



# TIMARU ODOUR ASSESSMENT

March 2021 Odour Scout Monitoring Report

**8 March 2021**

## Contents

1	Introduction.....	3
2	Methodology.....	4
3	Results.....	6
3.1	Day 1 – 22 <sup>nd</sup> October 2020 .....	6
3.1.1	Day 1 Summary.....	13
3.2	Day 2 – 23 <sup>rd</sup> February 2021.....	13
3.2.1	Day 2 Summary.....	16
3.3	Day 3 – 24 <sup>th</sup> February 2021.....	16
3.3.1	Day 3 Summary.....	20
3.4	Day 4 – 25 <sup>th</sup> February 2021.....	20
3.4.1	Day 4 Summary.....	24
3.5	Day 5 – 26 <sup>th</sup> February 2021.....	24
3.5.1	Day 5 Summary.....	28
4	Conclusion.....	28
A.	Appendix A – Field sheets and parameter descriptors .....	29

## 1 Introduction

Environment Canterbury is investigating odour nuisance effects around the Washdyke and North Timaru area.

Environment Canterbury has contracted NZ Air Limited (**NZ Air**) to undertake an independent odour assessment within the wider environment surrounding these suburbs. This report presents the results of a five day field odour scout monitoring program undertaken on 22<sup>nd</sup> - 26<sup>th</sup> February 2021. To provide consistency with previous odour studies in Bromley, the methodology for the odour scout program is based on that undertaken NZ Air in July and August 2020<sup>1</sup>. NZ Air has also reported and interpreted the data in a similar format to that in these previous reports.

This independent odour scout monitoring program is part of a wider odour study which is being undertaken by Environment Canterbury. The Timaru odour study contains three primary data feeds:

1. Observations made by the general public through the “Smelt it” mobile phone application.
2. Environment Canterbury’s enforcement team observations.
3. This five day independent odour scout monitoring program undertaken by NZ Air.

Primarily odours were observed as coming from three main industrial sites:

- Alliance Group Smithfield.
- South Canterbury By Products.
- Rooneys palm kernel storage facility.

As such, the odour survey was focused on these three industrial sites. However, in response to Smelt It notifications and odour sweeps of the suburbs other minor emitters were also observed, these included:

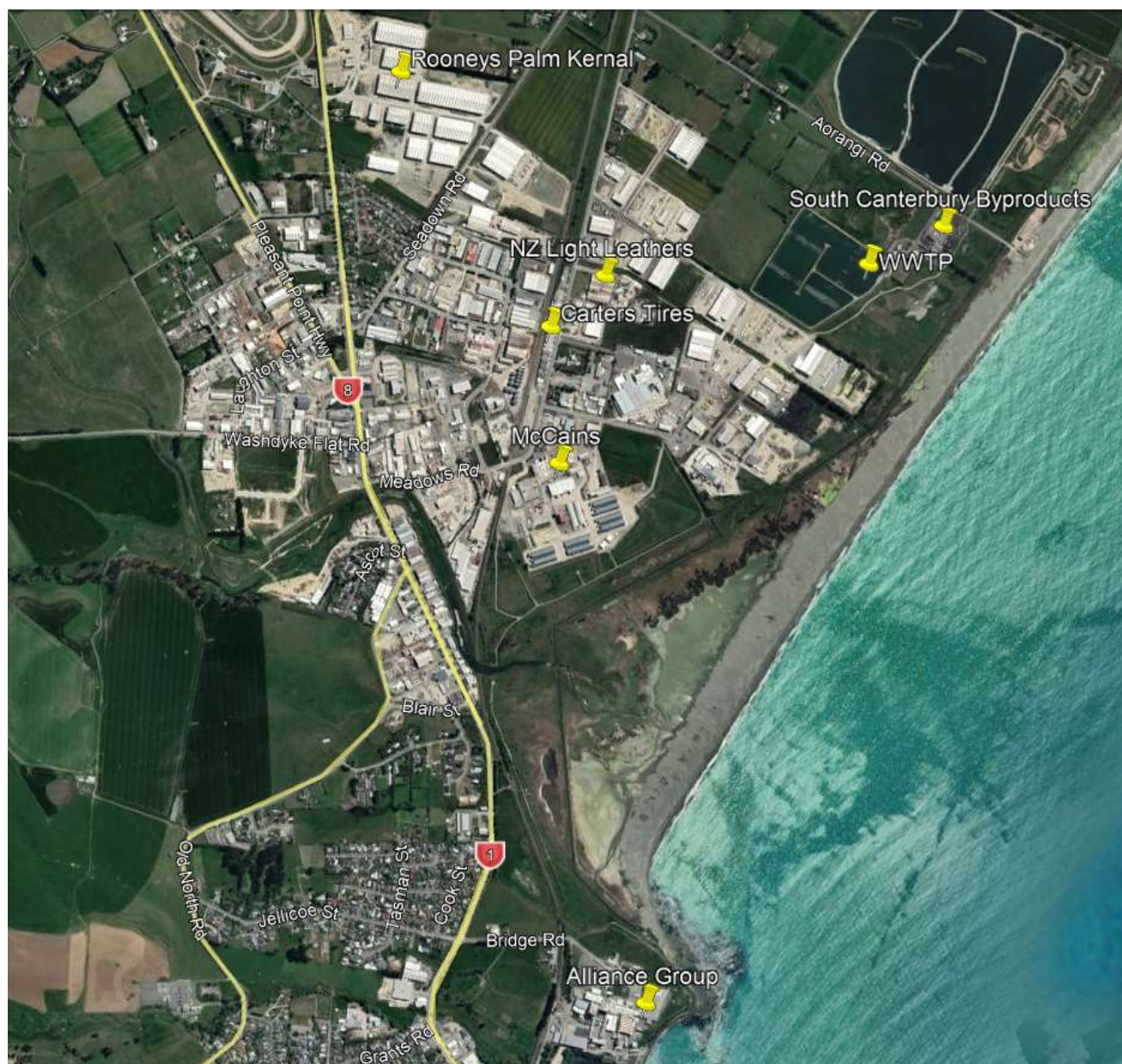
- McCain Foods Washdyke.
- The Washdyke wastewater treatment plant (WWTP).
- NZ Light Leathers.
- Carters Tires.

