and flyovers will not be modelled. If modelling of flyovers will be considered to be beneficial for this assessment, we could model road links at a higher elevation using a dispersion kernel created with a different source height in AERMOD. It will not however be considered beneficial for this assessment.		Tunnels and flyovers were not modelled. If modelling of flyovers will be considered to be beneficial for this assessment, we could model road links at a higher elevation using a dispersion kernel created with a different source height in AERMOD. It will not however be considered beneficial for this assessment.		
C.2	**Air quality model domain**									
C.2.1	Please provide a map (in report) showing model domain in relation to exceedance locations identified in PCM model.	See Figure 1 Local Plan Study Area with inset showing the location of the local exceedance area. Figure 2 Census IDs detailing the location of PCM model locally.	Please provide a single map with the model domain, PCM exceedances, monitoring results and displacement routes included.	See Figure 1 of the Local Plan Study Area with inset showing the location of the local exceedance area. Figure 2 Census IDs detailing the location of PCM model locally.	Please provide a map detailing the monitoring results (i.e. where does monitoring indicate exceedances and where compliance)	See Figure 1 of the Local Plan Study Area with inset showing the location of the local exceedance area. Figure 2 Census IDs detailing the location of PCM model locally.		See Figure 1 of the Local Plan Study Area with inset showing the location of the local exceedance area. Figure 2 Census IDs detailing the location of PCM model locally.	PCM exceedances shown in figure 4 Local exceedances are shown in figure 2	
C.2.2	Locally identified exceedance locations included?	Yes, the high-resolution nature of RapidAir and its inclusion of street canyons will make the model outputs naturally align with hotspots/exceedance locations. See Figure 1 in main report for model domain and Figure 2 for identified exceedances from PCM.	Does the model domain include any exceedances identified locally – either through monitoring or the Targeted Feasibility Study?	Yes, the high-resolution nature of RapidAir and its inclusion of street canyons will make the model outputs naturally align with hotspots/exceedance locations. See Figure 1 in main report for model domain and Figure 2 for identified exceedances from PCM.		Yes, the high-resolution nature of RapidAir and its inclusion of street canyons will make the model outputs naturally align with hotspots/exceedance locations. See Figure 1 in main report for model domain and Figure 2 for identified exceedances from PCM.		Yes, the high-resolution nature of RapidAir and its inclusion of street canyons will make the model outputs naturally align with hotspots/exceedance locations.	Figure 4 not 2	Amended
C.2.3	Domain includes displacement routes?	Yes. See Figure 3 Dispersion Routes.	Figure 3 does not refer to displacement routes. Our assessment of displacement routes would be assisted when a single map which includes the model domain, any known exceedances and displacement routes is provided.	Yes. See Figure 4 Dispersal Routes.	Our assessment of displacement routes would be assisted when a single map which includes the model domain, any known exceedances and displacement routes is provided.	Yes. See Figure 4 in AQ2.	Green once text stated in AQ2 is added to expplain addition of displacement routes.	Now completed.	OK	
C.3	**Air quality model receptor locations**									
C.3.1	Details of receptor grid size (only if needed for distributional analysis) and other receptor locations.	For the Stoke/Newcastle domain (which is reasonably small) we can set RapidAir to model down to 1 m. The model can comfortably deal with about 500 million locations which provides for over 20,000 cells in the x and y axes. So, we can model 20km x 20km at 1m resolution, 40km x 40km at 2m resolution, 60km x 60km at 3m resolution and so on. The canyon model is set to the same resolution as the grid model so that they align perfectly spatially. Stoke-on-Trent and Newcastle-under-Lyme have a wide network of monitoring locations comprising a mix of passive and active sampling. RapidAir run time is not sensitive to the number of receptors so all available monitoring locations within the domain will be included.	Gridded receptors are only needed if population weighted mean concentrations are used as part in the cost-benefit analysis in economic modelling (see Options Appraisal package). Are you intending to calculate population weighted mean concentrations? What is the approach to modelling local (non-PCM) road links?	For the Stoke/Newcastle domain we can set RapidAir to model down to 1 m. The model can comfortably deal with about 500 million locations which provides for over 20,000 cells in the x and y axes. So, we can model 20km x 20km at 1m resolution, 40km x 40km at 2m resolution, 60km x 60km at 3m resolution and so on. The canyon model is set to the same resolution as the grid model so that they align perfectly spatially. Stoke-on-Trent and Newcastle-under-Lyme have a wide network of monitoring locations comprising a mix of passive and active sampling. RapidAir run time is not sensitive to the number of receptors so all available monitoring locations within the domain will be included. Local (non-PCM) road links are modelled as long as they are covered by the traffic model and an appropriate fleet age profile (e.g. ANPR-derived) can be assigned to it.	