



South Kings Properties Pty Ltd on behalf of
Precinct 15 Landowners
Precinct 15
Updated Phase 2 Buffer Constraint Assessment

January 2015

Executive summary

GHD was engaged by Lawyers for George Western Foods (GWF) (the operator of Don Smallgoods at 248 -258 Blackshaws Rd) in May 2006 to conduct a buffer assessment of the Don Smallgoods operation. The assessment report¹ was issued in February 2007 and formed part of a submission by GWF to the Panel Hearings for the C33 Amendment to the Hobsons Bay Planning Scheme. The Don Smallgoods site was located on the southern boundary of Precinct 15. However, operations were ceased in late 2010 and have since been relocated to the GWF Castlemaine site.

In early 2010, Kyle Road Developments Pty Ltd engaged GHD Pty Ltd to undertake a buffer assessment and odour impact review of the Precinct 15 site ("the Site"). The assessment was confined to the separation needed to ensure protection from odour or dust impact only; it did not consider the issue of safety separation distances from major hazard facilities or the issue of noise.

GHD provided a Phase 1 report in February 2010² that concluded that the two existing industrial premises whose default buffers posed a potential constraint on the Site were; (i) Jotun (a manufacturer of paint and powder coatings) and (ii) Mobil Altona refinery – see Figure 1.

The constraint of Jotun was demonstrated to be of no consequence in an earlier buffer assessment conducted by GHD via Tract for the Bradmill site development.

The constraint posed by the refinery was considered by GHD to not extend sufficiently to apply in the direction of the Site (i.e. north of the refinery) on the basis of the local meteorology. It was agreed that the supporting analysis would be undertaken during the second phase of the assessment.

That report also concluded that the residual industries still operating (principally on the west and southern margins facing Kyle Rd and Blackshaws Rd respectively) did not attract amenity buffers.

GHD was subsequently engaged by the Precinct 15 Landowners (a successor to the original proponent) in May 2012 to conduct Phase 2 of the assessment. Phase 2 was also to include any relevant developments that have occurred in the interim since the initial assessment. In particular the ongoing activity by EPAV in the area to reduce the off-site impacts of industries in Brooklyn to the north of the site was to be reported. The EPAV enforcement activities with respect to odour impact and the dust monitoring and mitigation programme initiated by EPAV in October 2009 are described in this report.

A rezoning of the Precinct 15 site from 'Industrial 1 Zone' (mixed general industry) to zonings that allow for residential development is proposed. Land tenure and current use of Precinct 15 industrial sites suggests that (less than) light industrial activity either does not attract a buffer (viz. Form 700 and One Steel – see section 1.2 above) or it is in the best interest of the industry to relocate (viz. George Western Foods).

Application of the EPAV default buffer distances indicated that there is strictly insufficient separation of the Precinct 15 site from the Mobil Altona refinery and from Jotun to comply with these radial buffers. The default buffer of 1000 m was considered by GHD to be excessive for Jotun (as discussed in Section 2.1). However the default buffer distances did not account for site specific variation as described in section 3.5. The default buffer distances have been

¹ GHD 2007 "Assessment of Appropriate Buffer for Don Smallgoods Operations at 245/255 Blackshaws Rd, Altona North" Report #118654, 27 February 2007.

² GHD 2010 Letter report # 178361 to Tract Consultants, 19 February 2010.

applied as a fixed radial distance from the envelope of sources and do not take account of directions of good and poor dispersion.

The directional buffers determined for the Mobil Altona refinery in Section 3 all show that the retraction from the 2000 m default in the direction towards Precinct 15 is sufficient to remove any constraint on the Site.

On the basis of the directional buffers, there is sufficient separation of the Precinct 15 site from all other industries investigated herein. GHD recommend that the directional buffers apply as they account for site specific meteorology. The protection from disamenity afforded at proposed residences in Precinct 15 in consequence of an upset/malfunction at the refinery, will be greater than that afforded for residences in Altona and Seaholme at 2 km distance from the southern boundary of the refinery.

Recent complaint data and the mitigation measures being taken by industries following EPAV intervention activity show that improvements in plant operation and design have reduced the number of odour reports received by the EPAV. This suggests that consequent odour disamenity has also been reduced. Recent communication with EPAV confirms that odour complaints in Yarraville sourced to the Brooklyn Industrial Precinct have almost ceased, and that this is also the case for South Kingsville. This trend will continue as EPAV continue to reduce industry odour emissions in the future.

The EPAV programme of dust mitigation at the industries in Brooklyn has been effective in reducing PM10 levels at nearby residential areas, and both the Bradmill and Precinct 15 developments will be beneficiaries of this programme.

This process of improvement being led by EPAV suggests that odour and dust impacts at the Precinct 15 site will progressively reduce in the future, and be no worse than impacts in other nearby suburbs.

As there is no record of odour complaints being sourced to Jotun, the impact of this industry on the Precinct 15 site is expected to be low.

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Appendices

Appendix A - EPA Licence EA38

Appendix B - EPAV Newsletters – Brooklyn Dust Monitoring Program

Appendix C - EPAV Report – Air Monitoring in Brooklyn November 2009 to October 2010.

Appendix D - Extract from Mobil Altona Refinery Community Bulletin)

1. Introduction

1.1 Prior work on site

GHD was engaged by Lawyers for George Western Foods (GWF) (the operator of Don Smallgoods at 248 -258 Blackshaws Rd) in May 2006 to conduct a buffer assessment of the Don Smallgoods operation. The assessment report³ was issued in February 2007 and formed part of a submission by GWF to the Panel Hearings for the C33 Amendment to the Hobsons Bay Planning Scheme. The Don Smallgoods site was located on the southern boundary of Precinct 15. However, operations were ceased in late 2010 and have since been relocated to the GWF Castlemaine site.

1.2 Phase 1 report

In early 2010, Kyle Road Developments Pty Ltd engaged GHD Pty Ltd to undertake a buffer assessment and odour impact review of the Precinct 15 site ("the Site"). The assessment was confined to the separation needed to ensure protection from odour or dust impact only; it did not consider the issue of safety separation distances from major hazard facilities or the issue of noise.

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The constraint of Jotun was demonstrated to be of no consequence in an earlier buffer assessment conducted by GHD via Tract for the Bradmill site development.

The constraint posed by the refinery was considered by GHD to not extend sufficiently to apply in the direction of the Site (i.e. north of the refinery) on the basis of the local meteorology. It was agreed that the supporting analysis would be undertaken during the second phase of the assessment.

That report also concluded that the residual industries still operating (principally on the west and southern margins facing Kyle Rd and Blackshaws Rd respectively) did not attract amenity buffers.

Of these industries, only one, the One Steel facility on Kyle Rd, could be considered to fall within the categorised industry types in the EPA Buffer Guidelines. At this facility, One Steel fabricates, stores and distributes steel reinforcing product – an operation that would fall under the category 'Fabricated Metal Products – Iron and steel products'. The default buffer for this category (as set in publication AQ/86) was set at 500 m for annual throughput up to 1 million tpa. However, the annual throughput is estimated⁵ at just 14,000 tpa, or ~ 1.4% of the default throughput. Using a buffer assessment methodology⁶, the derated buffer accounting for reduced throughput is less than 50 m. As 100 m is the minimum buffer set in the EPA Buffer Guidelines, GHD considers that a buffer is not required. Also note that EPA has since revised the buffer guidelines with Publication 1518, March 2013 which now completely removes the fabricated metal product category.

³ GHD 2007 "Assessment of Appropriate Buffer for Don Smallgoods Operations at 245/255 Blackshaws Rd, Altona North" Report #118654, 27 February 2007.

⁴ GHD 2010 Letter report # 178361 to Tract Consultants, 19 February 2010.

⁵ Pers, comm. C. Jellis, Charter Keck Cramer.

⁶ Clarey P. Pollock T. "Integrating Separation Distances with Dispersion Modelling". Enviro 04, 28 March – 1 April 2004, Darling Harbour, Sydney

The Phase 1 report also summarised actions by EPAV to respond to concerns by local residents (organised to the Brooklyn Residents Action Group (BRAG)) including the formation of the Brooklyn Community Reference Group (BCRG) and subsequent actions to improve the environmental performance of industries in Brooklyn.

GHD was subsequently engaged by the Precinct 15 Landowners (a successor to the original proponent) in May 2012 to conduct Phase 2 of the assessment. Phase 2 was also to include any relevant developments that have occurred in the interim since the initial assessment. In particular the ongoing activity by EPAV in the area to reduce the off-site impacts of industries in Brooklyn to the north of the site was to be reported. The EPAV enforcement activities with respect to odour impact and the dust monitoring and mitigation programme initiated by EPAV in October 2009 are described in this report.

1.3 Context

With growing urban development, residential and industrial use zones are less separated and these land uses compete for increasingly valuable land. Some industries generate noise and air emissions, including odour and/or dust, which can impact the amenity of nearby residents. To minimise such impacts, local councils can manage land use by zoning such that proposed different land uses have minimum impact on existing land uses and *vice versa*.

The Environment Protection Authority Victoria (EPAV) has several tools to manage conflicting land use depending on the environmental impact. For **routine** emissions from industrial premises, EPAV require that emissions to air comply to design criteria, and this is achieved by means of Works Approvals and Licences. Emissions of odour and dust are termed unclassified indicators, and their design criteria are to be met at and beyond the premises site boundary. For odorous emissions, the design criterion is one odour unit (1 OU), where 1 odour unit is the level at which 50% of people can just detect the odorant in a laboratory situation with near zero background levels of odour.

For unintended and sporadic **upset/malfunctions** from industrial premises, emissions can increase substantially above routine levels. To minimise disamenity in this event, EPAV recommends that planning authorities adopt buffer/separation distances in planning schemes to separate sensitive land uses (e.g. residential) from specified categories of industry premises. In the event of a plant upset/malfunction causing maximum odour/dust emissions, these buffers should minimise disamenity at sensitive land uses.

A rezoning of the Precinct 15 site from 'Industrial 1 Zone' (mixed general industry) to zonings that allow for residential development is proposed. Land tenure and current use of Precinct 15 industrial sites suggests that (less than) light industrial activity either does not attract a buffer (viz. Form 700 and One Steel – see section 1.2 above) or it is in the best interest of the industry to relocate (viz. George Western Foods). This will place residential use in relative proximity to industrial zones, to the north and north-west (Brooklyn Industrial Precinct), and south (Mobil refinery) (see Figure 1).

During routine operations, several of the nearby industries generate odour that is detectable beyond their site boundary, as indicated by the history of odour complaints from residents in surrounding suburbs. This Phase 2 assessment evaluates the potential for odour/dust impact at Precinct 15 during both routine operations and 'upset' scenarios at nearby industrial premises.

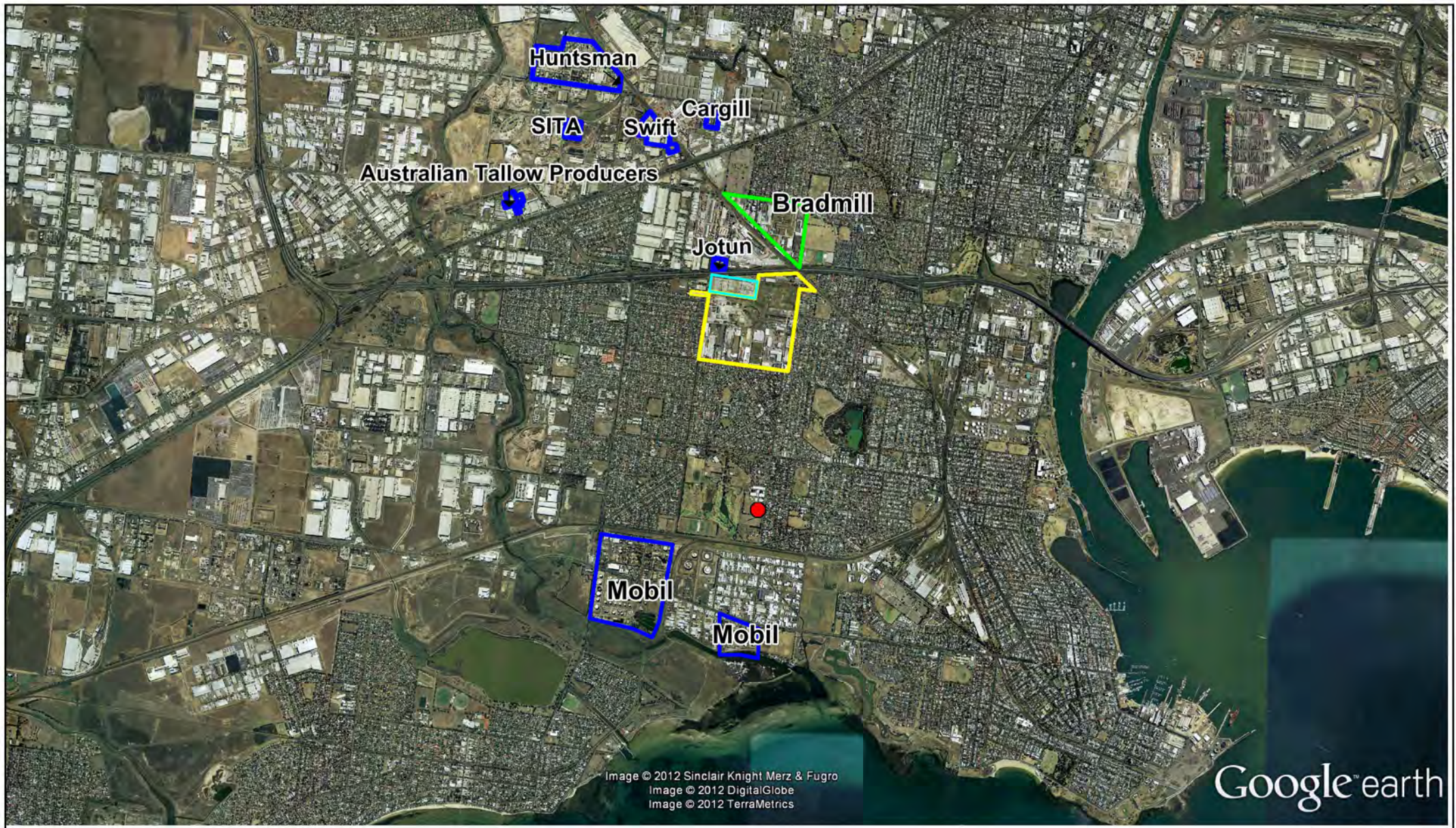
The evaluation of **routine** operations, will consider the recent odour/dust complaint history from neighbouring suburbs. The evaluation of potential for disamenity at the site due to an **upset** will be conducted by identifying premises that attract a buffer, and determining the constraint (if any) that the buffer places on the overall site.

This Phase 2 assessment also examines factors that influence current and future odour impact, namely:

- Processes put in place by EPAV such as Pollution Abatement Notices (PANs) to manage and reduce odour/dust emissions at industrial premises in the Brooklyn area;
- Throughput of individual industrial premises; and
- Prevailing wind conditions at Precinct 15.

This Phase 2 report provides an update to the further monitoring conducted by EPAV, addresses the dust mitigation campaign by EPAV, and examines a directional buffer for the Mobil refinery.

This report should be read in conjunction with the limitations and assumptions detailed in Section 7.



2. Buffer distance assessment – nearby industry

Figure 2 shows the known default buffers (ie those specified in the EPAV Buffer Guidelines⁷) from industry in the area that either approach or encroach on the Precinct 15 site. Note that industries located to the north and west of Precinct 15 had previously been identified by GHD in a previous buffer assessment conducted for Tract on the Bradmill site located north of Precinct 15.

The buffer areas depicted in Figure 2 show that:

- The 2000 m buffer from the Mobil refinery extends to Precinct 15 with a coverage of up to 200 m on the south west edge;
- The 1000 m buffer from Jotun Australia (Jotun) located at 9 Cawley Rd, Yarraville extends to almost completely cover the Precinct 15 site – excluding a small pocket at the south east corner; and
- All other buffers do not encroach onto the site as they are located well north of Geelong Road – note that in the case of Huntsman the facility is currently being decommissioned and placed on a care and maintenance footing.

2.1 Jotun

The potential constraint posed by the default buffer for Jotun can be dismissed (as was done at the Bradmill site) on the basis that:

- The default 1000 m buffer is too large for the size of the Jotun operation, and
- The lack of any complaints sourced to Jotun demonstrates that the operation is well run.

Those arguments were accepted by the Planning Panel in the Bradmill case, and will apply equally at Precinct 15. While Jotun is closer to most parts of Precinct 15 compared to the Bradmill site, the lack of known upset conditions for what is essentially a chemical mixing / batching operation is consistent with the absence of complaints sourced to this premises. The actual process of paint manufacturing results in brief periods of routine emissions and these are controlled by regulatory licencing. Residual air emissions are therefore very unlikely. Emissions could only be envisaged in an emergency event, rather than a plant upset condition. For example, leaks from the storage vessels of chemical constituents are subject to many fail safe measures and any spills are acted upon immediately.

2.2 Mobil Altona refinery

The issue of what constitutes an appropriate buffer for the Altona refinery is examined in detail in the following section. This is warranted as the default buffer of 2000 m for refineries was, in fact, based on a detailed assessment by EPAV of the complaint history at the Mobil Altona Refinery. In essence, the default 2000 m is not challenged here, but GHD believes that considerations of local meteorology allow a reduction in the buffer extent to the north of the refinery.

An additional complicating factor arises from the fact that the known odour sources from the refinery during upsets have been from elevated stacks, as well as ground level releases. The

⁷ EPAV 2013 “Recommended Separation Distances for Industrial Residual Air Emissions – Guideline” Publication 1518, 7 March 2013.

height of release, H_s , influences the shape of the directional buffer as well as the meteorology, so the analysis had to take account of both factors.

Appendix D shows an extract from the December 2014 Mobile Altona Refinery Community Bulletin which indicates a declining trend in verified odour complaints during the past few years.

3. Site-specific buffer – Mobil Altona refinery

The Phase 1 report noted the intrusion of the default buffer from the Mobil Altona Refinery onto the southern portion of the Site – extending ~ 200 m, but suggested that consideration of the local meteorology would allow the default buffer to be retracted to the north. This section considers the likely sources of upset/malfunctions within the refinery complex and determines the directional buffer for each source. It is found that the shape of the directional buffer is strongly dependent on the height of the odour release during a process upset.

3.1 Default buffer – history of selection

Figure 2 shows the current default buffer of 2000 m as scribed from the perimeter of the process infrastructure on the site. It can be seen that this buffer covers almost all of the Seaholme and Altona residential areas, as well as large portions of Newport, Williamstown and Altona North. In some places, the separation of existing residential areas from the refinery is reduced to less than half the default value.

Some of the shortfall of available buffer was present at the expansion of the refinery in 1955, while much has been due to encroachment by residential sub-divisions, both before and since the advent of the EPAV buffer guidelines (first published in 1977⁸). The original guidelines did not allow for buffers greater than 1000 m, and in July 1984 some industry categories that were found by EPAV to generate complaints at greater ranges were included (such as feedlots - 5000 m, as well as aluminium and petroleum refineries – 2000 m).

The selection of 2000 m for petroleum refineries was based on detailed work by EPAV officers in examining the complaint history from the Mobil Altona refinery at that time⁹. It was found that the critical constraint requiring separation from residences was not hazard, but odour impact (i.e. disamenity leading to complaint from offensive odour). The detailed survey and analysis was done earlier by the senior author, and formed part of his Master's thesis.¹⁰

The community attitude surveys showed that odour, followed by noise, was the prime cause of annoyance. Six population segments were surveyed; three from residences north of the refinery and three from residences to the south. The plot of percentage annoyed, **Y**, in each segment at least once monthly against distance from the refinery centroid, **X**, was found to fit a linear correlation as given by the relation below:

$$Y = 79.42 - 0.03 X \quad \text{equation 1}$$

Putting **Y** = 0 gives a distance **X** ~ 2650 m, or 2240 m from the perimeter boundary.

Investigation of other buffer guidelines (e.g. Israeli) showed 2000 m has been used for refineries refining crude with a sulphur content greater than 0.5%, and this value was subsequently adopted in the Victorian guidelines as the default value for oil refineries.

⁸ EPAV 1977 'Recommended Buffer Zones for Industrial Residual Air Emissions.' Licensing Manual, Melbourne Victoria, March 1977.

⁹ Ramsay P.J., Wareham A.E. 'Role of Buffer Zones in Environmental Management', Symposium on Siting, Engineering and Management of Hazardous Industries – 1983, Melbourne, April 13 – 14.

