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LICENCE APPLICATION AIR EMISSIONS IMPACT ASSESSMENT OF LITHIUM HYDROXIDE PROCESS PLANT – TRAIN 1

TIANQI LITHIUM KWINANA PTY LTD

Licence Application Air Emissions Impact Assessment of Lithium Hydroxide Process Plant – Train 1

Tianqi Lithium Kwinana Pty Ltd

TIANQI LITHIUM ENERGY AUSTRALIA
a Tianqi Lithium—IGO joint venture

Prepared for: Tianqi Lithium Energy Australia

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Environment | Air Quality

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Executive Summary

Tianqi Lithium Kwinana Pty Ltd (Tianqi) is seeking a Licence Application of Tianqi's Lithium Hydroxide Process Plant (LHP) located in Kwinana, Western Australia (the Site).

The application is required to allow operation of additional off-gas treatment equipment to the Calcination Kiln (Calciner). As well as adding air emission control equipment, the installation will reposition one of the prescribed air emission points, the Calciner Stack within the current site.

[redacted]

An air quality assessment for pollutant impacts was undertaken to predict ground level concentrations of key pollutants of TSP, NOx, SO_2 and CO using Calpuff dispersion modelling techniques.

The assessment found that all key pollutant mass emission rates as measured throughout the 2023 process period did not result in exceedences of ambient air quality limits at sensitive receptors.

Moreover, the Assessment of the existing key pollutant areas, together with this Licence Application Air Quality Impact Assessment (AQIA) that include additional emissions controls, shows that the Site's pollutant emissions do not negatively impact the Kwinana locality, nor at the nearest sensitive receptor.

1 Background & Scope

Environmental & Air Quality Consulting Pty Ltd (EAQ) was engaged by Tianqi Lithium (Tianqi) to undertake a Licence Application Emissions' Impact Assessment (the Assessment) of Tianqi's Lithium Hydroxide Process Plant (LHP) located in Kwinana, Western Australia (the Site).

A Works Approval for Stage 1, Train 1 of the Tianqi LHP was granted by the Department of Environment Regulation (now Department of Water and Environmental Regulation (DWER) under *the Environmental Protection Act 1986* (EP Act) on 21 September 2016.

The existing Works Approval required a further amendment to allow installation of additional off-gas treatment equipment to the Calcination Kiln (Calciner). As well as adding air emission control equipment, the installation will reposition one of the prescribed air emission points, the Calciner Stack within the current site.

[redacted]

The Assessment utilised dispersion modelling techniques (DoE, 2006) for airborne pollutants to support the Licence Application by predicting ground level concentrations of airborne pollutants, and subsequent risk and impact analyses for these modelled pollutants.

The pollutants considered within the Assessment, are:

- Total suspended particulate (TSP);
- Oxides of Nitrogen (NOx);
- Sulphur dioxide (SO_2) and trioxide (SO_3); and
- Carbon monoxide (CO).

1.1 Assessment Scope

The Assessment was undertaken using a desktop approach with the Calpuff Dispersion Model employed to predict ground level emissions downwind from the LHP. Calpuff was chosen to best represent the airborne emissions from the Site, given that the Site is < 1.5 kilometres from the coast.

The scope of works for the modelling assessment is as follows.

- Determine relevant air quality criteria for the locality and activity, and with reference to the Kwinana Environmental Protection Policy (Kwinana EPP) which falls under the Western Australia *Environmental Protection Act 1986* (EP Act);
- Develop a site-representative meteorological data set to be used as input for dispersion modelling;
- Generate a pollutant emissions inventory based on emissions' specifications for operations;
- Develop and run a conservative risk based emissions dispersion model for the LHP projecting pollutant impacts from the Site, to include;
    - Quantitative assessment of air quality impacts from operations incorporating significant buildings and structures into the model to account for possible building wake effects and potential resultant grounding of the plume.
- Follow the requirements set by Western Australia Department of Water and Environmental Regulation (DWER), formerly Department of Environment – DoE, for dispersion modelling impact assessments (DoE, 2006);
- Follow the 2019 Draft Guidance set by the DWER for Air Emissions in predicting ground level pollutant impacts at the nearest sensitive receptors;
- Assess predicted ground level concentrations (GLC) against relevant ambient air quality criteria; and
- As part of the Assessment, the background (airshed) concentrations of key pollutants will also be considered.

For the purposes of defining the risk of pollutant emissions impacting at the nearest sensitive receiver, the Assessment was carried out against the following modelling criteria where all pollutants were assessed against the worst-hour of meteorology.

Table 1-1: Pollutant Modelling Assessment Criteria

Substance	Ave. period	Standard - Maximum ambient Concentration ($\mu g/m^3$)	Criterion Source
TSP	24 hours	150 (Area A), 90 (Area B)	Kwinana EPP, 2009
NOx (as NO_2)	1 Hour	151	NEPM (2021)
	Annual	28	
SO_2 / SO_3	1 Hour	197	
	24 Hours	52	
CO	1 Hour	30,000	DWER (2019)
	8 Hours	10,310	NEPM (2021)

2 Locality Meteorology & Site

The Site is within the Kwinana Industrial Area (KIA) and is located approximately 30 kms south, south-west of the Perth Central Business District.

KIA consists of a wide range of industries, such as fabrication, construction, and processing industries including alumina, nickel and oil refineries. There are a variety of utility operations, including power stations, cogeneration plants, air separation plants, port facilities, desalination and wastewater treatment plants.

Industrial receptors are adjacent to the Site. The nearest sensitive receptor (non-industrial/commercial) to the Site is the Kwinana Motorplex which during the racing season is frequented by persons in an open-air environment to watch and partake in motor sport activities.

The nearest boundary at the Kwinana Motorplex is ≤ 600 m east of the Site's boundary.

The Site is relatively flat and low lying, at approximately 3 m to 5 m above sea level with no notable topographical features within 10 kilometres (excluding coastline).

Figure 2-1 illustrates the locality of the Site and local and nearby land uses.

Figure 2-2 depicts the physical layout of the Site and pollutant emission locations within the Calpuff modelling domain. These emissions' locations include the proposed re-location of the Calciner Stack.

2.1 Locality Meteorology

KIA experiences a Mediterranean climate with mild, wet winters and hot, dry summers. Local mean maximum temperatures reach 31°C in summer, dropping to 18°C in winter. Mean minimum temperatures reach 17°C in summer and 8°C in winter (based on Median Research Station).

The nearest useful observational dataset for meteorology to the Site's locality is the Bureau of Meteorology (BoM) Automatic Weather Station (AWS) at Garden Island (Station 009256), followed by Jandakot (Station 009172). Both stations are < 15 kms from the Site. Meteorological (met) trends at both stations would represent sea-breeze (Garden Island) and in general land-breeze effects (Jandakot).

To determine which annual met periods were the most representative of the locality both the Garden Island and Jandakot stations were investigated for their most recent 5-year (calendar) met trends (2018-2022). A bi-annual period was chosen for the 2020 and 2021 calendar years (i.e., 2 consecutive calendar years) to account for variability amongst single annual periods. Appendix A discusses the derivation of the 'representative' meteorological annual periods for the locality.

Both of these met stations, although in some proximity to the Site; may represent weather patterns outside of the modelling domain location of the Site. To compensate for any variability CSIRO's The Air Pollution Model (TAPM) was then utilised to generate synoptic data within the modelling project domain for the 2020-2021 periods.

Combining (hybridising) both the BoM and TAPM outputs for the 2020-2021 periods, generated a full bi-annual meteorological dataset representative of the locality. This was achieved using the Calmet processor within the Calpuff model that incorporates the modelling domains' terrain and other pertinent features that would affect dispersion.

The characteristics of the Calmet hybrid dataset for the 2020-21 representative year are illustrated in **Figure 2-3.** Figure 2-3 shows the annual and seasonal met characteristics, whilst **Figure 2-4** shows the hourly met characteristics. Other met trends, including stability class frequency, are illustrated in **Figures 2-5 to 2-8** to follow, with **Figure 2-8** showing that C - F Class Atmospheric Stability is common across the locality.

Average hourly stability ranges from C – **E** classes i.e., slightly unstable – stable.

Stable and very stable atmospheric conditions typically dominant those night-time meteorological characteristics within the Kwinana locality starting from 6PM through to 6AM daily.

Under stable conditions mechanical dispersion plays a larger role in dispersion and vertical mixing of emission plumes when there is complexity in the terrain and surface roughness. In low surface roughness terrain, the effects of mechanical turbulence are weakened, to include a decrease in vertical mixing, and ground level emission plumes tend to have larger impacts over longer downwind distances from the emission source.

In other words, in the absence of convective mixing (vertical) due to (among others) higher surface temperatures, those more-stable atmospheric periods can often result in larger ground level emissions impacts since dispersion of the emission plume is lessened.

Stability refers to the atmosphere's ability to resist or enhance vertical motion resulting in turbulence. Stability encompasses (among others) temperature changes with atmospheric height (lapse rate), wind speed and surface roughness. The six classes of stability are:

A	very unstable
B	unstable
C	slightly unstable
D	neutral
E	stable
F	very stable

- Unstable conditions enhance turbulence and subsequent dispersion;
- Neutral stability neither enhances nor reduces turbulence; and
- Stable conditions reduce turbulence and therefore dispersion is reduced.

