Tashkent New Gateway Hub International Airport
The Republic of Uzbekistan

Air Quality Impact Assessment

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1 INTRODUCTION

1.1 Entran Ltd has been commissioned to undertake an assessment of the likely air quality impacts arising from the development of the new airport 'Tashkent New Gateway Hub International Airport' on land to the south of Tashkent in Uzbekistan. The location of the Site is illustrated in Figure 1.1 below.

1.2 The Site is located approximately 10km to the south of the city of Tashkent, within a predominantly rural area bordering the small village of Imeni Kirova. Several rural communities are located within the surrounding area (i.e. within 2km radius) with the nearest situated immediately south of the Site boundary. Almost the entire site is currently predominantly agricultural land.

1.3 A detailed air quality dispersion modelling assessment has been undertaken to determine the impacts associated with the operation of the proposed airport.

Figure 1.1: Location of the Site

1.4 The airport will comprise the following key components:

- **Passenger Terminal Building**;
- **Air Traffic Control Tower** of approximate height 50m;
- **Support Buildings** comprising Aircraft Rescue and Firefighting Building; Central Utility Centre which includes the heating and cooling equipment; Car Park; Ground Handling and Ground Support Equipment Facilities; Fuel Storage and Filling Station; Sewage Treatment Plant; Electrical Sub-Stations; and Meteorology Centre;
- **Airside Infrastructure** consisting of:
    - two runways of 4km in length each, separated by a 1700m wide strip;
    - Taxiways – the runways are linked by one cross taxiway and each runway has one parallel taxiway and multiple entry and exit taxiways. Airside roads are present across the Site, including an airside to landside security fence and a number of gates.
    - **Aprons** – a passenger apron, governmental apron, general aviation apron and an isolated parking area.
    - **Lighting** – the airfield is equipped with approach light systems, an airfield ground lighting system and the required substations.
- **Landside Infrastructure** comprising:
    - **Passenger Landside Infrastructure** comprising the terminal access road, signage and lighting;
    - **Cargo and Maintenance, Repair and Overhaul (MRO) Landside Infrastructure** comprising a separate access road and rail connection and fuel storage and filling station;
- **Site Wide Facilities** comprising:
    - Heating and Cooling plant near the passenger terminal building;
    - Power Supply Network;
    - Fuel Farm including fuel storage and filling station;
    - Potable Water including pipeline network, storage tanks and water treatment works;
    - Wastewater collection network and Wastewater Treatment Facility;
    - Fire Water pipe network and storage tanks;
    - Waste Handing Building
    - Telecommunications and data centre

1.5 The facilities and operations on Site that lead to emissions to air comprise:

- Aircraft during landing, take-off and taxiing;
- Ground Support Vehicles and Auxiliary Power Units;
- Energy Generating Plant;
- Fuel Storage Tanks;
- Road Vehicles accessing the airport;
- Car park

1.6 Details of the likely numbers and mix of aircraft using the airport have been provided by the project team, pollutant emission information has been obtained from the International Civil Aviation Organisation (ICAO) database.

1.7 It is envisaged that the Ground Support Vehicles will predominantly comprise electric vehicles in line with the applicants green-energy principles. Therefore, emissions arising from the Ground Support Vehicles and Equipment have been scoped out of this assessment. It is envisaged that aircraft will obtain power from the airport rather than running APU's. Emissions from the APU's have therefore also been scoped out of this assessment.

1.8 The Energy Generating Plant comprises 6 diesel generators which will be operating at the Power Distribution Station; two diesel generators operating at the Central Utility Plant and one diesel generator operating at the Power Intake Building. Emissions arising from these generators has been included within the model. The generators are all stand by generators in case of a power outage; under normal operations they will be tested monthly for a maximum of one hour.

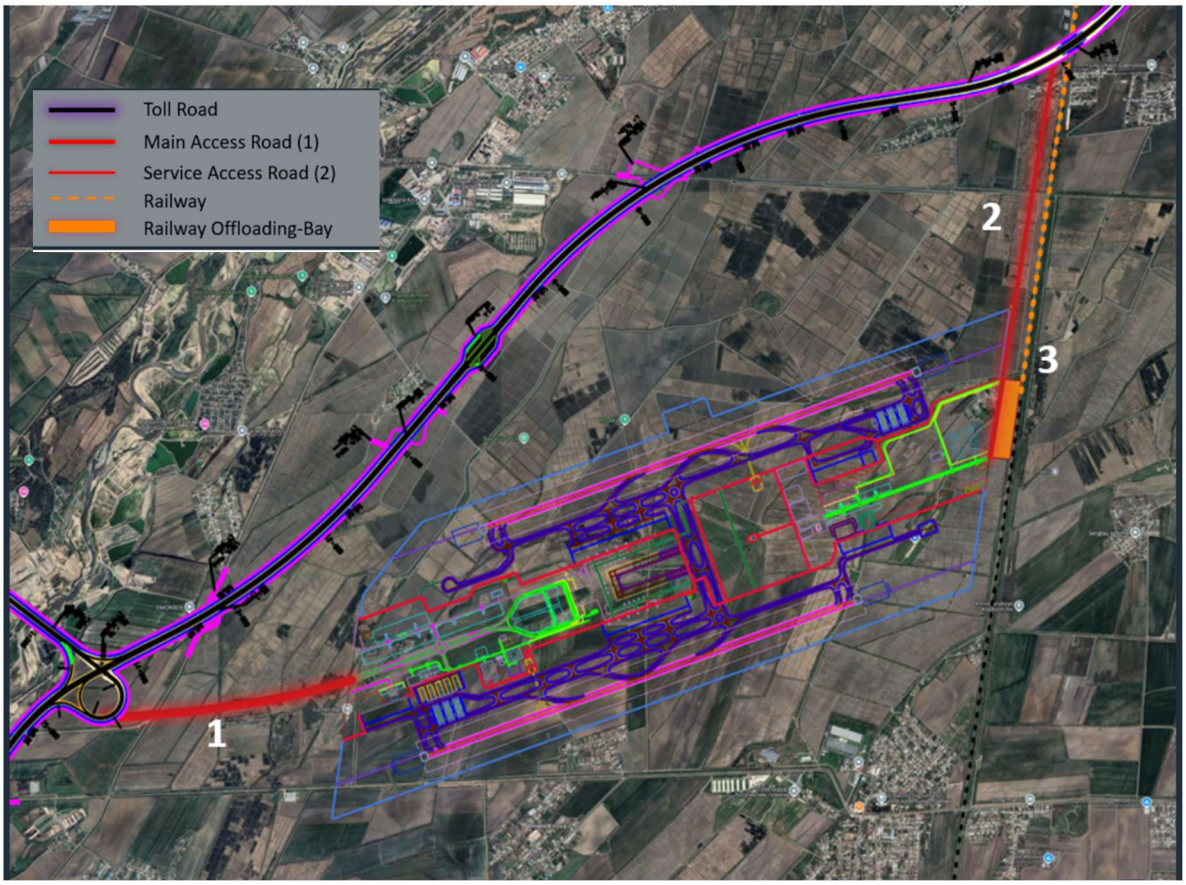
1.9 Emissions from fuel storage tanks comprise primarily Volatile Organic Compounds (VOCs) which are released from vents. The emissions are small and generally localised around the tanks, such that the evaporative emissions from the fuel storage tanks can be considered to be insignificant. Assessment of emissions from fuel storage tanks have therefore been scoped out of this assessment.

1.10 A new highway (toll road) is planned to be developed to the north and west of the airport in future that will link the airport to the existing wider road network. It is envisaged that the majority of airport traffic will access the airport via this new highway. The highway is not part of the Project. At the time of writing, information regarding the traffic flow on the new highway and the existing road network as a result of the airport was not known. With the exception of the access roads that will link the airport to the proposed highway, which are included, it has not been possible to include an assessment of emissions from roads in the wider area associated with the airport within

this assessment. It is envisaged this will be undertaken as part of the environmental impact assessment for the new highway.

1.11 The airport will be accessed via two access roads. The main access road, which will be used by all passenger road traffic, accesses the airport on the western side and links to the proposed new highway. The service road access which will be used by service vehicles and cargo traffic accesses the airport via the north east corner and travels north to join the proposed new highway approximately 2.1km to the north of the Site as indicated in following figure.

Figure 1.2: Route of Access Roads



1.12 A car parking area will be provided. It is understood this will be located near to the Passenger Terminal Building within the centre of the Site. At the time of writing, insufficient information was available to enable modelling of emissions from the carpark, however due to its central location within the Site and distance from sensitive areas, it is considered the impact of the carpark to local air quality would be insignificant. An assessment of emissions from the car park has therefore been excluded from this assessment.

1.13 The key pollutants arising from the operation of the airport are oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$) and Hydrocarbons.

1.14 A background monitoring study has been undertaken around the proposed Site to establish the current pollutant levels. The results from this monitoring are presented later in this report.

2 LEGISLATION, POLICY AND ASSESSMENT CRITERIA

National Air Quality Standards

2.1 The National Air Quality Standards relevant to this assessment are provided in Table 2.1 below. They are set out in SANPiN No. 0293-11 'Hygenic regulations List of Maximum Permissible Concentrations (MPC) of contaminants in the atmospheric air of inhabitant areas in the territory of the Republic of Uzbekistan'

Table 2.1: National Ambient Air Quality Standards

Pollutant	Ambient Air Maximum Permissible Concentration (MPC) (µg/m³)		
	One Time	24-Hour	Annual
Nitrogen dioxide (NO_2)	85	60	40
Carbon monoxide (CO)	5000	4000	3000
PM_{10}	500	300	50
$PM_{2.5}$	500	300	50

WHO Ambient Standards

2.2 The WHO ambient air quality standards are required by lenders such as the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (ERBD). The relevant WHO ambient air quality Targets and Guidelines have been used within this assessment and are provided in Table 2.2 below.

Table 2.2: WHO Ambient Air Quality Standards (µg/m³)

Pollutant	Average	Standard	Permitted Allowance
Nitrogen dioxide (NO_2)	24 Hour	120 (Interim Target 1)	3-4 days per year (99th percentile)
		50 (Interim Target 2)	
		25 (Guideline)	
	Annual	40 (Interim Target 1)	-
		30 (Interim Target 2)	-
		20 (Interim Target 3)	-
		10 (Guideline)	-
	24 Hour	7000 (Interim Target 1)	3-4 days per year

Pollutant	Average	Standard	Permitted Allowance
Carbon monoxide (CO)		4000 (Guideline)	(99th percentile)
Particulate matter (PM_{10})	24-Hour	150 (Interim Target 1)	3-4 days per year (99th percentile)
		100 (Interim Target 2)	
		75 (Interim Target 3)	
		50 (Interim Target 4)	
		45 (Guideline)	
	Annual	70 (Interim Target 1)	
		50 (Interim Target 2)	
		30 (Interim Target 3)	
		20 (Interim Target 4)	
		15 (Guideline)	
Particulate matter ($PM_{2.5}$)	24-Hour	75 (Interim Target 1)	3-4 days per year (99th percentile)
		50 (Interim Target 2)	
		37.5 (Interim Target 3)	
		25 (Interim Target 4)	
		15 (Guideline)	
	Annual	35 (Interim Target 1)	
		25 (Interim Target 2)	
		15 (Interim Target 3)	
		10 (Interim Target 4)	
		5 (Guideline)	

European Union Standards

2.3 The EU ambient air quality standards are also required by the European Bank for Reconstruction and Development (ERBD). The relevant EU air quality standards as set out within EU Directive 2008/50/EC have also been used within this assessment and are provided in Table 2.3 below.

Table 2.3: EU Ambient Air Quality Standards (µg/m³)

Pollutant	Average	Standard	Permitted Allowance
Nitrogen dioxide (NO_2)	1-Hour	200	18 hours per year (99.8th percentile)
	Annual	40	-

Pollutant	Average	Standard	Permitted Allowance
Carbon monoxide (CO)	8-Hour	10000	-
Particulate matter (PM_{10})	24-Hour	50	35 days per year (90.4th percentile)
	Annual	40	-
Particulate matter ($PM_{2.5}$)	Annual	20	-
Benzene	Annual	5	-

3 ASSESSMENT METHODOLOGY

Scope of Assessment

3.1 The assessment comprises dispersion modelling of emissions from the proposed airport facilities and the aircrafts to predict concentrations of pollutants arising from the airport at sensitive receptor locations and within a modelled grid across the study area which is an area of 10km by 10km centred on the airport.

3.2 Predicted concentrations are compared with the relevant ambient air quality standards.

Dispersion Modelling Parameters

3.3 The potential impact of emissions to air from the proposed airport on local air quality has been assessed using ADMS-Airport v5.1 a new generation dispersion model that incorporates the latest understanding of the atmospheric boundary layer.

3.4 The primary emission sources from the airport included within the model are as follows:

- Aircraft;
- Energy Generating Plant;
- Road Vehicles on the access roads;

3.5 With regards to the emissions from the aircraft, the modelling has considered emissions from the following activities: Take Off, Climb Out, Approach, Landing and Taxiing. It is assumed that the aircraft movements will be divided equally between Runway 1 and Runway 2. The direction of use of the runway (either 06 or 24 will be dependent on the wind direction. The runway direction has been selected to enable take off and landing operations into the wind.

3.6 The key pollutants arising from the airport are oxides of nitrogen (NO_x) and particulate matter. Carbon monoxide (CO), and hydrocarbons are also produced. Sulphur is present in aircraft fuel, however it is at a relatively low level, typically 600 to 800ppm. Sulphur dioxide emissions have therefore been scoped out of this assessment.

3.7 Emission factors of NOx, CO, particulate matter and total hydrocarbons arising from aircraft have been calculated from data obtained from the ICAO database.

3.8 Dispersion modelling cannot predict short-term concentrations from transportation sources as reliably as long-term concentrations. The UK Department for the Environment, Food and Rural Affairs (DEFRA) recommends the use of an empirical relationship between annual mean and short-term concentrations of NO_2. It has been determined that where the annual mean NO_2 concentrations are predicted to be below 60µg/m^3 exceedances of the 1 hour NO_2 standard are unlikely to occur. Predicting the conversion from NO_x to NO_2 within the atmosphere for short term emissions from transportation sources is also challenging. Therefore, the short-term effects of concentrations of NO_2 have been considered using this relationship instead of modelling short term emissions.

3.9 The diesel generators are provided for use only during interruptions of the normal supply from the national grid. Under normal operations, the diesel generators will only operate during routine testing for one hour per month.

3.10 For the purposes of the modelling the short term standards it is assumed that the energy generating plant is operating continuously throughout the relevant averaging period i.e. for comparison against the 24-hour standards, it is assumed that the plant will operate continuously for the full 24 hour period. The results can therefore be considered to be worst case and indicative of the abnormal conditions when there are interruptions to the national grid supply.

3.11 A summary of the emission parameters used in the dispersion modelling are presented in **Appendix A**.

3.12 For each scenario the results are presented as:

- The impact from the airport;
- The overall predicted environmental concentration (PEC) (impact + existing baseline concentration which has been determined by the baseline monitoring survey).