¹⁰ Ramsay, P.J. Industrial Odours and Community Attitudes: Odorous Emissions Associated with a Petroleum refinery and an Evaluation of Surrounding Community Attitudes. Masters thesis, Monash University, Clayton, Victoria, 1978.

An interesting conclusion was that the relationship shown in equation 1 was found to be independent of the position of segments (i.e. north or south of the refinery). As shown later, this result was obtained only because the incidence of poor dispersion to the north is only slightly lower than the incidence to the south.

The wind climate at the Mobil Refinery site is required so that; (i) the directions of prevailing winds, and (ii) the directions of good and poor dispersion, can be determined. In the directions of poor dispersion the maximum extent of impact from an odour/dust emission during an upset/malfunction can be increased. Similarly, in the direction of good dispersion, the maximum extent of impact will be reduced. With this information, a directionally-dependent buffer can be specified.

3.2 Choice of meteorological dataset

Ideally a 12-month dataset recorded at hourly intervals is required to fully characterise annual average, diurnal and seasonal variations in wind climate. The nearest meteorological dataset to the Mobil Altona Refinery is from the EPAV AQMS (air quality monitoring station) located in the Paisley campus of Bayside College on Blenheim Rd, Altona East, some 1.5 km to north east of the refinery (see Figure 1). As there is no intervening terrain, the Paisley dataset will be representative of the wind climate at the refinery and in neighbouring suburbs.

The earliest datasets for the Ausplume dispersion model were initially labelled as 'Melbourne.met', but were in fact based on wind and temperature data at Paisley. At subsequent times, even after the Station was rebadged as Altona North, the datasets have been labelled as 'Paisley.met'. In 2001 the vane and rotating cup anemometer was replaced by an ultrasonic sensor, and datafiles since then have been labelled as 'Altona North.met'.

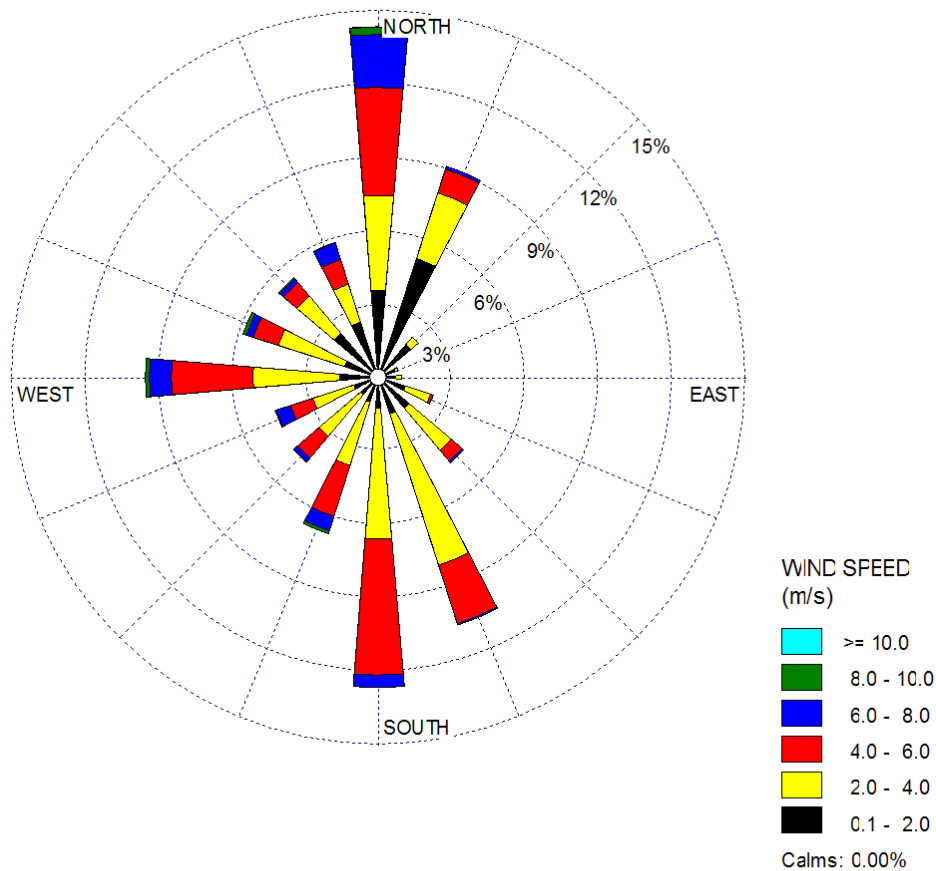
GHD holds 12 month datasets for 1995, 2002 and 2008 for this station, all obtained from EPAV. There are some minor differences between the datasets, reflecting inter-annual variability in wind climate. As a consequence, EPAV now prefer the 2008 datasets in the Port Phillip air shed to be used as their analysis suggests that this year is the best representation of 'typical' conditions.

3.3 Wind climate

Figure 3 shows the annual wind rose for the Altona North 2008 data. The following features can be seen from this figure:

- The prevailing wind directions are from the NW and SW quadrants, with a combined incidence of approximately 66%;
- There is a clear incidence of strong winds from the north, south and west, reflecting the movement of synoptic weather systems from the west;
- The incidence of due west winds (placing the subject land downwind of the refinery) is low at 7%, and
- The incidence of light winds is highest from the N and NNE, with a separate subsidiary incidence of light SE winds. The former is due to cool air drainage from the foothills of the Great Dividing Range to the north and from the Maribyrnong river valley, while the latter is due to the cooling of bay breezes in the afternoon and early evening during the warmer months.

Figure 3 Annual wind rose – Altona North AQMS 2008



3.4 Atmospheric stability – directions of good and poor dispersion

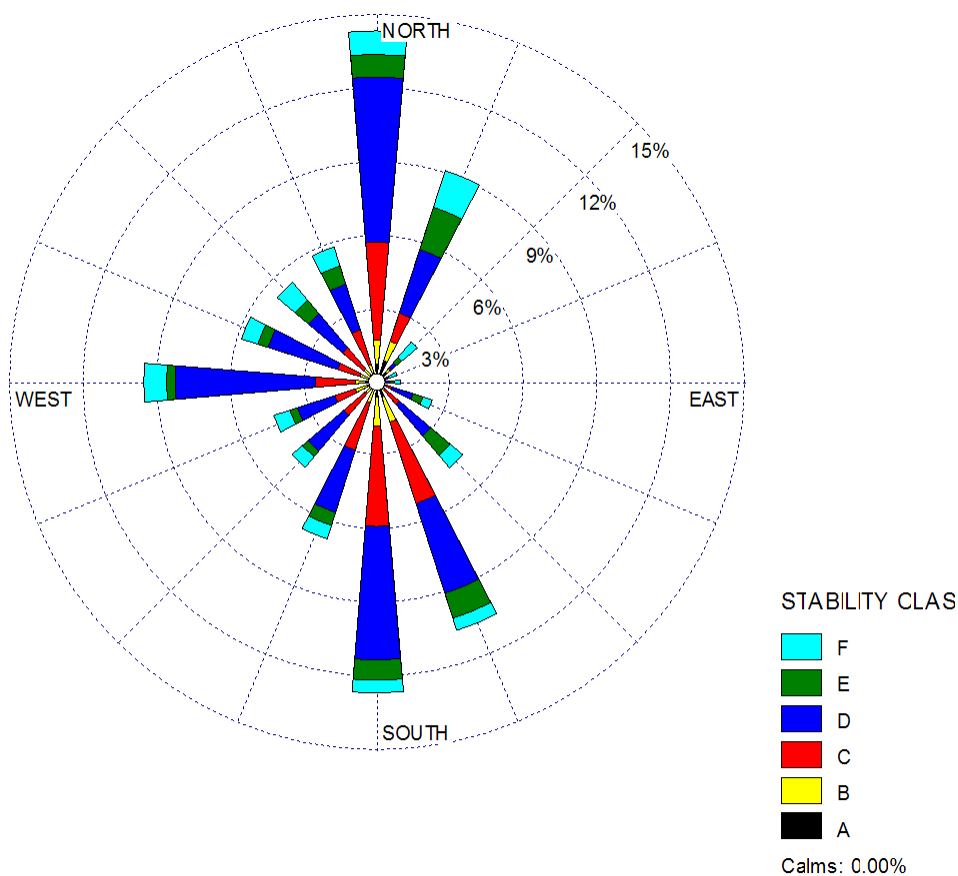
In the Pasquill/Gifford atmospheric stability scheme used in Ausplume, stability is classified into six classes A through F. A, B and C stability classes represent strongly, moderately and slightly unstable atmospheres respectively. Under unstable conditions dispersion of emissions from near-ground sources is good due to convectively vertical turbulent mixing. The stability category D denotes neutral atmospheric conditions (strong winds in moderate temperatures or lighter winds on overcast to partly cloudy days). Categories E and F denote slightly and moderately stable atmospheres when ground-based dispersion is poorest, as vertical mixing of air is suppressed. Stable atmospheric conditions occur in the absence of strong gradient winds, and mostly on nights with clear skies. They are often associated with ground-based radiation forced temperature inversions, sometimes with fog, mist or frost.

Neutral stability (D class) conditions occur most frequently and along with the prevailing wind direction can indicate the most common direction for potential odour impact. Under night-time E and F class conditions, odour emissions from ground based sources result in a downwind plume that is detectable to a greater distance than during the day (when unstable conditions commonly form). These conditions commonly result in odour complaints from ground and near ground sources at maximum range.

Figure 4 shows a stability rose for stable categories E and F (slightly and moderately stable respectively) for the Altona North data. The following features can be seen from this figure:

- Higher incidences of E and F stable categories are seen from the NNE, N and NW as well as SSE directions. These directions provide a guide on the directions of poor dispersion;
- A lower than average incidence of stable conditions is seen for all W, SW and E component winds; and
- There is a marked absence of easterly winds.

Figure 4 Stability wind rose – Categories E&F – Altona North AQMS 2008



3.5 Directionally-dependent buffer

The separation distance guideline allows the 'agent of change' to put a case to account for site-specific factors when requesting a variation to the default buffer specified in the guideline. Table 4 of EPA Publication 1518 lists six such factors most of which related to the conditions required to reduce the buffer. However, the topography and local meteorology factor does not bias to either a reduction or to an extension of the default buffer. Rather the buffer shape can be altered while retaining the enclosed area within the buffer.

So, in the direction(s) of poor dispersion the default buffer is extended, while in the direction of good dispersion the buffer can be retracted. In this manner, the degree of protection to an upset/malfunction is kept constant at a residence – independent of the direction of a residence from the odour source. Where the percentage change in buffer distance from the default value is small then there is little point in installing a directional buffer.

However, in the case of Precinct 15, the local meteorology gives a pronounced retraction in the westerly direction, due to the low incidence of stable easterly winds. There is a similar, though less pronounced retraction to the east, due to a low incidence of stable westerly winds. Hence the directional buffers determined in this section are considered to be appropriate and consistent with the intent of the guideline.

Where site-representative meteorological data is available, the directions of good and poor dispersion can be assessed as shown in section 3.4. Further, if the 12-month dataset is configured to Ausplume format (deriving atmospheric stability category and mixing height), then dispersion modelling can be conducted using a nominal source emission rate (dust or odour) to determine the directional change in extent from a fixed radial buffer. The methodology to calculate directional buffers is detailed in a paper¹¹ presented at Enviro 04.

Generally, odour sources are released at or near ground level, and in that case the extent of impact is almost entirely governed by the incidence of light stable winds in a given direction. However, for large industrial complexes such as refineries, some emission sources are released from tall stacks, and for these elevated releases the incidence of neutral and unstable conditions can also determine the maximum extent of impact. To gauge the effect of height of release on the pattern of impact, four simulations were conducted for the following scenarios:

- Scenario 1. A ground level release – assumed to occur anywhere within the refinery;
- Scenario 2. An elevated release from the flare stack DP33 (see EPAV Licence EA28, Appendix A, section 3 plan of the premises);
- Scenario 3. An elevated release from the flare stack DP34; and
- Scenario 4. An elevated release from the incinerator stack DP48 (see Appendix A, section 3 plan of the premises).

3.5.1 Scenario 1 - ground-based area release

A nominal 20 m x 20 m area source was modelled placed at the refinery centroid, and with a nominal emission rate. The 99.5% contour that gave a 2000 m range to the south was selected and plotted as shown in Figure 5. It can be seen from the figure that the extent of the contour to the east is substantially reduced to just 830 m. Similarly, the extent to the west is even more reduced, down to 540 m. To the north, the contour extent shrinks to 1200 m. This contour effectively gives the departure from the maximum default radius of 2000 m that would be needed if an equal exposure to disamenity was to be given in the event of a near-ground odour release from an upset/malfunction at the Mobil refinery.

The angular change in buffer distance defined by the contour in Figure 5 is given as a function of direction Θ in Table 1. This information has also been used to demonstrate the effect of accounting for a directional buffer when applied to the envelope of potential odour sources (green line in Figure 9) on the refinery site – as seen in Figure 9. The envelope (pale blue line) is used to

¹¹ Clarey P. Pollock T. "Integrating Separation Distances with Dispersion Modelling". Enviro 04, 28 March – 1 April 2004, Darling Harbour, Sydney.

define the limits of the position of a ground-level upset release which could occur anywhere within that envelope.

Table 1 Directional variation in buffer in response to local meteorology – ground-level release

Direction		Range m	% of max range	Direction		Range m	% of max range
Sector	deg.			Sector	deg.		
N	0	780	39	S	180	1545	77
NNE	22.5	870	44	SSW	202.5	2060	103
NE	45	775	39	SW	225	970	49
ENE	67.5	780	39	WSW	247.5	545	27
E	90	830	42	W	270	540	27
ESE	112.5	1100	55	WNW	292.5	910	45
SE	135	1500	75	NW	315	1335	67
SSE	157.5	1765	88	NNW	337.5	1110	55

From Figure 9 it can be seen that the directional buffer is substantially truncated to the west and north – it falls well short of the Precinct 15 land.

3.5.2 Scenario 2 - elevated release – stack DP33 at 46 m above ground

For this scenario the flare DP 33 was modelled with a nominal odour emission rate, and using the release parameters of discharge velocity $V_s = 20$ m/s, stack diameter $D_s = 0.5$ m, stack height $H_s = 46$ m and exhaust temperature $T_s = 300^\circ\text{C}$.

Figure 6 shows the near peak 99.5%ile pattern of odour impact, where a contour level has been chosen ($C = 6.6$ OU) so that its southern extent is approximately 2000 m. The contour shown in Figure 6 now shows a decreased extent to the east. Similarly, the degree of reduction in the contour's extent to the west is less marked than for the ground release. The contour extent to the north is seen to reduce, to approximately 1500 m.

Note that there are two 'islands' of elevated concentrations to approximately 10 OU sited north and south of the flare. These represent the position of the underside of the odour plume downwind from the flare. Typically this point occurs at approximately 10 stack heights downwind (i.e. $10 \times 46 \sim 460$ m). From Figure 6 the peak to the north is approximately 400 m distant, while the peak to the south is approximately 500 m distant. As these distances do not reach the residential areas to the north (Altona North) or to the south (Altona/Seaholme) the 'island' peaks have not been considered when drawing the buffer.

3.5.3 Scenario 3 - elevated release – stack DP34 at 61 m above ground

Here the high flare DP 34 was modelled with a nominal odour emission rate, as for DP 33, and using the same release parameters of discharge velocity $V_s = 20$ m/s and exhaust temperature $T_s = 300^\circ\text{C}$, but with a stack diameter $D_s = 0.76$ m and a stack height $H_s = 61$ m. Figure 7 shows the near peak 99.5%ile pattern of odour impact, where a contour level has been chosen ($C = 2.5$ OU)

so that its southern extent is approximately 2000 m. As for DP 33, the contour shown in Figure 7 now shows an almost equal extent to the north as to the south. Similarly, the degree of reduction in the contour's extent to the west is less marked than for the ground release. The contour extent to the north is seen to reduce only slightly, to approximately 1800m.

Note that as for DP 33 there are two 'islands' of elevated concentrations to approximately 4 OU sited north and south of the flare. These represent the position of the underside of the odour plume downwind from the flare. Typically this point occurs at approximately 10 stack heights downwind (i.e. $10 \times 61 \sim 600$ m). From Figure 7 the peak to the north is approximately 600 m distant, while the peak to the south is ~ 700 m distant. As these distances do not reach the residential areas to the north (Altona North) or to the south (Altona/Seaholme) the 'island' peaks are not considered in drawing the buffer.

3.5.4 Scenario 4 - elevated release – stack DP48 at 120 m above ground

For this scenario the incinerator stack DP 48 was modelled with a nominal odour emission rate, and using the release parameters of discharge velocity $V_s = 15$ m/s, stack diameter $D_s = 1.0$ m, stack height $H_s = 120$ m and exhaust temperature $T_s = 500^\circ\text{C}$. Figure 8 shows the near peak 99.5%ile pattern of odour impact, where a contour level has been chosen ($C = 11.4$ OU) so that its southern extent is approximately 2000 m. The contour presented in Figure 8 shows that the 'island' peaks seen in Figure 7 have moved further away from the stack base to encroach residential areas. The increase in distance of the 'island' centres from the stack DP48 is now approximately 1200 m to the north, and approximately 1500 m to the south. Both distances are approximately $10 \times H_s = 1200$ m ($H_s = 120$ m).

The contour in Figure 8 shows peak impact is confined to the two 'islands', the corresponding concentrations at similar range to the east and to the west are approximately 60 % and approximately 5% of the island peaks respectively. In effect, a corresponding buffer to the east and west of the plant as is provided to the south or north is not needed at all for a release at this height. The contour in Figure 8 has been transferred to Figure 9 (pink contours) with the origin centred on the position of stack DP 48.

3.6 Effect of directional buffers from refinery on Precinct 15

In Figure 9 the directional buffers given in Figures 5 to 8 have been overlaid onto an aerial basemap. Note that the buffer for ground-based release (Figure 5) has been applied to the envelope of the refinery site, as the release point is not defined. In contrast, the buffers for the release from stacks DP33, DP34 and DP48 are each centred on the stack location within the site.

Figure 9 shows that the directional variation of the buffer from the default 2000 m value is strongly dependent on the mode of release of the upset / malfunction odour emission. Where the emission is a near ground-level release, then the buffer (pale blue contour in the Figure) extends only approximately 1200 m to the northeast, and falls well short of the subject land. For upsets associated with a failure of a flare stack, the buffer is dependent on the flare stack height, H_s . A release from the incinerator stack DP 48 shows that peak impacts are located in two island areas north and south of the refinery, covering sections of Altona and Altona North respectively. It is only for an upset release from the flare stacks DP33 and DP34 on the eastern margin of the refinery, that the directional buffer (yellow and dark blue contour) extends significantly to the north (1500 m and 1800 m respectively). However, as these buffers are measured from the stack base, the extension north from the refinery boundary is reduced by approximately 300 m, and the buffers fall well short of the southern boundary of Precinct 15.