The locations of these businesses are illustrated in **Figure 1**.

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<sup>1</sup> NZ Air reports titled “Bromley Odour Assessment – July 2020 Odour Scout Monitoring Report” dated 31/7/2020 and “Bromley Odour Assessment – August 2020 Odour Scout Monitoring Report” dated 3/9/2020.

FIGURE 1 STUDY AREA AND PRIMARY EMITTERS



Aerial Imagery sourced from Google Earth March 2021

## 2 Methodology

The NZ Air odour scout observations were made on the following dates:

- Monday 22<sup>nd</sup> February
- Tuesday 23<sup>rd</sup> February
- Wednesday 24<sup>th</sup> February
- Thursday 25<sup>th</sup> February
- Friday 26<sup>th</sup> February

The odour scouts received email notifications from the Smelt It app. Where possible the odour scout undertook the next odour observation at the location of the Smelt It app notification. These observations in response to the app notifications were requested by Environment Canterbury to assist in validating observations by the public.

Two odour scouts made independent observations at each monitoring location on the first observation day (Monday 22<sup>nd</sup> Feb). As odour perception is very subjective, and differs from one individual to another, side by side independent observations by multiple individuals provides an increased level of quality assurance for the odour scout results. On the subsequent four observation days only one odour scout made observations.

On Monday 22<sup>nd</sup> Feb, the two odour scouts undertook a general survey of the area undertaking spot checks to identify industries within the study area who might be emitting odour. On subsequent days one odour scout focused on undertaking plume mapping of the primary emitters but also responded to Smelt It notifications as and when they were received.

Where an odour was detected the extent of the plume was determined by a series of downwind observations. Following this plume mapping, an upwind observation was made to ensure there was no other contributor to the plume. Where a Smelt It notification came through this would be investigated as soon as possible, if an odour was detected plume mapping of this event was undertaken.

Plume mapping was undertaken by making observations in a zig zag pattern moving towards the alleged odour emitter. In this way the odour scout can determine the extent and intensity of any odour plume being emitted from the alleged emitter. This methodology is based on the 'dynamic downwind surveillance' methodology described in the Draft Odour Surveillance Guidance produced by EPA Victoria<sup>2</sup>.

The methodology for making odour observations was based on the German reference method VDI 3940: 2006. The odour scout field observation methodology is also based on that described in Section 4 and Appendix 3 of the Ministry for the Environment Good Practice Guide for Assessing and Managing Odour (2016). At each odour observation location, the odour scout records the odour intensity (on a 0 – 6 scale) and character (from a list of 40 different odour descriptors) every 10 seconds for a period of 10 minutes. In addition to these observations, the following parameters are also recorded at each site:

- A unique sample site ID along with the GPS co-ordinates of the assessment location.
- The date and the time of the observation.
- The wind direction, as observed at ground level (in cardinal directions).
- The windspeed (in m/s as measured by a handheld anemometer or via the Beaufort scale).
- The cloud cover (in octas).
- The ground level ambient temperature (as recorded on a handheld digital thermometer).
- The overall hedonic tone (on a scale of -4 to +4).

The field sheet used to record the observations at each monitoring location are included as **Appendix A**. The list of odour character descriptors, intensity scale descriptors, and hedonic tone scale descriptors are also included in **Appendix A**.

Where applicable, the odour scout also recorded further information to provide context to the observation. For example, "a number of diesel trucks were passing by which resulted in a sporadic 'diesel fume' type odour during the observation". This information has been incorporated into the observation summaries in **Section 3** of this report.

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<sup>2</sup> EPA Victoria "Odour Surveillance Method Draft" December 2019



### 3 Results

To provide comparable results to the Bromley odour study, NZ Air has calculated the “percentage odour character frequency” and “percentage odour intensity frequency” for each observation similar to that described in previous Watercare and NZ Air reports.

Each day’s data is also presented pictorially over a map. The following information is included within the Figures:

- The location ID is the number in the square.
- The colour of the square indicates the hedonic tone.
- The wind direction during the observation is illustrated by the blue arrow adjacent to the location ID (note that a blue dot represents calm conditions where a consistent wind direction was not observed).

Where there is a red ‘R’ next to the ID number the observation is a response to a Smelt It notification.

Where wind directions have been consistent and enough data has been collected within the monitoring run, a description of the length and width of the plume observed has been provided.