<u>Local Meteorological Data</u>

3.13 The modelling has been carried out using five years (2020-2024) of hourly sequential meteorological data in order to take account of inter-annual variability and reduce the effect of any atypical conditions. Data from meteorological station at the existing Tashkent International Airport, which is located approximately 26km to the north northeast of the Site, has been used for the assessment.

3.14 Wind roses for each of these years are presented in Figures 3.1 to 3.5.

Figure 3.1: Wind rose for Tashkent International Airport (2020)

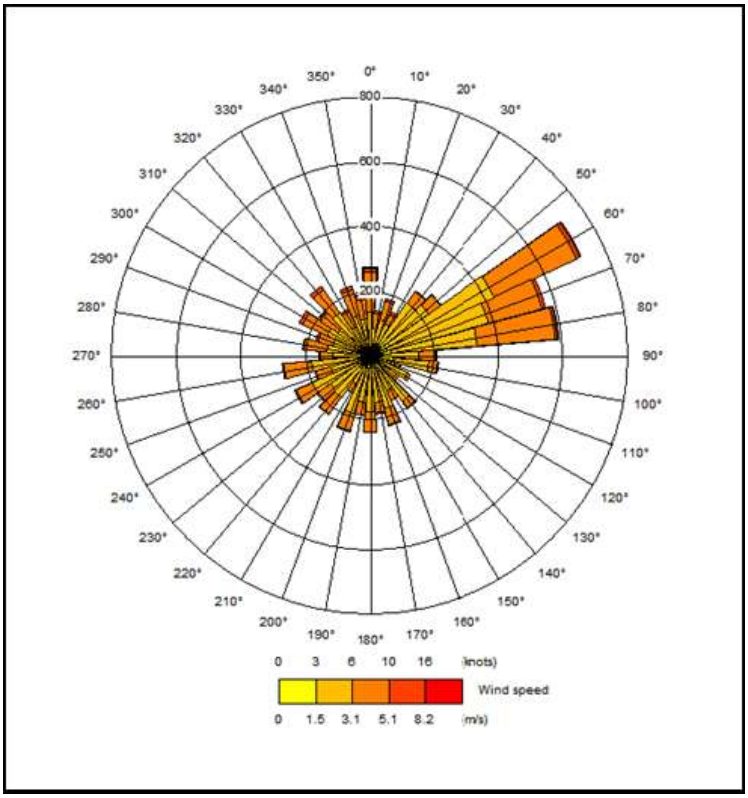


Figure 3.2: Wind rose for Tashkent International Airport (2021)

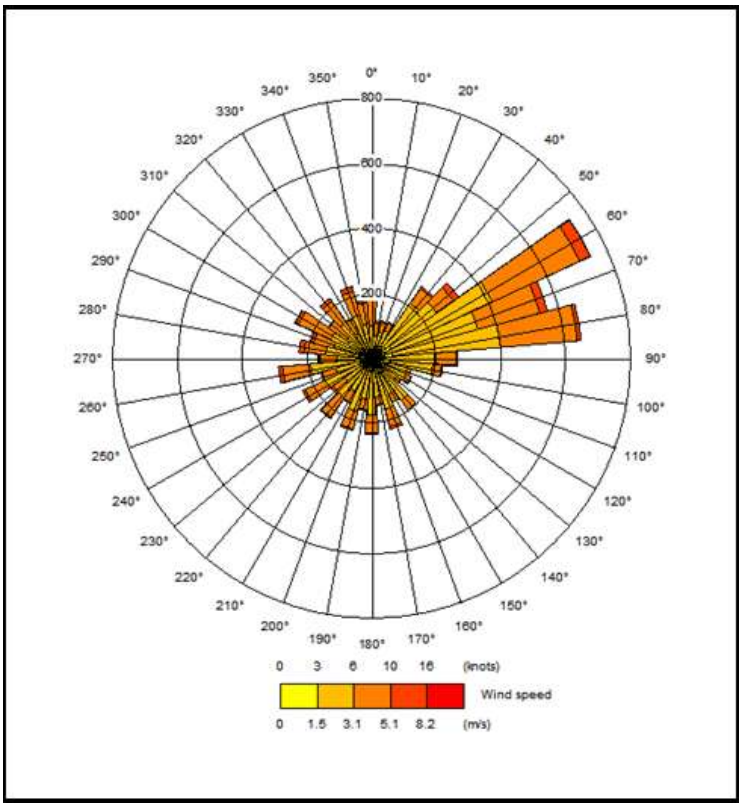


Figure 3.3: Wind rose for Tashkent International Airport (2022)

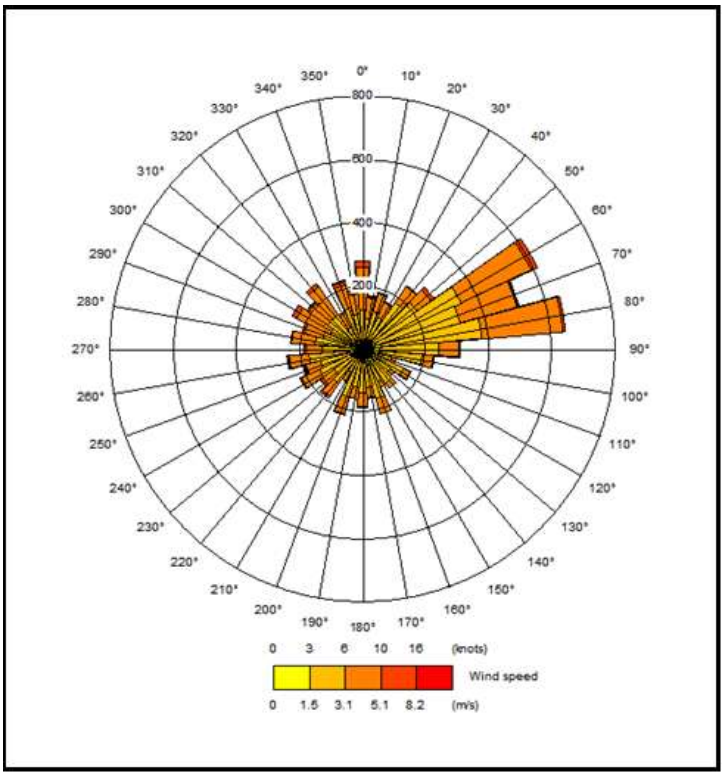


Figure 3.4: Wind rose for Tashkent International Airport (2023)

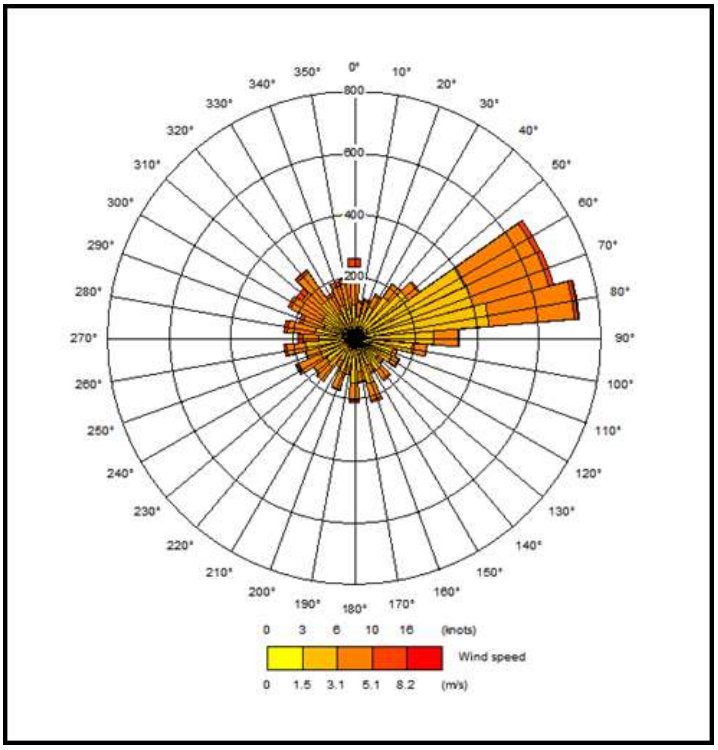
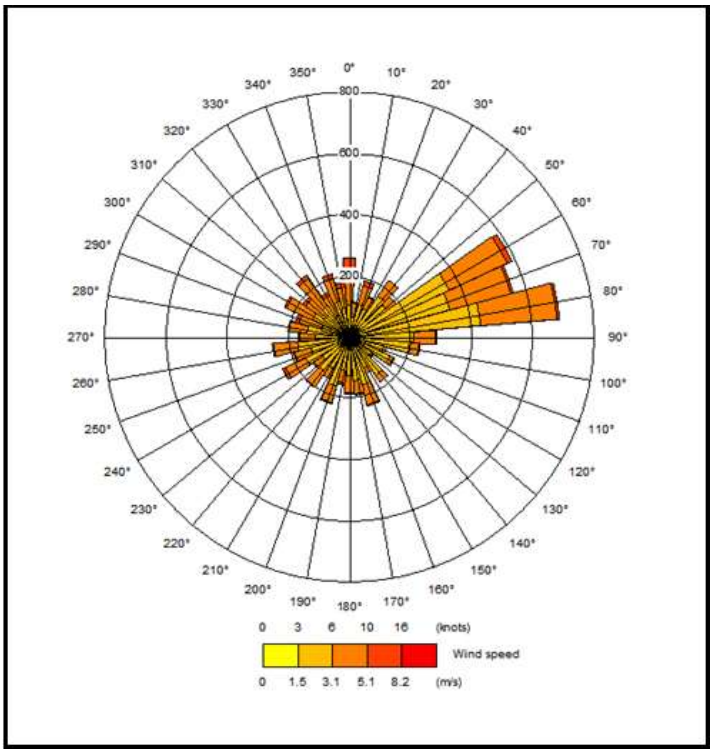


Figure 3.5: Wind rose for Tashkent International Airport (2024)



Building Downwash / Entrainment

3.15 The presence of buildings close to emission sources can significantly affect the dispersion of pollutants by leading to a phenomenon called building downwash. This occurs when a building distorts the wind flow, creating zones of increased turbulence. Increased turbulence causes the plume to come to ground earlier than otherwise would be the case and results in higher ground level concentrations closer to the source.

3.16 Downwash effects are only significant where building heights are greater than 30 to 40% of the emission release height. The downwash structures also need to be sufficiently close for their influence to be significant. The structures on site that are likely to be at a height greater than 30 to 40% of the height of the proposed diesel generator stacks are included within the model and presented in **Appendix A**.

Topography

3.17 The presence of elevated terrain can significantly affect the dispersion of pollutants by increasing turbulence and reducing the distance between the plume centre line and the ground level. The study area is relatively flat, terrain is therefore not likely to influence the dispersion of pollutants in this case. Terrain has been excluded from the model.

Nitric Oxide to NO_2 Conversion

3.18 Oxides of nitrogen (NO_x) emitted to atmosphere as a result of fuel combustion will consist of largely (around 90%) of nitric oxide (NO), a relatively innocuous substance. Once released into the atmosphere, NO is oxidised to NO_2. The proportion of NO converted to NO_2 depends on a number of factors including wind speed, distance from the source, solar irradiation and the availability of oxidants, such as ozone (O_3). At locations close to the source where highest concentrations are predicted, the rate of oxidation will be relatively small.

3.19 For transportation sources (road vehicles on the access roads and aircraft) a NO_x to NO_2 conversion has been used to determine the concentration of NO_2 at the location of the receptors. The proportion of NO_2 produced within the initial emission is known as the primary NO_2 fraction (f-NO_2). The primary NO_2 fraction varies with the level of thrust at which the engine is operating i.e. high thrust such as for aircraft during take-off means lower f-NO_2 value. The following f-NO_2 values have been used for the different aircraft activities[1]:

- Take Off: 0.045
- Climb Out: 0.053
- Approach and Landing Roll: 0.15
- Taxiing: 0.375

3.20 For road vehicles f-NO_2 values are provided within the Defra NO_x to NO_2 conversion spreadsheet.

3.21 With regards to the emissions from the diesel generators, a typical NOx:NO_2 conversion ratio of 70% for long term predictions and 35% for short term predictions have been assumed for comparison with the air quality standards for NO_2.

Sensitive Receptors

3.22 Thirty specific receptors and the have been identified in the vicinity of the Site, these are presented in Table 3.5 below and Figure 3.6.

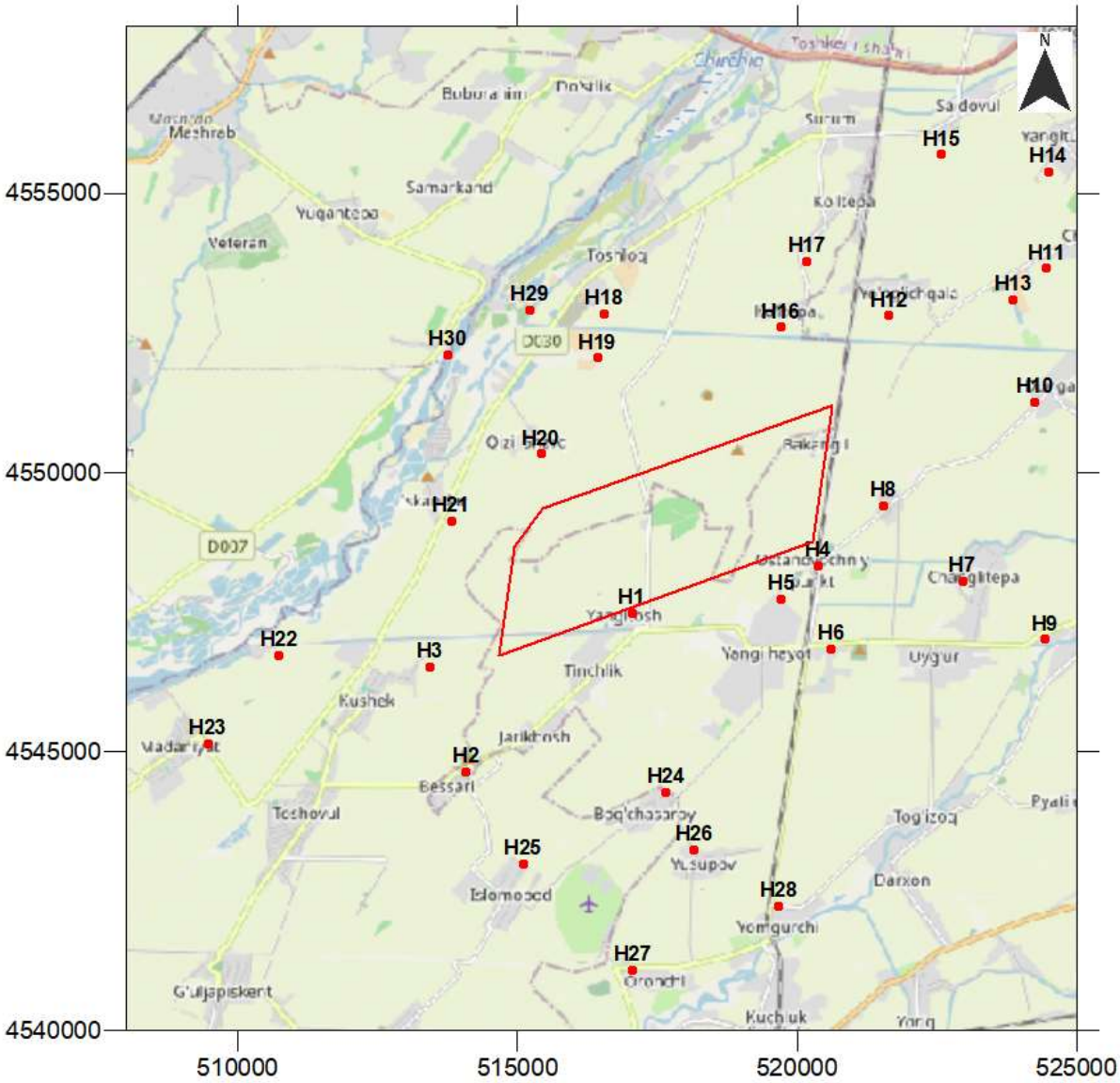
Table 3.5: Location of Sensitive Receptors

ID	Type of Receptor	Grid Reference
H1	Residential	517043.45, 4547487.20

[1] Underwood (2007), Revised Emissions Methodology for Heathrow. AEA Report for the Department for Transport.