Figure 5 Ground level release – Scenario 1 – 2008

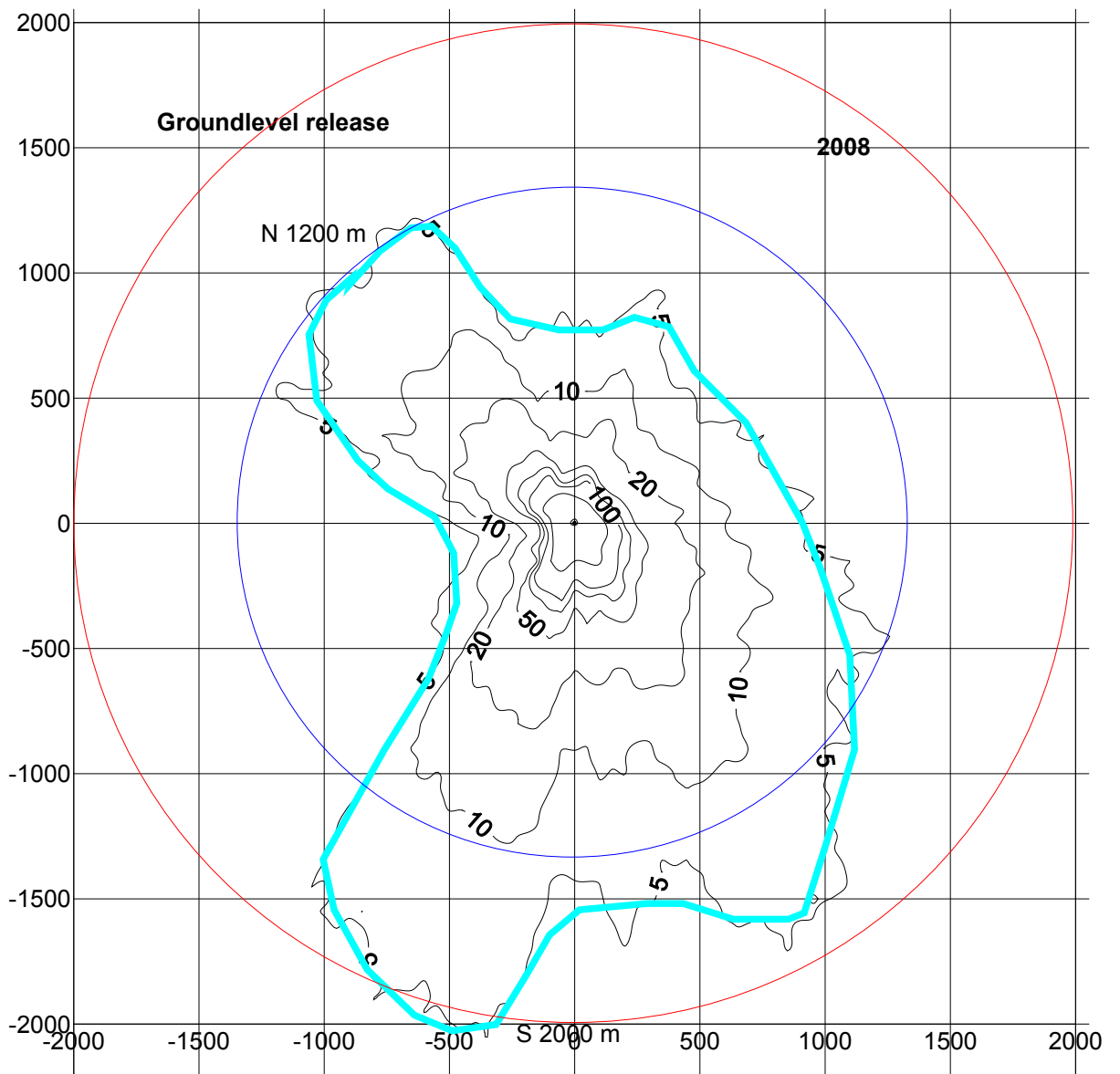


Figure 6 DP33 – Scenario 2 – 2008

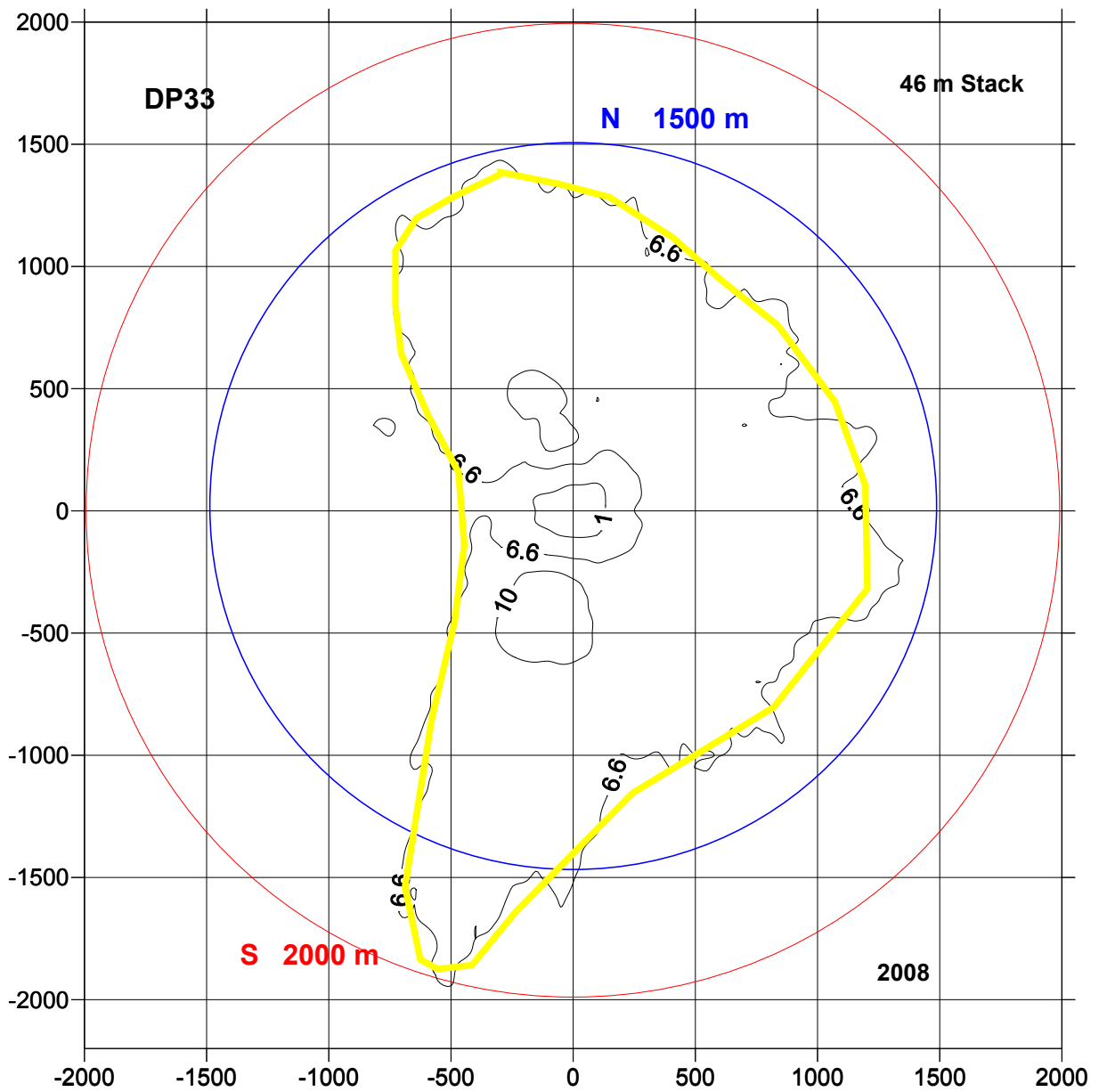


Figure 7 DP34 – Scenario 3 – 2008

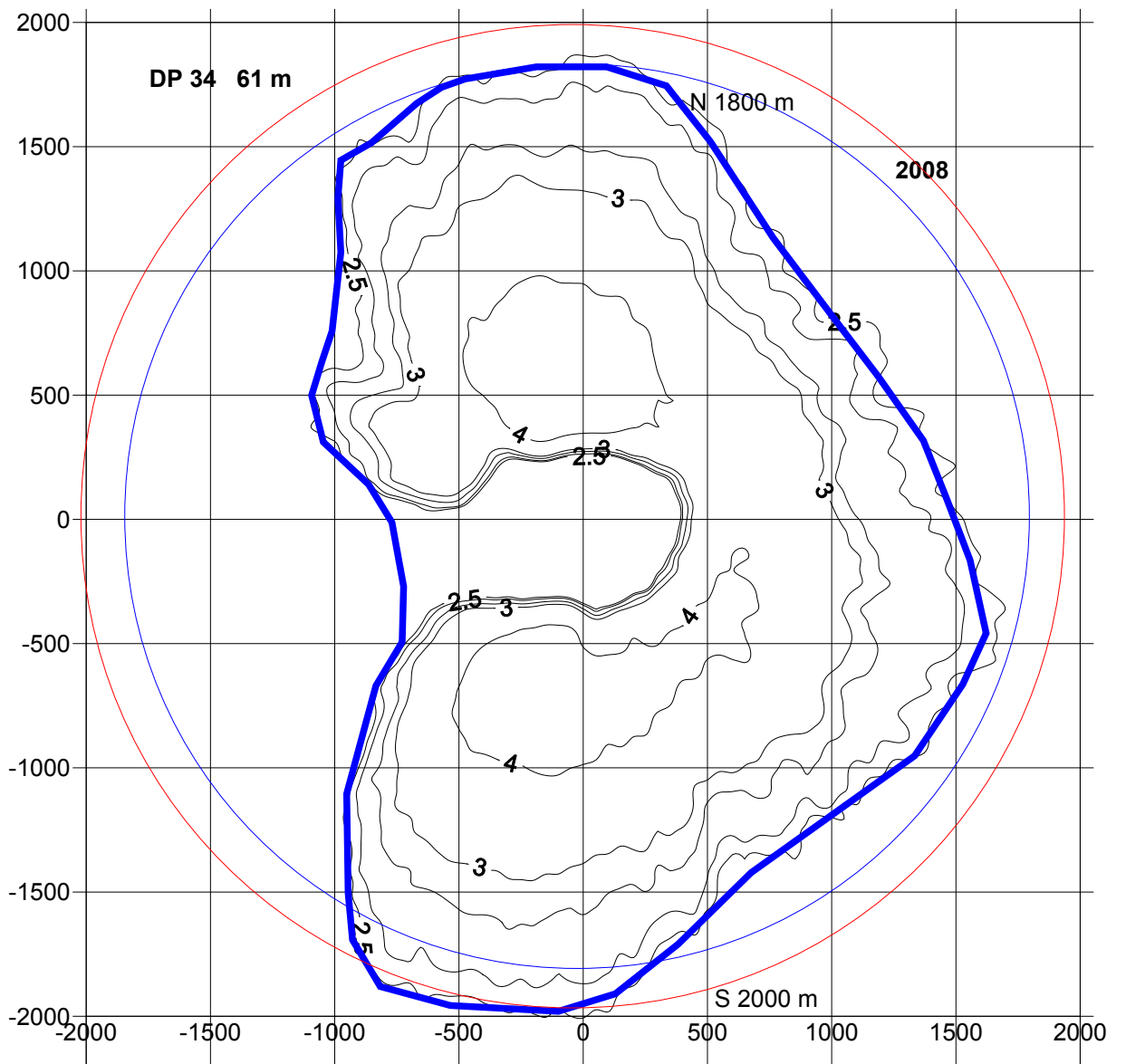
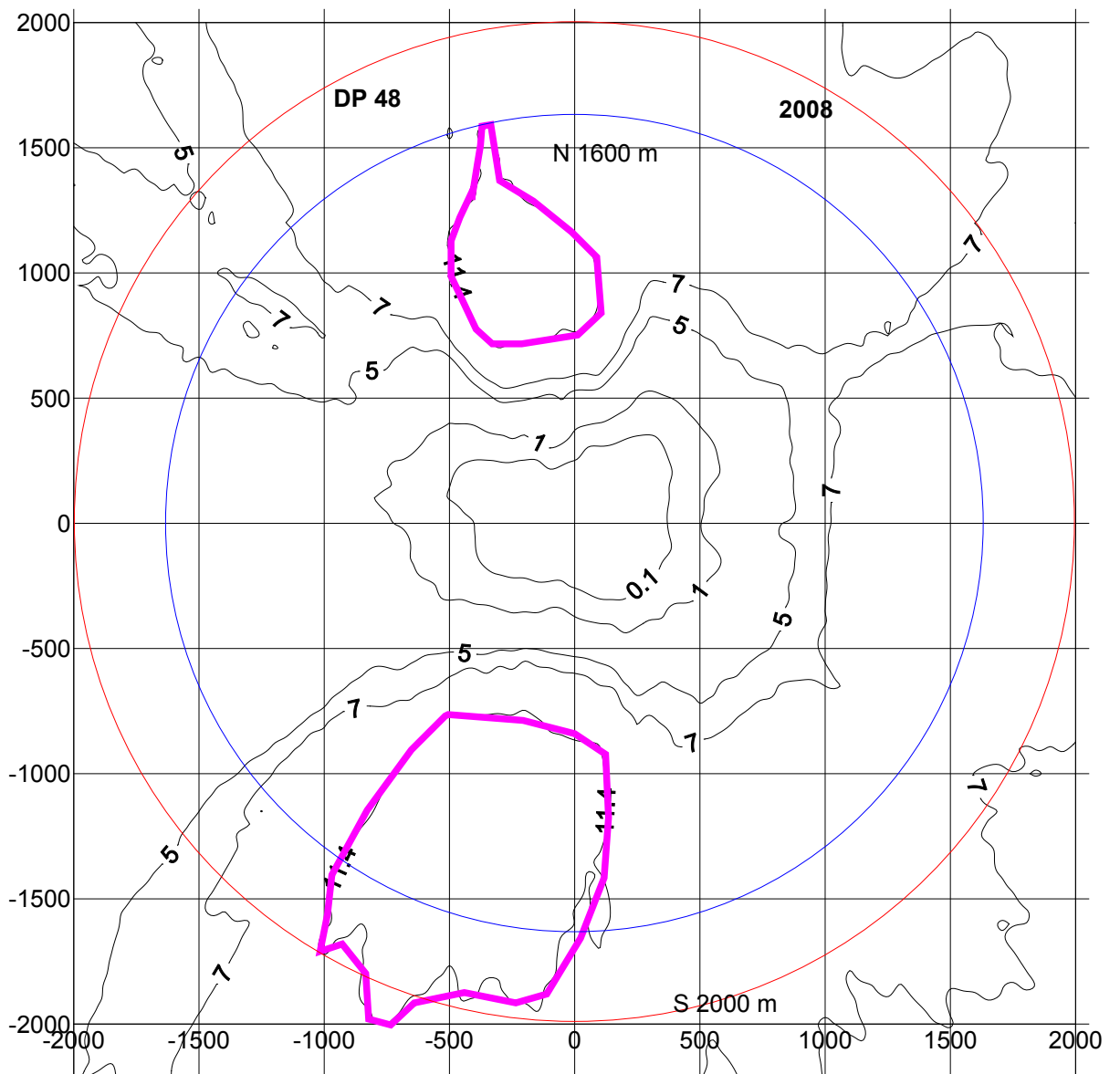
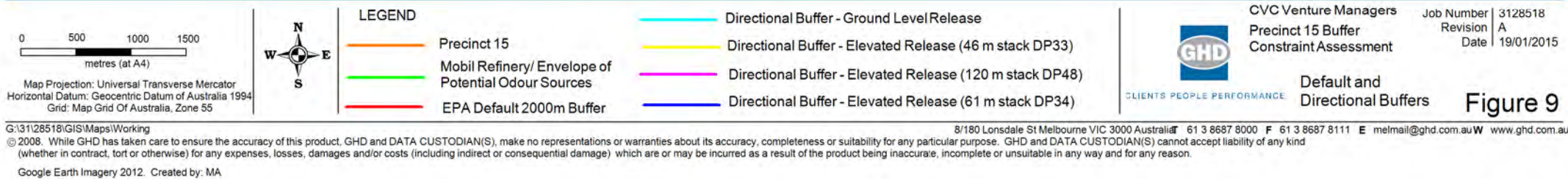


Figure 8 DP48 – Scenario 4 - 2008





4. Odour impact on Precinct 15

The following text is focussed on the exposure of the suburbs of Yarraville and Brooklyn, those being the two areas directly east of the Brooklyn Industrial Precinct. Early (April 2009) postings on the EPAV website did provide statistical data on other suburbs as well, and of these, the suburb of South Kingsville is more relevant as a surrogate for odour impact at Precinct 15 (see Figure 16). However, more recent postings have focussed on Brooklyn and Yarraville only, and this is presented below.

Recent communication with EPAV¹² confirms that the effectiveness of EPAV's efforts to minimise odour emissions from the Brooklyn Industrial Precinct is shown by the fact that odour complaints were rarely received from South Kingsville, and that in the past year complaints have also ceased from Yarraville, and have significantly reduced in Brooklyn. Table 2 (provided by EPA) shows this trend in resident complaints since 2009.

Table 2 Pollution reports by suburb

Year	Kingsville	Yarraville	South Kingsville	Total
2009	22	350	3	375
2010	21	427	4	452
2011	11	77	4	92
2012 ¹	10	18	0	28
Total	64	872	11	947

1. To early July

Pollution reports have substantially reduced since the last reported data in Table 2, so much so that¹³:

"Last year the lowest number of odour reports on record were received (electronic recording of reports began in 1996) and there have not been any extreme incidents of odour. The EPA can't verify if this is due to the community suffering from 'reporting fatigue' however EPA officers on-site have noticed less odour, and the drop in report numbers has been significant and rapid (down from 420 in 12/13 to 160 in 13/14)."

Due to the distance and direction to sources of odour (see discussion in section 4.2), a reduction in odour impact in Brooklyn, Kingsville and Yarraville would be even greater at Precinct 15 and at the general areas south of the Westgate Freeway such as Altona North, South Kingsville and Newport.

¹² C Bydder pers. comm. 14 June 2012

¹³ Chris Bydder, Team Leader – Compliance Strategy & Support, Metro, EPA Victoria, Brooklyn Community Representative Group COMMUNITY FORUM 3/2014, 13 August, 2014

4.1 Complaints in Yarraville and Brooklyn

The text in this section has been taken from the Bradmill buffer assessment¹⁴ conducted by GHD.

The EPAV criterion of 1 OU at the site boundary requires that industries should not emit odour that is detectable off-site during normal operations. Despite a sufficient buffer distance in most cases, calls from local residents reporting that odour is present indicate otherwise. The EPAV records calls from the residents at all hours, and responds to the complaints between 8 am and 5 pm, Monday to Friday. The record service prompts the complainant's assessment of the strength and character of the odour, and if possible the wind conditions at the time.

Graphs of reported odour complaints in Yarraville and Brooklyn from July 2007 to February 2009 in Figure 10(a) and (b) show that various industries have contributed to community complaints associated with detectable off-site odour. EPAV assigns the odour reports, after investigation to a 'likely' source based on wind direction, odour description from the complainant and recent activities of the included industries.

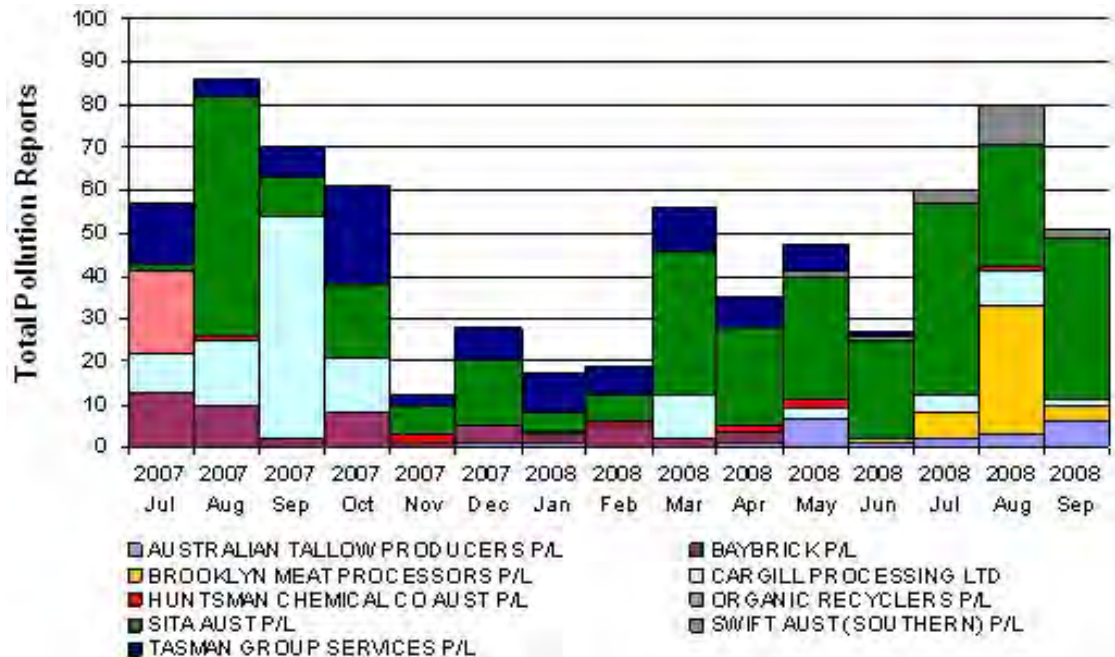
Figure 10(a) and (b) show that the number of odour reports varies throughout the year for each company. The industry whose odour was most often reported in surrounding residential areas was SITA Australia (including reports of the former operators Organic Recyclers). These reports have occurred in every month for the time period represented. Reports of odour sourced to Swift Australia (including the former operator Tasman Group Services and Braybrick) are also represented. There has been a significant number of reports sourced to Swift since October 2008, which suggests an apparent ineffectiveness of Swift's odour control processes (see Section 4.3 for more detail). Reports of odour coming from Brooklyn Meat Processors and Cargill Processing have decreased since mid 2008. There are regular reports sourced to Australian Tallow Producers, and these have increased in recent months.