#### 3.1 Day 1 – 22<sup>nd</sup> October 2020

On this date two odour scouts (AE and WP) were used to make independent duplicate observations at each monitoring location. The results for each scout are presented in **Tables 1 and 2** and **Figures 2 - 5**.

TABLE 1 AE OBSERVATIONS – 22/2/2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Upwind/downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	Upwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Upwind	Downwind	Downwind
Date and time	22/2/2021 09:21	22/2/21 09:38	22/2/2021 10:02	22/2/21 10:17	22/2/21 10:12	22/2/21 10:59	22/2/21 11:18	22/2/2021 11:33	22/2/2021 12:00	22/2/2021 12:14	22/2/21 12:33	22/2/21 12:54	22/2/21 13:19	22/2/21 13:35	22/2/2021 13:52	22/2/2021 14:18	22/2/2021 14:40
Wind direction	NNW	NNW	NNW	NNE	NNW	N	N	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Wind speed (Beaufort Scale)	1	1	2	2	1	1	2	1	1	1	1	1	1	2	2	1	1
Cloud cover (octa)	9	8	8	8	8	8	8	8	8	8	8	8	4	4	4	4	2
Temperature (Deg C)	16	16	16	16	16.5	17	17	17	17.5	17.5	19	18.5	21	22	22	23	24
Rain	Misty	Misty	None	Misty	Misty	None	None	None	None	None	None	None	None	None	None	None	None
Hedonic Tone	0	0	0	1	0	0	0	0	-2	-1	0	0	0	0	0	0	0
Character Descriptor	Percentage of odour character detected																
No odour	37%	62%	48%	60%	90%	93%	93%	88%	75%	67%	0%	100%	100%	100%	57%	100%	18%
Fragrant	0%	2%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Perfumy	5%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sweet	58%	27%	52%	15%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bakery (fresh bread)	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Meaty (cooked meat)	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sea/marine	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	43%	0%	0%
Bark-like, birch bark	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chemical	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	70%
Rubbish	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compost	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Silage	0%	0%	0%	3%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Like gasoline, solvent	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Putrid, foul, decayed	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	0%
Dead animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%	0%	0%	0%
Feecal (like manure)	0%	0%	0%	0%	0%	3%	0%	0%	0%	22%	0%	0%	0%	0%	0%	0%	0%
Other - Diesel fumes	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Intensity Descriptor	Percentage of intensity detected																
No odour	37%	62%	48%	60%	90%	93%	93%	88%	75%	67%	0%	100%	100%	100%	57%	100%	18%
Very weak	38%	8%	18%	20%	8%	2%	2%	7%	7%	22%	27%	0%	0%	0%	25%	0%	73%
Weak	12%	8%	22%	13%	2%	5%	5%	2%	13%	12%	63%	0%	0%	0%	17%	0%	8%
Distinct	13%	20%	10%	7%	0%	0%	0%	3%	3%	0%	10%	0%	0%	0%	2%	0%	0%
Strong	0%	2%	2%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FIGURE 2 AE WASHDYKE OBSERVATIONS – 22/2/2021