Gridded receptors are only needed if population weighted mean concentrations are used as part in the cost-benefit analysis in economic modelling (see Options Appraisal package). Are you intending to calculate population weighted mean concentrations?	For the Stoke/Newcastle domain we can set RapidAir to model down to 1 m. The model can comfortably deal with about 500 million locations which provides for over 20,000 cells in the x and y axes. So, we can model 20km x 20km at 1m resolution, 40km x 40km at 2m resolution, 60km x 60km at 3m resolution and so on. The canyon model is set to the same resolution as the grid model so that they align perfectly spatially. Stoke-on-Trent and Newcastle-under-Lyme have a wide network of monitoring locations comprising a mix of passive and active sampling. RapidAir run time is not sensitive to the number of receptors so all available monitoring locations within the domain will be included; determination of required outputs can then be carried out. All local (non-PCM) road links included in the traffic model will be modelled.	Are you intending to calculate population weighted mean concentrations? Receptor grid size is needed if you are not planning to do a damage cost approach to the economic assessment. Confirm which approach will be aken for the economic assessment and if not through damage costs then please provide details of receptor gid size. see section C.3.1 on pg 18 of the evidence package for details. Green once info provided	RapidAir runs for the North Staffordshire area were carried out at 3m resolution for all modelling years and scenarios. Stoke-on-Trent and Newcastle-under-Lyme Councils have a wide network of monitoring locations comprising a mix of passive and active sampling. RapidAir run time is not sensitive to the number of receptors so all available monitoring locations within the domain will be included; determination of required outputs can then be carried out. All local (non-PCM) road links included in the traffic model were modelled. A damage costs approach was taken for the economic assessment, so these gridded concentrations will not be required for this part of the study. However, they were used in the air quality analysis.	Explained in AQ2 2.3.2	
C.3.2	Methods to be used to assign subset of receptors for AQD assessment requirements.	Annex III of Directive 2008/50/EC (AQD) specifies that macroscale siting of sampling points should be representative of air quality for a street segment of no less than 100 m length at traffic-orientated sites. To provide results relevant to this requirement, for roadside locations where there is public access and the directive applies; road links with exceedances of the NO2 annual mean objective stretching over link lengths of 100m or greater can be presented as a separate GIS layer of model results. Annex III of the AQD also specifies that microscale sampling should be at least 25 m from the edge of major junctions. When reporting model results relevant to compliance with the AQD, locations up to 25m from the edge of major junctions in the model domain will therefore be excluded.	The receptor locations for all road links, including those below the limit value, must be compliant with the AQD macrositing and micrositing requirements. Receptors should be places at 2 m height and 4 m distance from the kerb. Will multiple receptors be modelled for each road link? In this case, the receptor location with the highest concentration which meets AQD requirements must be selected. At what spacing will receptors be placed and will they be placed on both sides of each road link?	Roadside receptor locations are placed at a distance of 4 m from the kerb, 2 m height and at 50 m intervals. Receptors are only considered for roads links with lengths greater than 100 m, where there is public access, and which are at least 25 m away from the edge of major junction.	Will non-AQD compliant receptors be screened out before or after modelling?	Roadside receptor locations are placed at a distance of 4 m from the kerb, 2 m height and at 4 m intervals. Receptors are only considered for roads links with lengths greater than 100 m, where there is public access, and which are at least 25 m away from the edge of major junction.	Will the screening exercise be undertaken before or after modelling? Green once info provided	Roadside receptor locations are placed at a distance of 4 m from the kerb, 2 m height and at 4 m intervals. Receptors are only considered for roads links with lengths greater than 100 m, where there is public access, and which are at least 25 m away from the edge of major junction. Non-AQD compliant receptors were screened out before modelling.	Explained in AQ2 2.3.2	
D.1	**Air quality base Year modelling**									
D.1.1	Base year to be used.	The modelling base year will be 2017 in line with the latest traffic and air quality data and the base year of the proposed transport model.		The modelling base year will be 2017 in line with the latest traffic and air quality data and the base year of the proposed transport model.		The modelling base year will be 2017 in line with the latest traffic and air quality data and the base year of the proposed transport model.	Base year requires update. Green once info provided	The air quality modelling base year was 2018, in line with the latest available monitoring data when the project commenced.	OK	