While there have been more recent instances of odour events from particular industries that have led to prosecution by EPAV, the odour complaint data shown in Figure 10 and Figure 11 has not been updated by EPAV and, in fact, the data has since been removed from the EPAV website.

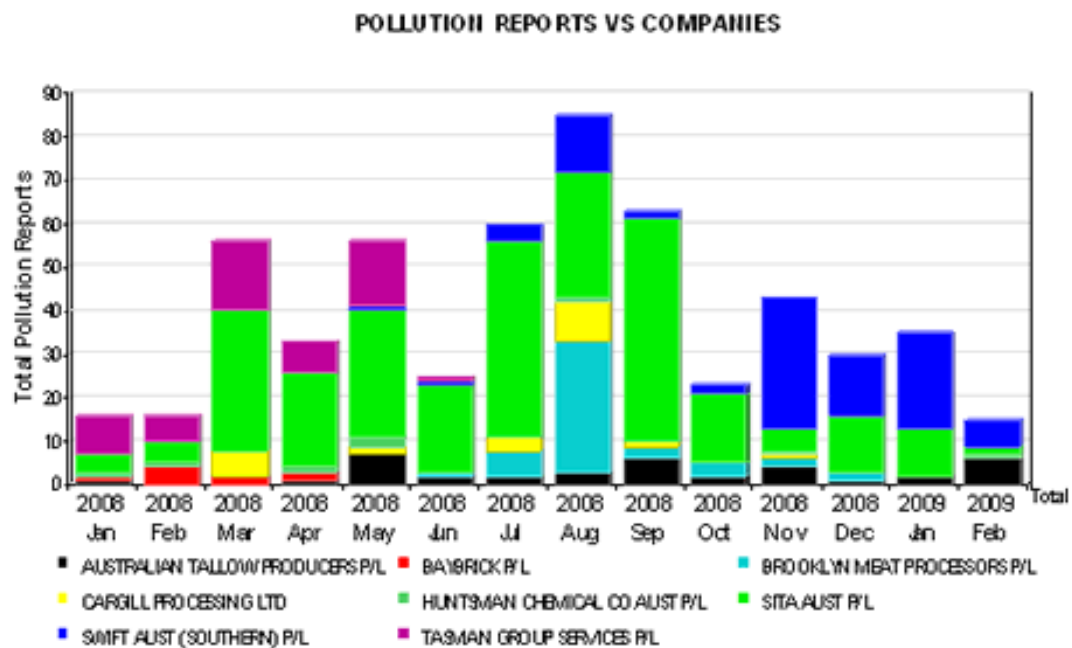
¹⁴ GHD 2011 "Buffer Distance Assessment and Odour /Dust Impact review" #201509, November 2011

Figure 10 Monthly odour reports from residents in Yarraville and Brooklyn sorted by 'Likely Source' Company ¹⁵

a)



b)



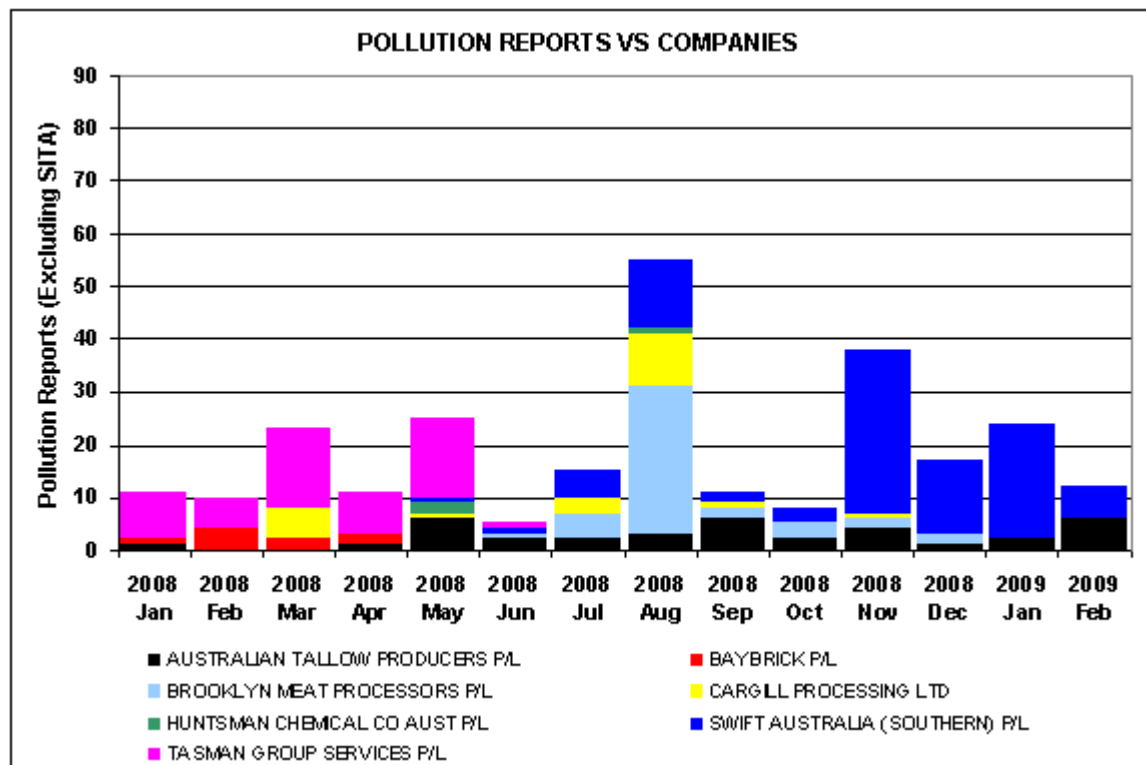
¹⁵ EPAVictoria, "Odours from Brooklyn", State Government of Victoria, http://www.epa.vic.gov.au/air/brooklyn_odours.asp, last accessed 6 April 2009.

Figure 11 shows EPAV pollution report data (interpreted) excluding those reports where the likely source company is SITA. This gives an indication of the expected drop in complaints if SITA's in-vessel system was already in place (refer Section 4.3 for more detail)¹⁶. It is also apparent from this figure that had Swift's odour control processes been operating as intended, then the total number of complaints would be on average around five complaints per month for the months since September 2008. For an estimated catchment population of approximately 4 800 residents this is a very small complaint rate, especially given that the complaints are only 'likely' – i.e. they have not been verified for each source.

The odour reports for each company vary over the year due to various factors, including seasonal variation in wind conditions and to changes in plant operation. The effect of wind conditions is discussed in the following section.

Note that Jotun was not included in the analysis, as no complaints to EPAV had been sourced to that site.

Figure 11 Monthly odour reports from residents in Yarraville and Brooklyn sorted by 'Likely Source' Company - excluding SITA Aust P/L¹⁷



¹⁶ And indeed what has been experienced into the 2013/14 financial year with the lowest number of complaints sourced to Brooklyn operations since electronic records commenced

¹⁷ Adapted from EPA Victoria's, "Odours from Brooklyn", State Government of Victoria, http://www.epa.vic.gov.au/air/brooklyn_odours.asp, last accessed 6 April 2009.

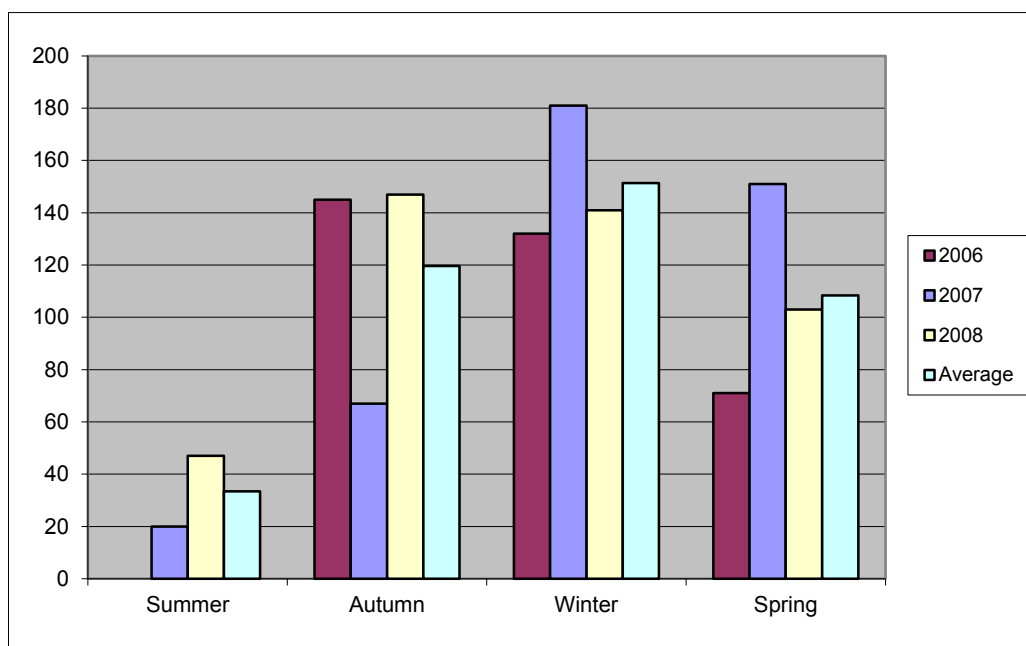
4.2 Odour reports in Yarraville and the effect of prevailing wind conditions

The Yarraville residential area is located immediately to the north east of Precinct 15. The complaint data from the Yarraville area are examined below as an indication of the expected impact conditions at the Precinct 15 site after it is developed. Note however, as mentioned above, the complaint history at Yarraville will be an over-estimate of that for South Kingsville – the latter suburb being the appropriate surrogate for Precinct 15. Wind patterns at the site are best taken from the EPAV AQMS at Footscray and a 12 month dataset for the year 2008 was used (see choice of year discussion in section 3.2).

Swift, SITA, Cargill

The industries that are attributed as the likely sources of most odour reports from Yarraville residents in the years 2007/2008 are Swift, SITA and Cargill. These industries are located to the north-west of Yarraville. This direction is also the direction of the prevailing wind in winter and of the poor dispersion E and F nocturnal breezes in winter, spring and autumn. This seasonal incidence of stable winds also matches complaint data supplied by EPAV, which indicates that more odour complaints are reported in these months than in summer, with the peak of odour-reporting occurring in winter (Figure 13).

Figure 12 Summary of odour reports in recorded from Yarraville residents for 2006¹, 2007 and 2008



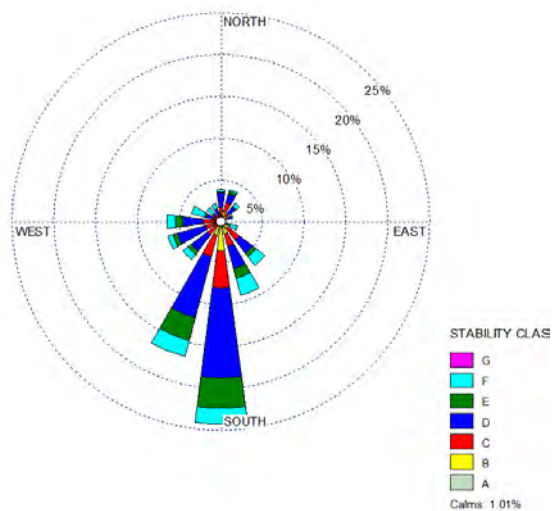
Notes: ¹ The summer 2006 data record is not complete, thus not included in the chart above.

Jotun

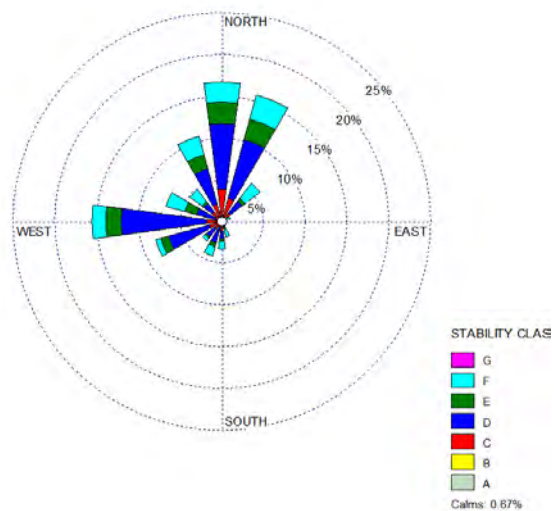
Jotun Australia (for which there is no odour complaint data available), is the closest industry with odorous emissions to the Precinct 15 site, and is situated to the south-west of Yarraville. Therefore, from the seasonal wind roses in Figure 14, the maximum potential for odour impact in Yarraville from this source would be expected in autumn when the wind prevails from the north and north-west directions and to a lesser extent in spring which also has minor north-west components.

Figure 13 Seasonal stable conditions vs. direction, stability rose at Footscray - 2008

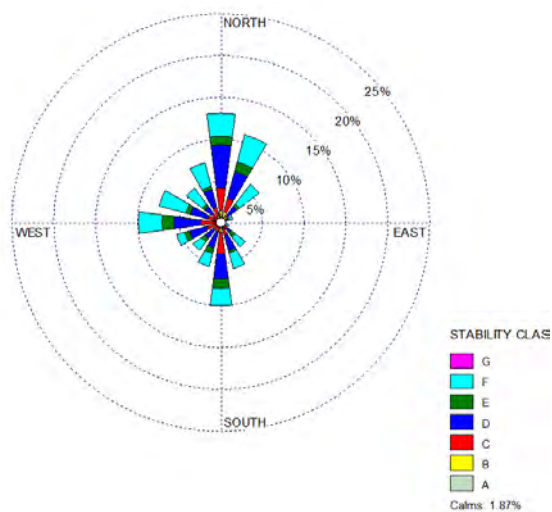
Summer 2008



Winter 2008



Autumn 2008



Spring 2008

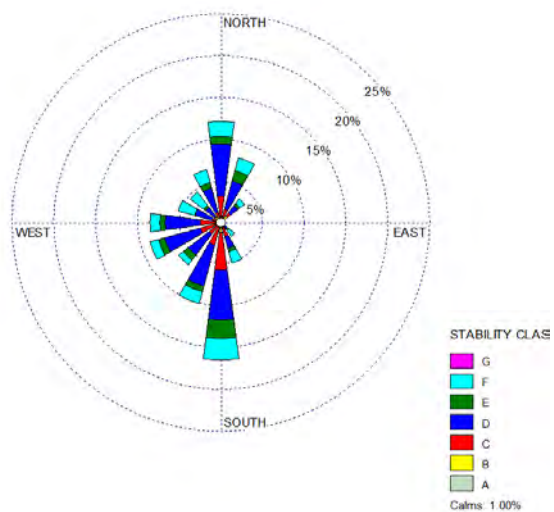
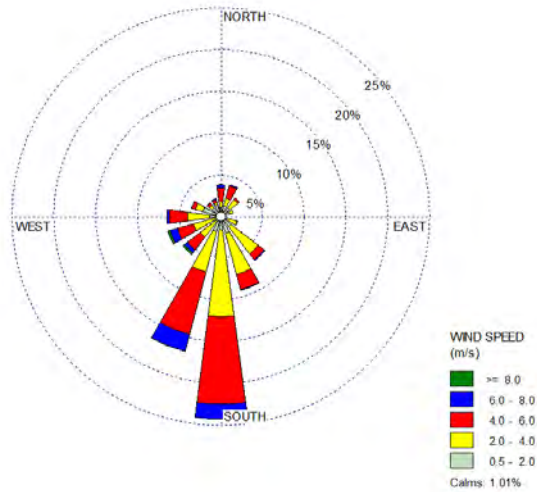
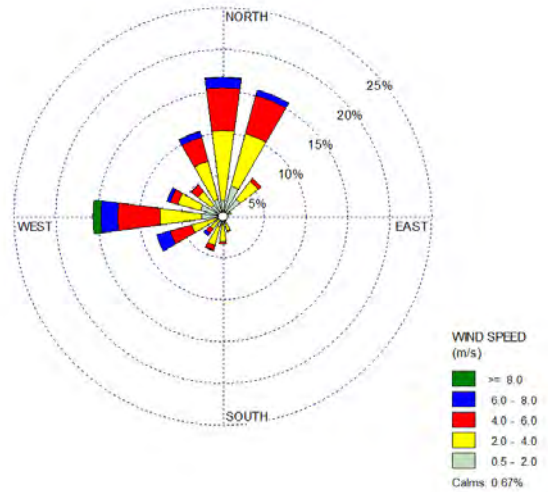


Figure 14 Footscray seasonal wind speed vs. direction rose plot at Footscray - 2008

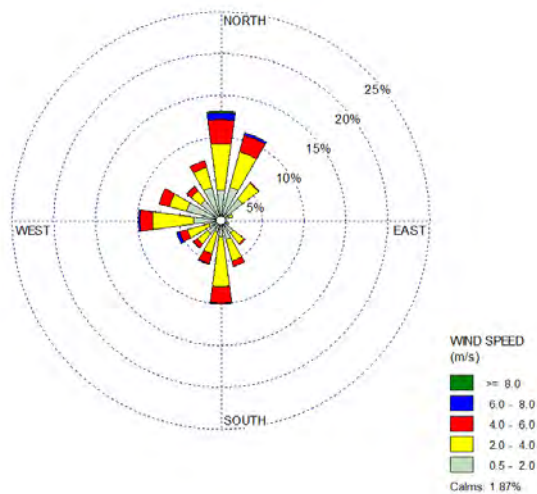
Summer 2008



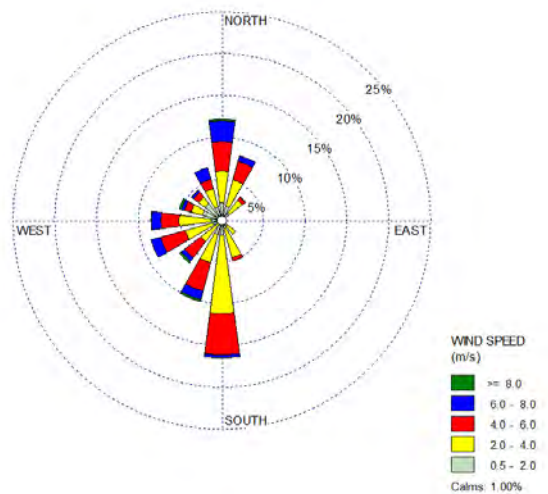
Winter 2008



Autumn 2008



Spring 2008



Implications of prevailing wind conditions for Precinct 15 Site

The location of Precinct 15 in relation to Yarraville indicates that the above complaint data will also be indicative of potential odour impact at the site. Precinct 15 is in many respects is located on the south western fringe of Yarraville. During north-west winds, Precinct 15 is directly down-wind from the industrial zone to the north-west that contains SITA, Swift and Huntsman. Under northerly winds, the Site is downwind of Cargill.

This exposure of Precinct 15 to such industrial premises that has resulted in odour complaints over the past several years implies that future residents at the Precinct 15 site can be expected to be similarly exposed. Further, the measures that are currently being undertaken by these industries to further mitigate emissions under the prompting of EPAV will be crucial in reducing this exposure into the future. The measures initiated by EPAV are examined below.

4.3 Effect of mitigation measures at industrial premises

The EPAV has a variety of enforcement measures to control emissions-to-air from industrial premises, including works approvals, licences, penalty infringement notices (PINs) and pollution abatement notices (PANs). EPAV licences can be applied to those industries so designated in the *Scheduled Premises and Exemptions Regulations - 2007*, and includes composting facilities (SITA), rendering plants and edible-oil processing works (Cargill). These licences require holders to meet specific emission limits, monitoring and reporting goals, and allow EPAV to penalise the licencees in the case of a licence limit exceedance.

Whether or not premises require a licence, EPAV can serve a PAN to control emissions. A PAN can specify measures to reduce emissions, including operations and/or activities to be conducted, equipment to be used in a certain way, or new equipment to be installed. Failure to comply with a notice can lead to a PIN (penalty infringement notice) and a fine being imposed.

EPAV has imposed these measures via PANs at some of the industrial premises in Brooklyn. These measures have required changes in plant operation and equipment in order to mitigate emissions, and, in turn, have led to a reduction in odour complaints sourced to the company. These mitigation measures are detailed in Table 3. The table shows that in the case of Cargill for example, mitigation measures have significantly reduced the number of odour reports in subsequent months, from approximately 50 in September to none between November 2007 and February 2008. After that date there were five months (March, May, July, August and September) when fewer than 10 reports in a month were recorded.

4.4 Recent odour events and EPAV response

EPAV have laid charges against Australian Tallow (see Table 3 for three incidents in 2010, two of which related to odour). Australian Tallow has also been directed by EPAV to improve the operation of a biofilter.