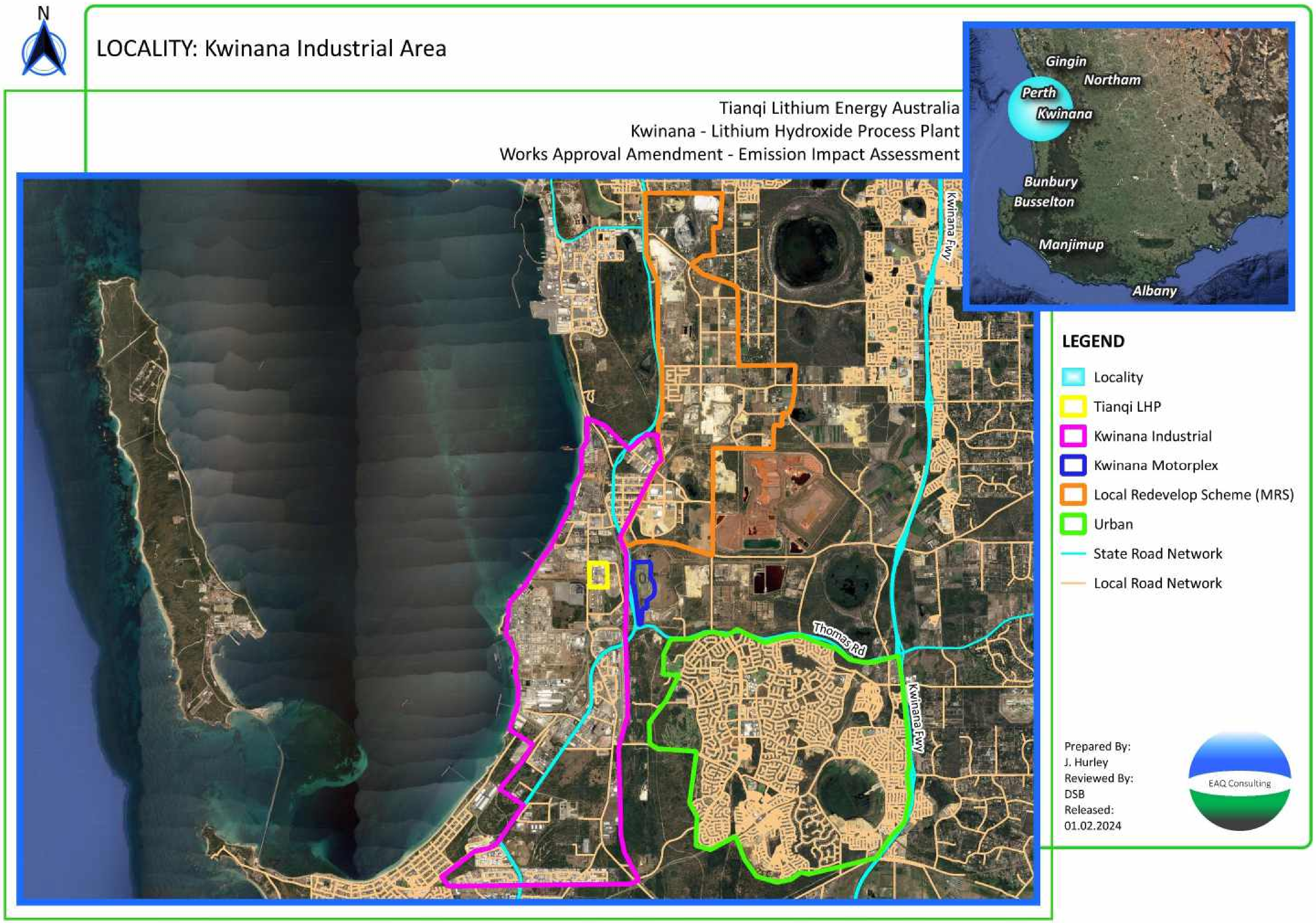


Figure 2-1: Tianqi Kwinana Lithium Hydroxide Process Plant Locality & Activities Footprint

[redacted]

Figure 2-2: Tianqi Kwinana Lithium Hydroxide Process Plant Layout (Stage 1, Train 1)

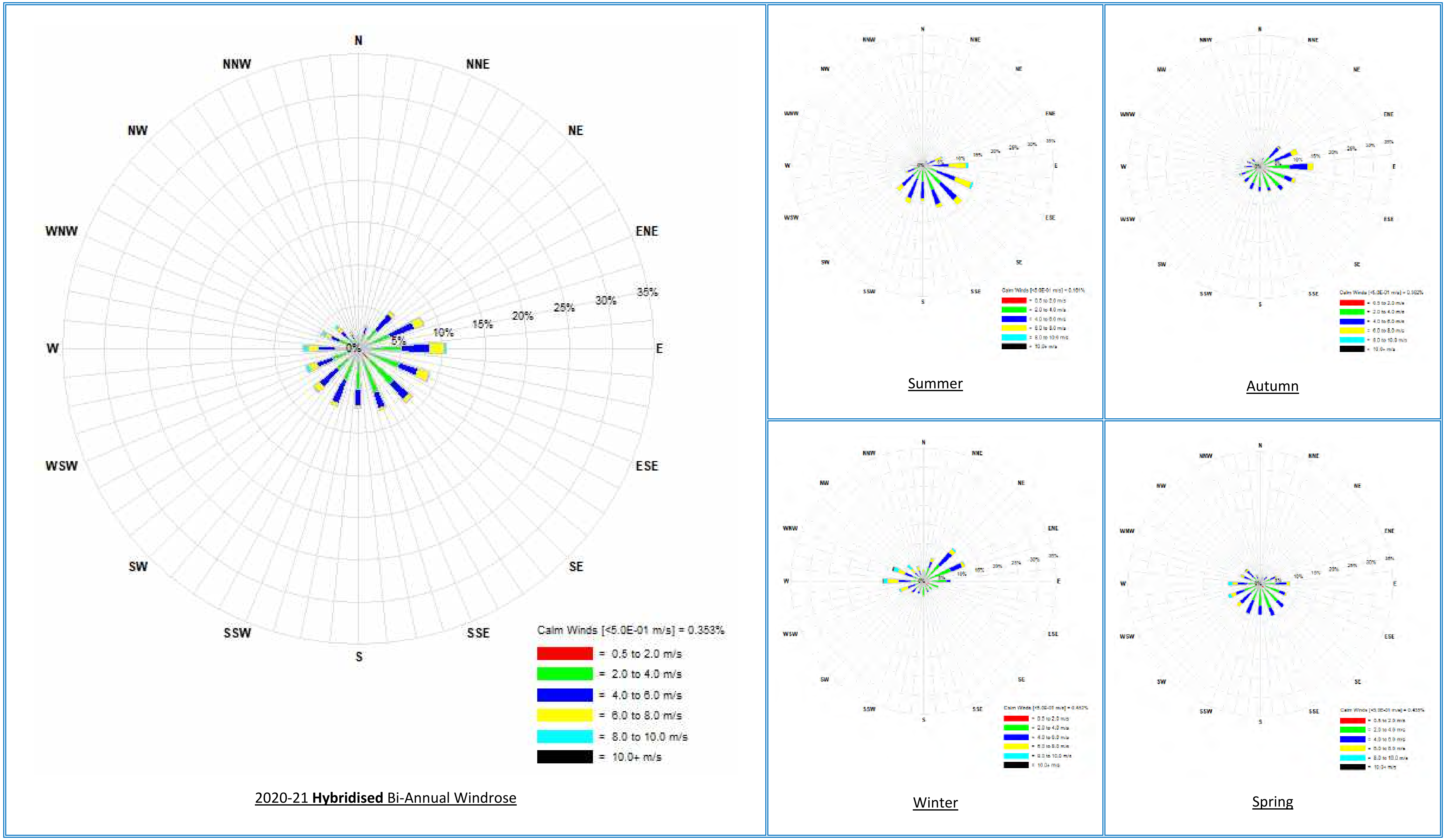
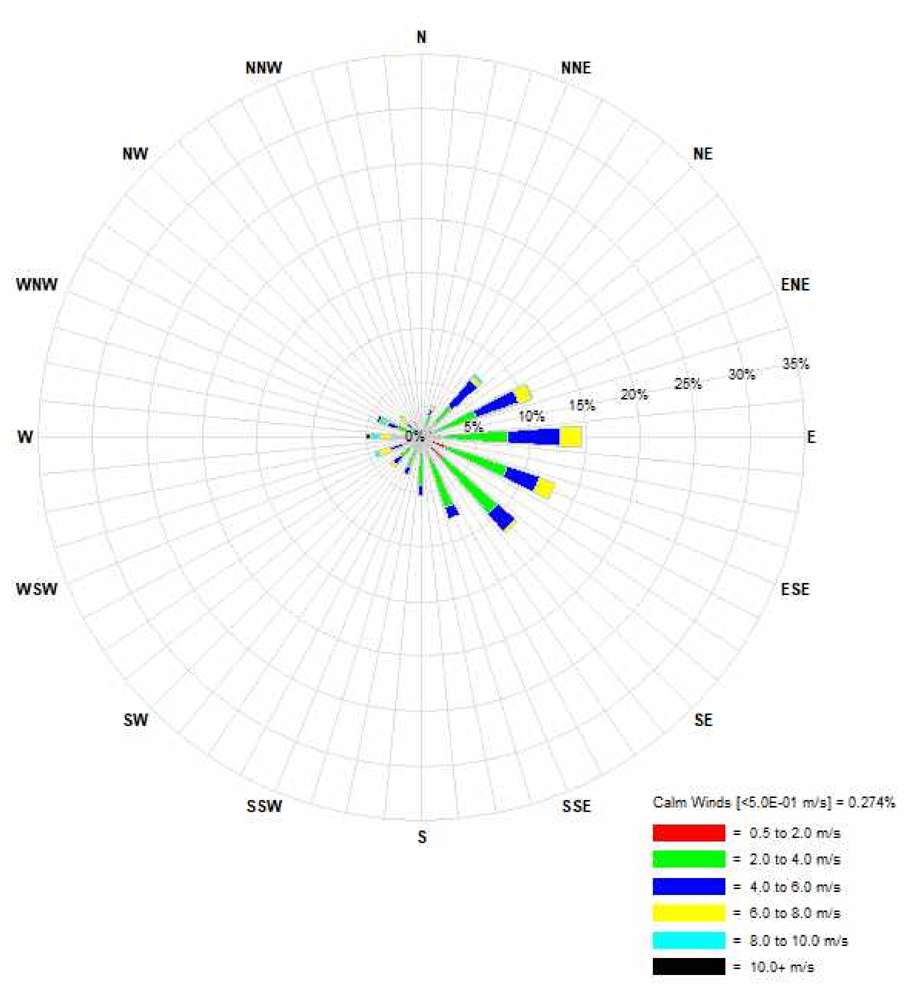
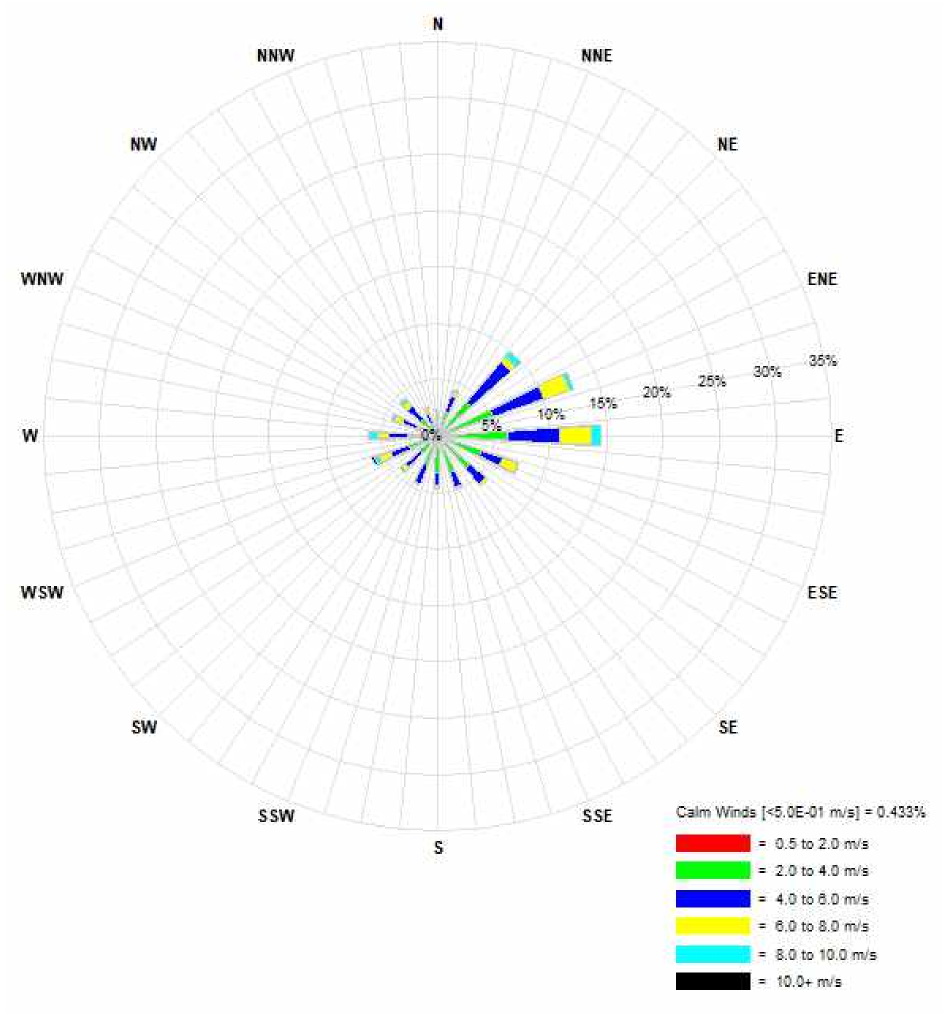