ID	Type of Receptor	Grid Reference
H2	Residential	514078.37, 4544629.13
H3	Residential	513433.12, 4546526.54
H4	Residential	520375.34, 4548325.53
H5	Residential	519718.53, 4547726.37
H6	Residential	520612.63, 4546829.97
H7	Residential	522957.38, 4548053.75
H8	Residential	521544.77, 4549410.58
H9	Residential	524428.87, 4547009.44
H10	Residential	524254.22, 4551266.53
H11	Residential	524462.68, 4553655.90
H12	Residential	521642.05, 4552807.85
H13	Residential	523863.21, 4553098.18
H14	Residential	524493.20, 4555392.14
H15	Residential	522585.19, 4555697.06
H16	Residential	519711.95, 4552601.02
H17	Residential	520172.49, 4553779.68
H18	Residential	516546.46, 4552847.95
H19	Residential	516428.39, 4552049.28
H20	Residential	515415.12, 4550333.82
H21	Residential	513811.48, 4549128.25
H22	Residential	510734.92, 4546729.91
H23	Residential	509459.76, 4545136.36
H24	Residential	517654.15, 4544275.42
H25	Residential	515099.68, 4542980.54
H26	Residential	518158.41, 4543247.69
H27	Residential	517059.49, 4541094.88
H28	Residential	519670.26, 4542236.72
H29	Residential	515215.22, 4552904.56
H30	Residential	513753.39, 4552108.26

Figure 3.6: Sensitive Receptor Locations



3.23 Pollutant concentrations have been predicted at the receptor locations and over a grid of size 10km by 10km Cartesian grid of 100m resolution centred on the Site which is the study area for the Project.

Significance Criteria

3.24 There are no local planning policies that provide criteria for acceptable impacts from development projects in Uzbekistan.

3.25 The IFC guidance[2] states that '*emissions from a single project should not contribute more than 25% of the applicable ambient air quality standards to allow additional, future sustainable development in the same airshed'*.

3.26 In the absence of specific significance criteria, this has been used to determine the significance of the emissions from the proposed airport in the local area.

[2] International Finance Corporation, World Bank Group. Environmental, Health and Safety Guidelines General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality (Apr 2007)

4 BASELINE CONDITIONS

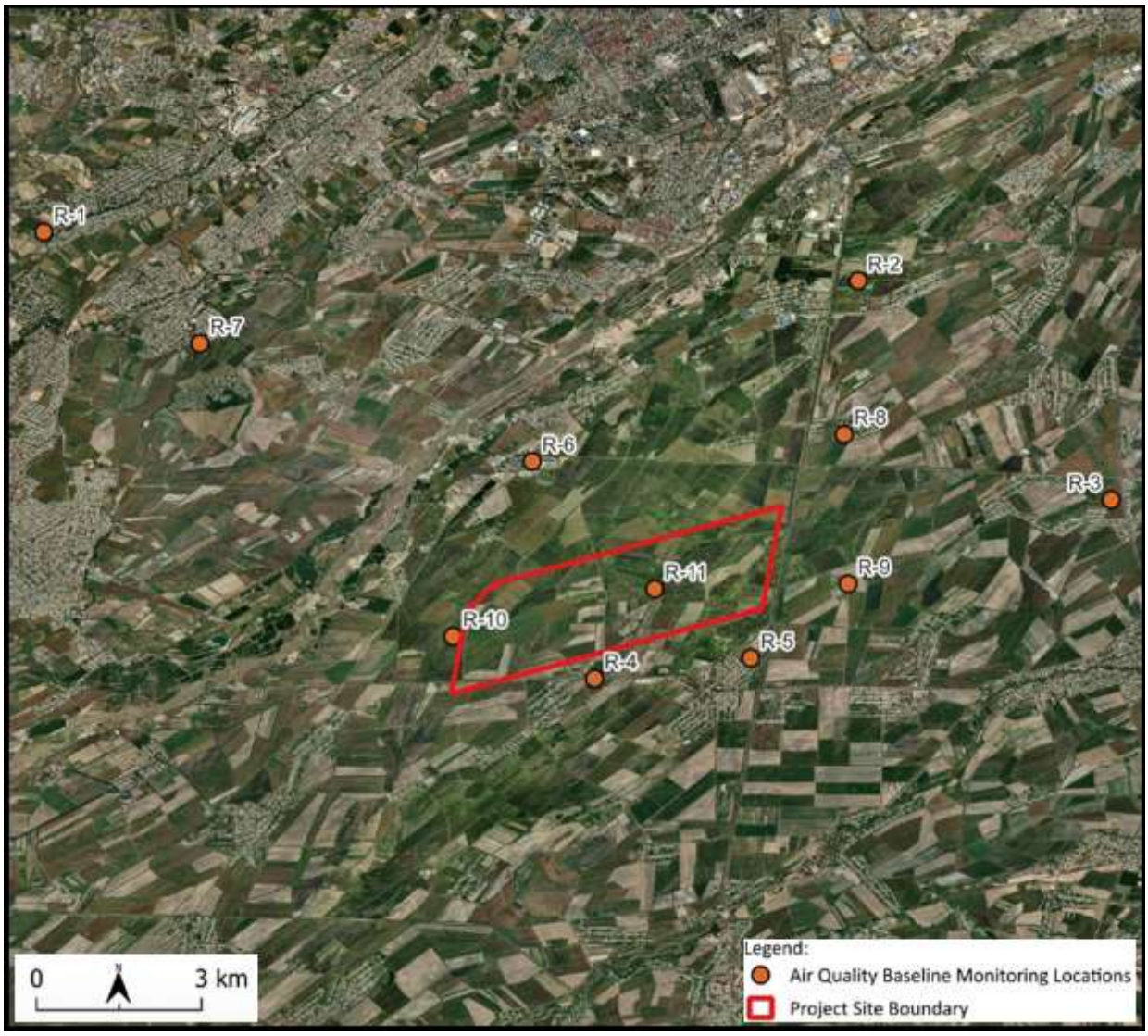
4.1 The Site is located in a primarily agricultural area. Monitoring has been undertaken to establish the existing baseline concentrations within the area.

Local Monitoring

4.2 A diffusion tube monitoring survey was undertaken within the study area to inform the assessment of the existing air quality. The pollutants monitored were NO_2, SO_2, O_3, Benzene, Toluene, Ethylbenzene, m/p-Xylene and o-Xylene. The diffusion tubes were supplied and analysed by Gradko International.

4.3 The locations where the diffusion tubes were positioned are illustrated in Figure 4.1 below. Duplicate tubes were deployed at each location.

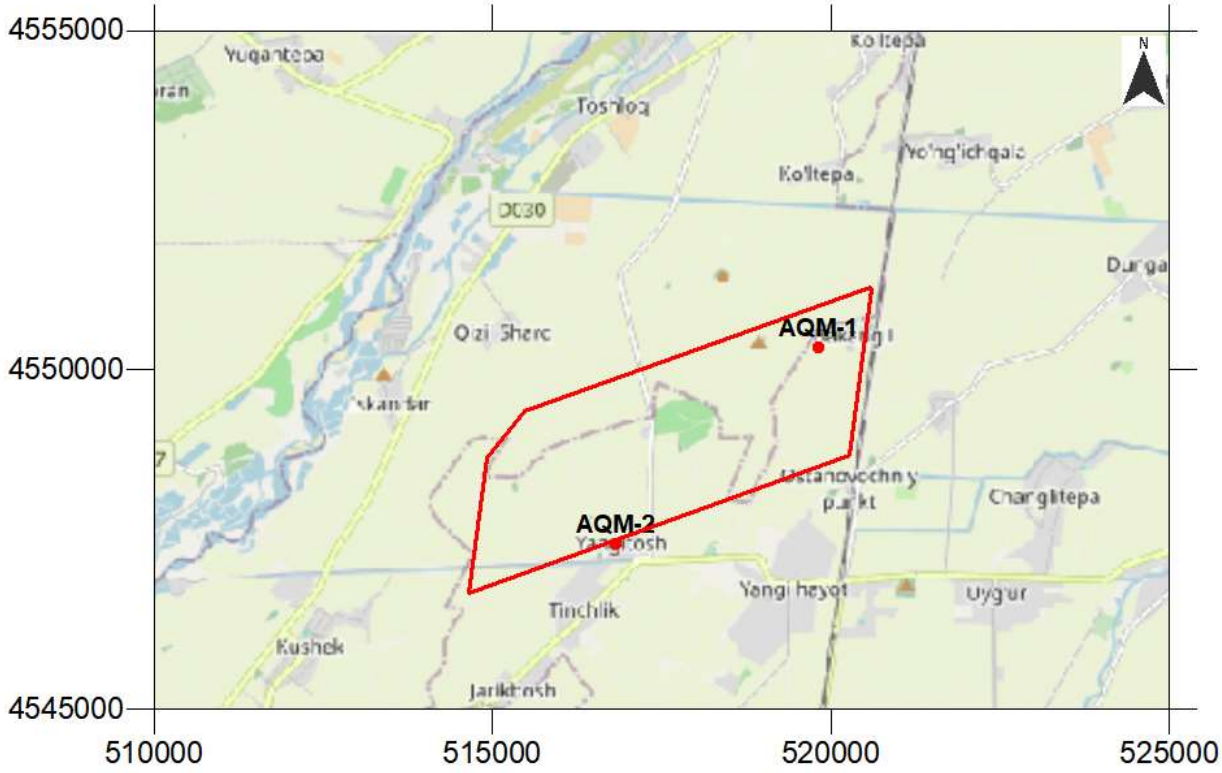
Figure 4.1: Location of diffusion tube monitoring undertaken in the vicinity of the Site.



4.4 In addition to passive sampling using diffusion tubes, continuous monitoring has also been undertaken to inform the assessment of existing air quality. Monitoring was undertaken for NO_2, O_3, CO, TVOC and particulates (including PM_{10} and $PM_{2.5}$) using a mobile air quality monitoring station.

4.5 Continuous ambient air quality measurements were taken at two locations for a period of 2 weeks at each location. One location was within the Site itself (AQM-1), measurements were taken at this location between the 13th December 2025 to 26th December 2025. The other location was on the southern boundary of the Site (AQM-2), measurements were taken at this location between 27th November 2025 and 9th December 2025. The locations where the continuous monitoring was undertaken are illustrated on Figure 4.2 below.

Figure 4.2: Location of continuous monitoring undertaken in the vicinity of the Site.



4.6 Two rounds of diffusion tube monitoring was completed. The results obtained for the relevant pollutants are provided in Tables 4.1 and 4.2 below.

Table 4.1 Results of diffusion tube monitoring of NO_2 (µg/m³)

Monitoring Location	Round One		Round Two		Average
	Period Average (µg/m³)		Period Average (µg/m³)		
	Tube A	Tube B	Tube A	Tube B	
AQ1 (roadside / urban)	50.51	51.68	42.39	45.76	47.59
AQ2 (roadside)	45.72	47.78	45.45	46.25	46.30
AQ3 (roadside)	42.3	41.38	42.68	44.60	42.74
AQ4 (location of Settlement close to the Site / rural)	34.88	26.30	32.54	34.81	32.13
AQ5 (location of Settlement close to the Site / rural)	32.26	32.55	35.61	32.19	33.15
AQ6 (roadside / urban)	43.14	43.54	37.55	38.08	40.58
AQ7 (roadside / urban)	45.21	44.28	39.56	40.75	42.45

Monitoring Location	Round One		Round Two		Average
	Period Average (µg/m³)		Period Average (µg/m³)		
	Tube A	Tube B	Tube A	Tube B	
AQ8 (location of Settlement close to the Site / rural)	31.74	33.01	37.73	38.07	35.14
AQ9 (location of Settlement close to the Site / rural)*	-	-	36.26	36.10	36.18
AQ10 (location of Settlement close to the Site / rural)	32.55	31.59	32.71	31.28	32.03
AQ11 (within the Site boundary / rural)	33.40	34.16	32.80	33.19	33.39
*Tube missing on collection					

4.7 At the background locations within the study area the measured concentrations are below the National annual mean standard and the WHO Interim Target Level 1 of 40µg/m³. Higher concentrations have been measured at roadside locations.

Table 4.2 Results of tenax tube monitoring of Benzene (µg/m³)

Monitoring Location	Round One		Round Two		Average
	Period Average (µg/m³)		Period Average (µg/m³)		
	Tube A	Tube B	Tube A	Tube B	
AQ1 (roadside / urban)	11	10	8.3	8.7	9.5
AQ2 (roadside)	7.7	8.2	5.6	5.4	6.7
AQ3 (roadside)	6.3	6.5	4.8	8.8	6.6
AQ4 (location of Settlement close to the Site / rural)	6	-	5.9	4.9	5.6
AQ5 (location of Settlement close to the Site / rural)	5.7	5.8	4.7	4.9	5.3
AQ6 (roadside / urban)	7.8	7.4	5.4	5.3	6.5
AQ7 (roadside / urban)	11	12	8.5	11.0	11.6
AQ8 (location of Settlement close to the Site / rural)*	7	6.9	-	-	7.0
AQ9 (location of Settlement close to the Site / rural)	-	6.2	5.8	5.5	5.8

AQ10 (location of Settlement close to the Site / rural)	6	6.2	5.0	4.8	5.5
AQ11 (within the Site boundary / rural)	6.6	6.5	5.2	5.0	5.8
*Tube missing on collection					

4.8 The Uzbekistan National Standards and the WHO do not have a standard for ambient benzene concentrations. The measured concentrations are in excess of the EU annual mean standard of 5µg/m^3.

4.9 The results of the continuous monitoring are presented in Table 4.3 below.

Table 4.3 Results of continuous monitoring (µg/m^3)

Pollutant	AQM-1		AQM-2		Average
	Period Average (µg/m^3)	Max (µg/m^3)	Period Average (µg/m^3)	Max (µg/m^3)	
NO_2	22.8	63.7	23.6	79.9	23.2
O_3	6.3	35.6	8.2	39.8	7.3
CO	795.5	2402.4	900.41	7692.1	842.9
SO_2	8.7	20.8	9.0	28.6	8.9
TVOC	18.1	140.2	24.7	570.0	21.1
PM_{10}	45.2	161.0	94.2	425.4	69.7
$PM_{2.5}$	36.2	133.2	66.9	218.9	51.6

4.10 As the continuous monitoring was only undertaken for two weeks at each site, the results should be considered as indicative. Monitoring over a longer period, including different seasons would be required to determine a more defined baseline.