During 2010, Cargill Processing was required by EPAV to undertake further measures at their plant to further reduce odour emissions following odour incidents in May and August 2010.

Table 3 Summary of selected industry operations and odour emission changes

Company	Events and Consequent Mitigation measures	When applied	Concurrent Trend in Odour Reports
SITA Australia	Took over from Organic Recyclers. Cleaned up site, removing excess material.	July / August 2007	Significant increase in August, then decrease in September to March 2008.
	PAN issued for breach of offensive off-site odours; The EPAV licence requires SITA to install in-vessel composting by 2010. SITA propose to install the SAWT (SITA Advanced Waste Treatment) process. When installed, the odour impact under routine operations will be substantially reduced, and eliminated at the Bradmill site.	May 2008	
	SITA Australia no longer list there Brooklyn operations on their web site as a resource recovery or recycling facility. In-vessel composting pursued to other sites.	Post 2008	
Swift Australia (formerly Tasman Group)	PAN issued to abattoir that requires detailed measures to reduce or eliminate odours at the site to be reported.	September 2007	
	Odour emission testing and modelling completed. Several improvements identified to eliminate fugitive emissions, which were found to be the primary odour source. Improvements slated for late 2008.	January 2008	
	Swift acquired Tasman Group.	March 2008	
	Fined (PIN) for breach of notice of offensive odours; PAN issued.	May 2008	
	To install biofilters to emission points in wastewater system and refurbishment of cattle-yards.	(Proposed) September 2008	
	Cover fugitive emission exit points (open doors, openings in wall of plant).	(Proposed) February / March 2008	

Company	Events and Consequent Mitigation measures	When applied	Concurrent Trend in Odour Reports
	Swift Australia (Southern) Pty Ltd was ordered to pay a fine by the Melbourne Magistrates Court in December 2010 for its role in polluting the environment. The company pleaded guilty to charges of polluting Stony Creek with animal effluent via discharges into a stormwater drain; failing to comply with two EPA Victoria directions to prevent such discharges; and placing waste where it could gain access to waters under the Environment Protection Act 1970.		Some odour impact but a one-off event controlled by regulatory prosecution and a clean-up action
Cargill Processing	Odour emission event leading to being fined (PIN) by EPA; PAN issued.	September 2007	Approximately 50 odour reports in September
	Installed biofilters to emission points.	September 2007	Reduced to zero from November to February, fewer (< ~ 10 per month) reports from April onwards
	Licence amended – ongoing monitoring and odour control measures required	November 2007 onwards	
	By 2010 there was a decline in performance of biofilters and an increase in odour complaints. Cargill Enters into an Enforceable Undertaking with EPA as an alternative to Court proceedings.		Number of days where odour complaints sourced to Cargill 2010: 15 2011: 14
	An Environmental Supervisor appointed to site: <ul style="list-style-type: none"> • Rebuild of Biofilter Cells in Preparation (2012) • Rebuild Biofilter cells in Extraction (2010, 2012 & 2014) • Install Wet Scrubber to Biofilter in Preparation (2011) • Air Atomised Sprays installed on Ventillation Duct for Biofilter in Preparation (2011) • Installed new fan on biofilter in Preparation (2011) 		Number of days where odour complaints sourced to Cargill 2012: 0 2013: 0

Company	Events and Consequent Mitigation measures	When applied	Concurrent Trend in Odour Reports
	<ul style="list-style-type: none"> • All Roller doors into preparation building have been made auto-closing • Repairs made to ducting to extraction biofilter to stop leaks (2012) • Smoke test conducted in Preparation Building (2011) • Gaps in roof structure of preparation building sealed up (2012, 2014) 		

5. Dust mitigation programme

In 2009, the focus of EPAV on odour emissions from industry in Brooklyn was enlarged to include dust emissions. The aim was to gain an indication of the level of downwind impact from dust emanating from the Brooklyn Industrial Precinct at nearby residential areas. In October 2009, a dust monitoring programme for fine particulates, PM₁₀, was commenced at three sites. Two DustTrak PM₁₀ gauges were located in residential areas, one in Brooklyn (#2) and one in Yarraville (#1). A third (#3) was located in the grounds of Annunciation Catholic School, Eames Ave Brooklyn, approximately 500 m south of the Brooklyn Industrial Precinct and approximately 1 km west-north-west of the Precinct 15 site. Figure 15 shows the locations of the monitoring stations.

At Station #3 a weather-proof enclosure was set up and fitted with both TEOM (tapered element oscillating microbalance) PM₁₀ and DustTrak PM₁₀ gauges. More recently (July 2010), the site was relocated a short distance to Brooklyn Reserve and additional monitoring equipment was deployed in the EPAV mobile laboratory (Molab). A new permanent site at West Footscray was commissioned in October 2010 – this site measures PM₁₀ with a TEOM. Data from the existing AQMS site at Footscray was also used. Figure 15 shows the location of the various dust monitoring equipment deployed by EPAV in the Brooklyn/Yarraville/Sunshine/Footscray area.

Initial reports (The Age, 17 February 2010) stated that there were 13 days in 100 days sampled at the Brooklyn school site when the PM₁₀ ambient goal of 50 µg/m³ was exceeded. This degree of exceedence (approximately once per week) was much higher than recorded in the EPAV AQMS in the metropolitan area (two exceedences in 100 days) and suggested significant local dust sources in this area are present.

EPAV have subsequently issued PANs to 26 industries in the Industrial Precinct, and the consequent level of exceedences of the PM₁₀ criterion has reduced. Appendix B reproduces a series of community newsletters issued by EPAV that provide detail and report progress in the monitoring to the end of 2010. Ongoing EPAV community consultation and regulatory action/cooperation with industry continues with the main forum of discussion being the Brooklyn Community Representative Group¹⁸.

5.1 Analysis of dust monitoring

The dust monitoring data for the first 12 months of monitoring (November 2009 – October 2010) has been analysed by EPAV¹⁹, and has been recently posted on their website. The full report is attached as Appendix C.

Monitoring was principally of PM₁₀ with a 4 month monitoring of PM_{2.5} at Site #3. PM₁₀ was monitored gravimetrically by TEOM at Site #3 and at both AQMSs. PM₁₀ was monitored at Sites #1 and #2 using the light-based DustTrak monitors.

The findings from the EPAV analysis are detailed in the report⁹, and those relevant to the Precinct 15 site are listed below:

¹⁸ <http://www.brooklynip.com.au/bcrg-updates/> and <http://www.brooklynip.com.au/bcrg-meeting-notes/>

¹⁹ EPAV 2011 "Air Monitoring in Brooklyn – November 2009 to October 2010" Pubn. 1407, September 2011

- The air quality in Brooklyn for PM₁₀ as measured at Sites 1, 2 and 3 was found to be poor, with 38 daily exceedences of the PM₁₀ 50 µg/m³ NEPM goal in the 12 months – exceedences at other AQMS in Melbourne were less than seven;
- The monitoring data for PM_{2.5} at Footscray and Sunshine West stations for the four month period July – October 2010 showed no significant differences to that at other stations in the Melbourne AQMS network. This result implies that the elevated levels in PM₁₀ in the Brooklyn area are due to the coarser end of the 1 -10 micron range, typically found in wind-blown crustal dust;
- The distribution of the Brooklyn PM₁₀ exceedences by day of week showed none occurred on the weekend, leading to a conclusion that the sources were likely to include commercial traffic on unsealed roads in the Brooklyn Industrial Estate and on unsealed areas within industrial premises;
- PM₁₀ levels were found to be significantly higher under northerly winds than under southerly winds, and levels increased as northerly wind speeds increased. This simply illustrates that the significant dust sources emanate from the Industrial Precinct to the north of the monitoring sites, and
- As northerly winds are commonly replaced with afternoon sea breezes (southerlies) at Brooklyn, the elevated dust levels are seen mostly in the morning, when the monitoring sites are downwind of the Brooklyn industrial precinct.

5.2 Effect of mitigation measures

Each operator in the Industrial Precinct has been required to devise and operate a Dust Management Plan and to take actions to mitigate dust emissions from each site. More recent dust measurements (i.e. post November 2010) show a significant decrease (approximately half) in exceedences of the PM₁₀ criterion²⁰ at the Brooklyn sample sites. However, the decrease may, in part, also be due to the increased rainfall in the last year, and EPAV are conducting similar analyses on the more recent data. In addition, chemical analysis has also been conducted to speciate the constituents in/adsorbed to the sampled dust and to date no exceedences of the corresponding criteria have been found⁶.

To the extent that a significant source is from truck traffic on (the unsealed) Bunting Road that serves many industries in the Industrial Precinct, further mitigation may require that this road be sealed.

5.3 Monitoring to winter 2014

EPAV have continued monitoring PM₁₀ dust in Brooklyn but now reduced to just one site in Brooklyn Reserve, Heather Avenue. Since the middle of February in 2014 there continues to be a trend of air quality improvements relative to recent years²¹. Dry days with consistent northerly winds are the weather conditions that help transport PM₁₀ and other dusts from the Brooklyn Industrial Precinct to the neighbouring residential areas to the south including Precinct 15 which is more distant than the monitoring location:

²⁰ EPAV – Paul Torre pers. comm.

²¹ Brooklyn air monitoring results for July and August 2014, <http://www.epa.vic.gov.au/our-work/current-issues/odour-and-air-quality/brooklyn-industrial-precinct/brooklyn-air-monitoring-results-jul-aug-2014>, Accessed 2 December 2014.

The BCRG newsletter summarised the trends as follows:

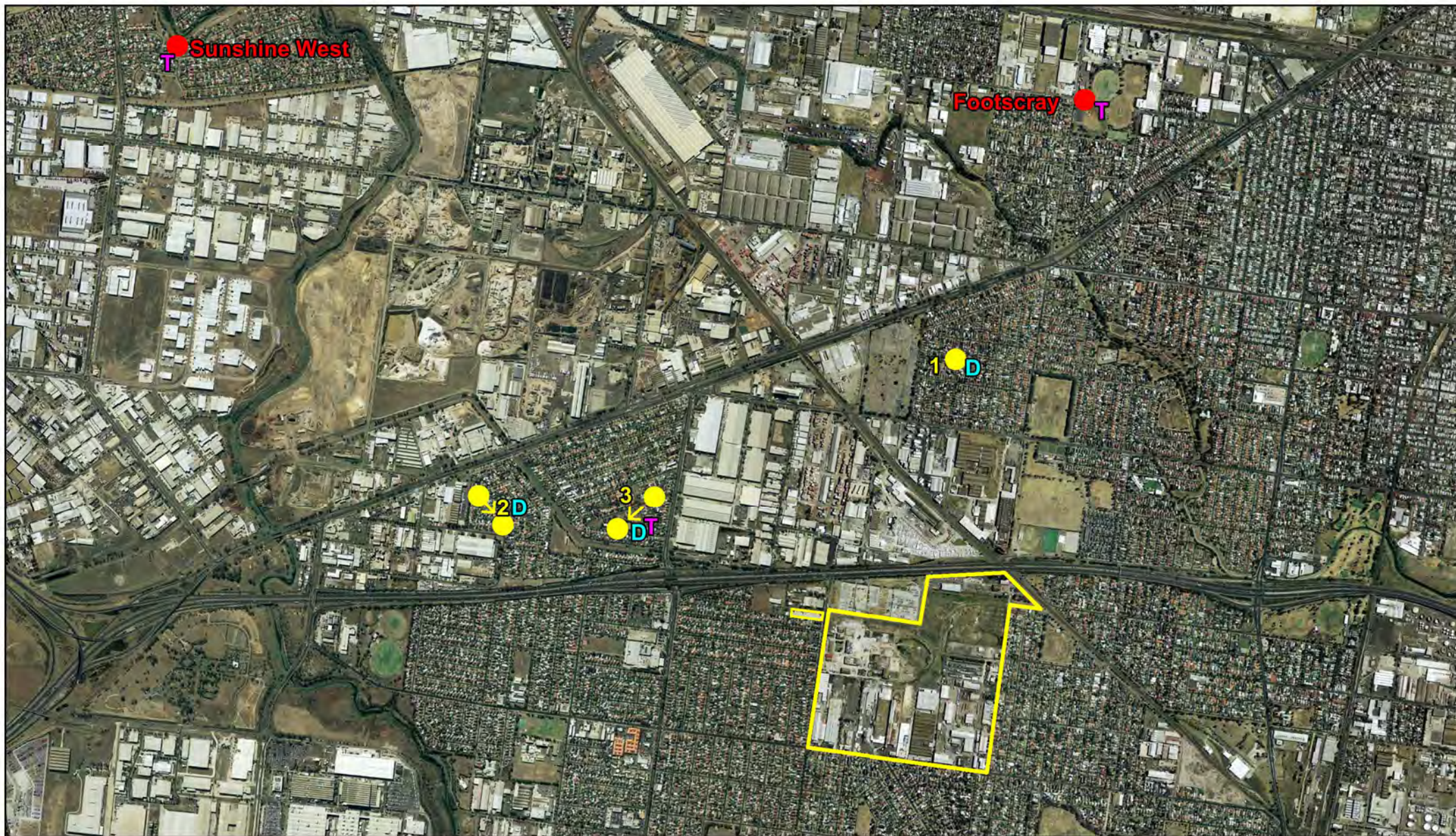
“ it is encouraging to report there have been fewer poor air quality days during autumn and winter this year.

The gradual improvement in Brooklyn’s air quality during the 2014 autumn and winter seasons compared to the same seasons in previous years is most likely due to a combination of better dust management on industrial sites and targeted works to reduce road dust.”

5.4 Implications for Precinct 15 Site

The monitoring conducted by EPAV has focussed on fine particles, principally PM₁₀, and the elevated levels have extended to Site #1 (~ 1 km north of the Site). However, the particle size ranges that commonly lead to disamenity are at higher size ranges – up to approximately 80 micron. At these size ranges the dust particles have sufficient fall velocity to deposit onto the ground/horizontal surfaces at comparatively short range from the Industry Precinct, approximately 100’s of metres. Hence the disamenity from dust deposition arising from industry dust emissions will be very much muted (if not undetectable) at the Precinct 15 site, (which is greater than 1 km east southeast of the east margin of the Brooklyn Industrial Estate).

In relation to the measured levels of PM₁₀ at Site #1, it can be expected that similar levels will also be experienced at the Precinct 15 site. However, the efforts by EPAV to date seem to be effective in reducing peak PM₁₀ levels from those initially measured in late 2009. The ongoing attention that EPAV is paying to the industries in Brooklyn in relation to dust emissions suggests that the levels at Site #1 (and at Precinct 15) will further reduce until the PM₁₀ criterion is met.



0 250 500 750
metres (at A4)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55



LEGEND

- Precinct 15
- AQMS-EPAPV Permanent Air Quality Monitoring Station
- 1, 2, 3 Campaign Stations

D Dustrack

T TEOM



CVC Venture Managers
Precinct 15 Buffer Constraint
Assessment

Job Number | 3128518
Revision | A
Date | 05/12/2014

Location of EPAV Dust Monitoring
Stations- Brooklyn Survey

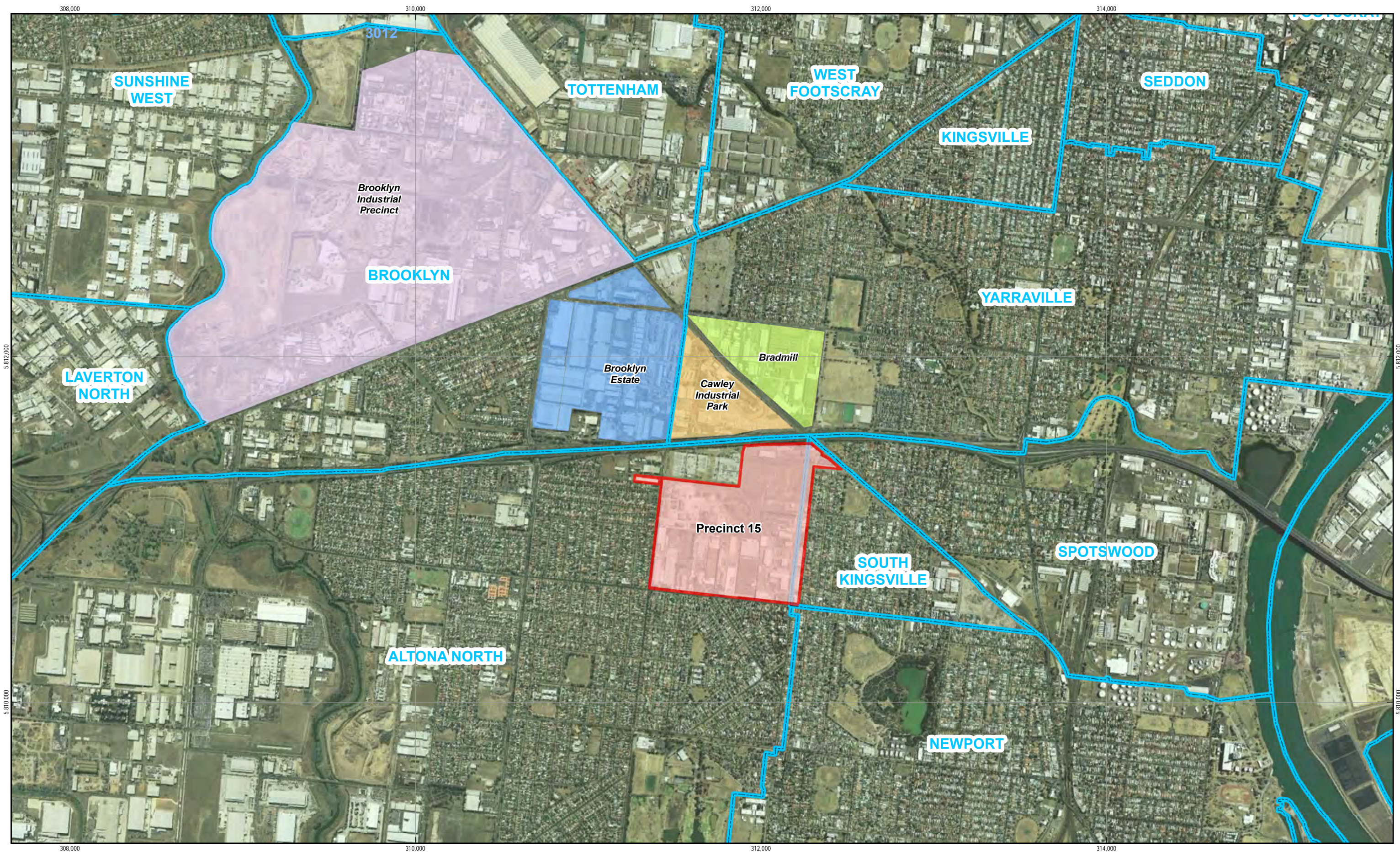
Figure 15

G:\3128518\GIS\Maps\Working

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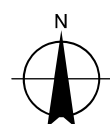
Google Earth Imagery 2012. Created by: MA

8/180 Lonsdale St Melbourne VIC 3000 Australia F 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com.au



Scale 1:20,000 @ A3
0 95 190 380 570 760
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- | | |
|---|---|
| Precinct 15 Boundary | Bradmill Site |
| Suburbs | Brooklyn Industrial Precinct |
| Brooklyn Estate | |
| Cawley Industrial Estate | |



CLIENTS | PEOPLE | PERFORMANCE

CVC Venture Managers
Precinct 15 Buffer Constraints Assessment

Job Number	31-32285
Revision	A
Date	08 Dec 2014

Residential Areas in Vicinity of Precinct 15

Figure 16

G:\31\32285\GIS\GIS_2012\GISMaps\Working\Figure 16 Precinct 15 Residential Areas_20141208.mxd

© 2014. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: Google Earth Pro & VicMap, DEPI (2012). Created by:lrsmith

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6. Conclusions and implications for development of Precinct 15

6.1 Directional buffers in case of process upsets

Application of the EPAV default buffer distances indicates that there is strictly insufficient separation of the Precinct 15 site from the Mobil Altona refinery and from Jotun to comply with these radial buffers. The default buffer of 1000 m is considered by GHD to be excessive for Jotun (as discussed in Section 2.1). However the default buffer distances do not account for site specific variation as described in section 3.5. The default buffer distances have been applied as a fixed radial distance from the envelope of sources and do not take account of directions of good and poor dispersion.

The directional buffers determined for the Mobil Altona refinery in Section 3 all show that the retraction from the 2000 m default in the direction towards Precinct 15 is sufficient to remove any constraint on the Site.