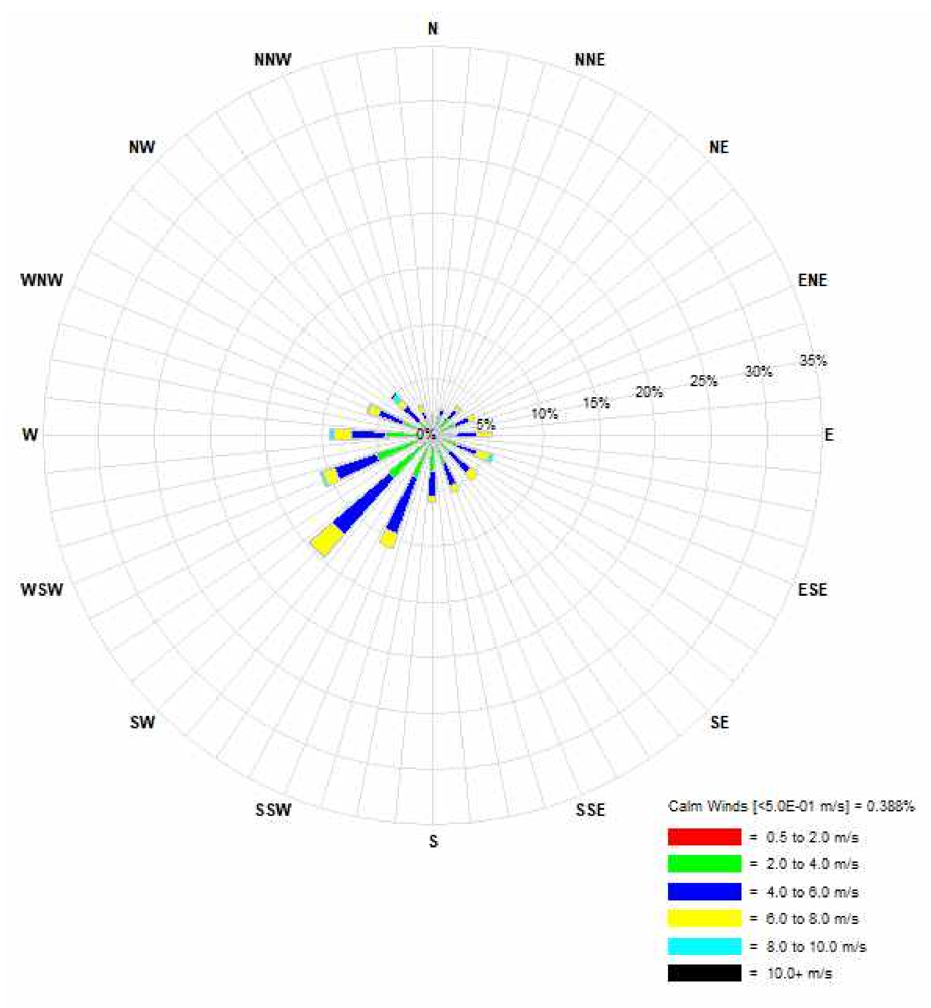
Figure 2-3: Annual and Seasonal Windroses for Hybrid derived Site-representative 2020-21 Meteorology (modelled)



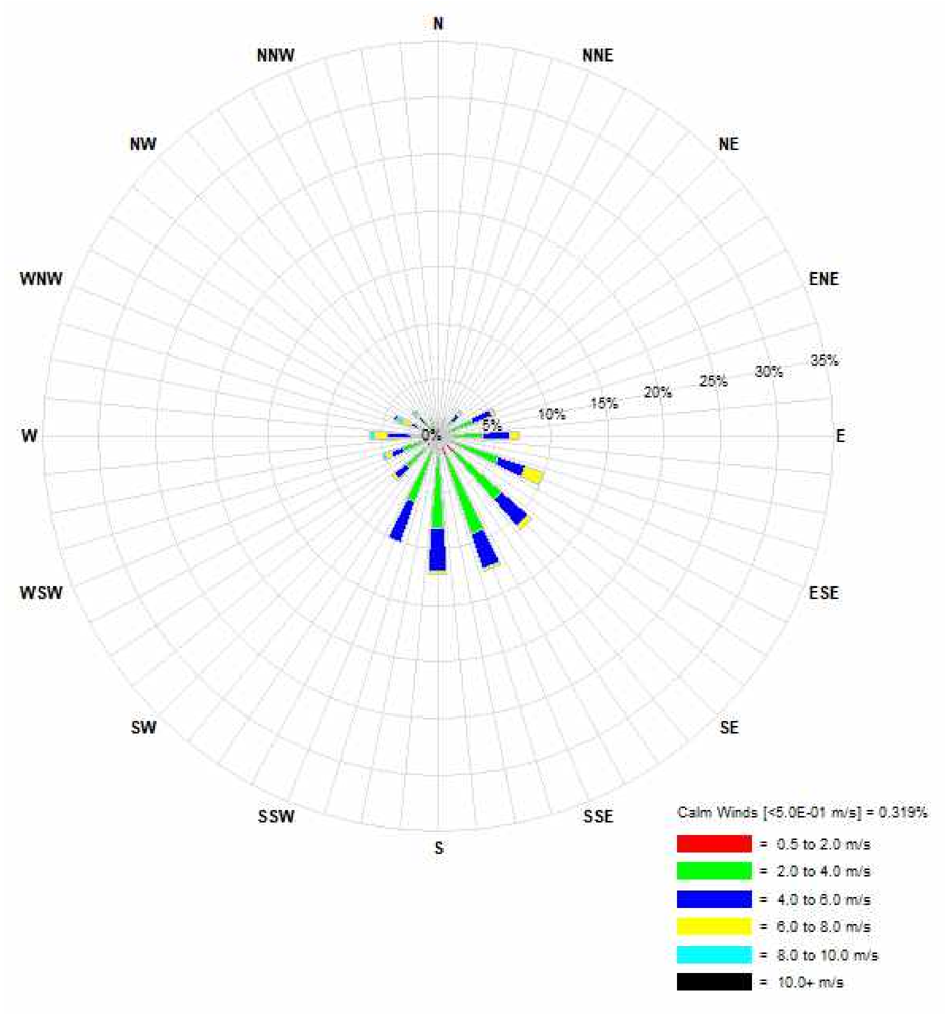
0100hrs – 0600hrs



0700hrs – 1200hrs



1300hrs – 1800hrs



1900hrs – 0000hrs

Figure 2-4: Time of Day Windroses for Hybrid derived Site-representative 2020-21 Meteorology (modelled)