D.1.2	Details of Meteorological data to be used. Details of surface roughness lengths at met site and dispersion site to be applied.	We will use surface meteorological data from Leek Thorncliffe monitoring station (NOAA Code 033300) processed in house using our own meteorological data management system. Our RapidAir model also takes account of upper air data which is used to determine the strength of turbulent mixing in the lower atmosphere- we will derive this from the closest radiosonde site and process in the USEPA AERMET model. We will utilise data filling where necessary following USEPA guidance which sets out the preferred hierarchy of routines to account for gaps (persistence, interpolation, substitution). Our modelling will be supplied with full meteorological discussion and if required we can supply the computer code used to process the data and details of any data filling that was required.	Data from which year will be used?	We will use surface meteorological data from Leek Thorncliffe monitoring station (NOAA Code 033300) processed in house using our own meteorological data management system. The selected year will be 2017. Our RapidAir model also takes account of upper air data which is used to determine the strength of turbulent mixing in the lower atmosphere- we will derive this from the closest radiosonde site and process in the USEPA AERMET model. We will utilise data filling where necessary following USEPA guidance which sets out the preferred hierarchy of routines to account for gaps (persistence, interpolation, substitution). Our modelling will be supplied with full meteorological discussion and if required we can supply the computer code used to process the data and details of any data filling that was required.	Please provide the surface roughness that will be used at the met site and the dispersion site.	We will use surface meteorological data from Leek Thorncliffe monitoring station (NOAA Code 033300) processed in house using our own meteorological data management system. The selected year will be 2017. Our RapidAir model also takes account of upper air data which is used to determine the strength of turbulent mixing in the lower atmosphere- we will derive this from the closest radiosonde site and process in the USEPA AERMET model. We will utilise data filling where necessary following USEPA guidance which sets out the preferred hierarchy of routines to account for gaps (persistence, interpolation, substitution). Our modelling will be supplied with full meteorological discussion and if required we can supply the computer code used to process the data and details of any data filling that was required. A uniform surface roughness value of 1.0 m will be modelled to represent a typical city/urban environment. A surface roughness of 0.3 m will be used to represent the meteorological measurement site.	Selected year requires update ? Green once info provided	Surface meteorological data from Leek Thorncliffe monitoring station (NOAA Code 033300) for 2018 was used, processed in house using our own meteorological data management system. We will utilise Data filling was used where necessary following USEPA guidance which sets out the preferred hierarchy of routines to account for gaps (persistence, interpolation, substitution). Our modelling will be supplied with full meteorological discussion and if required we can supply the computer code used to process the data and details of any data filling that was required. A uniform surface roughness value of 1.0 m was modelled to represent a typical city/urban environment. A surface roughness of 0.3 m will be used to represent the meteorological measurement site.	OK. Computer code not required.	
D.2	**Traffic input data**									
D.2.1	Source of traffic activity data and vehicle types.	The key source of traffic data will be the North Staffordshire Multi-Modal (NSMM) transport model which was run for the Etruria Valley Project in 2015. Traffic was adjusted to 2017 by using a growth factor of 1.0257. An ANPR study will be used to derive vehicle split and classification.	What is the traffic growth factor based on? Into what vehicle types and classifications will the fleet be split by the ANPR study?	The key source of traffic data will be the North Staffordshire Multi-Modal (NSMM) transport model which was run for the Etruria Valley Project in 2015. Traffic levels were adjusted to 2017 by using a specific Tempro-derived coefficient (1.0257) corresponding to an average day for the Staffordshire area for Urban Principal Roads. An ANPR study will be used to derive vehicle split and classification.		The key source of traffic data will be the North Staffordshire Multi-Modal (NSMM) transport model which was run for the Etruria Valley Project in 2015. Traffic levels were adjusted to 2017 by using a specific Tempro-derived coefficient (1.0257) corresponding to an average day for the Staffordshire area for Urban Principal Roads. An ANPR study will be used to derive vehicle split and classification.	Please update this given the new developments with traffic traffic model and ANPR study. Green once info provided	Annual average daily traffic (AADT) link flows for each model link for 2015 and 2022 were provided by Sweco using a traffic model derived from the North Staffordshire Multi-Modal Model (NSMM). No traffic growth was assumed to occur between 2015 and the air quality model year of 2018 , following advice provided by the Councils. The traffic model provides vehicle flows for five highway user classes which are: Cars, Taxis, HGVs, LGVs and Buses. A further breakdown of the HGV into rigid and articulated categories was carried out using local traffic count data and ANPR data. Additional traffic from motorcycles was derived using a constant scaling factor (0.005) for the domain, derived from automatic traffic count data. The taxi fleet was split between cars and LGVs based on size data provided by the Councils.	Is it possible for this advice to be included in an annex?	An analysis of traffic growth from 2015 to 2018 is presented in T2 Section 2.5.