On the basis of the directional buffers, there is sufficient separation of the Precinct 15 site from all other industries investigated herein. GHD recommend that the directional buffers apply as they account for site specific meteorology. The protection from disamenity afforded at proposed residences in Precinct 15 in consequence of an upset/malfunction at the refinery, will be greater than that afforded for residences in Altona and Seaholme at 2 km distance from the southern boundary of the refinery.

6.2 Mitigation of odour and dust emissions from Brooklyn industrial precinct

Despite the expectation indicated by the available buffer distances, and contrary to the EPAV requirement to meet 1 OU at site boundaries during routine operations, reports of odour impact in the Yarraville residential area to the north east indicate that odour impact has been experienced in the past – in some cases from routine emissions. Odour from the same industries that have caused reduced amenity at residences in Yarraville can also be expected to impact at the Precinct 15 site, especially in autumn when prevailing wind conditions place these industries upwind of this site.

However, recent complaint data and the mitigation measures being taken by industries following EPAV intervention activity show that improvements in plant operation and design have reduced the number of odour reports received by the EPAV. This suggests that consequent odour disamenity has also been reduced. Recent communication with EPAV confirms that odour complaints in Yarraville sourced to the Brooklyn Industrial Precinct have almost ceased, and that this is also the case for South Kingsville. This trend will continue as EPAV continue to reduce industry odour emissions in the future.

The EPAV programme of dust mitigation at the industries in Brooklyn has been effective in reducing PM₁₀ levels at nearby residential areas, and both the Bradmill and Precinct 15 developments will be beneficiaries of this programme.

This process of improvement being led by EPAV suggests that odour and dust impacts at the Precinct 15 site will progressively reduce in the future, and be no worse than impacts in other nearby suburbs.

The EPAV Annual Plan²² on pages 7 and 8 confirms that Brooklyn remains a targeted 'hotspot' to reduce odour and air quality (i.e. dust) events.

As there is no record of odour complaints being sourced to Jotun, the impact of this industry on the Precinct 15 site is expected to be low.

²² EPAV 2011 Annual Plan, 2011 – 2012, Pubn. 1410, September 2011

7. Limitations

This Report has been prepared by GHD for the Precinct 15 Landowners and may only be used and relied on by for the Precinct 15 Landowners for the purpose agreed between GHD and for the Precinct 15 Landowners.

GHD otherwise disclaims responsibility to any person or entity other than for the Precinct 15 Landowners arising in connection with this Report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in the Report and are subject to the scope limitations set out in the Report.

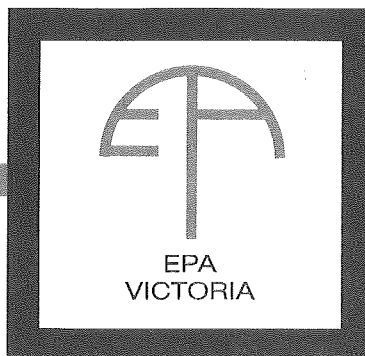
The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD and the limitations of the predictions made by the software model AUSPLUME. GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD described in this Report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this Report on the basis of information provided by Tract Consultants, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the Report which were caused by errors or omissions in that information.

Appendix A - EPA Licence EA38



L I C E N C E

issued under Section 20 of the Environment Protection Act 1970

Accreditation granted under Section 26 of the Environment Protection Act 1970

This licence allows the licence holder to discharge waste to the environment from the premises subject to the attached conditions.

LICENCE HOLDER: MOBIL REFINING AUSTRALIA PTY LIMITED

REGISTERED ADDRESS: 417 ST KILDA RD, MELBOURNE VIC 3004

PREMISES ADDRESS: CNR MILLERS RD & KOROROIT CREEK RD,
ALTONA VIC 3018

LICENCE NUMBER: EA38

DATE OF ISSUE: 20 DECEMBER 1974

DATE OF ACCREDITATION 4 DECEMBER 2001

DATE OF AMENDMENT: 11 NOVEMBER 2002

.....
TIMOTHY PETER KITCHEN
DELEGATE OF THE
ENVIRONMENT PROTECTION AUTHORITY

Page 1 of 7

Accreditation	<p>The licence holder is an accredited licensee. EPA granted accreditation following demonstration of a high level of environmental performance and an ongoing capacity to maintain and improve this performance. The basis for accreditation included implementation of an:</p> <ul style="list-style-type: none"> • Environment Management System; • Environmental Audit Program; and • Environment Improvement Plan. <p>Accreditation is subject to a number of ongoing checks and requirements. Accreditation must be re-established at least every five years. Where an accredited licensee fails to maintain requirements of the system, accreditation may be withdrawn and replaced with a more prescriptive licence.</p>
Plant Activities	<p>This licence applies to an oil refinery.</p>
Licence Objectives	<p>The licence holder shall adopt the following objectives for the protection of the environment:</p> <ul style="list-style-type: none"> • meet environmental quality requirements for all segments of the environment are met. This includes meeting the general provisions of the <i>Environment Protection Act 1970</i>, State environment protection policies, and Industrial waste management policies. In particular, <ul style="list-style-type: none"> ♦ <i>Industrial waste management policy (Waste Minimisation);</i> ♦ <i>Industrial waste management policy (Prescribed Waste);</i> ♦ <i>State environment protection policy (Waters of Victoria);</i> ♦ <i>State environment protection policy (Groundwaters of Victoria);</i> ♦ <i>State environment protection policy (Air Quality Management);</i> ♦ <i>State environment protection policy (Noise from Commerce, Industry and Trade)</i> • operate in accordance with good environmental practice at all times; and • take opportunities to minimise waste and continuously improve environmental performance.
Licence Structure	<p>The licence consists of the following parts.</p> <ol style="list-style-type: none"> 1. <i>Waste Management</i> <ul style="list-style-type: none"> • specifies the general requirements under which wastes may be discharged to the environment. 2. <i>Performance Monitoring and Reporting</i> <ul style="list-style-type: none"> • specifies the monitoring requirements and the arrangements for submission of reports to EPA. 3. <i>Plan of Premises</i> <ul style="list-style-type: none"> • plan of the premises covered by this licence, including discharge points.

1. WASTE DISCHARGE AND MANAGEMENT

Waste Minimisation

- 1.1. Wastes generated at the premises must be minimised in accordance with an Environment Improvement Plan endorsed by the Authority.

Audit Program

- 1.2. The accredited licensee must conduct an Environmental Audit Program in accordance with an agreed "Mobil Altona Refinery Audit Program" as approved by EPA in writing from time to time.
- 1.3. The Audit Program specified in condition 1.2 must include the participation of an Environmental Auditor (Industrial Facilities) appointed by the Authority.

Discharges to Air

The accredited licensee may discharge waste to the atmosphere from the stack discharge points identified on the attached Plan of Premises marked with the letter "A" ("the stack discharge points") subject to the following conditions:

- 1.4. The total mass rate of each waste discharged from the stack discharge points must not exceed the limits specified for that waste in Table 1.
- 1.5. Wastes other than those specified in Table 1 must not be discharged from the stack discharge points.
- 1.6. Total solid particles must not be emitted from a source other than discharge point 51 identified on the attached Plan of Premises marked with the letter "A".
- 1.7. Total solid particles must not be emitted from discharge point 51 at a concentration greater than 0.10 g/m^3 . *FCC*
- 1.8. Total organic compounds must not be emitted from discharge point 48A at a mass rate greater than 0.5 kg/min . *SRU incinerator*
- 1.9. Odours offensive to the senses of human beings must not be discharged beyond the boundaries of the premises (as indicated on the attached Plan of Premises marked with the letter "B").

Table 1: Emission Limits for Discharges to Air

WASTE	TOTAL MASS RATE (kg/min)	TOTAL ANNUAL MASS RATE (t/annum)
Sulfur oxides ¹	11.5	6,000
Nitrogen oxides ²	3.1	1,630
Carbon monoxide	11.0	5,780
Total Organic Compounds ³	1.8 ⁴	578 ⁵
Total Solid Particles	0.2	105

NOTES:

1. "Sulfur oxides" means the sum of all oxides of sulfur expressed as sulfur dioxide
2. "Nitrogen oxides" means the sum of all oxides of nitrogen expressed as nitrogen dioxide
3. "Total Organic Compounds (TOC)" means the sum of all compounds of carbon which contain at least one carbon to carbon bond plus methane and its derivatives. For the purposes of measurement 1 gram TOC shall be deemed to have the same flame ionisation response as one gram of n-hexane.
4. "Total mass rate for TOC emissions" includes fugitive air emissions from tank breathing and working.
5. "Total annual mass rate for TOC emissions" includes fugitive air emissions from tank breathing and working.

Discharges to Water

- 1.10. There must be no discharge or seepage of waste or contaminated stormwater from the premises (as indicated on the attached Plan of Premises marked with the letter "B") to the land, groundwater or water environments.

2. MONITORING AND REPORTING

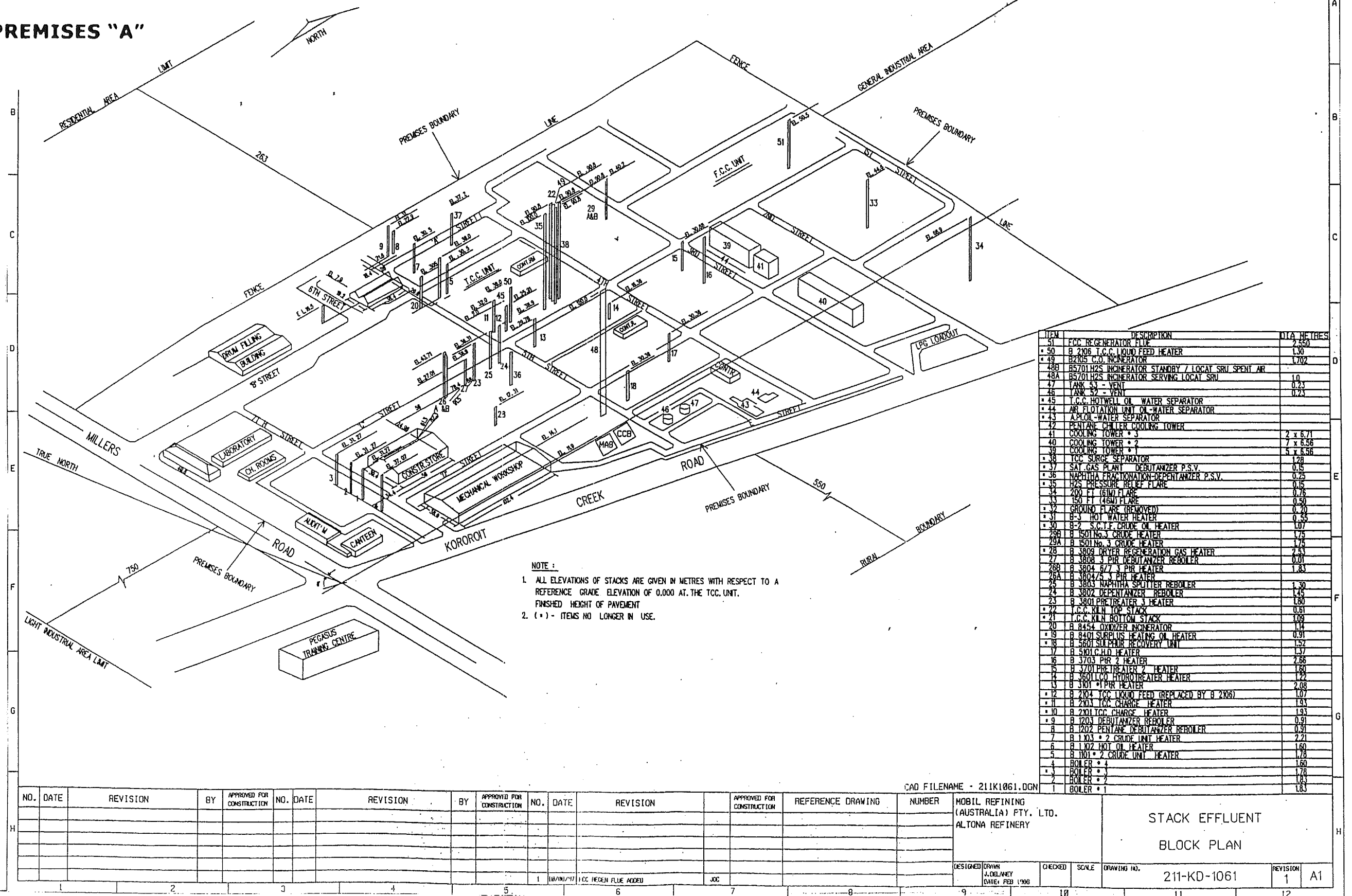
Annual Performance Report

- 2.1. Within 60 days after the end of each calendar year, the accredited licensee must submit a performance report of the premises to the Authority for the proceeding calendar year prepared in a form agreed between the Authority and the accredited licensee.
- 2.2. The performance report required by condition 2.1 of this licence must be signed and authorised by the Mobil Altona Refinery General Manager.
- 2.3. The performance report required by condition 2.1 of this licence must be signed and certified by an Environmental Auditor (Industrial Facilities) appointed by the Authority.

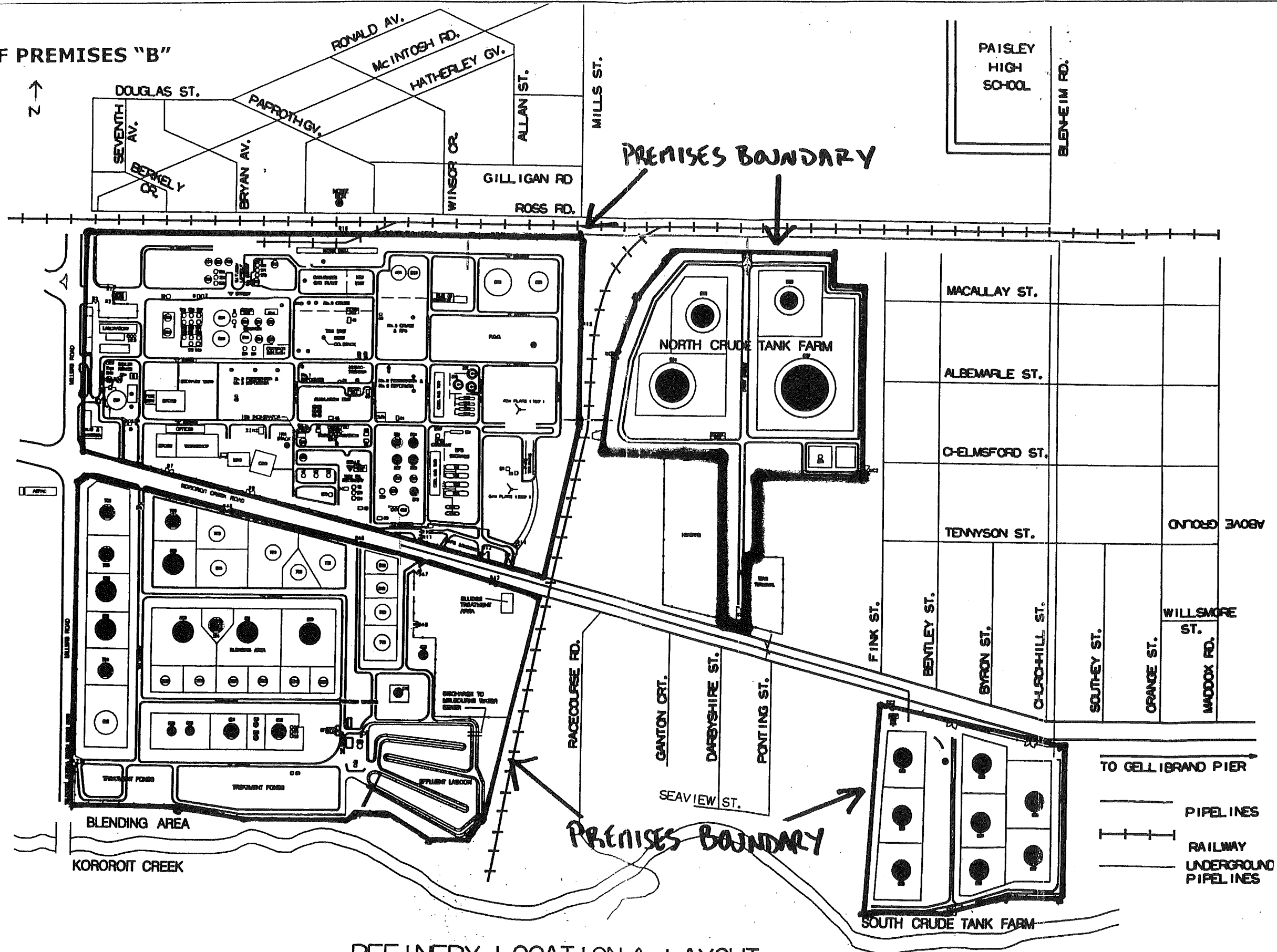
Exception Reports

- 2.4. The accredited licensee must notify the Authority:
 - a) of incidents as defined in and in accordance with the EPA approved "Mobil Altona Refinery Incident Reporting Guidelines" as amended and approved in writing by EPA from time to time.
 - b) As soon as practicable in writing of any performance monitoring result which indicates a breach of any condition of this licence or any State Environment Protection Policy or any Industrial waste management policy.

PLAN OF PREMISES "A"



PLAN OF PREMISES "B"



REFINERY LOCATION & LAYOUT

Appendix B - EPAV Newsletters – Brooklyn Dust Monitoring Program



COMMUNITY INFORMATION

BROOKLYN DUST MONITORING PROGRAM – BACKGROUND AND METHODOLOGY

August 2010

SUMMARY

In October 2009, EPA began an air quality monitoring program in the Brooklyn area surrounding the Brooklyn Industrial Estate. The program aims to obtain information about the levels and impact of airborne dust, primarily particle matter 10 micrometres or less in size (known as PM_{10}), coming from the industrial estate.

The original monitoring program measured the levels of PM_{10} in the air and compared the measured levels to the national standard. The monitoring program has recently been expanded to also provide information on the components and composition of the PM_{10} in the air.

Temporary monitoring stations have been set up in the residential area adjacent to the Brooklyn Industrial Estate. EPA also has a network of permanent air monitoring stations across Melbourne and Victoria. The stations at Altona, Deer Park and Footscray measure air quality for the western suburbs.

WHAT IS EPA MEASURING?

The dust monitoring program comprises two components:

- One component involves continuous monitoring of the concentrations of PM_{10} and $PM_{2.5}$ particles and wind conditions at a number of sites. $PM_{2.5}$ is particle matter that is 2.5 micrometres or less in size, which tends to be primarily from combustion sources – motor vehicles, solid fuel fires, incineration and industry processes.
- The second component involves measurement of asbestos and respirable silica and collection of PM_{10} for chemical analysis, which will determine the composition and characterisation of particles.

Asbestos and respirable silica will each be sampled and analysed using different sampling methods and analysed by two different laboratories.

PM_{10} particles for chemical analysis will be collected by two other sampling techniques and analysed by three other laboratories. The chemical analysis involves laboratory analysis for 20 different chemical elements and 18-25 chemical species.

The analysis is complex and needs to be able to detect very minute amounts of chemicals. This requires specialist laboratories located in NSW and Victoria.

WHERE IS EPA MEASURING?

- Site 1 – Molab 1, Brooklyn (Brooklyn Reserve). This site replaces the Brooklyn school site and measures PM_{10} and $PM_{2.5}$ and will also collect samples to be analysed for composition and characterisation. The equipment used for monitoring is similar to the equipment used in the rest of the EPA air monitoring network.
- Sites 2 and 3 – residential sites in Yarraville and Brooklyn. These two sites as well as site 1 (used for comparison purposes) will measure only indicative levels of PM_{10} , using different monitoring equipment called Dustrak. These sites give an indication of the spread of PM_{10} levels in the general area.
- Site 4 – Sunshine West. This monitoring station (under installation) will measure PM_{10} and $PM_{2.5}$. It will also provide information on the transport of dust, from both the industrial estate and the surrounding Sunshine West area upwind of the estate, during prevailing moderate to high northerly and southerly winds.

The measurements from the monitoring sites around Brooklyn are also compared with background representative levels measured at EPA's air monitoring station at Footscray as a way to determine local sources of dust.

WHAT WILL THE MONITORING TELL US?

Continuous PM_{10} concentration analysis

The measured particle concentration is assessed against the concentrations specified as the national standard. Wind speed and direction are used to identify the direction of the dust source.

On the basis of the elevated particle levels frequently measured above the national standard during the summer period, and observations from surveillance and site inspections, EPA was able to issue regulatory notices on potentially dust-creating industries in Brooklyn, requiring them to reduce dust from their properties.