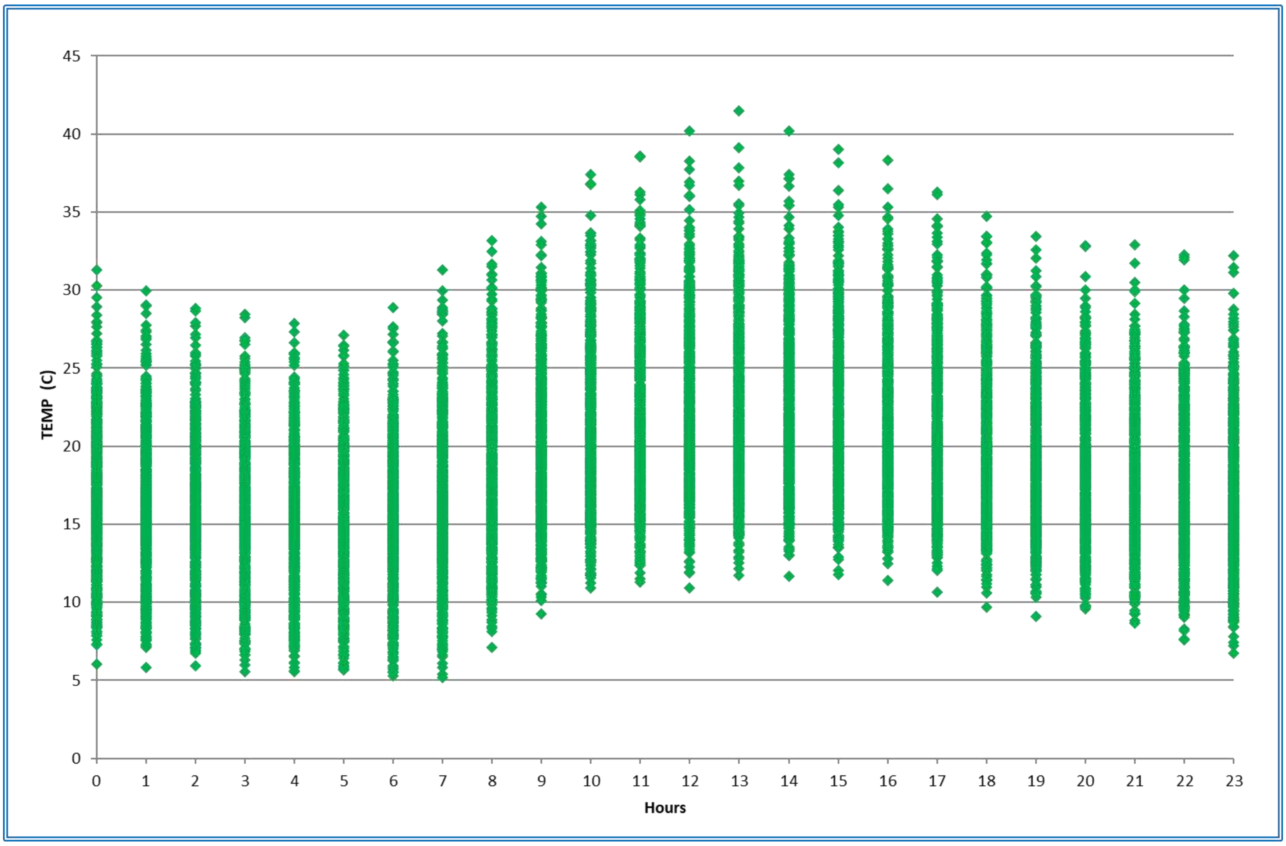


Figure 2-5: Annual X-Y scatter plot diurnal temperatures for 2020-21 (modelled)

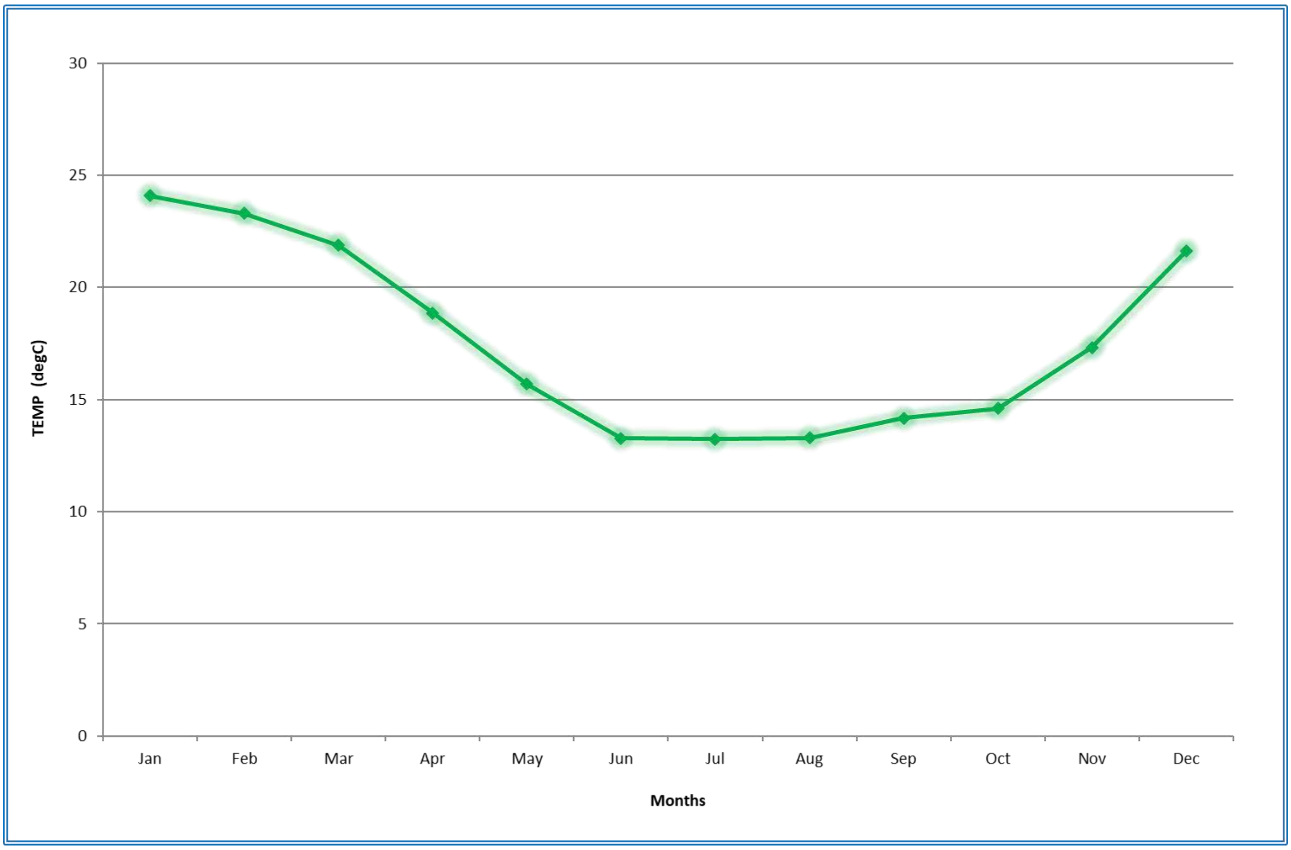


Figure 2-6: Average Monthly Temperatures for 2020-21 (modelled)

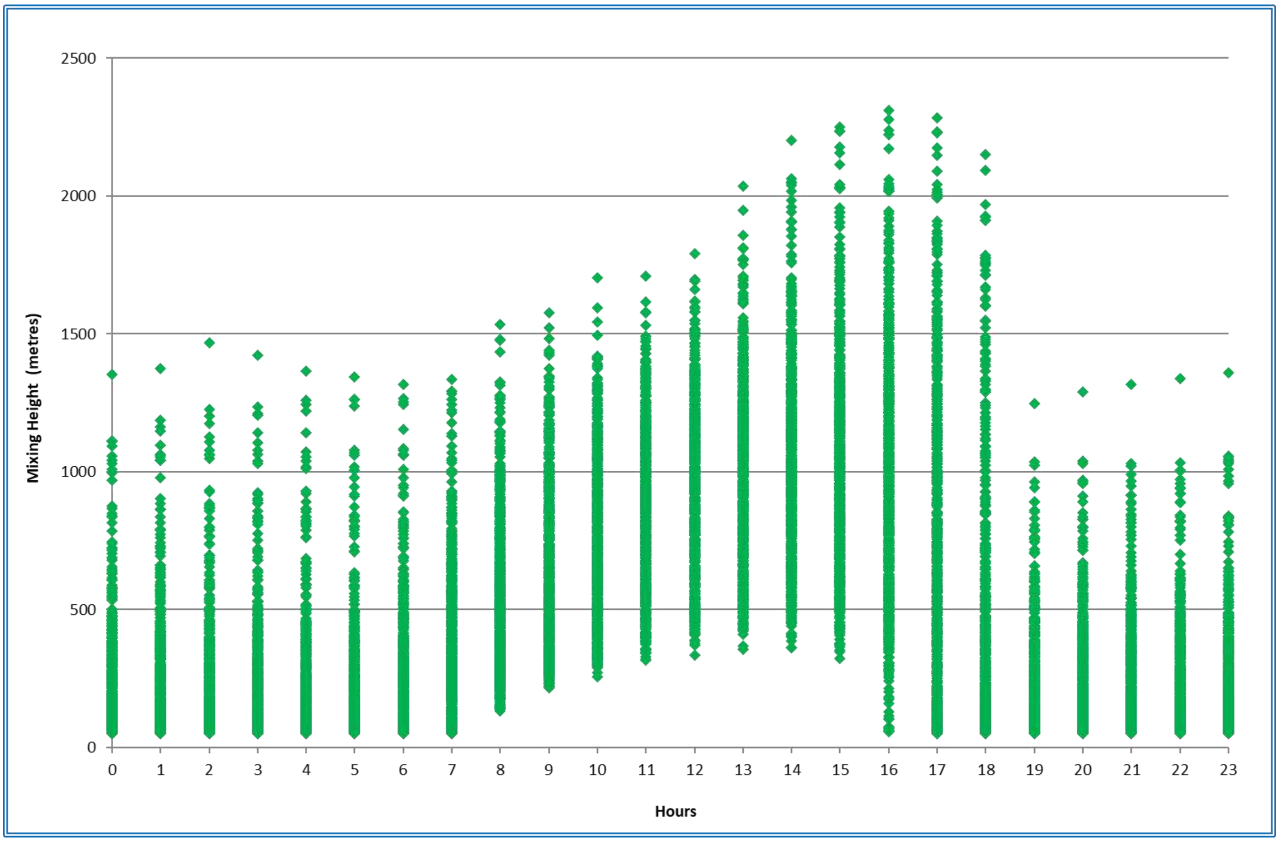


Figure 2-7: Annual X-Y scatter plot diurnal mixing height for Kwinana Locality (modelled)