4.11 For NO_2, the concentrations measured by the diffusion tubes differ notably from those measured by the continuous analyser. The average of the concentrations measured at the background diffusion tube locations and at the continuous monitor has been used as a baseline concentration within the modelling which is 26.7µg/m^3.

5 ASSESSMENT OF IMPACTS

Introduction

5.1 The maximum predicted pollutant concentrations as a result of emissions to air from the airport have been predicted by dispersion modelling using five years of meteorological data.

5.2 The impact of the proposals is considered as a proportion of the relevant air quality standards to determine the significance of the impact.

5.3 In order to determine the overall predicted environmental concentration (PEC) the existing baseline concentrations as summarised in Section 4 have been added to the predicted impact. The long-term (i.e. annual mean) PECs are determined by adding the indicative baseline concentrations to the long-term predicted impact.

5.4 To predict the short-term PECs, the predicted short-term impact is added to the short-term baseline concentration. Usual practice is to assume the short-term baseline concentrations to be twice that of the long-term baseline concentrations as recommended by the UK EA. Hourly, 8-hour and 24-hour concentrations are considered to be short-term concentrations. The exception to this is when calculating the 24 hour PM_{10} concentrations for comparison to the EU standard, as this is a lower percentile (90.4th percentile) it is recommended by UK guidance that the background concentration is not doubled.

5.5 Under normal operating conditions the diesel generators will be operating only during testing which is for one hour per month. During periods of disruption of the power supply from the national grid, the diesel generators will be operated. The modelling of the long term / annual mean emissions has included the emissions from the diesel generators when operating for one hour per month. The modelling of short term emissions has assumed the diesel generators are all operating continuously throughout the averaging period.

<u>Nitrogen Dioxide (NO_2)</u>

5.6 Nitrogen Dioxide will be emitted from the exhaust emissions from the aircraft, from the road traffic using the access roads and from the diesel generators.

5.7 The maximum predicted annual mean NO_2 concentrations arising from the aircraft, the road traffic on the access roads and the diesel generators (operating for one hour per month) at the nearest identified sensitive receptors are presented in Table 5.1. The results are presented as the impact

from airport and as a percentage of the relevant standards. The overall environmental concentration (PEC) is also provided (impact from the airport emissions + existing baseline).

Table 5.1: Maximum Predicted Annual Mean (Long Term) NO_2 Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard				PEC (µg/m³)
		National Standard / WHO Interim Target 1 and EU Standard	WHO Interim Target 2	WHO Interim Target 3	WHO Guideline	
Standard		40 µg/m³	30 µg/m³	20 µg/m³	10 µg/m³	
H1	16.3	40.6	54.2	81.3	162.5	43.0
H2	2.3	5.7	7.6	11.4	22.7	29.0
H3	6.9	17.1	22.8	34.3	68.5	33.6
H4	3.1	7.9	10.5	15.7	31.4	29.8
H5	3.6	9.0	11.9	17.9	35.8	30.3
H6	1.8	4.5	6.0	9.0	18.0	28.5
H7	1.1	2.8	3.7	5.5	11.0	27.8
H8	2.9	7.3	9.7	14.6	29.1	29.6
H9	0.7	1.6	2.2	3.3	6.5	27.4
H10	0.8	1.9	2.5	3.8	7.5	27.5
H11	0.6	1.6	2.1	3.2	6.3	27.3
H12	1.3	3.2	4.2	6.4	12.7	28.0
H13	0.7	1.9	2.5	3.7	7.4	27.4
H14	0.5	1.3	1.7	2.5	5.0	27.2
H15	0.6	1.4	1.9	2.9	5.7	27.3
H16	2.1	5.3	7.0	10.5	21.0	28.8
H17	1.3	3.2	4.3	6.4	12.8	28.0
H18	2.0	5.0	6.6	9.9	19.8	28.7
H19	2.8	6.9	9.2	13.8	27.5	29.5
H20	6.3	15.8	21.0	31.5	63.0	33.0
H21	6.1	15.2	20.3	30.4	60.8	32.8
H22	3.2	8.0	10.7	16.1	32.1	29.9
H23	2.4	5.9	7.9	11.9	23.7	29.1
H24	1.6	4.0	5.3	8.0	15.9	28.3

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard				PEC (µg/m³)
		National Standard / WHO Interim Target 1 and EU Standard	WHO Interim Target 2	WHO Interim Target 3	WHO Guideline	
Standard		40 µg/m³	30 µg/m³	20 µg/m³	10 µg/m³	
H25	1.1	2.8	3.7	5.6	11.2	27.8
H26	1.1	2.9	3.8	5.7	11.4	27.8
H27	0.7	1.8	2.4	3.7	7.3	27.4
H28	0.9	2.3	3.0	4.5	9.0	27.6
H29	1.8	4.5	6.0	9.0	18.0	28.5
H30	1.6	4.1	5.4	8.1	16.2	28.3

5.8 The results indicate that the National Standard, the WHO Interim Target 1 and the EU Standard for annual mean NO_2 concentrations will be exceeded at one selected receptor (receptor H1) which is located close to the southern boundary of the Site.

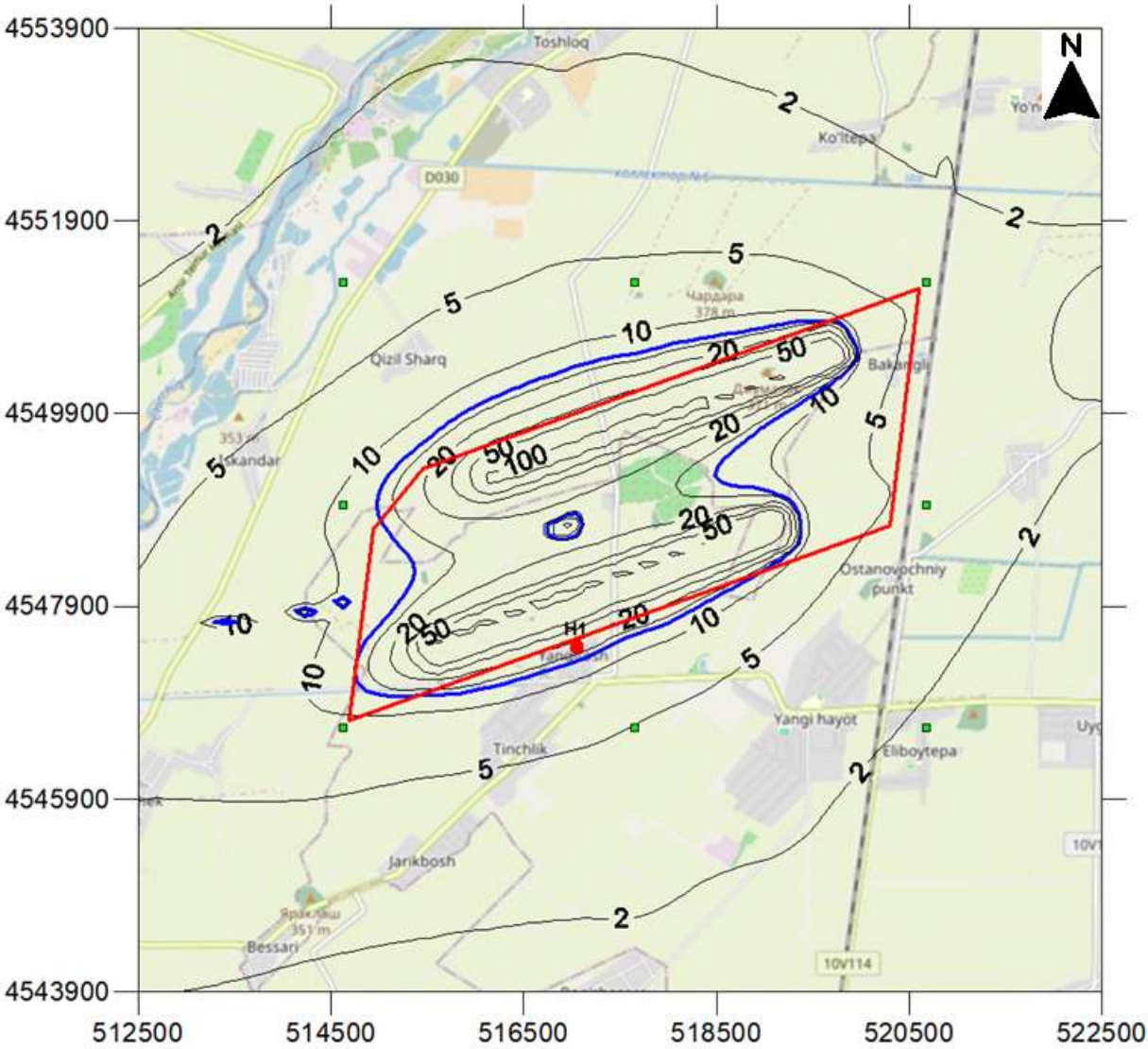
5.9 The predicted impacts are below 25% of the National Standard, the EU Standard and WHO Interim Targets 1 and 2 at all but one of the sensitive receptors (H1). It is therefore considered that the impact of the proposed airport on annual mean NO_2 concentrations is insignificant across the majority of the study area, but significant within a small area of the small village Imeni Kirova to the south of the Site. The Contour Plot illustrated in Figure 5.1 shows the area of exceedance within the blue line shown on the plan. The red line indicates the area of the proposed airport. The area of exceedance is primarily within the airport, only a small number of properties are located within this area of exceedance to the south of the airport in the vicinity of receptor H1 which is shown on the plan.

5.10 It should be noted that the background concentrations are likely to improve in future years with the increased number of electric vehicles within the vehicle fleet and with improved technology. It is therefore likely that by the opening year, the existing baseline concentrations in the vicinity of the site may have reduced.

5.11 It should also be noted that a number of worst-case assumptions have been made regarding the modelling of aircraft emissions which may lead to an overestimation of the impact in this area.

Receptor H1 is located close to the middle of the runway, the time aircraft spend during the landing and take off activities and the length of runway required for each activity has been estimated as the maximum likely. As such that the section of the runway closest to the area surrounding receptor H1 has been modelled to experience emissions from both landing and take-off activities which in reality may not be the case. The predicted concentrations over the long term (annual) period in this area may therefore be overestimations.

Figure 5.1: Contour Plot illustrating the Maximum Annual Mean NO_2 Impact arising from the Proposed Airport (µg/m³)



5.12 Dispersion modelling cannot predict short-term concentrations from transportation sources as reliably as long-term concentrations. The prediction of the conversion of NO_x to NO_2 within the atmosphere following emission from the aircraft is also challenging for short term averaging periods.

5.13 An empirical relationship between annual mean and short-term concentrations of NO_2 is recommended by the UK Department for the Environment, Food and Rural Affairs. For transportation sources, it has been determined that where the annual mean NO_2 concentrations are predicted to be below 60µg/m^3, exceedances of the 1 hour NO_2 standard are unlikely to occur.

5.14 The highest predicted annual mean concentration of NO_2 at a sensitive receptor is 43.0µg/m^3, which is significantly lower than 60µg/m^3. Whilst the empirical relationship was determined for the UK hourly standard of 200µg/m^3 as the 99.8th percentile, this is the same as the EU standard and therefore it is considered that the EU hourly mean standard is unlikely to be breached. It is not possible to accurately predict the concentrations arising from the aircraft or the access road over a 24 hour or the One-Time period for comparison with the National Standards. However, as the annual National Standard, the WHO Interim Target 1 and the EU Standard are easily achieved over the majority of the study area and the hourly mean EU Standard is achieved it is likely that there will not be any exceedances of the other short-term standards for NO_2.

5.15 Short-term concentrations arising from industrial point sources can be predicted with more certainty. Emissions will arise from the diesel generators during the monthly testing operations and when operated in the event of a power outage. Further modelling has been undertaken to determine the likely contribution arising from the diesel generators over the relevant short-term periods. The results are presented in Tables 5.2 to 5.5 below.

Table 5.2: Maximum Predicted 24 Hour Mean NO_2 Concentrations arising from the diesel generators (µg/m^3)

Receptor	Impact (µg/m^3)	Impact as % of National Standard National Standard
Standard		60 µg/m^3
H1	3.7	6.1
H2	1.0	1.7
H3	2.4	4.0
H4	1.3	2.1
H5	1.2	1.9
H6	1.0	1.6
H7	0.7	1.2
H8	1.1	1.9
H9	0.6	1.0
H10	0.6	0.9
H11	0.5	0.8

Receptor	Impact ($\mu g/m^3$)	Impact as % of National Standard National Standard
Standard		60 $\mu g/m^3$
H12	0.8	1.3
H13	0.6	0.9
H14	0.5	0.8
H15	0.6	1.1
H16	0.9	1.5
H17	0.8	1.3
H18	1.2	2.1
H19	1.4	2.3
H20	1.7	2.8
H21	1.8	3.0
H22	1.4	2.3
H23	1.0	1.7
H24	1.0	1.6
H25	0.8	1.3
H26	0.8	1.3
H27	0.7	1.2
H28	0.5	0.9
H29	1.0	1.6
H30	1.1	1.8
Presented as the 100th percentile for direct comparison with the National Standard		

Table 5.3: Maximum Predicted 24 Hour Mean NO_2 Concentrations arising from the diesel generators ($\mu g/m^3$)

Receptor	Impact ($\mu g/m^3$)	Impact as % of Relevant Standard		
		WHO Interim Target 1	WHO Interim Target 2	WHO Guideline
Standard		120 $\mu g/m^3$	50 $\mu g/m^3$	25 $\mu g/m^3$
H1	2.66	2.2	5.3	10.6
H2	0.66	0.6	1.3	2.6
H3	1.86	1.6	3.7	7.5
H4	0.79	0.7	1.6	3.1
H5	0.93	0.8	1.9	3.7
H6	0.59	0.5	1.2	2.4

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard		
		WHO Interim Target 1	WHO Interim Target 2	WHO Guideline
Standard		120 µg/m³	50 µg/m³	25 µg/m³
H7	0.48	0.4	1.0	1.9
H8	0.73	0.6	1.5	2.9
H9	0.43	0.4	0.9	1.7
H10	0.40	0.3	0.8	1.6
H11	0.38	0.3	0.8	1.5
H12	0.43	0.4	0.9	1.7
H13	0.42	0.3	0.8	1.7
H14	0.27	0.2	0.5	1.1
H15	0.33	0.3	0.7	1.3
H16	0.50	0.4	1.0	2.0
H17	0.45	0.4	0.9	1.8
H18	0.78	0.7	1.6	3.1
H19	0.91	0.8	1.8	3.6
H20	1.17	1.0	2.3	4.7
H21	1.35	1.1	2.7	5.4
H22	1.12	0.9	2.2	4.5
H23	0.88	0.7	1.8	3.5
H24	0.68	0.6	1.4	2.7
H25	0.54	0.5	1.1	2.2
H26	0.55	0.5	1.1	2.2
H27	0.55	0.5	1.1	2.2
H28	0.43	0.4	0.9	1.7
H29	0.71	0.6	1.4	2.8
H30	0.74	0.6	1.5	2.9
Presented as the 99th percentile for direct comparison with the WHO Standards and Guidelines which includes an allowance of 3-4 days exceedance per year				

5.16 The process contributions from the proposed diesel generators are small in comparison to the relevant standards; less than 25% of the National Standard, WHO Interim Targets 1 and 2 and the WHO Guideline at all of the receptor locations. For the purposes of the modelling it has been assumed that all of the diesel generators will the operating over the entire averaging period (24 hours). The results in the table above are predicted using five years of recent meteorological data and therefore represent the highest predicted concentrations over a five year period. The diesel

generators will only be operated for a period greater than one hour in the event of a power outage, it is unlikely that all the generators will operate simultaneously and unlikely that they would be required for a continuous 24 hour period. It is also unlikely that this will coincide with worst case meteorological conditions. As such the concentrations provided in the tables above should be considered to be a worst case and unlikely scenario. It is considered that the impact of the proposed diesel generators on 24 hour mean NO_2 concentrations is insignificant.