Asbestos, respirable silica and PM_{10} analysis

The chemical analysis will estimate the composition of the particles and assist in identifying general sources

such as soil, smoke, sea salt, vehicle emissions and possibly some potential industry sources.

The determination of the airborne concentrations of asbestos, respirable silica and specific elements will provide the data to undertake an air quality risk assessment to evaluate the health risk posed for the concentrations measured.

A statistically sound air quality risk assessment requires about 12 months of data, to ensure seasonal variations are considered.

EPA will be able to provide some interim findings of the analysis at the September 2010 BCRG meeting, but there will not be sufficient data for a full air quality risk assessment at that stage.

LIMITS OF THE MONITORING PROGRAM

The ability to identify sources will be limited when the dust generated from a number of the sites is similar and then mixed together in the air.

Every individual also has a unique level of personal health, and the effect of dust on an individual cannot be determined through this study. This monitoring program will therefore make simple comparisons of measurements in Brooklyn and its surrounds against the health-based standard to judge the effect on a population as a whole, rather than an individual.

PARTICLE CONCENTRATION DATA TO DATE

To date (between 28 October 2009 and 14 July 2010), the monitoring program has measured 31 days when PM_{10} levels were above the national air quality objective.

During spring, summer and early to mid-autumn, days above the air quality objective generally occurred during warm to hot temperatures and with a wind direction from the north (the direction of the industrial estate). Comparing the measurements in Brooklyn with the Footscray monitor indicates the dust problem is localised to surrounding suburbs and, most likely, from local sources.

In late autumn and winter, low temperatures combined with low winds can produce poor dispersion of general urban air pollution. Urban pollutants are typically from combustion sources, such as motor vehicles, industry and solid-fuel heating.

The build-up of these particles is likely to account for recent exceedances of the national objective at Brooklyn; however, the levels measured in Brooklyn are still higher than in surrounding areas.

The PM_{10} dust measurements already demonstrate dust levels beyond acceptable standards and the data collected to date has enabled EPA to issue regulatory notices to Brooklyn companies to mitigate dust from their properties.

EPA is sharing the data with local government officers to enable them to take enforcement action when possible.

A complete report will be developed following the completion of the monitoring, and the general findings have been communicated through community meetings.

WHAT ARE THE NATIONAL STANDARDS?

The air quality objectives are specified in the State environment protection policy (SEPP) for the air environment, which has been adopted from the national standards – the *National Environment Protection (Ambient Air Quality) Measures* (NEPM). The air quality objective for PM_{10} is 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), averaged over 24 hours.

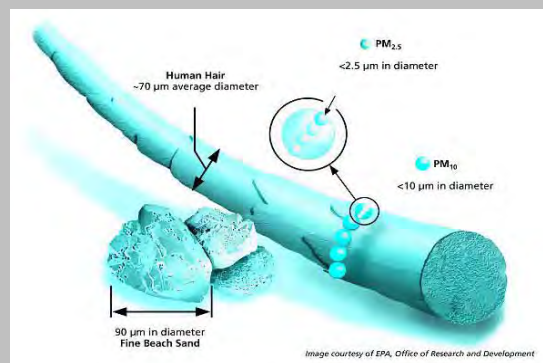
WHAT IS DUST?

Dust, or particulate matter (PM), can come from a number of different sources, including industry, motor vehicles, domestic wood heaters, waste burning and general windblown dust.

It is usually categorised into coarse particles (those found near unsealed roadways and dusty industries) and fine particles (such as those in smoke and haze).

Coarse particles are bigger and tend to deposit closer to the source, whereas fine particles can be carried a long way, especially on a windy day.

Dust with particles that have a diameter of less than 10 micrometres (one micrometre is 1/1000 of a millimetre) is called PM_{10} . Particles of this size, are less than one-tenth the diameter of a hair and if breathed in, are small enough to make their way into the lungs, affecting human health.



Depending on a range of factors, including degree of exposure and existing health, PM_{10} dust can aggravate existing respiratory and cardiovascular disease, decrease lung function, exacerbate asthma and alter the body's defence and lung-clearance mechanisms.

Those most sensitive to PM_{10} dust include the elderly, children and people with existing respiratory or cardiovascular disease.



COMMUNITY INFORMATION – NEWSLETTER

ISSUE 5: BROOKLYN INDUSTRIAL AREA – IMPROVING ENVIRONMENTAL PERFORMANCE

July 2010

This newsletter provides updates on progress of activities to reduce noise, dust and odour from the Brooklyn Industrial Precinct.

THE BROOKLYN COMMUNITY REFERENCE GROUP

The Brooklyn Community Reference Group (BCRG) is a collaboration between community, industry and government, working towards ongoing clean air and reduced noise from the Brooklyn Industrial Precinct and other industries in the area.

BCRG works with industries and residents across the three local government areas of Hobsons Bay, Brimbank, and Maribyrnong.

BROOKLYN BLITZ

On Monday 21 June, 52 officers from EPA Victoria, Victoria Police, the Sheriff's Department, VicRoads, WorkSafe and Brimbank City Council were involved in a blitz on individual and company compliance against road safety, environmental, workplace safety and planning legislation.

Agencies participating in the blitz were very pleased with the success of the operation and plan to repeat the exercise in the future.

Three hundred vehicles in total were pulled over in the blitz, with the following fines issued:

- EPA – one truck determined to be totally defective (unregistered, unroadworthy, no waste transport certificates), 12 found to be non-compliant with waste transport requirements and four exceeded noise levels, totalling more than \$4500 in fines.
- Sheriff's Department – 37 warrants paid in full, 12 defendants (individuals) – money collected: \$14,132.70.
Court arrangements: 76 warrants, 10 defendants valued at \$24,486.70.
Licence suspensions: 104 warrants, 8 defendants valued at \$27,585.60.
Total: 36 defendants, 228 warrants valued at \$71,525.20.
- VicRoads – 32 offences (unregistered, unroadworthy, unsecure loads), totalling \$4500 in on-the-spot fines.

- VicPol – 13 offences (unregistered vehicles, no seatbelt, using mobile phones), totalling \$6000 on-the-spot fines.

Site inspections were also undertaken by WorkSafe and EPA:

- EPA – Identified three licence breaches. Four new investigations are now under way as a result of the inspections.
- WorkSafe – nine offending sites – 11 notices issued.

NEWS ON DUST AND ODOUR

- Three further clean-up notices have been issued to dust-producing companies with a compliance date of 1 October 2010. EPA has now issued 24 pollution abatement notices for dust mitigation.
- Due date for action on the first round of notices (six in total) has passed. EPA has received dust action plans for all of the businesses issued with a notice in this round. These businesses, amongst others, will present their plans to the July BCRG meeting.
- EPA is continuing dust surveillance, which will enable collection of evidence to issue notices on companies found to be creating dust.
- There are seven separate instances of offensive odour at various stages of investigation and legal negotiation. One of these cases is listed for court in early July.

OTHER NEWS

A meeting to set up a formal committee of senior representatives from councils, EPA, Department of Health and parliament, as well as the independent chair of BCRG, was held on 31 May 2010.

The committee adopted the name of Brooklyn Industrial Precinct Steering Committee and will enable a coordinated response to issues around the industrial precinct. The group will meet again in late August.

Brooklyn air quality data on the web

Dust monitoring data (measured as PM₁₀) from the Brooklyn air monitoring station is now available live on EPA's website:

www.epa.vic.gov.au/air/bulletins/aqbhour.asp

UPDATE ON DUST MONITORING

EPA started a dust monitoring program in late October 2009 to gain evidence on the extent and impact of dust emanating from the Brooklyn Industrial Precinct.

To date (28/10/09 – 24/06/10) the monitoring program has measured 26 days when dust levels were above the national air quality objective.

In autumn and winter months low temperatures combined with low winds can produce poor dispersion of urban air pollution. Urban pollutants are typically from combustion sources, such as motor vehicles, industry and solid-fuel heating. The build-up of these particles is likely to account for recent exceedances of the national objective at Brooklyn; however, the levels measured in Brooklyn are still higher than in surrounding areas.

Molab 1, Brooklyn Reserve

The dust monitoring program measures the quantity of fine dust (PM₁₀) at several stations surrounding the industrial precinct. The monitoring program has been expanded to analyse the elements in the dust.

Molab 1, deployed in Brooklyn Reserve, measures fine dust levels (PM₁₀ and PM_{2.5}) and will also take samples to be analysed for composition.

The characterisation analysis (composition) involves laboratory analysis for 20–25 different chemical elements by local and interstate laboratories. The analysis is complex and requires specialist laboratories, not all available in Victoria.

EPA will be able to provide some interim findings at the September BCRG meeting, but it takes around 12 months of sampling to collect sufficient data to make a statistically sound 'air quality risk assessment'.

Sampling began in July. The monitoring station at the Brooklyn school site will be decommissioned once Molab 1 is operational.

Note that the PM₁₀ dust measurements already demonstrate dust levels beyond acceptable standards and EPA will continue to take action, regardless of the dust composition.

New Sunshine West monitor

Installation of a new dust monitoring station at Sunshine West is progressing. Fencing and underground services (power and phone) have been completed. Power connection to the site is anticipated to take several weeks.

This monitoring station will provide evidence of the movement and levels of dust in prevailing northwesterly and southerly winds.

BCRG COMMUNITY MEETINGS

Brooklyn Community Reference Group (BCRG) community meetings are held every six months, with additional meetings scheduled as required. The meetings are open for public attendance. RSVPs essential to Jen@KismetForward.com.au.

- Biannual BCRG community meeting – 14 July 2010, 6.30 – 9.30 pm. Brooklyn Community hall, Cypress Avenue, Brooklyn.
- Progress update – 15 September 2010, 6.30 – 9.30 pm. Brooklyn Community hall, Cypress Avenue, Brooklyn.
- Biannual BCRG community meeting – 17 November 2010, 6.30 – 9.30 pm. Brooklyn Community hall, Cypress Avenue, Brooklyn.

REPORTING POLLUTION

The community supports EPA by reporting pollution in its area to the Pollution Watch Line on 9695 2777.

EPA officers use information such as wind data, recent field investigations and information from the community to determine possible sources. Follow-up action may include on-site attendance, after consideration of the extent, nature and severity of pollution reports from the community.

Local government can also respond to and prosecute complaints if companies are in breach of their planning permits:

- Brimbank City Council – 9249 4000.
- Maribyrnong City Council – 9688 0200
- Hobson Bay City Council – 9932 1000

COMMUNITY CONTACTS

- **Yarraville On The Nose (YOTN)**
Contact **Bruce** on **9332 2808** or email coord.onthenose@gmail.com
(Yarraville and Kingsville area west of Williamstown Road).
- **Brooklyn Residents Action Group (BRAG)**
Contact **Bert** on **9314 1053** (AH)
(based in the Brooklyn area bounded by Geelong Road and the West Gate Freeway).
- The **BCRG Chair** is **Jen Lilburn**, Kismet Forward
(**0418 373 352**, jen@kismetforward.com.au).



ISSUE 6: BROOKLYN INDUSTRIAL AREA – IMPROVING ENVIRONMENTAL PERFORMANCE

October 2010

This newsletter provides updates on progress of activities to reduce noise, dust and odour from the Brooklyn Industrial Precinct.

THE BROOKLYN INDUSTRIAL PRECINCT

The Brooklyn Industrial Precinct is the triangular industrial area bordered by Kororoit Creek and the major thoroughfares Geelong and Somerville roads.

The precinct houses more than 60 industries, including quarrying, former landfill, abattoirs, composting, material recycling, tallow producers, container storage, chemical manufacturing as well as numerous small businesses including light industrial, retail and manufacturing.

The precinct is under the management of Brimbank City Council. Hobsons Bay, Wyndham and Maribyrnong city councils border the precinct, with some industries on the fringe of the precinct falling within their boundaries.

INTRODUCING CHRIS WEBB

Chris Webb joined EPA Victoria in August 2010 as Director of Environmental Services. Among other things, this area of EPA manages the delivery of all pollution response, environmental compliance checking, environmental monitoring and enforcement.

Chris was formerly Director, Construction and Utilities, for WorkSafe. In that role he was responsible for holding industries to account for their occupational health and safety performance and oversaw a significant increase in regulatory activity and improved performance. Chris's background includes qualifications in chemistry, 10 years in the oil industry – including responsibility for environmental performance – and five years at the Australian Grand Prix Corporation, responsible for risk, HR and strategy.

Chris is a local resident to the industrial precinct so he is well aware of the concerns of local people. He has already met a number of the local residents and will attend the Brooklyn Community Reference Group (BCRG) meetings as he settles into his new role.

NEWS ON DUST AND ODOUR

Dust pollution abatement notices

Twenty-six pollution abatement notices (PANs) and three clean-up notices have been issued for dust mitigation.

Fourteen of these have passed the compliance date and EPA has received 13 dust reports, with one company closed. Received dust reports are being assessed by dust mitigation experts. So far, companies have committed to spend in excess of two million dollars on dust control measures

Eight additional PANs are due for compliance in the next two months.

Dust and mud on roads

EPA is working with VicRoads and councils to address issues of dust from roads. The agencies have agreed to run combined operations targeting specific roads in the Brooklyn area.

Paramount Road was the first road chosen for the operation in mid-September, targeting trucks and sites that are tracking dust and mud off-site. Ten officers from VicRoads, council and EPA monitored the road over three days to investigate compliance with the Road Safety, Litter and Environment Protection Acts. This was the initial phase of an ongoing operation over the coming months. Council and VicRoads have also agreed to increased sweeping and road maintenance activities.

Odour investigation and enforcement

- Charges laid against Australian Tallow for breach of licence and pollution (10 and 19 February 2010).
- Court mention of Swift on 25 October for breach of licence and environmental hazard for discharge of effluent.
- EPA assessing a proposal for an enforceable undertaking lodged by Cargill for series of odour incidents earlier this year.
- EPA currently investigating recently confirmed reports of offensive odour from Australian Tallow and Cargill.

- EPA has responded to a range of recent offensive odour reports but these could not be confirmed by the officers.

Surveillance and investigation

EPA continues to undertake surveillance and investigations in the Brooklyn area.

We are reviewing current licence conditions of identified premises causing significant odour in Brooklyn. More prescriptive conditions may result.

EPA has issued to all businesses with PANs letters about dust and mud on roads. Additional premises that have been identified as offering a medium to high risk of generating dust or mud will receive notices.

UPDATE ON DUST MONITORING

EPA started a dust monitoring program in late October 2009 to measure particle matter coming from the Brooklyn Industrial Precinct.

To date (up to 15 September 2010), the monitoring program has measured 38 days with dust levels above the national air quality objective. The national goal for air quality is less than five exceedances of the national air quality objective per annum.

Measurements in Brooklyn are well above those in other areas across Melbourne. The Department of Health has developed brochures on the health impacts of dust, which were presented at the September BCRG community Forum (for a copy, contact the BCRG Chair, Jen Lilburn).

EPA also presented initial results from the particle characterisation analysis (composition) at the September BCRG meeting. The characterisation analysis (composition) involves laboratory analysis for 20 to 25 different chemical elements by local and interstate laboratories. The analysis is complex and requires specialist laboratories, not all available in Victoria.

Air monitoring is also being undertaken for asbestos and respirable silica. Readings to date have not detected limits of health concern; however, a comprehensive health risk assessment cannot be made until about 12 months of data is collected.

Molab 1, Brooklyn Reserve

Molab 1, set up in Brooklyn Reserve, measures particle levels (PM₁₀ and PM_{2.5}) in air and also collects particle samples from the air for laboratory analysis to determine the components and composition of the particles.

New Sunshine West monitor

The new dust monitoring station at Sunshine West is operational. This station will provide evidence of the movement and levels of dust in prevailing north-westerly and southerly winds.

Brooklyn air quality data on the web

Particle monitoring data (measured as PM₁₀) from the Brooklyn air monitoring station is now available live on EPA's website:

www.epa.vic.gov.au/air/bulletins/aqbbhour.asp

BCRG COMMUNITY FORUM

The BCRG Community Forum is an opportunity for members of the community, industry, and local and state government to discuss issues about the air quality of the general Brooklyn area. It also enables the communication of plans and progress by individual industries, local government and EPA.

Meetings are held every four months with additional meetings scheduled as required.

RSVPs essential to: jen@kismetforward.com.au

- BCRG community meeting – 17 November 2010, 6.30–9.30 pm. Brooklyn Community Hall, Cypress Avenue, Brooklyn.

REPORTING POLLUTION

The community supports EPA by reporting pollution in its area to the Pollution Watch Line on 9695 2777.

EPA officers use information such as wind data, recent field investigations and information from the community to determine possible sources. Follow-up action may include on-site attendance, after consideration of the extent, nature and severity of pollution reports from the community.

Local government can also respond to and prosecute complaints if companies are in breach of their planning permits:

- Brimbank City Council – 9249 4000.
- Maribyrnong City Council – 9688 0200
- Hobson Bay City Council – 9932 1000

COMMUNITY CONTACTS

- **Yarraville On The Nose (YOTN)**
Contact **Bruce** on **9332 2808** or email coord.onthenose@gmail.com
(Yarraville and Kingsville area west of Williamstown Road).
- **Brooklyn Residents Action Group (BRAG)**
Contact **Bert** on **9314 1053** (AH)
(based in the Brooklyn area bounded by Geelong Road and the West Gate Freeway).
- The BCRG Chair is **Jen Lilburn**, Kismet Forward
(0418 373 352, jen@kismetforward.com.au).

Appendix C - EPAV Report – Air Monitoring in Brooklyn November 2009 to October 2010.

Publication 1407, September 2011

2.2 Where and when did EPA monitor?

Air monitoring stations (see Figure 1) have been continuously monitoring air quality from residential areas of Brooklyn since late October 2009. Another site was set up in Sunshine West during September 2010. The fixed, long-term trend site in Footscray has been operational since 1981.

Figure 2 shows an aerial image of Brooklyn and the surrounding suburbs. The image is centred on the Brooklyn industrial estate and shows all nearby air monitoring sites.

During the period of air quality monitoring, two sites were operational within the residential area of Brooklyn. The first site was set up at Annunciation Catholic Primary School in Nolan Avenue, Brooklyn. This station monitored air quality from late October 2009 until late September 2010. A second station was installed during July 2010 in the Brooklyn Reserve, near the corner of Heather and Nolan Avenues, Brooklyn. This site is still collecting air quality data.



Figure 2: Aerial image showing the location of air monitoring sites in relation to the Brooklyn Industrial Estate.

2.3 What did EPA monitor?

Particles were monitored as both:

- PM_{10} – particles smaller than 10 micrometres – since late October 2009
- $PM_{2.5}$ – particles smaller than 2.5 micrometres – since July 2010.

PM_{10} can be absorbed into the lungs, impacting on people's health, especially those who have existing respiratory illnesses or heart disease. Children and the elderly may be more vulnerable to the effects of particles. Due to their small size, $PM_{2.5}$ can also be absorbed deep into the lungs and impact on human health.

2.4 How did EPA interpret the monitoring results?

The maximum and average concentrations measured for each pollutant over the initial 12-month monitoring period (November 2009 to October 2010) at Brooklyn are presented in this report.

Levels were compared against Victorian and Australian air quality objectives and goals³ (Table 1). The objectives are set at levels that protect human health and aesthetic enjoyment. The goals, expressed as a maximum number of high-pollution days per year, are used to guide strategies for the management of activities affecting our air quality.

Table 1: Air quality objectives

Pollutant	Averaging period	Objective	Goal
Particles as PM_{10}	24 hours	50 $\mu\text{g}/\text{m}^3$	5 days

This report compares PM_{10} levels with those monitored in Melbourne, Geelong and the Latrobe Valley over the same time period (based on averages from all stations in each region).

For $PM_{2.5}$, instead of objectives the AAQ NEPM specifies advisory reporting standards, with a daily ($25 \mu\text{g}/\text{m}^3$) and annual ($8 \mu\text{g}/\text{m}^3$) standard.

3 FINDINGS

3.1 Air quality in Brooklyn is generally poor

During the 12 months of monitoring at Brooklyn, the PM_{10} air quality objective was not met on 38 days. This is much greater than the goal of no more than five days (Table 1).

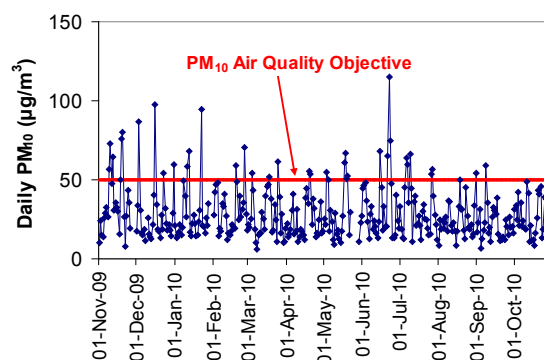


Figure 3: Daily PM_{10} values recorded at Brooklyn (November 2009 to October 2010).