D.2.2	Details of representation of road locations (achieved through use of a georeferenced transport model or another approach?)	See Figure 1 Local Plan Development Study Area . All modelling links have been snapped to the OS ITN road network for the best spatial representation through the use of a buffer-based approach and the manually quality-controlled.		All modelling links will be snapped to the OS ITN road network for the best spatial representation through the use of a buffer-based approach and the manually quality-controlled.		All modelling links will be snapped to the OS ITN road network for the best spatial representation through the use of a buffer-based approach and the manually quality-controlled.		All modelling links will be snapped to the OS ITN road network for the best spatial representation through the use of a buffer-based approach and the manually quality-controlled.		
D.2.3	Source of vehicle fleet composition information (local/EFT).	ANPR	When is the survey planned? What vehicle types will it cover?	ANPR	When is the survey planned? What vehicle types will it cover?	ANPR	Please state any other sources of fleet coposition information other than ANPR .Green once info provided	ANPR data was used for cars, LGVs, HGVs, and buses. National fleet data for "Urban (not London) was used for motorcycles. For Taxis and private hire, fleet composition is derived from information on licenced vehicles in Stoke-on-Trent and Newcastle-under-Lyme provided by Newcastle-under-Lyme Borough Council.	Report states that taxi fleet composition was derived from the ANPR data. Please amend.	Amended
D.2.4	Source of vehicle speed information.	Traffic speeds were provided for every road link considered by the North Staffordshire Multi-Modal (NSMM) transport model	Where does the speed data in the NSMM come from?	Traffic speeds will be provided for every road link considered by the North Staffordshire Multi-Modal (NSMM) transport model.	Where does the speed data in the NSMM come from? Are speeds derived from travel times in the NSMM? How does the accuracy of this data compare to trafficmaster?	Traffic speeds will be provided for every road link considered by the North Staffordshire Multi-Modal (NSMM) transport model.	Where does the speed data in the NSMM come from? Are speeds derived from travel times in the NSMM? How does the accuracy of this data compare to trafficmaster? Green once info provided	Traffic speeds were provided for every road link considered by the North Staffordshire Multi-Modal (NSMM) transport model. Journey time validation was carried out following DfT guidelines, based on those described in WebTAG Unit M3.1 and the DMRB Volume 12, Section 2, Part 1, Chapter 4. The transport model was found to perform within guidelines for both traffic flows and modelled speeds. For validated links, all modelled travel times were found to pass the DRMB criteria of being within 15% or 1 minute of the observed times.		
D.3	**NO_x/NO_2 emissions assumptions**									
D.3.1	Source of primary NO_2 emission fractions (f-NO_2).	Defra f-NO_2 fractions which we understand will be released in time to support this work.	Please use version 8.0.1a of the EFT in the meantime. A new version of EFT may become available in time for baseline modelling. f-NO_2 should be calculated on a link-by-link basis using the EFT having entered local fleet inputs.	Defra f-NO2 fractions	Please use version 8.0.1a of the EFT in the meantime. A new version of EFT may become available in time for baseline modelling. f-NO_2 should be calculated on a link-by-link basis using the EFT having entered local fleet inputs.	Defra f-NO2 fractions will be used using the emission factor toolkit version identified above.	EFT version 9.0.1a is now available for baseline modelling, please update. f-NO_2 should be calculated on a link-by-link basis using the EFT having entered local fleet inputs. Please confirm. Green once info provided	f-NO2 was calculated on a link-by-link basis using the EFT version 9.1b for each modelled year, having entered local fleet inputs.		