Table 5.4: Maximum Predicted 1 Hour NO_2 Concentrations arising from the diesel generators ($\mu g/m^3$)

Receptor	Impact ($\mu g/m^3$)	Impact as % of EU Standard
Standard		200 $\mu g/m^3$
H1	10.5	5.3
H2	4.0	2.0
H3	5.7	2.9
H4	4.5	2.3
H5	5.0	2.5
H6	4.5	2.2
H7	3.5	1.8
H8	4.3	2.2
H9	3.4	1.7
H10	3.0	1.5
H11	3.0	1.5
H12	3.8	1.9
H13	3.2	1.6
H14	2.5	1.3
H15	2.6	1.3
H16	3.8	1.9
H17	3.4	1.7
H18	3.8	1.9
H19	4.2	2.1
H20	7.1	3.6
H21	7.2	3.6
H22	4.6	2.3
H23	3.8	1.9
H24	4.0	2.0
H25	3.6	1.8

Receptor	Impact ($\mu g/m^3$)	Impact as % of EU Standard
Standard		200 $\mu g/m^3$
H26	3.7	1.8
H27	3.2	1.6
H28	3.4	1.7
H29	3.9	1.9
H30	4.1	2.1
Predicted as the 99.8th percentile for direct comparison to the EU Standard		

5.17 The process contributions from the proposed diesel generators are small in comparison to the relevant EU standard; less than 25% at all locations. For the purposes of modelling it has been assumed that all of the diesel generators will the operating simultaneously. The results in the table are predicted using five years of recent meteorological data and therefore are the highest concentrations predicted over a five year period. The diesel generators will only be operated for a period of one hour for once a month during testing and in the event of a power outage. It is unlikely that all the generators will operate simultaneously and it is also unlikely that this will coincide with worst case meteorological conditions. As such the concentrations provided in the tables above should be considered to be a worst case and unlikely scenario. It is considered that the impact of the proposed diesel generators on hourly mean NO_2 concentrations is insignificant.

Table 5.5: Maximum Predicted 15 min NO_2 Concentrations arising from the diesel generators for comparison with National One Time Standard ($\mu g/m^3$)

Receptor	PC ($\mu g/m^3$)	PC as % of National Standard
Standard		85 $\mu g/m^3$
H1	31.3	36.8
H2	8.7	10.2
H3	13.3	15.7
H4	9.3	10.9
H5	12.6	14.8
H6	10.9	12.9
H7	6.6	7.7
H8	8.4	9.9
H9	5.3	6.2
H10	5.3	6.2

Receptor	PC ($\mu g/m^3$)	PC as % of National Standard
Standard		85 $\mu g/m^3$
H11	4.8	5.7
H12	7.4	8.8
H13	5.3	6.2
H14	4.6	5.5
H15	4.8	5.6
H16	8.3	9.7
H17	7.1	8.3
H18	9.2	10.9
H19	11.3	13.3
H20	17.9	21.0
H21	18.6	21.9
H22	7.0	8.3
H23	6.3	7.4
H24	10.4	12.2
H25	9.2	10.8
H26	8.1	9.6
H27	7.2	8.4
H28	6.1	7.2
H29	10.0	11.8
H30	10.3	12.1
Predicted as the 100th percentile for direct comparison to the National Standard		

5.18 The impacts from the proposed diesel generators are small in comparison to the National One-Time Standard and less than 25% at all but one location. For the purposes of modelling it has been assumed that all of the diesel generators will the operating simultaneously. The results in the table are predicted using five years of recent meteorological data and therefore represent the highest concentration predicted over a five year period. The diesel generators will only be operated for a period of one hour for once a month during testing and in the event of a power outage. It is unlikely that all the generators will operate simultaneously and it is also unlikely that this will coincide with worst case meteorological conditions. As such the concentrations provided in the table above should be considered to be a worst case and unlikely scenario. It is considered that the impact of the proposed diesel generators on One Time NO_2 concentrations is insignificant.

Particulate Matter (PM_{10})

5.19 The maximum predicted annual, 24 hour and 15 minute PM_{10} concentrations arising from the proposed airport at the nearest identified sensitive receptor locations are presented in Tables 5.6 to 5.10. The results are presented as the impact of the emissions from the proposed airport and as a percentage of the relevant standards. The overall predicted environmental concentration (PEC) is provided (impact + existing baseline).

Table 5.6: Maximum Predicted Annual Mean PM_{10} Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard						PEC (µg/m³)
		WHO Interim Target 1	WHO Interim Target 2 and National Standard	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	EU Standard	
Standard		70 µg/m³	50 µg/m³	30 µg/m³	20 µg/m³	15 µg/m³	40 µg/m³	
H1	0.33	0.5	0.7	1.1	1.7	2.2	0.8	45.5
H2	0.05	0.1	0.1	0.2	0.3	0.3	0.1	45.3
H3	0.17	0.2	0.3	0.6	0.9	1.2	0.4	45.4
H4	0.07	0.1	0.1	0.2	0.4	0.5	0.2	45.3
H5	0.08	0.1	0.2	0.3	0.4	0.5	0.2	45.3
H6	0.04	0.1	0.1	0.1	0.2	0.3	0.1	45.2
H7	0.03	0.0	0.1	0.1	0.1	0.2	0.1	45.2
H8	0.07	0.1	0.1	0.2	0.4	0.5	0.2	45.3
H9	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H10	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H11	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H12	0.03	0.0	0.1	0.1	0.2	0.2	0.1	45.2
H13	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H14	0.01	0.0	0.0	0.0	0.1	0.1	0.0	45.2
H15	0.01	0.0	0.0	0.0	0.1	0.1	0.0	45.2
H16	0.05	0.1	0.1	0.2	0.3	0.4	0.1	45.3

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard						PEC (µg/m³)
		WHO Interim Target 1	WHO Interim Target 2 and National Standard	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	EU Standard	
Standard		70 µg/m³	50 µg/m³	30 µg/m³	20 µg/m³	15 µg/m³	40 µg/m³	
H17	0.03	0.0	0.1	0.1	0.2	0.2	0.1	45.2
H18	0.04	0.1	0.1	0.1	0.2	0.3	0.1	45.2
H19	0.06	0.1	0.1	0.2	0.3	0.4	0.2	45.3
H20	0.13	0.2	0.3	0.4	0.7	0.9	0.3	45.3
H21	0.14	0.2	0.3	0.5	0.7	1.0	0.4	45.3
H22	0.08	0.1	0.2	0.3	0.4	0.6	0.2	45.3
H23	0.06	0.1	0.1	0.2	0.3	0.4	0.1	45.3
H24	0.03	0.0	0.1	0.1	0.2	0.2	0.1	45.2
H25	0.03	0.0	0.1	0.1	0.1	0.2	0.1	45.2
H26	0.02	0.0	0.0	0.1	0.1	0.2	0.1	45.2
H27	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H28	0.02	0.0	0.0	0.1	0.1	0.1	0.0	45.2
H29	0.04	0.1	0.1	0.1	0.2	0.3	0.1	45.2
H30	0.04	0.1	0.1	0.1	0.2	0.3	0.1	45.2

5.20 The results indicate that there will not be any exceedances of the National Standard or the WHO Interim Target 1 or 2 at any of the sensitive receptors with the airport operational. Exceedances of the EU Standard, the WHO Interim Targets 3 and 4 and the WHO Guideline are predicted, however this is due to the high existing concentration measured in the vicinity of the Site. Recorded concentrations of PM_{10} are in excess of these standards, this is likely to be due to the agricultural nature of the Project site.

5.21 The predicted annual mean PM_{10} concentrations are below 25% of all of the relevant standards at all of the sensitive receptors. It is therefore considered that the impact of the proposed airport on annual mean PM_{10} concentrations is insignificant.

Figure 5.2: Contour Plot illustrating the Maximum Annual Mean PM_{10} Impact arising from the Proposed Airport (µg/m³)

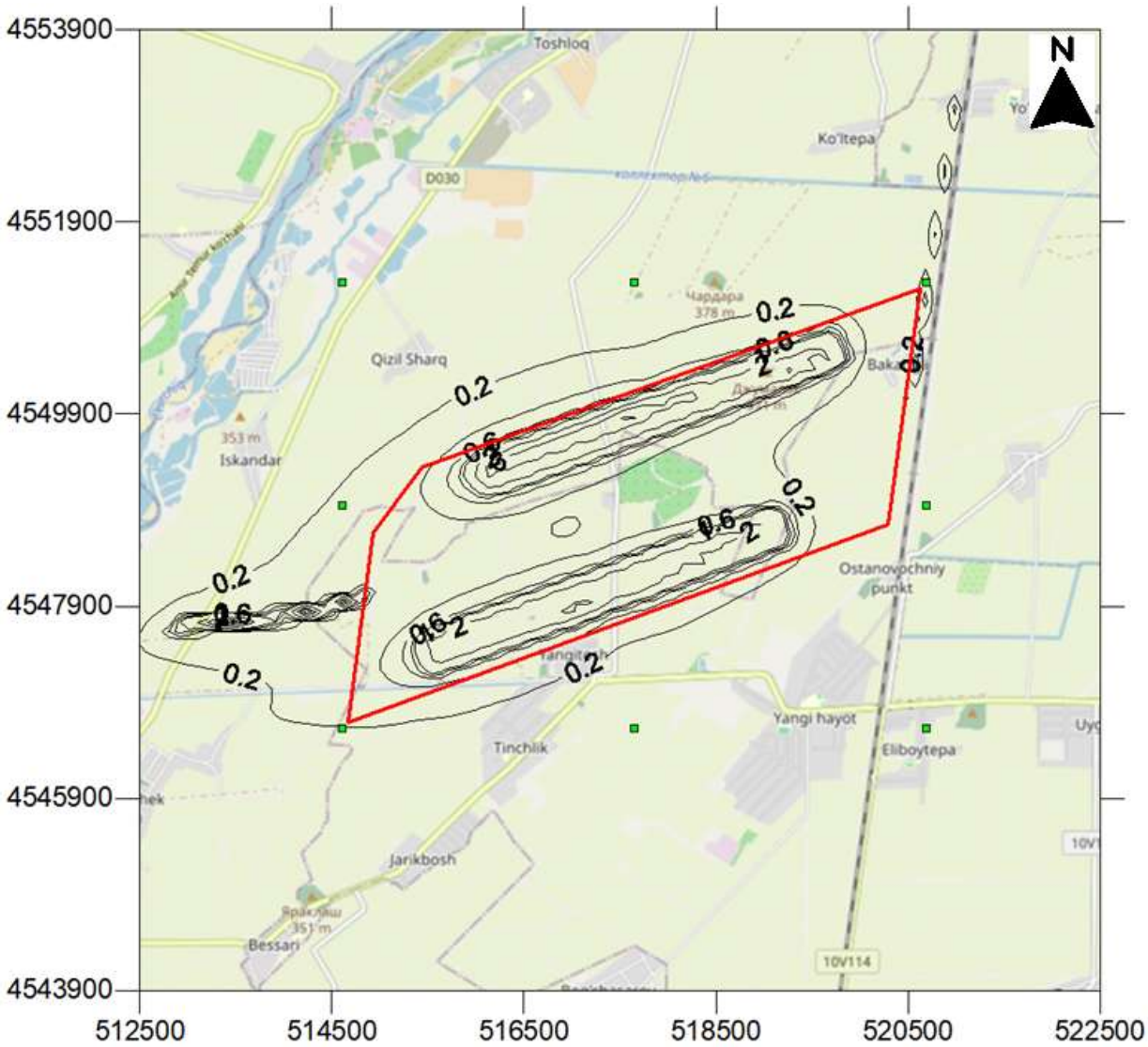


Table 5.7: Maximum Predicted 24 Hour Mean PM_{10} Concentrations (as 100th percentile) (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		300 µg/m³	
H1	1.57	0.5	92.0
H2	0.34	0.1	90.7
H3	0.71	0.2	91.1
H4	0.57	0.2	91.0
H5	0.47	0.2	90.9
H6	0.26	0.1	90.7
H7	0.25	0.1	90.7

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		300 µg/m³	
H8	0.43	0.1	90.8
H9	0.15	0.0	90.5
H10	0.22	0.1	90.6
H11	0.18	0.1	90.6
H12	0.29	0.1	90.7
H13	0.21	0.1	90.6
H14	0.15	0.1	90.6
H15	0.21	0.1	90.6
H16	0.50	0.2	90.9
H17	0.34	0.1	90.7
H18	0.30	0.1	90.7
H19	0.36	0.1	90.8
H20	0.66	0.2	91.1
H21	0.51	0.2	90.9
H22	0.39	0.1	90.8
H23	0.33	0.1	90.7
H24	0.32	0.1	90.7
H25	0.23	0.1	90.6
H26	0.25	0.1	90.6
H27	0.19	0.1	90.6
H28	0.18	0.1	90.6
H29	0.31	0.1	90.7
H30	0.26	0.1	90.7
Presented as the 100th percentile for direct comparison with the National Standard			

Table 5.8: Maximum Predicted 24 Hour Mean PM_{10} Concentrations (as 99th percentile) (µg/m³)