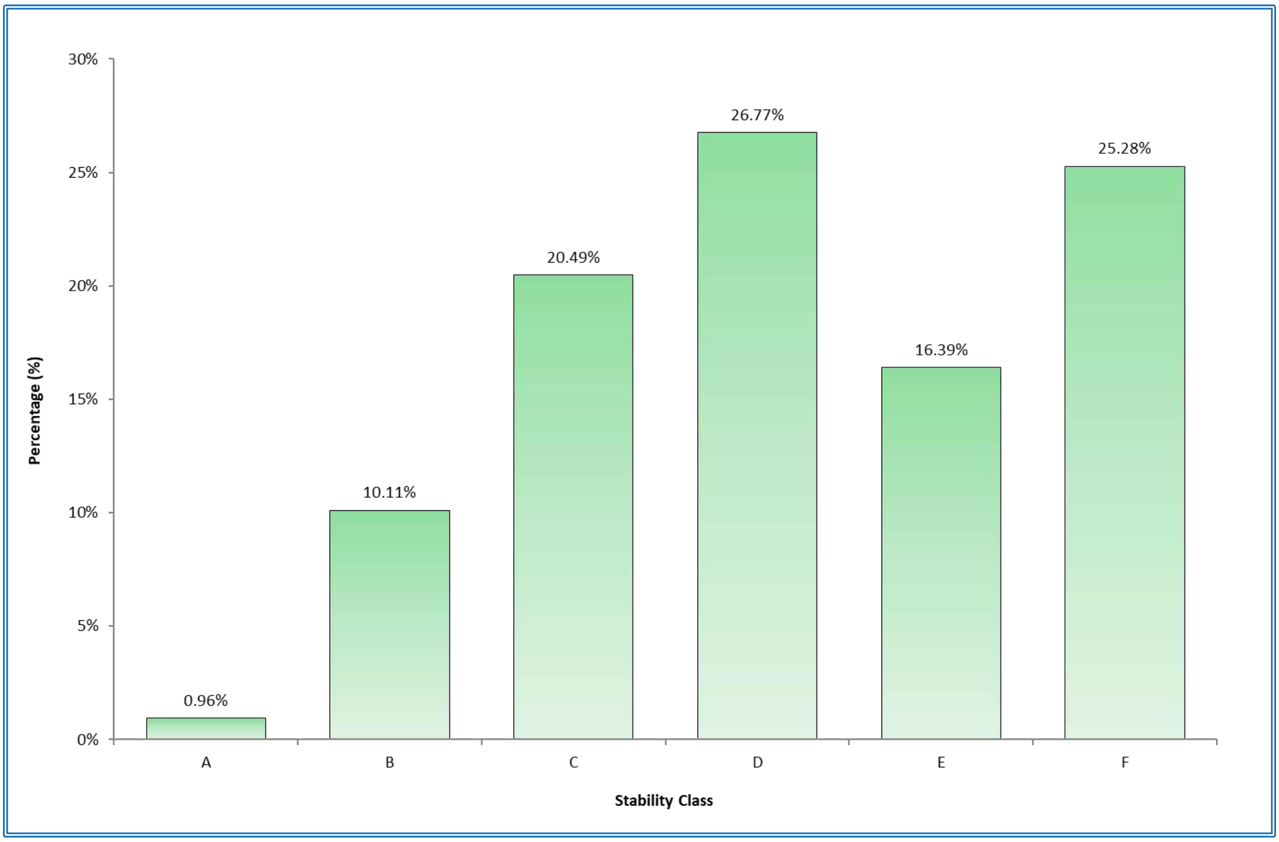


Figure 2-8: Annual stability class frequency for Kwinana Locality (modelled)

2.2 LHP Licence Application Process Description

[redacted]

During the initial Site's design, the existing Works Approval emission compliance standards were based on dust, NOx, SO and CO levels (refer Table 3-2). Compliance with the dust emission limit is readily achieved by the baghouse, while compliance with the NOx, SOx and CO limits is achieved by the design of the combustion system. Although it is not required under the current licence conditions, in order to improve its emissions, Tianqi intends to install additional best-practice off gas treatment equipment.

The entire Calciner off-gas stream will be processed by the new off-gas treatment equipment. This is a flow of 84,000 Am^3/h, (51,000 Nm^3/h). This duty point represents a 25% flow margin above the normal operating point of the Calciner. The system will operate continuously while the Calciner is operating.

The detailed flowsheet for the off-gas treatment system incorporates a combination of thermal oxidation of the organic species and wet gas scrubbing. The thermal oxidiser with a gas scrubber will be installed downstream of the baghouse and upstream of the Stack.

The complete details regarding the Licence Application and proposed infrastructure and process equipment and flow are provided in Tianqi's overarching Licence Application document(s).

3 Pollutant Emissions

The LHP, as part of its current operational licence conditions, has been undertaking stack emissions testing for key pollutants from primary process areas, to include:

- Calciner Fan Stack;
- Calciner Refeed Feed End Stack;
- Calciner Refeed Discharge End Stack;
- Spodumene Mill Stack;
- Roast Kiln Stack;
- Acid Roast Scrubber Stack;
- Sodium Sulphate Stack; and
- Steam Generator Stacks (2 of).

The measured 2023 concentrations of airborne pollutants are listed in Table 3-1 together with the current licensed emissions' limits (concentration) in Table 3-2.

Table 3-1: 2023 Emitted Pollutant Concentrations

Emission Location	2023	TSP (mg/m^3)	NOx (mg/m^3)	SO_2 (mg/m^3)	SO_3 (mg/m^3)	CO (mg/m^3)
Calciner Fan Stack	Max	3	400	28.8		51.1
	Min	1	198	19.7		6
	Ave.	1.9	320	25.2		19.6
Calciner Re-Feed Discharge	Max	46	0.119	0.179		0.179
	Min	2	0.102	0.153		0.153
	Ave.	16	0.110	0.166		0.166
Calciner Re-Feed Feed	Max	40				
	Min	40				
	Ave.	40				
Spodumene Mill	Max	2				
	Min	2				
	Ave.	2				
Acid Roast Scrubber Stack	Max	10		1300	2.40	
	Min	2.1		350	0.28	
	Ave.	6.1		807	1.05	
Sodium Sulphate Stack	Max	16	633			
	Min	10	4			
	Ave.	13	318			

Table 3-2: Current Works Approval Licence Conditions for Emissions

Discharge point and location on Schedule 1: Map of discharge point locations	Emission	Limit
Calciner fan stacks Sodium sulfate heater stacks	NOx	350 mg/m^3
	TSP	50 mg/m^3
Acid roast scrubber stacks	SO_3	100 mg/m^3
	TSP	50 mg/m^3
Calciner refeed end stacks	TSP	50 mg/m^3
Calciner refeed discharge end stacks		
Spodumene mill stacks		

Stack testing of these primary emissions sources, for 2023, has provided the pollutant mass emission rates listed in **Table 3-3**.

Table 3-3: Stack Testing Pollutant Mass Emission Rates

Location	Stack dia. (m)	-	Velocity (m/s)	Vol. Flow (m^3/s)	Temp.	TSP	NOx	SO_2	SO_3	CO
						grams per second (g/s)				
Calciner Stack	1.10	Max	21.00	19.96	198.00 (°C)	0.04276	1.73626	0.11404		0.19957
		Min	10.70	10.17	148.00 (°C)	0.01330	0.76977	0.07869		0.02328
		Ave.	*15.90*	*15.11*	*452.97 (K)*	*0.02996*	*1.28849*	*0.10003*		*0.07817*
Calciner Re-Feed Discharge End	0.20	Max	15.80	0.50	54.00 (°C)	0.02038	0.00199	0.00298		0.00298
		Min	13.00	0.41	21.00 (°C)	0.00082	0.00170	0.00254		0.00254
		Ave.	*14.22*	*0.45*	*310.65 (K)*	*0.00705*	*0.00184*	*0.00276*		*0.00276*
Calciner Re-Feed Feed End	0.20	Max	13.00	0.41	63.00 (°C)	0.01634				
		Min	13.00	0.41	63.00 (°C)	0.01634				
		Ave.	*13.00*	*0.41*	*336.15 (K)*	*0.01634*				
Spodumene Mill	1.18	Max	3.25	3.55	61.00 (°C)	0.00711				
		Min	3.25	3.55	61.00 (°C)	0.00600				
		Ave.	*3.25*	*3.55*	*334.15 (K)*	*0.00655*				
Acid Roast Scrubber Stack	0.15	Max	10.50	0.19	47.00 (°C)	0.00141		0.24122	0.00034	
		Min	8.00	0.14	37.00 (°C)	0.00039		0.04948	0.00005	
		Ave.	*9.57*	*0.17*	*314.82 (K)*	*0.00090*		*0.14316*	*0.00016*	
Sodium Sulphate Stack	0.50	Max	19.00	3.73	156.00 (°C)	0.05498	0.01492			
		Min	17.50	3.44	64.00 (°C)	0.03731	0.01374			
		Ave.	*18.25*	*3.58*	*383.15 (K)*	*0.04614*	*0.01433*			

The ***average*** mass emission rates listed in Table 3-3 above have been modelled within the Assessment to determine their ground level concentrations at key ground level receptor locations.

4 Dispersion Modelling Methods

4.1 Meteorology

As discussed in Section 2.1, the nearest BoM AWS(s) to the Kwinana Locality are Garden Island (Station 009256) and Jandakot (Station 009172).