D.3.2	Details of method used to calculate projections for f-NO_2 and to calculate NO_2 concentrations from NO_x concentrations.	Link-specific fractions of primary NO2 will be calculated using the COPERT v5 emission functions for all vehicles up to and including Euro 6/VI. Emission rates of primary NO2 and of total NOx will be calculated with our in-house emission calculation tool pyCOPERT as agreed by JAQU, which is fully consistent with COPERT v5 and links directly to our RapidAir dispersion modelling system. The specific fractions of primary NO2 for every projected year are calculated based on the projected average fleet composition for every year from the NAEI, which determine the predominance of specific primary emission factors (of any given emission standard).	If using EFT, please use version 8.0.1a and be aware a new version of EFT may become available in time for baseline modelling. pyCOPERT is an accepted alternative. What method will be used to convert NOx to NO2 concentrations?	Link-specific fractions of primary NO2 will be calculated using the COPERT v5 emission functions for all vehicles up to and including Euro 6/VI. Emission rates of primary NO2 and of total NOx will be calculated with our in-house emission calculation tool pyCOPERT as agreed by JAQU, which is fully consistent with COPERT v5 and links directly to our RapidAir dispersion modelling system. The specific fractions of primary NO2 for every projected year are calculated based on the projected average fleet composition for every year from the NAEI, which determine the predominance of specific primary emission factors (of any given emission standard). The Defra NOx to NO2 model will be used. This method is based on road specific fractions of primary NO2.		Link-specific fractions of primary NO2 will be calculated using the COPERT v5 emission functions for all vehicles up to and including Euro 6/VI. Emission rates of primary NO2 and of total NOx will be calculated with our in-house emission calculation tool pyCOPERT as agreed by JAQU, which is fully consistent with COPERT v5 and links directly to our RapidAir dispersion modelling system. The specific fractions of primary NO2 for every projected year are calculated based on the projected average fleet composition for every year from the NAEI, which determine the predominance of specific primary emission factors (of any given emission standard). The Defra NOx to NO2 model will be used. This method is based on road specific fractions of primary NO2.		Projections for f-NO2 were carried out using the EFT version 9.1b. The Defra NOx to NO2 model was used to calculate NO2 concentrations from NOx concentrations. This method is based on road specific fractions of primary NO2.		
D.4	**Non-road transport modelling**									
D.4.1	Details of modelling for non-road transport sources and background.	No non-road transport sources were explicitly modelled. Their contribution has been taken into consideration through the use of the NOx background maps produced by the PCM model and made available online .	Will the sector removal tool be used to remove the minor road component from the background concentrations?	No non-road transport sources will be explicitly modelled for the baseline. Their contribution will be been taken into consideration through the use of the NOx background maps produced by the PCM model and made available online , after removal of the modelled roads. The contribution of minor roads was considered as additional.		No non-road transport sources will be explicitly modelled for the baseline. Their contribution will be been taken into consideration through the use of the NOx background maps produced by the PCM model and made available online , after removal of the modelled roads. The contribution of minor roads was considered as additional.		No non-road transport sources will be explicitly modelled for the baseline. Their contribution will be been taken into consideration through the use of the NOx background maps produced by the PCM model and made available online , after removal of the modelled roads. The contribution of minor roads was considered as additional.		
D.5	**Measurement data for model calibration**									
D.5.1	Details used for the model calibration e.g. dates, locations and details of the model performance and uncertainty.		Please provide detail, including a map.	Details will be provided when the detailed modelling will take place.	Please provide detail, including a map in an updated AQ2.	Details of available monitoring data, including a map of all sites, are provided in AQ2.	AQ2 refers to model performance but not specifically to uncertainty. Please add in reference to uncertainty. Perhaps referring to section 7.536 onwards of LAQM.TG16. Green once info provided	Details of available monitoring data, including a map of all sites, are provided in AQ2. An analysis of model uncertainty is provided in AQ3.		