Receptor	Impact (µg/m³)	PC as % of Relevant Standard					
		WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	PEC (µg/m³)
Standard		150 µg/m³	100 µg/m³	75 µg/m³	50 µg/m³	45 µg/m³	
H1	1.15	0.8	1.1	1.5	2.3	2.5	91.5
H2	0.26	0.2	0.3	0.3	0.5	0.6	90.7
H3	0.61	0.4	0.6	0.8	1.2	1.3	91.0
H4	0.42	0.3	0.4	0.6	0.8	0.9	90.8
H5	0.40	0.3	0.4	0.5	0.8	0.9	90.8
H6	0.22	0.1	0.2	0.3	0.4	0.5	90.6
H7	0.17	0.1	0.2	0.2	0.3	0.4	90.6
H8	0.29	0.2	0.3	0.4	0.6	0.7	90.7
H9	0.12	0.1	0.1	0.2	0.2	0.3	90.5
H10	0.15	0.1	0.1	0.2	0.3	0.3	90.5
H11	0.13	0.1	0.1	0.2	0.3	0.3	90.5
H12	0.21	0.1	0.2	0.3	0.4	0.5	90.6
H13	0.14	0.1	0.1	0.2	0.3	0.3	90.5
H14	0.09	0.1	0.1	0.1	0.2	0.2	90.5
H15	0.11	0.1	0.1	0.2	0.2	0.3	90.5
H16	0.31	0.2	0.3	0.4	0.6	0.7	90.7
H17	0.19	0.1	0.2	0.3	0.4	0.4	90.6
H18	0.26	0.2	0.3	0.3	0.5	0.6	90.7
H19	0.34	0.2	0.3	0.4	0.7	0.7	90.7
H20	0.52	0.3	0.5	0.7	1.0	1.2	90.9
H21	0.45	0.3	0.4	0.6	0.9	1.0	90.8
H22	0.32	0.2	0.3	0.4	0.6	0.7	90.7
H23	0.26	0.2	0.3	0.3	0.5	0.6	90.7
H24	0.24	0.2	0.2	0.3	0.5	0.5	90.6
H25	0.14	0.1	0.1	0.2	0.3	0.3	90.5
H26	0.19	0.1	0.2	0.3	0.4	0.4	90.6

Receptor	Impact (µg/m³)	PC as % of Relevant Standard					
		WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	PEC (µg/m³)
Standard		150 µg/m³	100 µg/m³	75 µg/m³	50 µg/m³	45 µg/m³	
H27	0.14	0.1	0.1	0.2	0.3	0.3	90.5
H28	0.12	0.1	0.1	0.2	0.2	0.3	90.5
H29	0.22	0.1	0.2	0.3	0.4	0.5	90.6
H30	0.22	0.1	0.2	0.3	0.4	0.5	90.6
Presented as the 99th percentile for direct comparison with the WHO Standards and Guidelines which includes an allowance of 3-4 days exceedance per year							

Table 5.9: Maximum Predicted 24 Hour Mean PM_{10} Concentrations (as 90.4th percentile) (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of EU Standard	PEC (µg/m³)
Standard		50 µg/m³	
H1	0.77	1.5	46.0
H2	0.15	0.3	45.3
H3	0.39	0.8	45.6
H4	0.17	0.3	45.4
H5	0.18	0.4	45.4
H6	0.11	0.2	45.3
H7	0.07	0.1	45.3
H8	0.15	0.3	45.3
H9	0.05	0.1	45.3
H10	0.06	0.1	45.3
H11	0.05	0.1	45.3
H12	0.10	0.2	45.3
H13	0.06	0.1	45.3
H14	0.04	0.1	45.2
H15	0.04	0.1	45.2
H16	0.13	0.3	45.3
H17	0.08	0.2	45.3
H18	0.13	0.3	45.3

Receptor	Impact ($\mu g/m^3$)	Impact as % of EU Standard	PEC ($\mu g/m^3$)
Standard		50 $\mu g/m^3$	
H19	0.17	0.3	45.4
H20	0.30	0.6	45.5
H21	0.27	0.5	45.5
H22	0.22	0.4	45.4
H23	0.16	0.3	45.4
H24	0.10	0.2	45.3
H25	0.08	0.2	45.3
H26	0.08	0.2	45.3
H27	0.06	0.1	45.3
H28	0.06	0.1	45.3
H29	0.12	0.2	45.3
H30	0.11	0.2	45.3
Presented as the 90.4th percentile for direct comparison with the EU Standard which includes an allowance of 35 days exceedance per year In accordance with the UK guidance the background for 24 hour PM_{10} is not doubled when calculating 24 hour PM_{10} for comparison with the standard as a 90.4th percentile			

5.22 The results indicate that there will be no exceedances of the National Standard, the WHO Interim Targets 1 and 2 or the EU Standard at any of the identified sensitive receptors.

5.23 The existing PM_{10} concentrations are large in comparison to the predicted impact from the airport and are in excess of the WHO Interim Targets 3 and 4 and in excess of the WHO Guideline. However, as identified earlier, the measured background concentrations should be considered as indicative due to the relatively short duration of monitoring undertaken.

5.24 The diesel generators will only be operated for a period greater than one hour in the event of a power outage. For the purposes of the modelling, it has been assumed that the diesel generators will be operating simultaneously throughout the relevant averaging period (24 hours). The modelling has been undertaken using five years of recent meteorological data, the results presented in the tables above represent the concentrations likely during the worst case meteorological conditions experienced over a five year period.

5.25 It is unlikely that all the generators will operate simultaneously and unlikely that they would be required for a continuous 24 hour period. It is also unlikely that this would coincide with worst case meteorological conditions. As such the concentrations provided in the tables above should be considered to be a worst case and unlikely scenario.

5.26 The impacts from the airport are small in comparison to the relevant standards and less than 25% of the standards at all receptor locations. It is considered that the impact of the proposed airport on 24 hour mean PM_{10} concentrations is insignificant.

Table 5.10: Maximum Predicted 15 Minute Mean PM_{10} Concentrations for comparison to One Time National Standard (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		500 µg/m³	
H1	6.10	1.2	96.5
H2	2.43	0.5	92.8
H3	2.66	0.5	93.1
H4	2.50	0.5	92.9
H5	2.00	0.4	92.4
H6	1.56	0.3	92.0
H7	1.41	0.3	91.8
H8	1.93	0.4	92.3
H9	1.25	0.2	91.6
H10	1.37	0.3	91.8
H11	1.51	0.3	91.9
H12	1.81	0.4	92.2
H13	1.69	0.3	92.1
H14	1.16	0.2	91.6
H15	1.33	0.3	91.7
H16	2.79	0.6	93.2
H17	2.55	0.5	93.0
H18	1.85	0.4	92.2
H19	2.12	0.4	92.5
H20	2.84	0.6	93.2
H21	2.06	0.4	92.5
H22	1.71	0.3	92.1
H23	1.66	0.3	92.1
H24	1.67	0.3	92.1
H25	1.78	0.4	92.2
H26	1.63	0.3	92.0
H27	1.38	0.3	91.8
H28	1.59	0.3	92.0

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		500 µg/m³	
H29	2.10	0.4	92.5
H30	1.73	0.3	92.1
Presented as the 100th percentile for direct comparison with the National Standard			

5.27 The results indicate that there will be no exceedances of the National Standard at any of the identified sensitive receptors.

5.28 The impacts from the airport are small in comparison to the relevant standard, they are less than 25% of the standard at all receptor locations. It is considered that the impact of the proposed airport on One Time PM_{10} concentrations is insignificant.

Particulate Matter ($PM_{2.5}$)

5.29 The maximum predicted annual mean, 24 hour mean and 15 minute mean $PM_{2.5}$ concentrations arising from the proposed airport at the nearest identified sensitive receptor locations and at the location of the maximum concentrations predicted within the modelled grid are presented in Tables 5.11 to 5:14. The results are presented as the impact from emissions from the airport and as a percentage of the relevant standards. The overall predicted environmental concentrations (PEC) are provided (impact of the proposed airport + existing baseline).

Table 5.11: Maximum Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard							PEC (µg/m³)
		National Standard	WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	EU Standard	
Standard		50 µg/m³	35 µg/m³	25 µg/m³	15 µg/m³	10 µg/m³	5 µg/m³	20 µg/m³	
H1	0.33	0.7	0.9	1.3	2.2	3.3	6.6	1.7	36.5
H2	0.05	0.1	0.1	0.2	0.3	0.5	1.0	0.3	36.3
H3	0.17	0.3	0.5	0.7	1.2	1.7	3.5	0.9	36.4
H4	0.07	0.1	0.2	0.3	0.5	0.7	1.5	0.4	36.3
H5	0.08	0.2	0.2	0.3	0.5	0.8	1.6	0.4	36.3
H6	0.04	0.1	0.1	0.2	0.3	0.4	0.8	0.2	36.2

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard							PEC (µg/m³)
		National Standard	WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	EU Standard	
Standard		50 µg/m³	35 µg/m³	25 µg/m³	15 µg/m³	10 µg/m³	5 µg/m³	20 µg/m³	
H7	0.03	0.1	0.1	0.1	0.2	0.3	0.5	0.1	36.2
H8	0.07	0.1	0.2	0.3	0.5	0.7	1.4	0.4	36.3
H9	0.02	0.0	0.0	0.1	0.1	0.2	0.3	0.1	36.2
H10	0.02	0.0	0.1	0.1	0.1	0.2	0.4	0.1	36.2
H11	0.02	0.0	0.0	0.1	0.1	0.2	0.3	0.1	36.2
H12	0.03	0.1	0.1	0.1	0.2	0.3	0.7	0.2	36.2
H13	0.02	0.0	0.1	0.1	0.1	0.2	0.4	0.1	36.2
H14	0.01	0.0	0.0	0.0	0.1	0.1	0.2	0.1	36.2
H15	0.01	0.0	0.0	0.1	0.1	0.1	0.3	0.1	36.2
H16	0.05	0.1	0.2	0.2	0.4	0.5	1.1	0.3	36.3
H17	0.03	0.1	0.1	0.1	0.2	0.3	0.6	0.2	36.2
H18	0.04	0.1	0.1	0.2	0.3	0.4	0.9	0.2	36.2
H19	0.06	0.1	0.2	0.2	0.4	0.6	1.2	0.3	36.3
H20	0.13	0.3	0.4	0.5	0.9	1.3	2.6	0.7	36.3
H21	0.14	0.3	0.4	0.6	1.0	1.4	2.9	0.7	36.3
H22	0.08	0.2	0.2	0.3	0.6	0.8	1.7	0.4	36.3
H23	0.06	0.1	0.2	0.2	0.4	0.6	1.1	0.3	36.3
H24	0.03	0.1	0.1	0.1	0.2	0.3	0.7	0.2	36.2
H25	0.03	0.1	0.1	0.1	0.2	0.3	0.5	0.1	36.2
H26	0.02	0.0	0.1	0.1	0.2	0.2	0.5	0.1	36.2
H27	0.02	0.0	0.0	0.1	0.1	0.2	0.3	0.1	36.2
H28	0.02	0.0	0.1	0.1	0.1	0.2	0.4	0.1	36.2
H29	0.04	0.1	0.1	0.2	0.3	0.4	0.8	0.2	36.2
H30	0.04	0.1	0.1	0.2	0.3	0.4	0.8	0.2	36.2

5.30 The results of the modelling predict there will be no exceedances of the National Standard for annual mean $PM_{2.5}$ concentrations. Exceedances of the WHO Interim Targets and Guidelines and the EU Standard for annual mean $PM_{2.5}$ concentrations are predicted, however this is due to the high existing concentration of $PM_{2.5}$ measured in the vicinity of the Site. The existing concentration

is high in comparison to the contribution from the airport and is in excess of the relevant WHO Interim Targets and Guidelines and the EU Standards.

5.31 The process contributions are less than 25% of all of the relevant standards at all of the selected receptor locations. It is considered that the impact of the operation of the airport on annual mean $PM_{2.5}$ concentrations is insignificant.

Figure 5.3: Contour Plot illustrating the Maximum Annual Mean $PM_{2.5}$ Impact arising from the Proposed Airport (µg/m³)

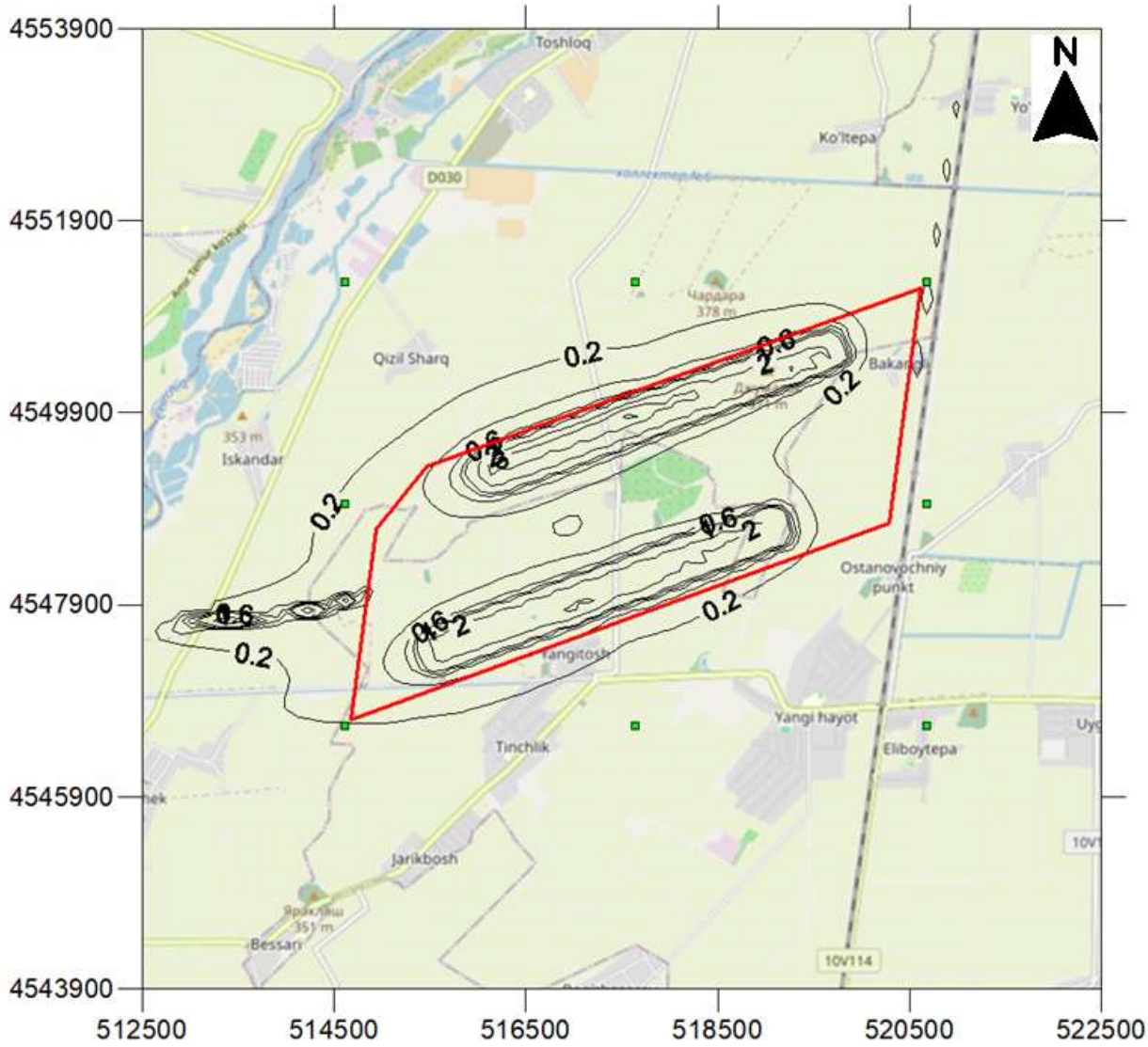


Table 5.12: Maximum Predicted 24 Hour Mean $PM_{2.5}$ Concentrations (as 100th percentile) (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		300 µg/m³	
H1	1.57	0.5	74.0
H2	0.33	0.1	72.7
H3	0.70	0.2	73.1
H4	0.56	0.2	73.0
H5	0.47	0.2	72.9
H6	0.26	0.1	72.7
H7	0.25	0.1	72.6
H8	0.43	0.1	72.8
H9	0.15	0.0	72.5
H10	0.22	0.1	72.6
H11	0.18	0.1	72.6
H12	0.28	0.1	72.7
H13	0.20	0.1	72.6
H14	0.15	0.0	72.5
H15	0.21	0.1	72.6
H16	0.50	0.2	72.9
H17	0.33	0.1	72.7
H18	0.30	0.1	72.7
H19	0.36	0.1	72.8
H20	0.65	0.2	73.1
H21	0.50	0.2	72.9
H22	0.37	0.1	72.8
H23	0.32	0.1	72.7
H24	0.32	0.1	72.7
H25	0.22	0.1	72.6
H26	0.25	0.1	72.6
H27	0.19	0.1	72.6
H28	0.17	0.1	72.6
H29	0.31	0.1	72.7
H30	0.26	0.1	72.7