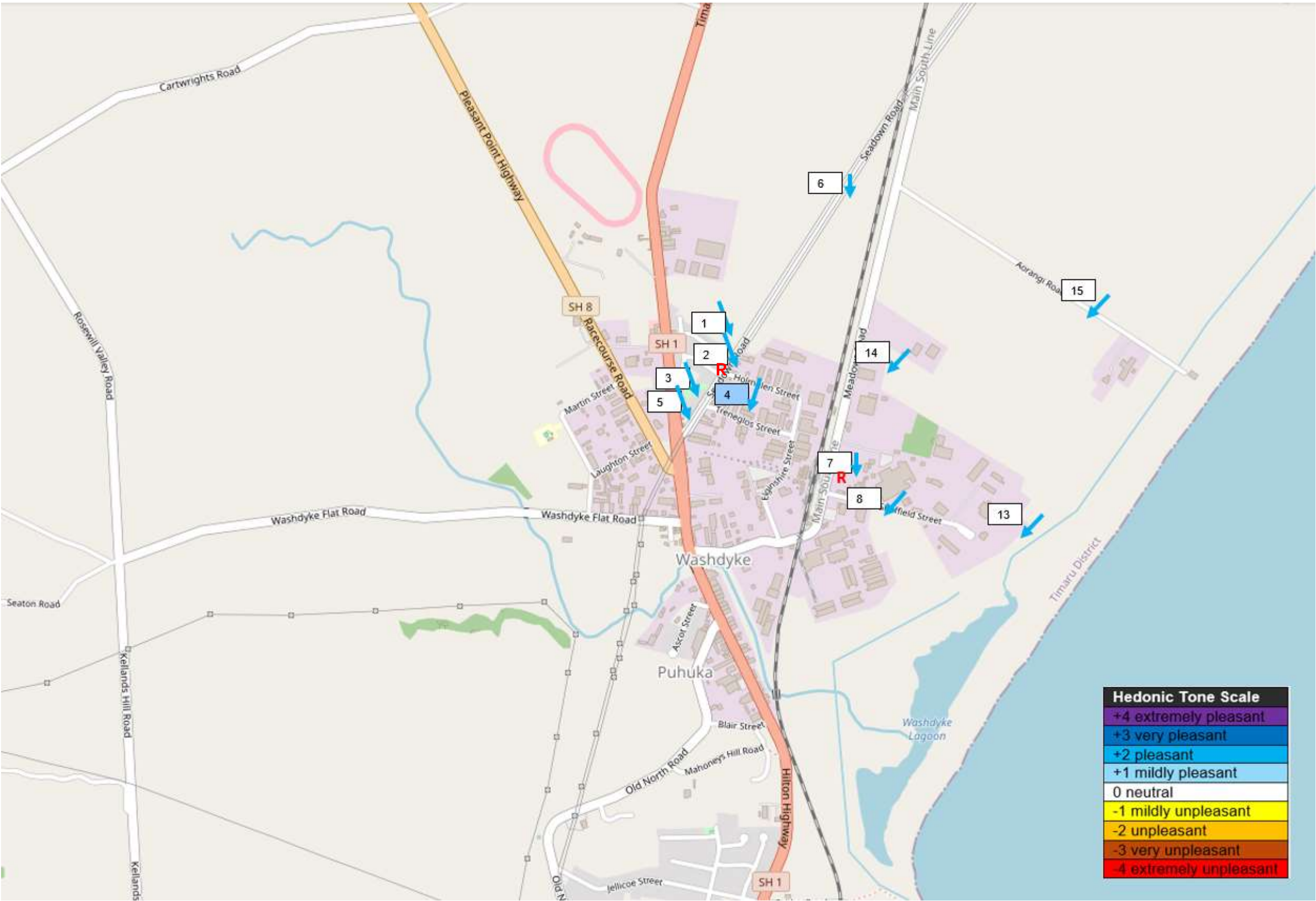




FIGURE 3 AE NORTH TIMARU OBSERVATIONS – 22/2/2021

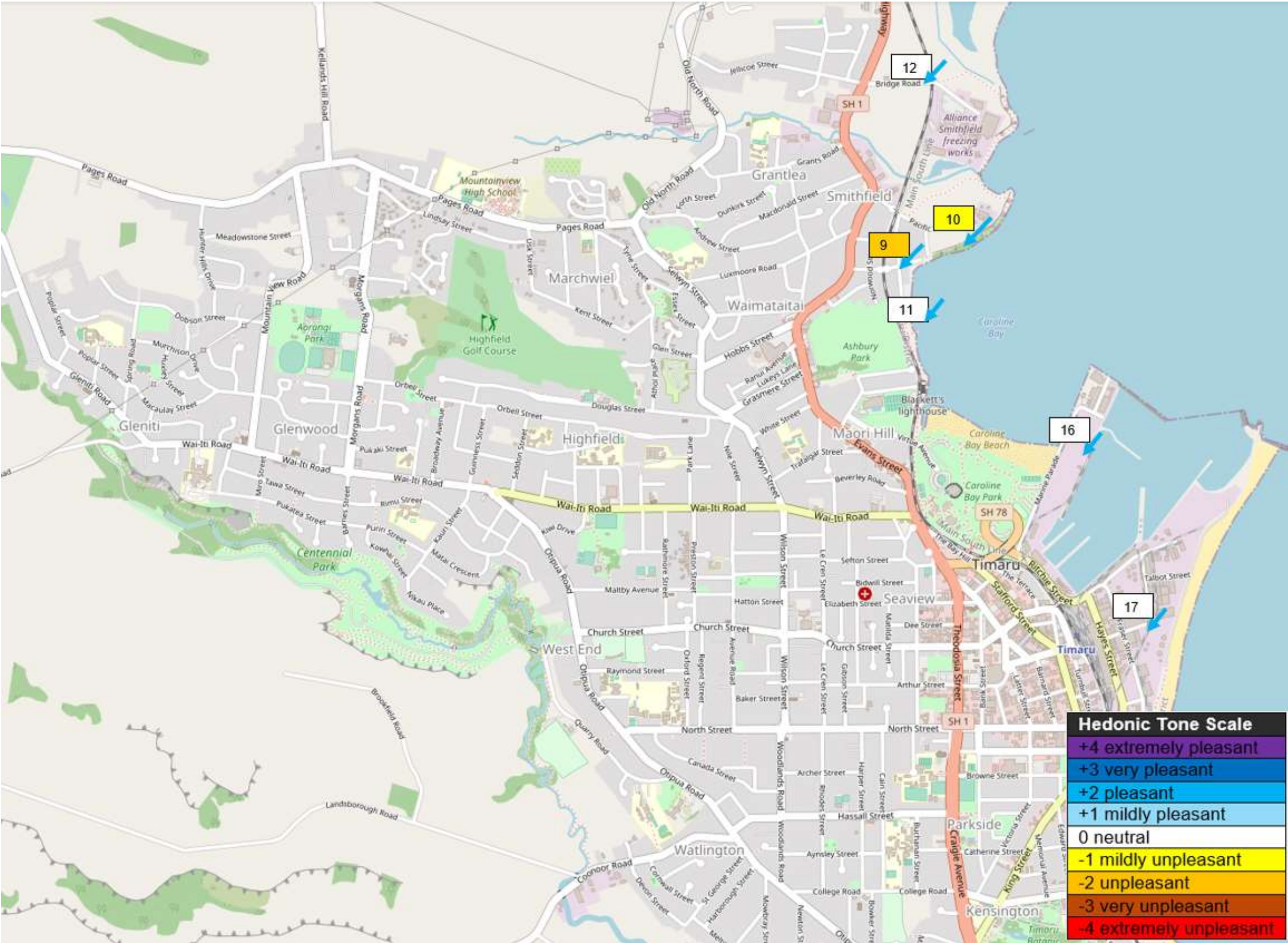


TABLE 2 WP OBSERVATIONS – 2/2/2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Upwind/downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	Upwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Upwind	Downwind	Downwind
Date and time	22/2/2021 09:21	22/2/21 09:38	22/2/2021 10:02	22/2/21 10:17	22/2/21 10:12	22/2/21 10:59	22/2/21 11:18	22/2/2021 11:33	22/2/2021 12:00	22/2/2021 12:14	22/2/21 12:33	22/2/21 12:54	22/2/21 13:19	22/2/21 13:35	22/2/2021 13:52	22/2/2021 14:18	22/2/2021 14:40
Wind direction	NNW	NNW	NNW	NNE	NNW	N	N	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Wind speed (Beaufort Scale)	1	1	2	2	1	1	2	2	2	1	1	1	1	2	2	1	1
Cloud cover (octa)	8	8	8	8	8	8	8	8	8	8	8	8	4	5	4	4	2
Temperature (Deg C)	16.5	16	16	16	16.5	17	17	17	17	17.5	19	18.5	21	22	22	23	24
Rain	Misty	None	None	Misty	Misty	None	None	None	None	None	None	None	None	None	None	None	None
Hedonic Tone	0	0	0	1	0	0	0	0	-2	-1	0	0	0	0	0	0	0
Character Descriptor	Percentage of odour character detected																
No odour	28%	58%	48%	53%	95%	93%	92%	93%	67%	60%	0%	100%	100%	97%	67%	100%	40%
Fragrant	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Perfumy	5%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sweet	57%	23%	52%	15%	5%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Fruity	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bakery (fresh bread)	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Meaty (cooked meat)	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sea/marine	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	33%	0%	0%
Chemical	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	53%
Rubbish	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compost	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Silage	3%	0%	0%	5%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Like gasoline, solvent	0%	3%	0%	0%	0%	2%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Putrid, foul, decayed	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%
Dead animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%
Feecal (like manure)	0%	0%	0%	0%	0%	3%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%
Other - Diesel fumes	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%
Intensity Descriptor	Percentage of intensity detected																
No odour	28%	58%	48%	53%	95%	93%	93%	93%	67%	60%	0%	100%	100%	97%	67%	100%	40%
Very weak	35%	20%	27%	17%	5%	3%	0%	3%	0%	28%	43%	0%	0%	3%	20%	0%	30%
Weak	28%	10%	25%	25%	0%	2%	7%	0%	28%	5%	0%	0%	0%	0%	13%	0%	30%
Distinct	8%	8%	0%	5%	0%	2%	0%	3%	5%	7%	57%	0%	0%	0%	0%	0%	0%
Strong	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