³ *State Environment Protection Policy (Ambient air quality)*, Victoria Government Gazette No. S19, 9 Feb 1999 (amended Dec 2001), available from www.epa.vic.gov.au/air/ - click on 'Protecting Victoria's air environment'.

National Environment Protection (Ambient Air Quality) Measure, National Environment Protection Council, available from www.ephc.gov.au

3.2 How do Brooklyn's particle levels compare to other regions?

Brooklyn recorded significantly more days of PM₁₀ exceedances (38) than any other site in EPA's monitoring network during the same period (see Figure 4). The second highest number of days exceeding the PM₁₀ air quality objective were measured at Footscray (six), significantly fewer than at Brooklyn. The PM₁₀ air quality objective was not exceeded during monitoring at Sunshine in September and October.

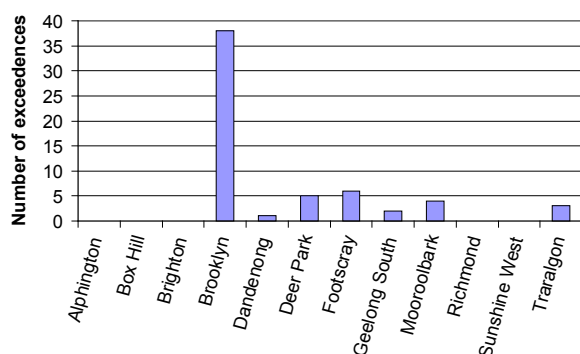


Figure 4: Number of PM₁₀ exceedances recorded at EPA air monitoring sites (November 2009 to October 2010).

3.3 Poor air quality is more likely to occur in Brooklyn on weekdays

There was a clear pattern in the days of the week when PM₁₀ exceedances occurred (Figure 5) – only on weekdays and not at all on Saturdays or Sundays.

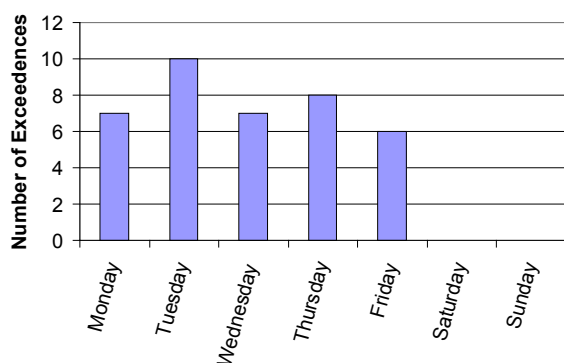


Figure 5: Days of the week on which PM₁₀ exceedances were recorded in Brooklyn (November 2009 to October 2010).

3.4 PM_{2.5} levels in Brooklyn are consistent with other locations in Melbourne

PM_{2.5} are particles less than 2.5 micrometres in size. They are smaller and finer than PM₁₀. Sources closely related to combustion are the major sources of PM_{2.5},

including domestic wood heating, motor vehicles, industrial processes and smoke from planned burns and bushfires.

PM_{2.5} monitors were installed at the Brooklyn site in July 2010 and at the Sunshine West site in September 2010. Permanent PM_{2.5} monitoring is conducted at Alphington and Footscray. Figure 6 shows PM_{2.5} levels at sites in Melbourne from July 2010 to October 2010.

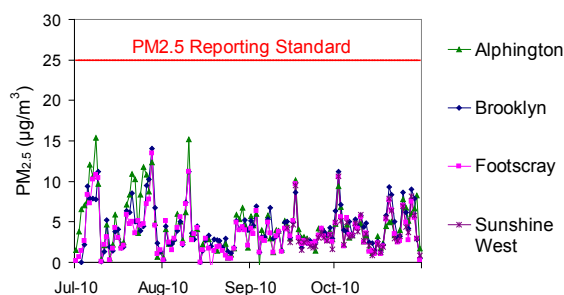


Figure 6: Daily PM_{2.5} values recorded at air monitoring sites Brooklyn (July 2010 to October 2010).

The graph shows a very strong correlation in measured PM_{2.5} values at all sites. This provides evidence to suggest that, when Brooklyn records higher PM₁₀ levels, the increase is associated with the coarse fraction of PM₁₀ (particulate matter between 2.5 and 10 micrometres in size) and not the finer particles. The major source of this kind is windblown dust, both from soil and roads.

4 FURTHER DATA ANALYSIS

In summary, the monitoring results showed a significant PM₁₀ impact at Brooklyn, unlike other monitoring sites in Melbourne and, in particular, other sites close to the industrial estate in Footscray and Sunshine West. Levels of PM_{2.5} measured at Brooklyn were comparable to those measured in Footscray and Alphington.

The elevated PM₁₀ levels in Brooklyn were only measured during northerly wind conditions, only on weekdays and were highest in the morning. Rainfall and temperature also influenced PM₁₀ levels. The following analyses examine each of these factors in greater detail.

To determine the conditions that lead to PM₁₀ peaks at Brooklyn, it is necessary to look at hourly data. There is no one-hour objective for PM₁₀ in the AAQ NEPM, but EPA uses an advisory one-hour level (80 µg/m³) in the hourly air quality web updates.

Hourly PM₁₀ measurements are used to classify air quality as 'very good', 'good', 'fair', 'poor' or 'very poor'. This advisory one-hour level is used in this report as the criterion for assessing hourly PM₁₀ data.

4.1 PM₁₀ levels in Brooklyn are greater during northerly winds

There were 356 hours of poor or very poor air quality measured at Brooklyn from 1 November 2009 to 31 October 2010 due to increased PM₁₀ levels. This equates to four per cent of all hours at Brooklyn during the 12-month period.

In 276 of these poor or very poor air quality hours, winds were coming from the north. Table 2 compares this with other wind directions and also provides the percentage of hours that air quality is poor or very poor in Brooklyn when the wind blows from particular directions.

Table 2: Hours of poor or very poor air quality measured at Brooklyn for each wind direction (November 2009 to October 2010)

Wind direction	Frequency of these winds (hours)	Poor or very poor air quality (hours)	Percentage of poor or very poor hours (%)
Northerly	2842	276	9.7
Easterly	511	19	3.7
Southerly	2654	17	0.6
Westerly	2459	44	1.8

Table 2 highlights that, nearly 10 per cent of the time that the wind is blowing from the north, air quality in Brooklyn is poor or very poor. It also shows that winds in Brooklyn blow from all directions with a similar frequency, except the east.

A similar analysis was done for the Footscray monitoring site during the same 12-month period. The results for PM₁₀ are presented in Table 3 and show that wind direction has only a minimal impact on air quality in Footscray.

Table 3: Hours of poor or very poor air quality measured at Footscray for each wind direction (November 2009 to October 2010)

Wind direction	Frequency of these winds (hours)	Poor or very poor air quality (hours)	Percentage of poor or very poor hours (%)
Northerly	2544	14	0.6
Easterly	515	2	0.4
Southerly	2448	10	0.4
Westerly	2080	42	2.0

Wind speed (Figure 7) is also a factor influencing air quality in Brooklyn. Poor or very poor air quality is much more likely as wind speeds increase above 5 m/s. Air quality also deteriorates as wind speeds drop below 2 m/s.

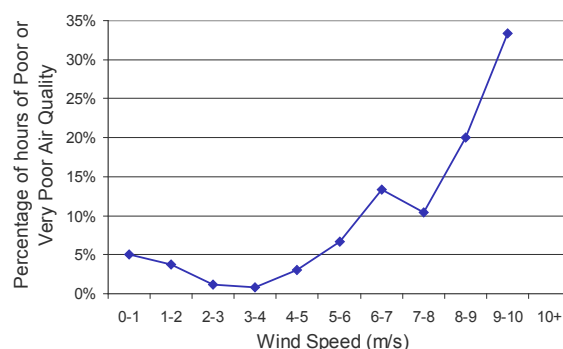


Figure 7: Percentage of hours of poor or very poor air quality in Brooklyn for each wind speed range (November 2009 to October 2010).

Further analysis was done to investigate the combined influence of wind direction and wind speed. This is presented in Figure 8 and shows that, whatever the speed of the wind, as long it is a southerly, there is less than a three per cent chance of poor or very poor air quality in Brooklyn. This is in direct contrast to the effect of northerly winds, for which speeds less than 2 m/s or greater than 4 m/s mean an eight per cent chance of poor or very poor air quality. This probability rises above 20 per cent when wind speeds are greater than 6 m/s.

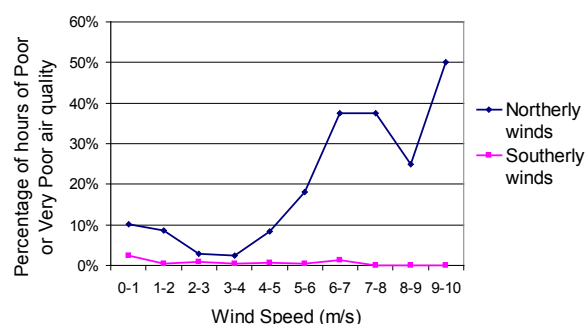


Figure 8: Percentage of hours of poor or very poor air quality in Brooklyn for each wind speed range (November 2009 to October 2010).

4.2 Poor air quality in Brooklyn occurs most frequently during the morning

The diurnal pattern of poor or very poor air quality was investigated to determine whether daily PM₁₀ exceedances on working days occurred during working hours (Figure 9). There was a distinct increase in the frequency of poor or very poor air quality hours between 6 am and midday, with the peak levels of PM₁₀ occurring between 7 am and 9 am.

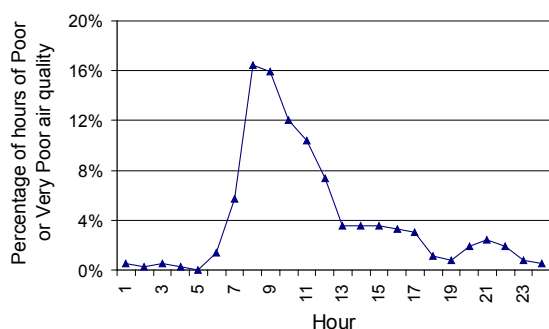


Figure 9: Percentage of hours of poor or very poor air quality in Brooklyn for each hour of the day (November 2009 to October 2010).

4.3 What impact does rainfall have on particle levels in Brooklyn?

Section 3.4 shows that coarse-fraction particles of PM_{10} are responsible for the overall PM_{10} increases recorded at Brooklyn. As windblown dust, from both soil and roads, is a likely source of this coarse fraction, rainfall will influence the amount of airborne particles in the region. Rainfall increases the soil moisture, making it unlikely that particles can be raised by the winds or vehicle traffic.

Rainfall was analysed by counting the number of days without rain prior to each exceedance of the daily PM_{10} standard.

The results are presented below in Table 4 and clearly show that, if there has been rain in the previous three days, an exceedance of the daily PM_{10} standard is very unlikely. If there has been at least three days without rain, the chance of an exceedance rises to about 25 per cent. The data also shows that, as long as there have been at least three days without rain, the chance of an exceedance does not increase if the period without rain increases.

Table 4: Number of days without rain prior to each 24-hour PM_{10} exceedance at Brooklyn (November 2009 to October 2010).

Days without rain	Total	Number of PM_{10} exceedances	Percentage of PM_{10} exceedances (%)
Fewer than 3 days	234	6	2.6
3-5 days	48	12	25.0
5-7 days	33	8	24.2
7-10 days	24	6	25.0
More than 10 days	30	6	20.0

Note: The rainfall data is for Laverton and was accessed from the Bureau of Meteorology.

4.4 What impact does temperature have on particle levels in Brooklyn?

Temperature was analysed to see whether a clear relationship exists between temperature and PM_{10} levels.

Figure 10 shows there are two PM_{10} responses to temperature. The first is an increase in PM_{10} levels when the temperature is less than five degrees, and the second is a steady, almost linear increase in PM_{10} levels when the temperature rises above 20 degrees.

Higher PM_{10} levels and lower temperatures were measured during early-morning light northerly wind conditions, linked to early morning peak vehicle and dust-generating activity in the estate, which is likely to cause dust to be suspended or resuspended from roads into air.

Higher temperature tends to dry out soil and dust material, increasing the capacity for the material to be raised and suspended in the air and transported to surrounding areas by moderate to strong winds.

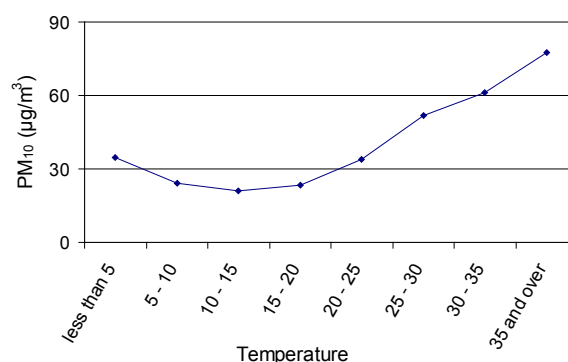


Figure 10: Average PM_{10} levels in Brooklyn for each temperature range (November 2009 to October 2010).

4.5 How far is the dust spreading?

Measured levels of PM_{10} are greatest at the Brooklyn monitoring site, well above those recorded at Footscray and, more recently, Sunshine West.

Indicative PM_{10} monitoring using non-compliance mobile monitors was also conducted from October 2009 until September 2010. Although these monitors are not used in EPA's air monitoring network, they provide useful information about the general levels of PM_{10} .

Monitoring was conducted at one residential site and Annunciation Catholic Primary School in Brooklyn, as well as one residential site in Yarraville.

This monitoring was undertaken to estimate the relative levels of PM_{10} and the extent of the impact in the surrounding residential area. The monitoring results showed average PM_{10} levels were relatively similar, indicating PM_{10} impact occurring generally in

the nearby Brooklyn and Yarraville residential area, extending over a distance of approximately 3 km.

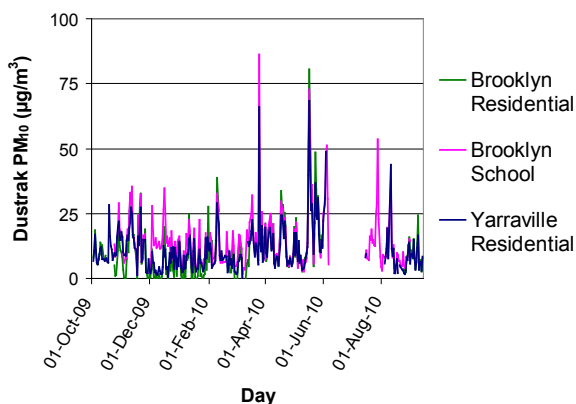


Figure 11: Indicative 24-hour PM₁₀ levels (October 2009 to September 2010).

5 WHAT IS CAUSING POOR AIR QUALITY IN BROOKLYN?

To determine the cause of poor air quality in Brooklyn, the findings and results from the data analysis outlined in sections 3 and 4 were combined. This highlighted a few key points.

The source of the PM₁₀ in Brooklyn is still difficult to pinpoint with certainty. This analysis suggests the source is located to the north of the Brooklyn monitoring site and is typically emitting coarse-fraction particles. The source is also linked to the working week and has a morning peak.

As PM₁₀ levels are strongly influenced by the working week, industrial processes and motor vehicles are likely sources of particles. This does not explain why PM₁₀ levels decrease during the afternoon even though traffic and industrial activities are still occurring. The main reason PM₁₀ levels are lower in Brooklyn during the afternoon is because the morning northerly winds shift to southerly sea breezes.

Motor vehicle exhausts are not the source of the increased PM₁₀ in Brooklyn, because motor vehicle combustion produces mainly fine particles (PM_{2.5}). Section 3.4 shows that PM_{2.5} levels in Brooklyn are consistent with other locations in Melbourne. This proves combustion from motor vehicles is not causing the PM₁₀ exceedances.

Because of the significant morning peak, vehicle activity still is a likely factor contributing to increases in PM₁₀. The most plausible explanation for the PM₁₀ exceedances in Brooklyn is that dust from the industrial estate (from unsealed roads and industrial premises) is being transported towards the Brooklyn residential area during northerly winds. This dust is either transported directly to the residential area or

onto major local roads to the south of the estate and then re-suspended towards the residential area by vehicles travelling along the major roads.

6 EPA ACTIONS TO MINIMISE PARTICLE LEVELS

To address the dust air quality issues being experienced in the Brooklyn area EPA is undertaking the following actions:

- Responding to community reports of dust, mud and odour impacts in the Brooklyn area.
- Issuing pollution abatement notices to control dust and mud emissions from industry.
- Undertaking licence and notice compliance inspections.
- Undertaking enforcement action where non-compliance is identified.
- Continuing to work with councils and VicRoads on the improvement of roads to reduce dust emissions (by sealing verges and unsealed roads).
- Continued engagement of the community to address current and new pollution issues in the area.
- Continuing to undertake dust and odour assessments and surveys, and using the results to drive compliance and enforcement activities in Brooklyn.

At present EPA has issued:

- 29 pollution abatement notices (24 are still current)
- three clean-up notices
- two penalty infringement notices (fines for dust emission).

7 WHAT ARE THE HEALTH IMPACTS?

The Department of Health provides the following information.

The members of our community most vulnerable to the effects of dust are infants and young children, the elderly, people with respiratory conditions (such as asthma, bronchitis and emphysema) and people with heart disease.

The most common symptoms experienced as a result of elevated dust levels are irritation to the eyes and upper airways. Elevated PM₁₀ levels can increase the symptoms of existing heart and lung conditions, including asthma. For vulnerable populations, elevated PM₁₀ may:

- worsen allergic reactions and asthma attacks in people with these pre-existing conditions
- worsen breathing-related problems in people with respiratory conditions
- increase the symptoms of existing heart problems.

These impacts may lead to increases in medication usage or the need for medical treatment at your GP or, in some cases, at a hospital.

8 WHAT CAN I DO TO REDUCE EXPOSURE TO PARTICLES?

The Department of Health provides the following advice.

On predicted high dust days, the following precautions can help you protect yourself and your family against adverse effects of airborne dust:

- Avoid outdoor activity. If you must go outside, spend as little time outside as possible.
- Avoid vigorous exercise, especially if you have asthma or a breathing-related condition.
- Stay indoors, with windows and doors closed.
- Stay in air-conditioned premises if possible and ensure regular maintenance of air conditioner filters.
- If you are an asthmatic or have a respiratory condition and you develop symptoms such as shortness of breath, coughing, wheezing or chest pain, follow your prescribed treatment plan. If symptoms do not settle, seek medical advice.

9 CONCLUSIONS

During the first 12 months of monitoring at Brooklyn the air quality objectives were met for 90 per cent of days. Even so, Brooklyn's air quality was typically worse than for other locations in Melbourne.

The most significant impact on Brooklyn's air quality over the monitoring period was from dust particles originating within the Brooklyn industrial estate.

Analysis of the air quality monitoring data has indicated sources within the Brooklyn industrial estate are causing the poor air quality. Raised dust from large trucks travelling along unsealed roads within the industrial estate is suspected as a significant source of the dust measured in Brooklyn's residential area.

EPA investigations have discovered some industrial sites within the estate have also contributed to the increased particle levels. EPA has taken enforcement action against some of these premises.

EPA is conducting a modelling assessment to quantify the impact of the unsealed roads on local air quality. Work is also being done to characterise the chemical composition of the PM₁₀ recorded in Brooklyn. The findings from these studies will be made available through EPA's website.

Appendix D - Extract from Mobil Altona Refinery Community Bulletin)

Emergency and sirens info and complaints table

Date	Verified				Unverified			
	Odour	Noise	Flaring	Other	Odour	Noise	Flaring	Other
2011	12	9	n/a*	12	74	0	n/a*	1
2012	0	5	1	3	29	4	1	4
2013	5	2	2	8	34	5	0	3
Jan-June 2014	3	0	2	0	16	0	0	1
July 2014	0	0	0	0	1	0	0	0
Aug 2014	0	0	0	0	0	0	0	0
Sep 2014	0	0	0	0	0	0	0	0
Total YTD	3	0	2	0	17	0	0	1

*To improve transparency we have revised the way we report complaints and in 2012 began reporting 'flaring' as its own complaint category.

Source: Altona Refinery, Community Bulletin, December 2014.

http://www.exxonmobil.com/Australia-English/PA/Files/mcn_altonaclcdec14.pdf

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