D.5.2	Type of monitoring data (automatic and/or diffusion tubes) used for the model calibration.	Automatic and diffusion tubes. See Figure 1 for existing monitoring locations and Figure 5 for proposed monitoring locations. and type of monitoring points.	How many monitors of each type will be used? What methods will be used to correct bias in diffusion tube data and to carry out the calibration?	Automatic and diffusion tubes. See Figure 3 for existing monitoring locations. The data reported by the diffusion tubes will be bias and distance adjusted using the Local Air Quality Management (LAQM) Annual Status Report (ASR) for England, and the NO2 Fall-Off with Distance Calculator.	How many monitors of each type will be used?	Monitoring data from 5 automatic monitoring stations and 110 diffusion tubes in the two council areas will be used to calibrate the model. The data reported by the diffusion tubes will be bias and distance adjusted using the Local Air Quality Management (LAQM) Annual Status Report (ASR) for England, and the NO2 Fall-Off with Distance Calculator.		Monitoring data from 5 automatic monitoring stations and 110 diffusion tubes in the two council areas will be used to calibrate the model. The data reported by the diffusion tubes will be bias and distance adjusted using the Local Air Quality Management (LAQM) Annual Status Report (ASR) for England, and the NO2 Fall-Off with Distance Calculator.		
D.5.3	All available automatic (and/or diffusion tube) monitoring data included in the model calibration	Yes. No monitoring locations were excluded		Yes. No monitoring locations will be excluded		Yes. No monitoring locations will be excluded		Yes. No monitoring locations will be excluded		
D.5.4	Quality assurance of measurement data.	Automatic monitors - The local authority attended the monitoring stations at least every 2 or 4 weeks (depending on whether the location is experiencing high NO2 concentrations or not, respectively) to change the filter and check the calibration of the instrument. The instruments have the minimum data capture of 75% for the year. Diffusion tubes were supplied and analysed by Staffordshire Scientific Services in 2017. The Laboratory participates in the UK-PT scheme, inter-comparison exercises. Preparation method used for the diffusion tube was 20% Triethanolamine in water. A national bias adjustment factor applied to the data. Monitoring data was completed for at least 75% of the year (9 months) or data was annualised. Diffusion tubes were changed on a monthly basis. Monitoring sites comply with the microscale siting requirements set out in Annex III of the AAQD.		Automatic monitors - The local authority attended the monitoring stations at least every 2 or 4 weeks (depending on whether the location is experiencing high NO2 concentrations or not, respectively) to change the filter and check the calibration of the instrument. The instruments have the minimum data capture of 75% for the year. Diffusion tubes were supplied and analysed by Staffordshire Scientific Services in 2017. The Laboratory participates in the UK-PT scheme, inter-comparison exercises. Preparation method used for the diffusion tube was 20% Triethanolamine in water. A national bias adjustment factor applied to the data. Monitoring data was completed for at least 75% of the year (9 months) or data was annualised. Diffusion tubes were changed on a monthly basis. Monitoring sites comply with the microscale siting requirements set out in Annex III of the AAQD.		Automatic monitors - The local authority attended the monitoring stations at least every 2 or 4 weeks (depending on whether the location is experiencing high NO2 concentrations or not, respectively) to change the filter and check the calibration of the instrument. The instruments have the minimum data capture of 75% for the year. Diffusion tubes were supplied and analysed by Staffordshire Scientific Services in 2017. The Laboratory participates in the UK-PT scheme, inter-comparison exercises. Preparation method used for the diffusion tube was 20% Triethanolamine in water. A national bias adjustment factor applied to the data. Monitoring data was completed for at least 75% of the year (9 months) or data was annualised. Diffusion tubes were changed on a monthly basis. Monitoring sites comply with the microscale siting requirements set out in Annex III of the AAQD.		Automatic monitors - The local authority attended the monitoring stations at least every 2 or 4 weeks (depending on whether the location is experiencing high NO2 concentrations or not, respectively) to change the filter and check the calibration of the instrument. The instruments have the minimum data capture of 75% for the year. Diffusion tubes were supplied and analysed by Staffordshire Scientific Services in 2017. The Laboratory participates in the UK-PT scheme, inter-comparison exercises. Preparation method used for the diffusion tube was 20% Triethanolamine in water. A national bias adjustment factor applied to the data. Monitoring data was completed for at least 75% of the year (9 months) or data was annualised. Diffusion tubes were changed on a monthly basis. Monitoring sites comply with the microscale siting requirements set out in Annex III of the AAQD.		