FIGURE 4 WP WASHDYKE OBSERVATIONS – 22/2/2021

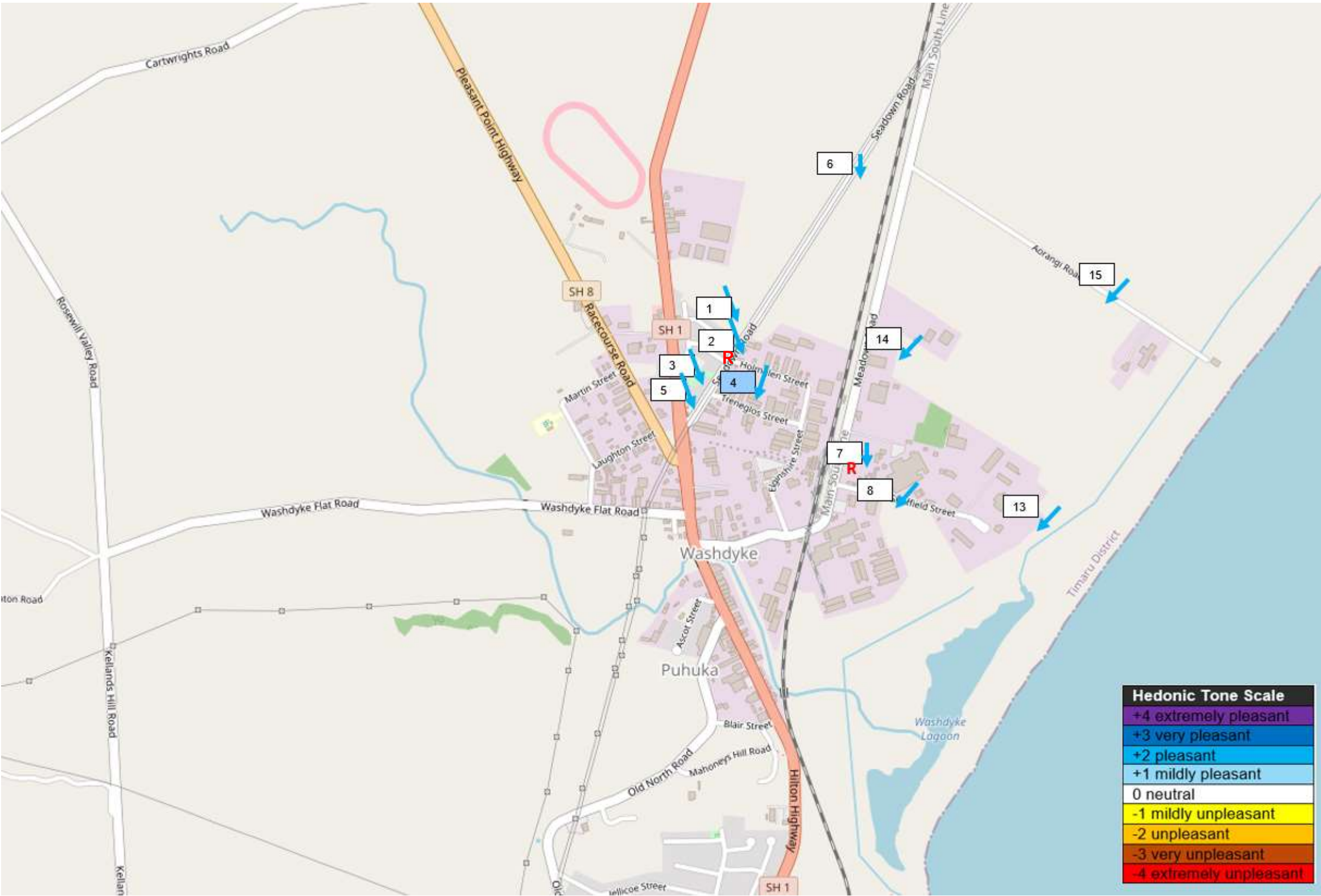
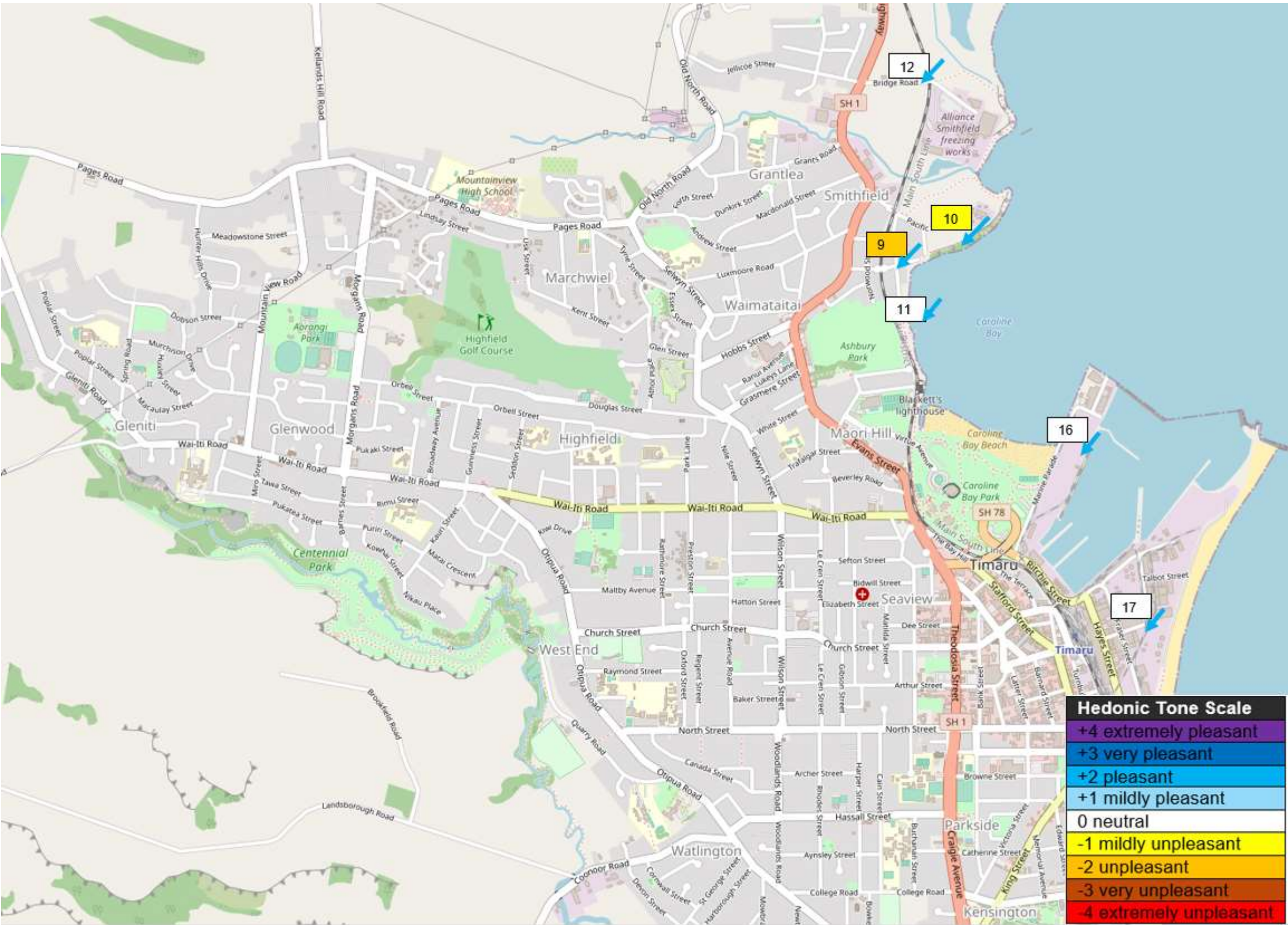




FIGURE 5 WP NORTH TIMARU OBSERVATIONS – 22/2/2021



### 3.1.1 Day 1 Summary

At the start of Day 1 there were calm to light breezes with wind directions initially coming from the NNW then later in the day they came from the NE. It was a misty morning which warmed up in the afternoon.