Presented as the 100th percentile for direct comparison with the National Standard

Table 5.13: Maximum Predicted 24 Hour Mean $PM_{2.5}$ Concentrations as 99th percentile (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard					PEC (µg/m³)
		WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	
Standard		75 µg/m³	50 µg/m³	37.5 µg/m³	25 µg/m³	15 µg/m³	
H1	1.48	2.0	3.0	4.0	5.9	9.9	73.9
H2	0.33	0.4	0.7	0.9	1.3	2.2	72.7
H3	0.59	0.8	1.2	1.6	2.4	4.0	73.0
H4	0.56	0.7	1.1	1.5	2.2	3.7	73.0
H5	0.44	0.6	0.9	1.2	1.8	2.9	72.8
H6	0.24	0.3	0.5	0.6	1.0	1.6	72.6
H7	0.25	0.3	0.5	0.7	1.0	1.6	72.6
H8	0.41	0.5	0.8	1.1	1.6	2.7	72.8
H9	0.14	0.2	0.3	0.4	0.6	0.9	72.5
H10	0.19	0.2	0.4	0.5	0.7	1.2	72.6
H11	0.15	0.2	0.3	0.4	0.6	1.0	72.5
H12	0.26	0.3	0.5	0.7	1.0	1.7	72.7
H13	0.17	0.2	0.3	0.5	0.7	1.2	72.6
H14	0.15	0.2	0.3	0.4	0.6	1.0	72.5
H15	0.16	0.2	0.3	0.4	0.7	1.1	72.6
H16	0.39	0.5	0.8	1.0	1.6	2.6	72.8
H17	0.27	0.4	0.5	0.7	1.1	1.8	72.7
H18	0.26	0.3	0.5	0.7	1.0	1.7	72.7
H19	0.36	0.5	0.7	1.0	1.4	2.4	72.8
H20	0.62	0.8	1.2	1.7	2.5	4.1	73.0
H21	0.50	0.7	1.0	1.3	2.0	3.3	72.9
H22	0.37	0.5	0.7	1.0	1.5	2.4	72.8
H23	0.25	0.3	0.5	0.7	1.0	1.7	72.6
H24	0.31	0.4	0.6	0.8	1.2	2.1	72.7
H25	0.22	0.3	0.4	0.6	0.9	1.5	72.6
H26	0.24	0.3	0.5	0.6	0.9	1.6	72.6
H27	0.19	0.2	0.4	0.5	0.7	1.2	72.6
H28	0.15	0.2	0.3	0.4	0.6	1.0	72.6
H29	0.25	0.3	0.5	0.7	1.0	1.7	72.6

Receptor	Impact ($\mu g/m^3$)	Impact as % of Relevant Standard					PEC ($\mu g/m^3$)
		WHO Interim Target 1	WHO Interim Target 2	WHO Interim Target 3	WHO Interim Target 4	WHO Guideline	
Standard		75 $\mu g/m^3$	50 $\mu g/m^3$	37.5 $\mu g/m^3$	25 $\mu g/m^3$	15 $\mu g/m^3$	
H30	0.26	0.3	0.5	0.7	1.0	1.7	72.7
Presented as the 99th percentile for direct comparison with the WHO Standards and Guidelines which includes an allowance of 3-4 days exceedance per year							

5.32 No exceedances are predicted of the National Standard or WHO Interim Target 1 for 24 hour mean $PM_{2.5}$ at any of the receptor locations. Exceedances of the WHO Interim Targets 2, 3 and 4 and the WHO Guideline for 24 hour mean $PM_{2.5}$ are predicted, however this is due to the high existing concentration of $PM_{2.5}$ in the vicinity of the Site. The short-term baseline concentration is in excess of the WHO Interim Targets 2, 3 and 4 and the WHO Guideline. However, as identified earlier, the measured background concentrations should be considered as indicative due to the relatively short duration of monitoring undertaken.

5.33 The diesel generators will only be operated for a period greater than one hour in the event of a power outage. For the purposes of the modelling, it has been assumed that the diesel generators will be operating simultaneously throughout the relevant averaging period (24 hours). The modelling has been undertaken using five years of recent meteorological data, the results presented in the tables above represent the concentrations likely during the worst case meteorological conditions experienced over a five year period.

5.34 It is unlikely that all the generators will operate simultaneously and unlikely that they would be required for a continuous 24 hour period. It is also unlikely that this would coincide with worst case meteorological conditions. As such the concentrations provided in the tables above should be considered to be a worst case and unlikely scenario.

5.35 The impacts from the airport are small in comparison to the relevant standards and less than 25% of the standards at all receptor locations. It is considered that the impact of the proposed airport on 24 hour mean $PM_{2.5}$ concentrations is insignificant.

Table 5.14: Maximum Predicted 15 Minute Mean $PM_{2.5}$ Concentrations for comparison to One Time National Standard (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		500 µg/m³	
H1	6.10	1.2	78.5
H2	2.42	0.5	74.8
H3	2.64	0.5	75.0
H4	2.46	0.5	74.9
H5	1.97	0.4	74.4
H6	1.53	0.3	73.9
H7	1.38	0.3	73.8
H8	1.90	0.4	74.3
H9	1.23	0.2	73.6
H10	1.35	0.3	73.7
H11	1.46	0.3	73.9
H12	1.77	0.4	74.2
H13	1.63	0.3	74.0
H14	1.14	0.2	73.5
H15	1.30	0.3	73.7
H16	2.79	0.6	75.2
H17	2.55	0.5	74.9
H18	1.85	0.4	74.2
H19	2.12	0.4	74.5
H20	2.83	0.6	75.2
H21	2.06	0.4	74.5
H22	1.63	0.3	74.0
H23	1.63	0.3	74.0
H24	1.67	0.3	74.1
H25	1.77	0.4	74.2
H26	1.62	0.3	74.0
H27	1.38	0.3	73.8
H28	1.58	0.3	74.0
H29	2.10	0.4	74.5
H30	1.72	0.3	74.1
Presented as the 100th percentile for direct comparison with the National Standard			

5.36 No exceedances are predicted of the National Standard at any of the receptor locations.

5.37 The impacts from the airport are small in comparison to the relevant standards and less than 25% of the standards at all receptor locations. It is considered that the impact of the proposed airport on One Time $PM_{2.5}$ concentrations is insignificant.

Carbon Monoxide (CO)

5.38 The maximum predicted annual, 24 hour, 8 hour and 15 minute mean CO concentrations arising from the proposed airport at the nearest identified sensitive receptor locations are presented in Tables 5.15 and 5.19. The results are presented as the impact of the emissions from the proposed airport and as a percentage of the relevant standards. The overall predicted environmental concentrations (PEC) are provided (impact of the proposed airport + existing baseline).

Table 5.15: Maximum Predicted Annual Mean CO Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as % National Standard	PEC (µg/m³)
Standard		3000	
H1	31.10	1.0	826.6
H2	4.07	0.1	799.6
H3	11.55	0.4	807.0
H4	6.41	0.2	801.9
H5	7.53	0.3	803.0
H6	3.49	0.1	799.0
H7	2.04	0.1	797.5
H8	4.16	0.1	799.7
H9	1.27	0.0	796.8
H10	1.63	0.1	797.1
H11	1.36	0.0	796.9
H12	2.51	0.1	798.0
H13	1.60	0.1	797.1
H14	1.04	0.0	796.5
H15	1.16	0.0	796.7
H16	4.46	0.1	800.0
H17	2.63	0.1	798.1
H18	4.22	0.1	799.7

Receptor	Impact ($\mu g/m^3$)	Impact as % National Standard	PEC ($\mu g/m^3$)
Standard		3000	
H19	6.00	0.2	801.5
H20	11.28	0.4	806.8
H21	11.14	0.4	806.6
H22	6.04	0.2	801.5
H23	4.08	0.1	799.6
H24	2.72	0.1	798.2
H25	1.83	0.1	797.3
H26	1.84	0.1	797.3
H27	1.16	0.0	796.7
H28	1.52	0.1	797.0
H29	3.70	0.1	799.2
H30	3.21	0.1	798.7
Presented as the 100th percentile to allow direct comparison to the National Standard			

5.39 The results indicate that there will be no exceedances of the National Standard for annual mean CO with the airport operational. The impacts are less than 25% of the relevant standard at all of the sensitive receptors. It is therefore considered that the impact of the operation of the proposed airport on annual mean CO concentrations is insignificant.

Figure 5.4: Contour Plot illustrating the Maximum Annual Mean CO Impact arising from the Proposed Airport (µg/m³)

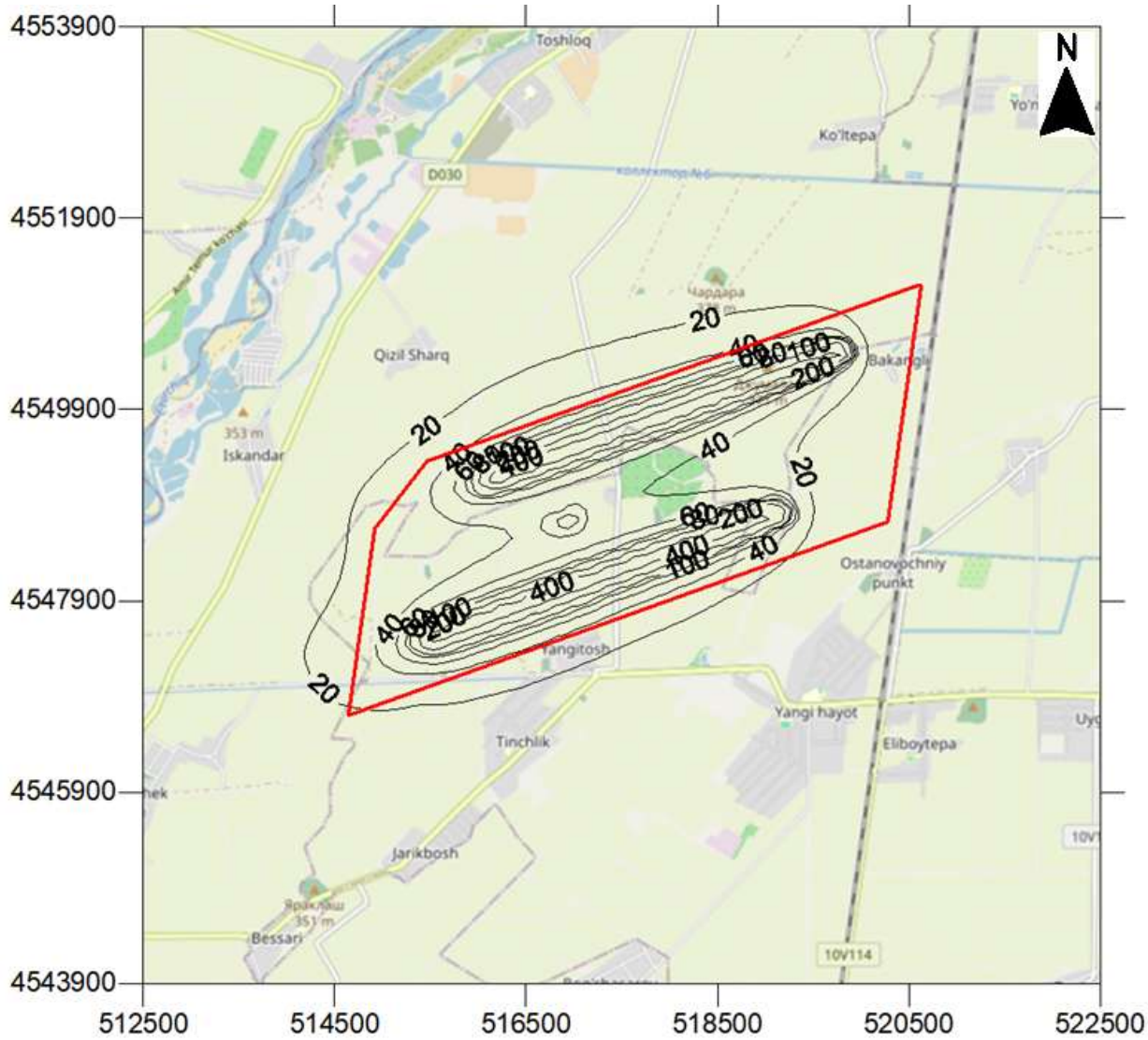


Table 5.16: Maximum Predicted 24 hour Mean CO Concentrations (100th percentile) (µg/m³)

Receptor	Impact (µg/m³)	Impact as % National Standard	PEC (µg/m³)
Standard		4000	
H1	147.2	3.7	1738.2
H2	30.9	0.8	1621.9
H3	50.8	1.3	1641.8
H4	47.7	1.2	1638.7
H5	46.1	1.2	1637.1
H6	25.1	0.6	1616.1

Receptor	Impact (µg/m³)	Impact as % National Standard	PEC (µg/m³)
Standard		4000	
H7	19.2	0.5	1610.2
H8	40.3	1.0	1631.3
H9	11.6	0.3	1602.6
H10	19.6	0.5	1610.6
H11	14.1	0.4	1605.1
H12	23.2	0.6	1614.2
H13	16.8	0.4	1607.8
H14	10.4	0.3	1601.4
H15	15.8	0.4	1606.8
H16	47.1	1.2	1638.1
H17	28.7	0.7	1619.7
H18	31.5	0.8	1622.5
H19	37.7	0.9	1628.7
H20	61.2	1.5	1652.2
H21	43.4	1.1	1634.4
H22	25.2	0.6	1616.2
H23	19.5	0.5	1610.5
H24	26.6	0.7	1617.6
H25	19.8	0.5	1610.8
H26	19.1	0.5	1610.1
H27	13.2	0.3	1604.2
H28	16.9	0.4	1607.9
H29	25.6	0.6	1616.6
H30	22.7	0.6	1613.7
Presented as the 100th percentile to allow direct comparison to the National Standard			

Table 5.17: Maximum Predicted 24 hour Mean CO Concentrations (as 99th percentile) (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard		PEC (µg/m³)
		WHO Interim Target 1	WHO Guideline	
Standard		7000	4000	
H1	101.4	1.4	2.5	1692.4
H2	20.5	0.3	0.5	1611.5
H3	41.7	0.6	1.0	1632.7
H4	37.1	0.5	0.9	1628.1
H5	37.4	0.5	0.9	1628.4
H6	20.1	0.3	0.5	1611.1
H7	13.9	0.2	0.3	1604.9
H8	23.7	0.3	0.6	1614.7
H9	9.1	0.1	0.2	1600.1
H10	12.1	0.2	0.3	1603.1
H11	9.5	0.1	0.2	1600.5
H12	17.1	0.2	0.4	1608.1
H13	10.9	0.2	0.3	1601.9
H14	6.9	0.1	0.2	1597.9
H15	8.5	0.1	0.2	1599.5
H16	30.9	0.4	0.8	1621.9
H17	17.3	0.2	0.4	1608.3
H18	23.5	0.3	0.6	1614.5
H19	30.5	0.4	0.8	1621.5
H20	47.2	0.7	1.2	1638.2
H21	35.5	0.5	0.9	1626.5
H22	20.5	0.3	0.5	1611.5
H23	14.9	0.2	0.4	1605.9
H24	16.7	0.2	0.4	1607.7
H25	12.7	0.2	0.3	1603.7
H26	12.0	0.2	0.3	1603.0
H27	7.6	0.1	0.2	1598.6
H28	12.8	0.2	0.3	1603.8
H29	20.1	0.3	0.5	1611.1

Receptor	Impact (µg/m³)	Impact as % of Relevant Standard		PEC (µg/m³)
		WHO Interim Target 1	WHO Guideline	
Standard		7000	4000	
H30	17.0	0.2	0.4	1608.0
Presented as the 99th percentile to allow direct comparison to the WHO Standard and Guideline which allow 3-4 days exceedance per year				

5.40 The results indicate that there will be no exceedances of the National Standard, the WHO Interim Target 1 or the WHO Guideline for 24 hour mean CO with the airport operational.