E.1	**Baseline projections modelling**									
E.1.1	Years to be modelled.	Modelling years are: • 2018 • 2019 • 2020 • 2021 • 2022 • 2023 • 2024 • 2025 • 2026 • 2027	The base year (2017), the earliest year in which compliance is expected to be achieved through having taken measures, and all years in between (interim years) should be modelled. Concentrations in interim years can be derived using interpolation if there are no major changes in these years that would make interpolation inaccurate. At the moment, the base year is missing, and you suggest the earliest year in which you can achieve compliance through taking measures is 2027.	The years to be modelled will be determined once the shortlisted options are developed further. However, at this stage, these are anticipated to include: • 2017 (baseline) • 2020 • 2023 • 2026	The base year (2017), the earliest year in which compliance is expected to be achieved through having taken measures, and all years in between (interim years) should be modelled. Concentrations in interim years can be derived using interpolation if there are no major changes in these years that would make interpolation inaccurate. What is the earliest year in which you can achieve compliance through taking measures (i.e. in what year do you suggest a CAZ benchmark would achieve compliance)? We expect to see 2 years here. The first year is the base year and the second yearis the year that the 'main' measure (e.g. CAZ) being modelled could be implemented.	The following years will be modelled: •2018 (baseline); •2021: the year that the main measures could be implemented; •202X: earliest year compliance is achieved through taking measures. This year will be established during the detailed modelling, working backwards from 2031, 10 years after implementation. Concentrations in interim years will be derived using interpolation.	Please provide update on earliest year of compliance is achieved through taking measures. Green once info provided	The following years were modelled: •2018: The base year • 2022: the earliest year that compliance is achieved through taking measures. Concentrations in interim years were derived using interpolation.		
E.1.2	Details of method for projected vehicle fleet composition.	Vehicle fleet compositions have been projected taking into consideration the evolution of the different vehicle types and ages estimated by the National Atmospheric Emissions Inventory (NAEI). The split between petrol and diesel passenger cars, light-goods vehicles (LGVs), rigid and articulated heavy-goods vehicles, buses, and motorcycles was based on ANPR data. These splits were applied directly on the traffic model outputs. In addition to this, the composition of buses in all the roads of the modelling domain was set to be 100% Euro III after a discussion with Stoke-on-Trent City Council, which confirmed that all the bus routes present in the modelled		Vehicle fleet compositions will be projected taking into consideration the evolution of the different vehicle types and ages estimated by the National Atmospheric Emissions Inventory (NAEI). The split between petrol and diesel passenger cars, light-goods vehicles (LGVs), rigid and articulated heavy-goods vehicles, buses, and motorcycles was based on ANPR data. These splits will be applied directly on the traffic model outputs. The composition of the bus fleet will reflect recent funding approvals for a bus retrofit scheme. The schedule for the implementation of this scheme will be confirmed with the operators.		Vehicle fleet compositions will be projected taking into consideration the evolution of the different vehicle types and ages estimated by the National Atmospheric Emissions Inventory (NAEI). The split between petrol and diesel passenger cars, light-goods vehicles (LGVs), rigid and articulated heavy-goods vehicles, buses, and motorcycles was based on ANPR data. These splits will be applied directly on the traffic model outputs. The composition of the bus fleet will reflect recent funding approvals for a bus retrofit scheme. The schedule for the implementation of this scheme will be confirmed with the operators.	Okay but will EFT fleet projection tool be used to model future euro standard composition	Vehicle fleet compositions were projected taking into consideration the evolution of the different vehicle types and ages estimated by the National Atmospheric Emissions Inventory (NAEI) using the EFT fleet projection tool. The 2018 split between petrol and diesel passenger cars, light-goods vehicles (LGVs), rigid and articulated heavy-goods vehicles, buses, and motorcycles was based on ANPR data. These splits were applied directly on the traffic model outputs.		
E.1.3	Impact of RDE emission factors (subsequent Euro 6 stages) included?	Included within COPERT 5.		Included within COPERT 5.		Included within COPERT 5.		Included within he EFT version 9.1b.		