A series of Smelt It notifications came through between 8 am and 11 am from Flemington St and Randwick Pl. The notifications described the odour as being from the Rooneys palm kernel storage facility. The characters described by the complainants included “Fragrant, Perfumy, Sweet, and burnt molasses”. Odour intensities of 2 (weak) – 5 (strong) were described in the notifications.

AE and WP undertook a series of observations (Locations 1 – 5) in response to this Smelt It notification. A sweet/molasses like smell with intensities recorded between 0 (no odour) and 4 (strong), was detected at Locations 1 – 5 confirming the presence of odour consistent with that reported by the complainants. Brief pleasant odours were detected at Location 4 due to a bakery being nearby. No odour was detected at the upwind location (Location 6). The hedonic tone of these observations was rated by the odour scouts as 0 – neutral due to its character and mostly low intensities. The extent of this plume was approximately 450 m downwind from the nearest storage shed and approximately 350 m wide

Odours consistent with that which was observed being emitted from Alliance Smithfield were detected at Locations 9 and 10. At Location 9 (approximately 400 m southwest from Alliance Smithfield) ‘putrid, foul, decayed’ odours were detected briefly at intensities up to 3 (distinct). These odours were rated as being ‘unpleasant’ by both odour scouts.

Weak odours described as ‘dead animal, faecal’ were observed briefly at Location 10. Both odour scouts considered these odours to be -1 (mildly unpleasant) on the hedonic scale.

The duplicate odour observations between WP and AE were similar in intensity and character at most locations over the course of the day. There were slight differences at some locations which are within the expected range of variance between two different individuals.

### 3.2 Day 2 – 23<sup>rd</sup> February 2021

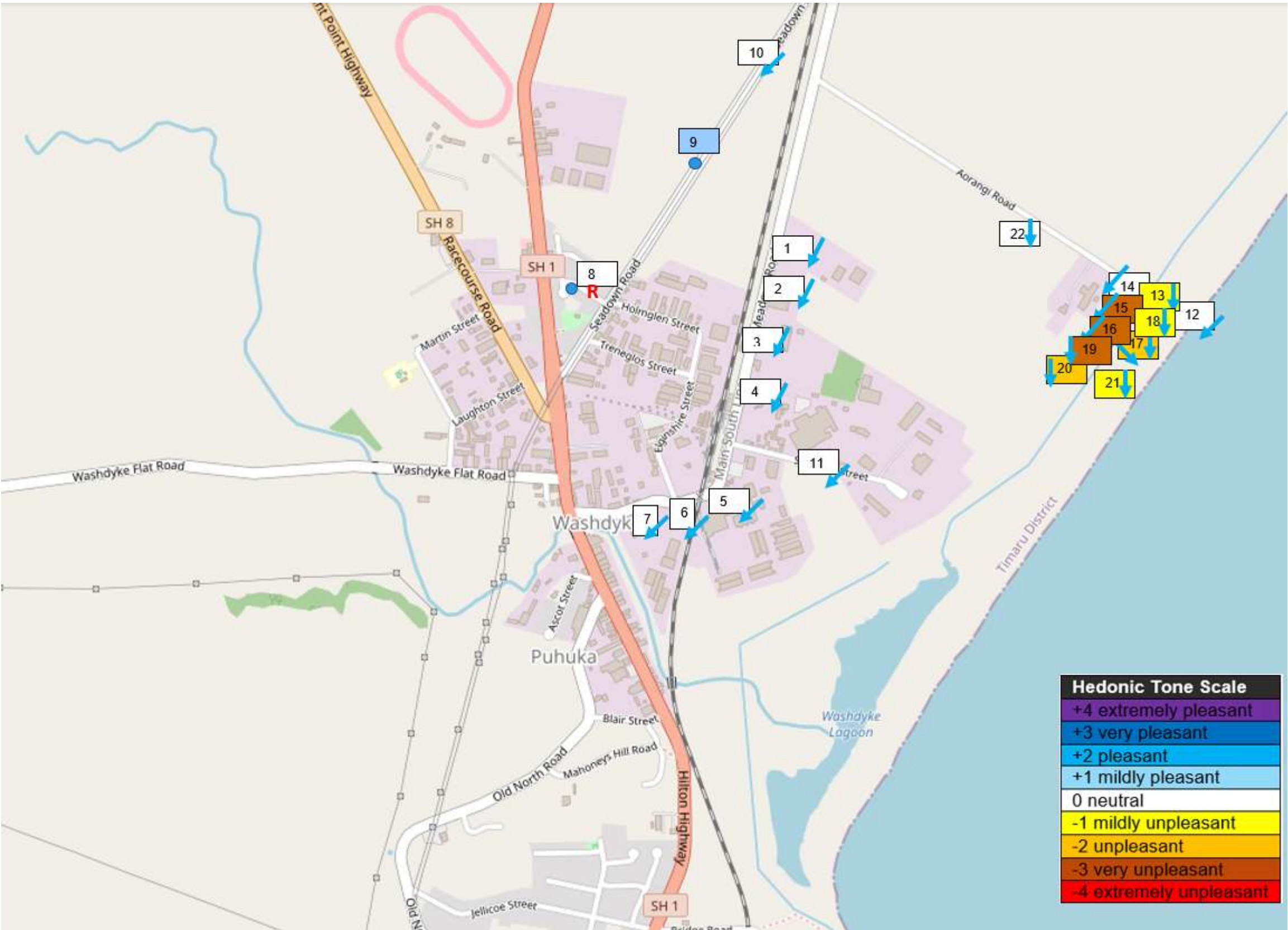
On this date one odour scout (WP) was used to make observations throughout the day. The results for this day’s observations are presented in **Table 3** and **Figure 6**.