To determine which bi-annual met periods were the most representative of the locality both the Garden Island and Jandakot stations were investigated for their most recent 5-year met trends (2018-2022).

To provide additional upper air met characteristics the CSIRO's The Air Pollution Model (TAPM) was also utilised and then used to supplement the development of the final met dataset.

Appendix A discusses the derivation of the 'representative' meteorological (met) annual periods for the locality, and subsequent development of the bi-annual met dataset.

4.2 Geophysical Configuration

4.2.1 Terrain Configuration

Terrain elevations were sourced from 1 Second Shuttle Radar Topography Mission (SRTM) Derived Smoothed Digital Elevation Model (DEM-S). The SRTM data has been treated with several processes including but not limited to removal of stripes, void filling, tree offset removal and adaptive smoothing (Gallant, Dowling, Read, Wilson, Tickle, & Inskeep, 2011). Coastline data was sourced from USGS Global Self-consistent Hierarchical High-resolution Shoreline (GSHHS) Database (Paul & Smith, 2015). A map of the terrain is illustrated in **Figure 4-1** to follow.

4.2.2 Land Use Configuration

Land use was sourced from the United States Geological Survey (USGS) Global Land Cover Characteristics Data Base for the Australia-Pacific Region (Survey, 1997).

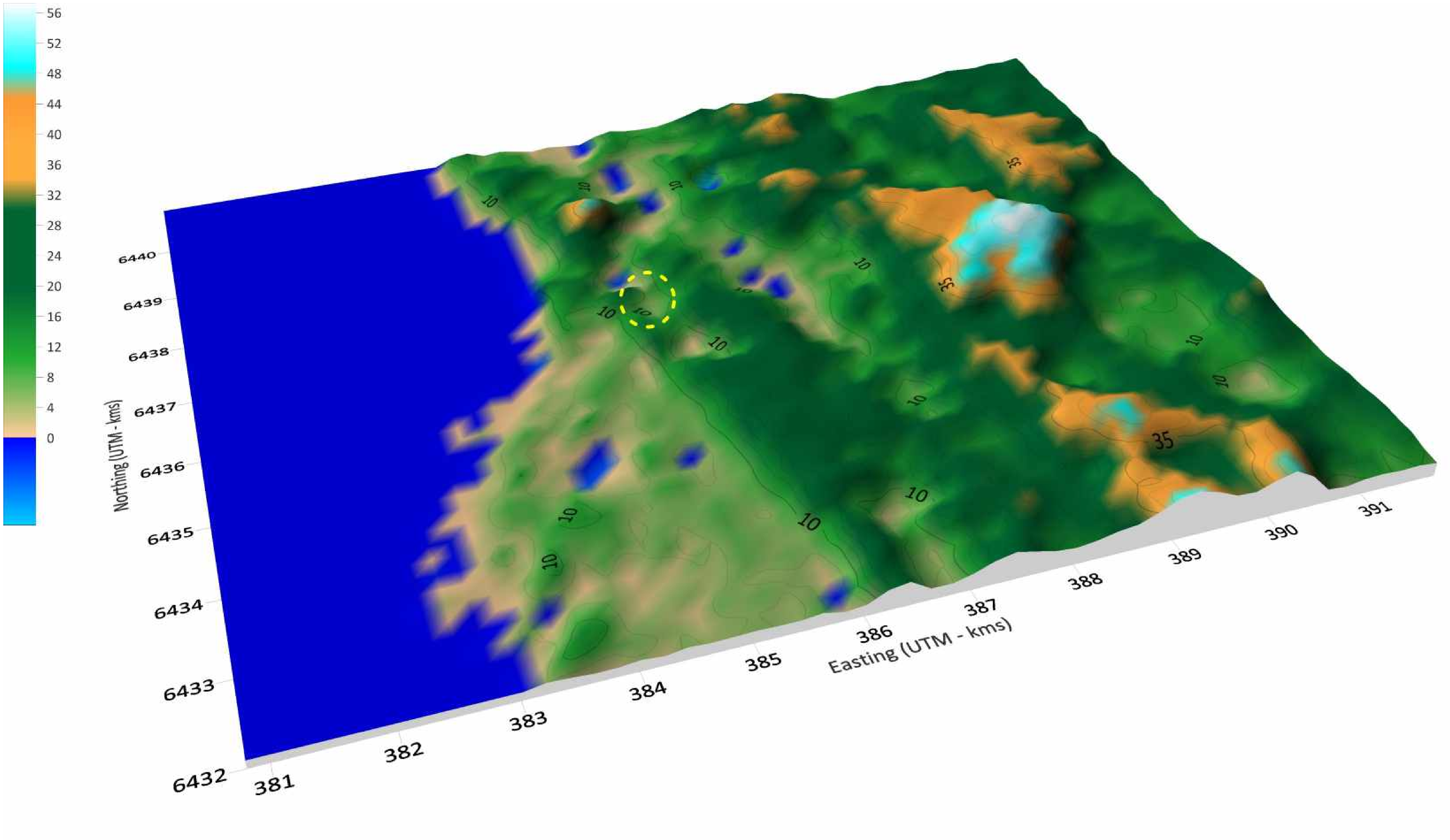


Figure 4-1: Terrain Features across Calpuff Modelling Domain (Tianqi LHP - hashed circle)

4.3 Calmet Meteorological Model Configuration

[redacted]

4.4 Calpuff Dispersion Model Configuration

[redacted]

[redacted]

4.4.5 Sensitive Receptors

Sensitive receptors were placed at the Site's boundary corners, the nearest industrial receptor (Waste to Energy Plant), at a public road location to the north-east of the Site, at the Kwinana Motorplex, and at a single receptor in the Medina residential area to the east.

These receptors are listed in **Table 4-2.**

Table 4-2: Sensitive Receptors

Receptor	X UTM (km)	Y UTM (km)
NW corner of Site	384.745	6435.278
SW corner of Site	384.735	6434.778
NE corner of Site	385.121	6435.281
SE corner of Site	385.132	6434.786
NE Road Bend	385.312	6435.303
Kwinana Waste-to-Energy Plant	384.875	6435.536
Medina Residential Receptor	386.867	6433.280
Kwinana Motorplex	385.766	6435.157

4.4.6 Dispersion Modelling Limitations

By definition, air quality models can only approximate atmospheric processes. Many assumptions and simplifications are required to describe real phenomena in mathematical equations. Model uncertainties can result from:

- Simplifications and accuracy limitations related to source data;
- Extrapolation of meteorological data from selected locations to a larger region; and
- Simplifications to model physics to replicate the random nature of atmospheric dispersion processes.

Models are reasonable and reliable in estimating the maximum concentrations occurring on an average basis. That is, the maximum concentration that may occur at a given time somewhere within the model domain, as opposed to the exact concentration at a point at a given time will usually be within the ±10% to ±40% range (US EPA, 2003).

Typically, a model is viewed as replicating dispersion processes if it can predict within a factor of two, and if it can replicate the temporal and meteorological variations associated with monitoring data. Model predictions at a specific site and for a specific hour, however, may correlate poorly with the associated observations due to the above-indicated uncertainties. For example, an uncertainty of 5° to 10° in the measured wind direction can result in concentration errors of 20% to 70% for an individual event (US EPA, 2003).

5 Assessment Results & Conclusion

The rank-1 ground level concentrations of key pollutants have been predicted across the modelling computational domain and at those sensitive receptor locations surrounding the Site.

The ground level concentrations (GLCs) of key pollutants have been shown to be below the ambient air quality guidelines (refer Table 1-1) at the nearest receptors assessed (refer Table 4-2).

The 2023 average emissions concentrations of airborne pollutants as measured at the existing Tianqi LHP are shown to be below the Site's current licence limits for Train 1.

Given the pollutant emissions at the point of discharge (refer Table 3-1), on average, do not exceed the emissions' limits set within the licence conditions, the likelihood of GLCs exceeding ambient air quality limits are low. As a consequence, the GLCs were typically expected to be below the regulatory limits for ground level exposure.

Tables 5-1, 5-2, 5-3 and **5-4** list the Calpuff predicted ground level concentrations for NOx, SO2, CO and TSP respectively at those sensitive receptor locations assessed and includes comparison to the air quality exposure guideline values with a Percentage of Exposure Limit Value (%). This value represents the percentage ratio of projected GLCs compared to the assessment criteria for each pollutant.

Also included is **Table 5-5** which assumes that TSP is the Particulate Matter (PM) 10 fraction (PM_{10}) and is subsequently compared to the ground level ambient air quality exposure value for PM_{10}.

A percentage less than 100 % shows that the projected concentration at the sensitive receptor location achieves less than the assessment criterion i.e., PASS, whereas a percentage greater than 100 % shows non-compliance against the assessment criterion i.e., FAIL.

The magnitude of the compliance PASS/FAIL can be readily gauged by the size of the Percentage of Exposure Limit Value (%).

- All GLC values reported for each sensitive receptor are the maximum, Rank 1 values for all averaging periods; and
- All units of concentration are in $\mu g/m^3$ unless stated otherwise.