E.1.4	Details of methods to calculate future fleet emissions 10 years beyond compliance to inform options appraisal (linked with C2.2).	Specific Tempro-derived growth factors were applied to the total traffic flows compared to the 2017 baseline.	How are emissions calculated from traffic data?	Emission calculations for every road are calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. To do this calculation, three types of variables intervene: annual average daily flows for every vehicle type, an age profile in terms of Euro standards for each vehicle type, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Vehicle flows will be projected for any of the considered years using Tempro-derived factors corresponding to an average day for the Staffordshire area for Urban Principal Roads. • Fleet age profiles will be projected taking into consideration the evolution described in the National Atmospheric Emission Projections (NAEI).	For clarification, this is 10 years beyond implementation (in most cases 10 years beyond compliance has been reached). Only future fleet emissions need to be calculated in this year and not concentrations.	Emission calculations for every road are calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. To do this calculation, three types of variables intervene: annual average daily flows for every vehicle type, an age profile in terms of Euro standards for each vehicle type, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Vehicle flows will be projected for any of the considered years using Tempro-derived factors corresponding to an average day for the Staffordshire area for Urban Principal Roads. • Fleet age profiles will be projected taking into consideration the evolution described in the National Atmospheric Emission Projections (NAEI).		Emission calculations for every road were calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. To do this calculation, three types of variables intervene: annual average daily flows for every vehicle type, an age profile in terms of Euro standards for each vehicle type, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Vehicle flows were projected for any of the considered years using Tempro-derived factors corresponding to an average day for the Staffordshire area for Urban Principal Roads. • Fleet age profiles were projected taking into consideration the evolution described in the National Atmospheric Emission Projections (NAEI).	Are these results detailed somewhere?	Advice was received from JAQU that modelling for future years was not be required at this stage, so results have not been included in this submission.
E.2	**With measures projections modelling**									
E.2.1	Years to be modelled.	Modelling years are: • 2018 • 2019 • 2020 • 2021 • 2022 • 2023 • 2024 • 2025 • 2026 • 2027	The base year (2017), the earliest year in which compliance is expected to be achieved through having taken measures, and all years in between (interim years) should be modelled. Concentrations in interim years can be derived using interpolation if there are no major changes in these years that would make interpolation inaccurate. At the moment, the base year is missing, and you suggest the earliest year in which you can achieve compliance through taking measures is 2027.	The years to be modelled will be determined once the shortlisted options are developed further. However, at this stage, these are anticipated to include: • 2017 (baseline) • 2020 • 2023 • 2026		The following years will be modelled with measures: •2021: the year that the main measures could be implemented; •202X: earliest year compliance is achieved through taking measures. This year will be established during the detailed modelling, working backwards from 2031, 10 years after implementation. Concentrations in interim years will be derived using interpolation.	Please confirm the following: The base year (201x), The earliest year in which compliance is expected to be achieved through having taken measures (i.e. in what year do you suggest a CAZ benchmark would achieve compliance)?, All years in between (interim years) to be modelled. Green once info provided	The following years were modelled with measures: •2018: The base year •2022: the expected compliance year for the CAZ benchmark Concentrations in interim years were derived using interpolation.		
E.2.2	Details of methods to calculate future fleet emissions 10 years beyond compliance to inform options appraisal.	Specific Tempro-derived growth factors were applied to the total traffic flows compared to the 2017 baseline.	How are emissions calculated from traffic data? Please note that only emissions need to be calculated for 10 years beyond compliance for the economic appraisal. This is separate to the compliance assessment itself.	Emission calculations for every road are calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. To do this calculation, three types of variables intervene: annual average daily flows for every vehicle type, an age profile in terms of Euro standards for each vehicle type, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Vehicle flows will be projected for any of the considered years using Tempro-derived factors corresponding to an average day for the Staffordshire area for Urban Principal Roads. • Fleet age profiles will be projected taking into consideration the evolution described in the National Atmospheric Emission Projections (NAEI).	For clarification, this is 10 years beyond implementation (in most cases 10 years beyond compliance has been reached). Only future fleet emissions need to be calculated in this year and not concentrations.	Emission calculations for every road are calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. To do this calculation, three types of variables intervene: annual average daily flows for every vehicle type, an age profile in terms of Euro standards for each vehicle type, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Vehicle flows will be projected for any of the considered years using Tempro-derived factors corresponding to an average day for the Staffordshire area for Urban Principal Roads. • Fleet age profiles will be projected taking into consideration the evolution described in the National Atmospheric Emission Projections (NAEI).		Emission calculations for every road were calculated as the sum-product of the annual average daily vehicle flows of every Euro standard class and their respective NOx emission factors. Emissions were calculated using average AM, interpeak, PM and off-peak flows and speeds for each vehicle type, an age profile in terms of Euro standards for each vehicle typie, and emission factors by vehicle type and Euro standard. While this principle applies to all emission calculations irrespective of the year, the data needs to be projected: • Traffic flows were derived from a projected traffic model, described in reports TD1 to TD4. • Fleet age profiles were projected using the EFT fleet projection tool.		