5.41 It should be noted that the above predicted concentrations assume that the diesel generators are operating for the entire averaging period (24 hours), however they will only be operated for a period greater than one hour in the event of a power outage. For the purposes of the modelling, it has been assumed that all the diesel generators will be operating simultaneously throughout the relevant averaging period (24 hours). The modelling has been undertaken using five years of recent meteorological data, the results presented in the tables above represent the concentrations likely during the worst case meteorological conditions experienced over a five year period.

5.42 It is unlikely that all the generators will operate simultaneously and unlikely that they would be required for a continuous 24 hour period. It is also unlikely that this would coincide with worst case meteorological conditions. As such the concentrations provided in the tables above should be considered to be a worst case and unlikely scenario.

5.43 The impacts are less than 25% of the relevant standards at all of the sensitive receptors. It is therefore considered that the impact of the proposed plant on 24 hour mean CO concentrations is insignificant.

Table 5.18: Maximum Predicted 8-Hour Mean CO Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of EU Standard	PEC (µg/m³)
Standard		10000	
H1	217.4	2.2	1808.4

Receptor	Impact (µg/m³)	Impact as % of EU Standard	PEC (µg/m³)
Standard		10000	
H2	57.3	0.6	1648.3
H3	104.4	1.0	1695.4
H4	82.8	0.8	1673.8
H5	94.3	0.9	1685.3
H6	52.6	0.5	1643.6
H7	36.6	0.4	1627.6
H8	74.3	0.7	1665.3
H9	28.1	0.3	1619.1
H10	36.4	0.4	1627.4
H11	37.6	0.4	1628.6
H12	54.2	0.5	1645.2
H13	43.6	0.4	1634.6
H14	25.2	0.3	1616.2
H15	33.2	0.3	1624.2
H16	72.6	0.7	1663.6
H17	48.1	0.5	1639.1
H18	71.8	0.7	1662.8
H19	92.2	0.9	1683.2
H20	128.4	1.3	1719.4
H21	78.8	0.8	1669.8
H22	44.4	0.4	1635.4
H23	40.6	0.4	1631.6
H24	42.0	0.4	1633.0
H25	33.3	0.3	1624.3
H26	31.3	0.3	1622.3
H27	34.8	0.3	1625.8
H28	34.9	0.3	1625.9
H29	63.9	0.6	1654.9
H30	52.8	0.5	1643.8
Presented as the 100th percentile for direct comparison with the EU Standard			

5.44 The results indicate that there will be no exceedances of the EU Standard for 8 hour mean CO with the airport operational. The impacts are less than 25% of the relevant standards at all of the sensitive receptors. It is therefore considered that the impact of the proposed plant on 8 hour mean CO concentrations is insignificant.

5.45 It should be noted that the above predicted concentrations assume that the diesel generators are operating for the entire averaging period (8 hours) which would only occur during an interruption of the supply from the national grid. The predicted concentrations should therefore be considered to be worst case and an unlikely event.

Table 5.19: Maximum Predicted 15-Minute Mean CO Concentrations for comparison to One Time National Standard (µg/m³)

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		5000	
H1	665.9	13.3	2256.9
H2	276.2	5.5	1867.2
H3	202.7	4.1	1793.7
H4	240.4	4.8	1831.4
H5	231.1	4.6	1822.1
H6	166.8	3.3	1757.8
H7	139.1	2.8	1730.1
H8	169.2	3.4	1760.2
H9	122.3	2.4	1713.3
H10	144.2	2.9	1735.2
H11	181.1	3.6	1772.1
H12	189.6	3.8	1780.6
H13	203.9	4.1	1794.9
H14	113.9	2.3	1704.9
H15	139.1	2.8	1730.1
H16	335.6	6.7	1926.6
H17	309.6	6.2	1900.6
H18	227.4	4.5	1818.4
H19	268.8	5.4	1859.8
H20	308.5	6.2	1899.5

Receptor	Impact (µg/m³)	Impact as % of National Standard	PEC (µg/m³)
Standard		5000	
H21	212.2	4.2	1803.2
H22	104.9	2.1	1695.9
H23	91.4	1.8	1682.4
H24	189.1	3.8	1780.1
H25	163.2	3.3	1754.2
H26	174.3	3.5	1765.3
H27	161.4	3.2	1752.4
H28	183.4	3.7	1774.4
H29	207.8	4.2	1798.8
H30	197.8	4.0	1788.8
Presented as the 100th percentile for direct comparison with the National Standard			

5.46 The results indicate that there are no exceedances of the National Standard for One Time CO concentrations at the sensitive receptors. The impacts are less than 25% of the standard at all of the sensitive receptors, therefore the impact with regards to One Time CO concentrations is considered to be insignificant.

Hydrocarbons (HC)

5.47 The maximum predicted annual mean hydrocarbon concentrations arising from the proposed airport at the nearest identified sensitive receptor locations are presented in Table 5.20 below. The results are presented as the impact of the emissions from the proposed airport and as a percentage of the relevant standards. The overall predicted environmental concentration (PEC) is provided (impact of the proposed airport + existing baseline). As there is no standard for total hydrocarbons, the predicted impacts have been compared to the EU standard for annual mean benzene and the existing baseline is assumed to be the measured benzene concentration.

Table 5.20: Maximum Predicted Annual Mean Hydrocarbon Concentrations (µg/m³)

Receptor	Impact (µg/m³)	Impact as% EU Standard for Benzene	PEC (µg/m³)
Standard		5 µg/m³	
H1	2.11	42.2	8.4
H2	0.28	5.6	6.6
H3	0.82	16.4	7.1
H4	0.44	8.8	6.7
H5	0.51	10.3	6.8
H6	0.24	4.8	6.5
H7	0.14	2.8	6.4
H8	0.30	6.1	6.6
H9	0.09	1.8	6.4
H10	0.11	2.3	6.4
H11	0.09	1.9	6.4
H12	0.17	3.5	6.5
H13	0.11	2.2	6.4
H14	0.07	1.4	6.4
H15	0.08	1.6	6.4
H16	0.31	6.1	6.6
H17	0.18	3.6	6.5
H18	0.28	5.6	9.9
H19	0.40	7.9	10.0
H20	0.78	15.5	7.1
H21	0.77	15.5	7.1
H22	0.42	8.3	6.7
H23	0.28	5.7	6.6
H24	0.19	3.7	6.5
H25	0.13	2.6	6.4
H26	0.13	2.5	6.4
H27	0.08	1.6	6.4
H28	0.10	2.0	6.4
H29	0.25	5.0	9.8
H30	0.22	4.4	9.8

5.48 In the absence of a standard for total hydrocarbons, the predicted concentrations have been compared to the EU Standard for benzene. The impact of the proposed airport is below the standard of the sensitive receptor locations.

5.49 The overall predicted PECs are in excess of the EU ambient standard for annual mean benzene concentrations. It should be noted however that the measured existing concentration of benzene in the vicinity of the Site is already in excess of the standard. The contribution from the airport is relatively small and is total hydrocarbons rather than benzene alone. It is therefore considered that the impact of the airport on hydrocarbons is likely to be insignificant.

6 SUMMARY AND CONCLUSIONS

6.1 An assessment has been carried out to determine the potential air quality impacts on ambient air quality associated with the operation of a proposed airport on land to the south of Tashkent city. The pollutants considered in the assessment were NO_2, CO, particulates (PM_{10} and $PM_{2.5}$) and hydrocarbons.

6.2 Monitoring was undertaken in the vicinity of the Site to establish the existing baseline pollutant concentrations within the study area. Continuous monitoring was undertaken using a portable monitor for 2 weeks at 2 locations in November and December 2025. A diffusion tube survey was also undertaken. In order to establish accurate reliable baseline concentrations, monitoring should be undertaken for a minimum of 6 months incorporating both summer and winter months. In the absence of any other data, the measured concentrations were used as baseline concentrations within this assessment and should therefore be considered as indicative. However, this does not affect the magnitude of impacts predicted as a result of the proposed airport, only the predicted environmental pollutant concentrations. The limitations of the monitoring should be noted and the overall predicted environmental concentrations should be treated as indicative only.

6.3 Detailed dispersion modelling of potential emissions from the airport has been carried out using ADMS-Airport. Pollutant concentrations were predicted arising from the aircraft, a number of diesel generators and the access roads to the airport.

6.4 Under normal operating conditions, the airport is connected to the National Electricity Grid. The diesel generators are only operated during routine testing once a month. During periods of interruption of the normal power supply, the diesel generators will provide emergency power to the airport.

6.5 Long term (annual mean) concentrations of NO_2, CO, PM_{10}, $PM_{2.5}$ and Hydrocarbons were predicted arising from the airport. The modelling of long term impacts included the assumption that the diesel generators were operating only for one hour per month for testing. The predicted annual mean concentrations of CO and PM_{10} meet the relevant standards for all of the pollutants considered. The predicted annual mean concentrations of NO_2 meet the relevant standards at all but one selected receptor which is located in a small village Imeni Kirova which is located immediately to the south of the Site.

6.6 The impacts are less than 25% of the relevant standards with the exception of a small area of the village Imeni Kirova. The impact of annual mean NO_2 concentrations associated with operation

of the airport is in excess of 25% of the relevant standards in this location. The impact of the airport on annual mean concentrations is considered to be insignificant across the study area for all pollutants except for this small area.

6.7 Existing concentrations of $PM_{2.5}$ and benzene were measured to be high in the vicinity of the Site and in excess of the standards. The exceedances of these standards are therefore due to the existing concentration rather than the operation of the airport. The impact of the airport is less than 1% of the National Standard and WHO Interim Target 1 for annual mean $PM_{2.5}$ concentrations at all of the sensitive receptor locations. The predicted annual mean impacts of hydrocarbons is less than 25% of the EU standard for benzene.

6.8 It is not possible to model short term concentrations of NO_2 from the airport due to the difficulty of calculating the conversion of NO_x to NO_2 for short term predictions. Consideration of an empirical relationship between long term and short term concentrations has determined that the impact on short term NO_2 concentrations is not likely to be significant.

6.9 Modelling of short term impacts for particulates and CO has been undertaken. The modelling assumed that the diesel generators were operating simultaneously and for the full averaging period of the standard i.e. 24 hours. The results should therefore be considered to be worst case predictions. The results indicated that the impact on short term concentrations of particulates and CO would be insignificant.

6.10 Whilst it has not been possible to accurately determine the short term impacts of NO_2 for the transportation sources (aircraft and road traffic), modelling of the impacts arising from the diesel generators when operating during power outages has been modelled. It is considered that the impact of the diesel generators on short term concentrations of NO_2 is likely to be insignificant.

APPENDIX A

Table A1: Aircraft Details and ATM

		ATM (2029)	No of Engines
International Flights	Code C	61448	2
	Code E	18357	2
Domestic Flights	Code C	18191	2
Cargo	Code C	88	2
	Code D	2796	2
	Code E	2057	2
General Aviation	Code A	1086	2
	Code B	723	2
	Code C	778	2
	Code D	13	2
	Code E	37	2
Total		105574	2

Table A2: Aircraft Emissions

	Take Off	Climb Out	Approach / Landing	Taxiing
Total Mass NOx (kg/year)	453,020.53	925,596.33	209,713.46	262,244.64
Total Mass CO (kg/year)	5,075.16	14,500.26	38,821.91	655,508.43
Total Mass Hydrocarbons (kg/year)	2,108.85	5,754.43	7,570.15	39,500.11
Total Mass Particulates (kg/year)	2,085.24	7,641.58	3,259.60	2,547.04

Table A3: Road Vehicle Emissions

	Total Vehicles (AADT)	% HDV	Speed (kph)
Main Access Road	32526	5.7	60
Service Access Road	1022	100	60

Table A4: Diesel Generator Emission Parameters

Parameter	11kv HT DG:2250KVA	LTDG:2250KVA	LTDG:320KVA
Location	Load Centre	Central Utility Plant	Power Intake Building
No of Generators	6	2	1
Operating Hours per year	12	12	12
Stack Height (m)	30	30	15
Stack Diameter (m)	0.45	0.40	0.25
Temperature (K)	399.45	398.25	400.35
Exit Velocity (m/s)	40	35	5.5
Concentration (mg/m^3)[(a)]			
NO_x (as NO_2)	649.2	649.2	3990.2
CO	174.2	174.2	191
HC	0.1112	0.1112	0.0073
Particulates	23	23	3.8
Emission Rate (g/s)			
NO_x (as NO_2)	1.2932	1.2932	1.2569
CO	0.3470	0.3470	0.0602
HC	0.1112	0.1112	0.0073

Parameter	11kv HT DG:2250KVA	LTDG:2250KVA	LTDG:320KVA
Particulates	0.0458	0.0458	0.0012
Emission Rate (g/s) (Long Term / Annual)			
NO_x (as NO_2)	0.00177	0.00177	0.00172
CO	0.00048	0.00048	0.00008
HC	0.00015	0.00015	0.00001
Particulates	0.00006	0.00006	0.000002

Table A5: Buildings included in the model

Parameter	Building Height (m)
Passenger Terminal	37.35
Substation	10.45
Admin Building	16.8
Power Intake	13.6