Table 5-1: NOx Calpuff Predicted GLC Values

Averaging Period	Receptor ID	Rank-1 GLC (µg/m³)	Exposure Limit (µg/m³)	Percentage of Exposure Limit Value (%)
1-HOUR	NW corner of Site	19.4	151	12.82%
	SW corner of Site	10.1		6.67%
	NE corner of Site	17.0		11.24%
	SE corner of Site	15.7		10.42%
	NE Road Bend	9.1		6.00%
	Kwinana Waste-to-Energy Plant	11.2		7.43%
	Medina Residential Receptor	3.32		2.20%
	Kwinana Motorplex	6.95		4.60%
8760-HOUR	NW corner of Site	0.22	28	0.78%
	SW corner of Site	0.16		0.58%
	NE corner of Site	0.23		0.81%
	SE corner of Site	0.14		0.52%
	NE Road Bend	0.25		0.89%
	Kwinana Waste-to-Energy Plant	0.20		0.71%
	Medina Residential Receptor	0.03		0.09%
	Kwinana Motorplex	0.19		0.68%

Table 5-2: SO_2 Calpuff Predicted GLC Values

Averaging Period	Receptor ID	Rank-1 GLC (µg/m³)	Exposure Limit (µg/m³)	Percentage of Exposure Limit Value (%)
1-HOUR	NW corner of Site	65.7	197	33.37%
	SW corner of Site	20.4		10.34%
	NE corner of Site	14.1		7.15%
	SE corner of Site	23.9		12.13%
	NE Road Bend	12.9		6.56%
	Kwinana Waste-to-Energy Plant	39.8		20.22%
	Medina Residential Receptor	5.6		2.86%
	Kwinana Motorplex	13.9		7.04%
24-HOUR	NW corner of Site	15.6	52	30.00%
	SW corner of Site	2.83		5.45%
	NE corner of Site	3.29		6.33%
	SE corner of Site	4.43		8.52%
	NE Road Bend	1.86		3.58%
	Kwinana Waste-to-Energy Plant	4.36		8.38%
	Medina Residential Receptor	0.60		1.16%
	Kwinana Motorplex	1.52		2.91%

Table 5-3: CO Calpuff Predicted GLC Values

Averaging Period	Receptor ID	Rank-1 GLC (µg/m³)	Exposure Limit (µg/m³)	Percentage of Exposure Limit Value (%)
1-HOUR	NW corner of Site	1.17	30,000	0.004%
	SW corner of Site	0.61		0.002%
	NE corner of Site	1.02		0.003%
	SE corner of Site	0.93		0.003%
	NE Road Bend	0.55		0.002%
	Kwinana Waste-to-Energy Plant	0.68		0.002%
	Medina Residential Receptor	0.20		0.001%
	Kwinana Motorplex	0.42		0.001%
8-HOUR	NW corner of Site	0.23	10,000	0.002%
	SW corner of Site	0.20		0.002%
	NE corner of Site	0.31		0.003%
	SE corner of Site	0.21		0.002%
	NE Road Bend	0.30		0.003%
	Kwinana Waste-to-Energy Plant	0.30		0.003%
	Medina Residential Receptor	0.08		0.001%
	Kwinana Motorplex	0.29		0.003%

Table 5-4: TSP Calpuff Predicted GLC Values

Averaging Period	Receptor ID	Rank-1 GLC (µg/m³)	Area-A Kw EPP Limit (µg/m³)	Percentage of Exposure Limit Value (%)	Area-B Kw EPP Limit (µg/m³)	Percentage of Exposure Limit Value (%)
24-HOUR	NW corner of Site	1.27	150	0.85%	90	1.41%
	SW corner of Site	1.53		1.02%		1.70%
	NE corner of Site	1.43		0.95%		1.59%
	SE corner of Site	1.89		1.26%		2.10%
	NE Road Bend	0.79		0.53%		0.88%
	Kwinana Waste-to-Energy Plant	1.37		0.91%		1.52%
	Medina Residential Receptor	0.21		0.14%		0.24%
	Kwinana Motorplex	0.57		0.38%		0.63%

Table 5-5: TSP as PM_{10} Calpuff Predicted GLC Values

Averaging Period	Receptor ID	Rank-1 GLC (µg/m³)	DWER Limit (µg/m³)	Percentage of Exposure Limit Value (%)
24-HOUR	NW corner of Site	1.27	46	2.76%
	SW corner of Site	1.53		3.33%
	NE corner of Site	1.43		3.11%
	SE corner of Site	1.89		4.10%
	NE Road Bend	0.79		1.72%
	Kwinana Waste-to-Energy Plant	1.37		2.98%
	Medina Residential Receptor	0.21		0.46%
	Kwinana Motorplex	0.57		1.23%

Figures 5-1 to 5-4 illustrate the ground level predictions of short-term exposure, as concentration isopleths (contours) for key pollutants from the LHP. These ground level predictions are based on the Train 1 process area emissions.

The Assessment of the existing key pollutant areas, together with this Licence Application Air Quality Impact Assessment (AQIA) that include additional emissions controls, shows that the Site's pollutant emissions do not negatively impact the Kwinana locality, nor at the nearest sensitive receptor.

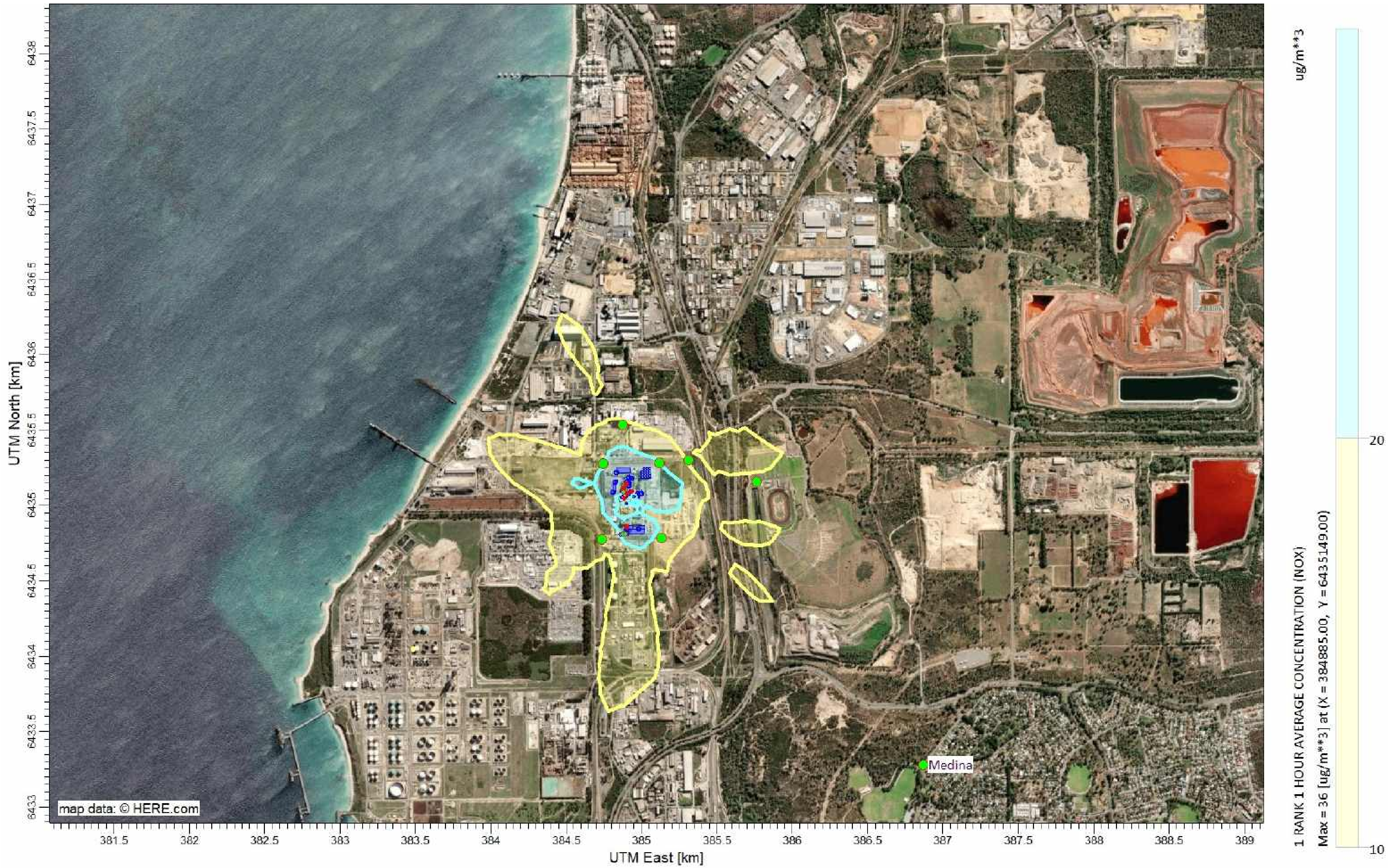


Figure 5-1: NOx Ground Level Concentrations (Rank-1, 1-hr averaging)

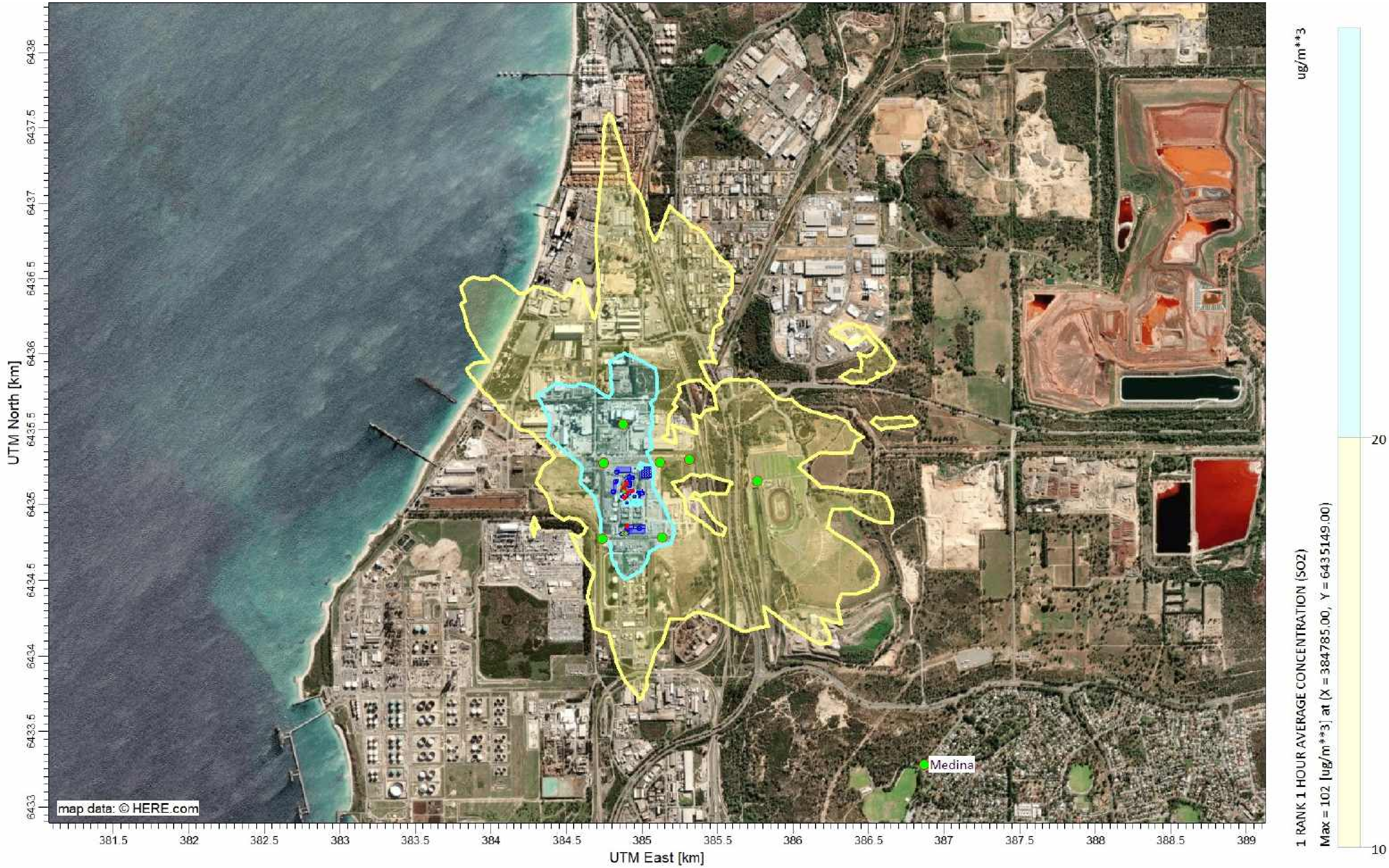


Figure 5-2: SO_2 Ground Level Concentrations (Rank-1, 1-hr averaging)

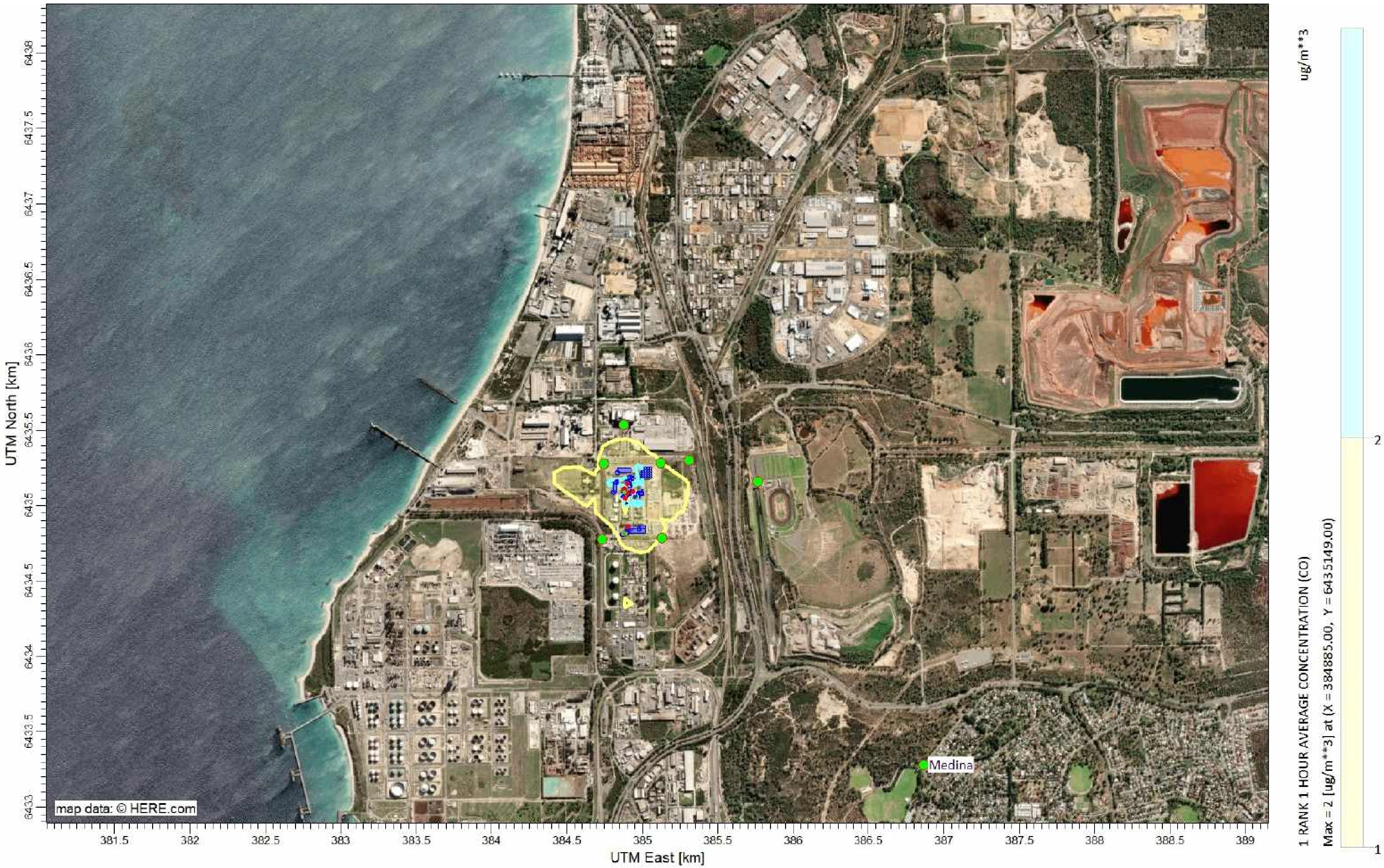


Figure 5-3: CO Ground Level Concentrations (Rank-1, 1-hr averaging)

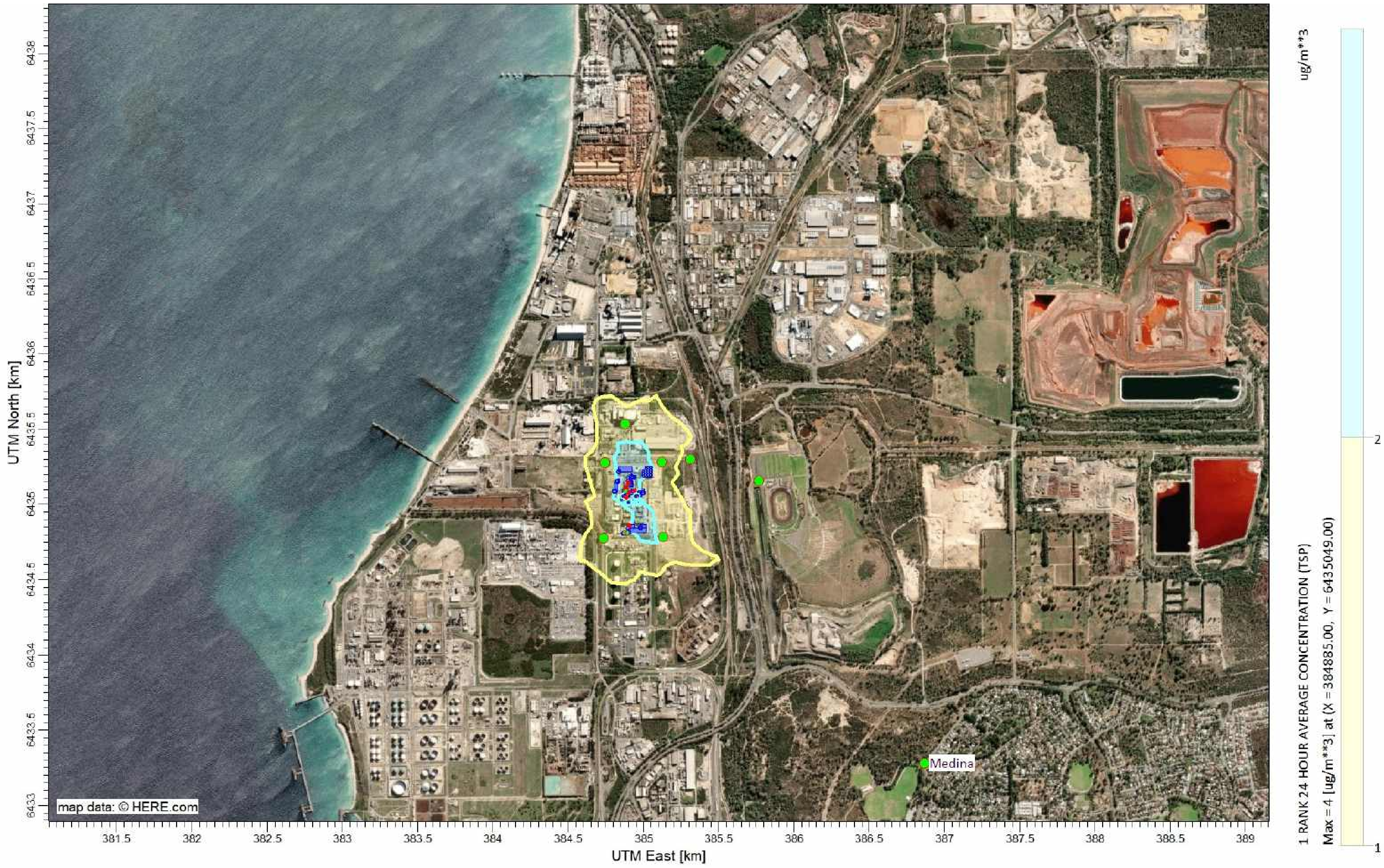


Figure 5-4: Total Suspended Particulate (TSP) Ground Level Concentrations (Rank-1, 24-hr averaging)

6 Bibliography

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Appendix A: Derivation of Representative Meteorology

Appendix B: BPIP Inputs

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Appendix C: Example of Calpuff Input File