TABLE 3 WP OBSERVATIONS – 23/2/2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Upwind/downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind
Date and time	23/2/21 8:23	23/2/21 8:40	23/2/21 8:58	23/2/21 09:21	23/2/21 9:45	23/2/21 10:00	23/0/21 10:18	23/0/21 10:35	23/2/21 10:54	23/2/21 11:08	23/2/21 11:45	23/2/21 12:03	23/2/21 12:20	23/2/21 12:28	23/2/21 12:43	23/2/21 12:55	23/2/21 13:07	23/2/21 13:27	23/2/21 13:40	23/2/21 13:53	23/2/21 14:05	23/2/21 14:20
Wind direction	NNE	NNE	NNE	NNE	NE	NE	NE	Calm	Calm	NE	NE	NE	N	NE	NE	NE	N then NW	N	N	N	N	N
Wind speed (m/s)	0	0	1	1	1	1	1 to 3	Calm	Calm	0	1	0	1	0	0	Calm	0	1	1	1	1	2
Cloud cover (octa)	8	8	8	8	8	7	7	8	7	7	7	8	7	8	8	7	8	8	7	7	8	7
Temperature (Deg C)	17	17	17	17.5	18	18.5	18.5	18	18	18.5	19	20	20	20	21	21	21	20	20	20	20	20
Rain	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Hedonic Tone	0	0	0	0	0	0	0	0	1	0	0	0	-1	0	-3	-3	-2	-1	-3	-2	-1	0
Character Descriptor	Percentage of odour character detected																					
No odour	65%	85%	55%	78%	62%	52%	80%	92%	53%	97%	70%	78%	88%	98%	0%	62%	57%	28%	0%	53%	80%	97%
Sweet	0%	0%	3%	8%	0%	0%	12%	7%	47%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fruity	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Meaty (cooked meat)	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sea/marine	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Woody, resinous	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cooked vegetables	0%	0%	0%	0%	32%	38%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chemical	0%	0%	37%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compost	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Silage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sickening	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Musty, earthy, mouldy	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Oily, fatty	0%	0%	5%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Like gasoline, solvent	0%	0%	0%	7%	0%	10%	7%	2%	0%	0%	10%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	3%
Paint-like	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sulphidic	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dead animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	38%	43%	0%	100%	42%	17%	0%
Sewer odour	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	72%	0%	5%	3%	0%
Other - Fertiliser	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Intensity Descriptor	Percentage of intensity detected																					
No odour	65%	85%	55%	85%	62%	52%	80%	92%	53%	97%	70%	78%	88%	98%	0%	62%	57%	28%	0%	53%	78%	97%
Very weak	35%	15%	45%	15%	20%	42%	5%	8%	38%	3%	20%	22%	5%	2%	0%	0%	32%	53%	35%	33%	22%	3%
Weak	0%	0%	0%	0%	10%	7%	15%	0%	8%	0%	10%	0%	7%	0%	70%	28%	8%	18%	60%	13%	0%	0%
Distinct	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	30%	10%	3%	0%	5%	0%	0%	0%
Strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FIGURE 6 WP OBSERVATIONS – 23/2/2021



### 3.2.1 Day 2 Summary

Day 2 was dominated by very low/calm speeds. As such the wind direction was variable but tended to be more north easterly than anything else. It was an overcast day with mild ambient temperatures (17 - 21 deg C)

WP undertook a number of spot checks around Washdyke industries (Locations 1 – 5). After observing a 'Cooked vegetable' odour at Location 5, WP undertook a brief plume assessment for odours emitted from McCains (Locations 5 - 7). 'Cooked vegetable' like odour was observed approximately 300 m downwind of McCains.

WP then responded to a Smelt It notification from Randwick PI (Location 8). WP attended approximately 30 minutes after the notification (due to needing to complete the earlier observations). At Location 8 (about 150 m from the nearest palm kernel storage building) very weak 'sweet' odour was very briefly detected which could be attributed to the palm kernel store. At Location 9 adjacent to the Rooneys palm kernel storage facility (about 50 m from the nearest storage building), more consistent very weak – weak, sweet odour associated with the palm kernel was detected.

The remainder of the day was spent tracking the plume around South Canterbury By Products. The 'dead animal' odour plume extended approximately 200 m south of the facility. Within approximately 150 m of the facility odour was rated as -3 (very unpleasant) on the hedonic scale. Odour intensities ranged from (no odour) to 3 (distinct). 'Sewer' like odour from the WWTP was also observed consistently at low intensities at Location 18. It was also briefly detected at low intensities at Locations 20 and 21

### 3.3 Day 3 – 24<sup>th</sup> February 2021

On this date only one odour scout (WP) was used to make observations throughout the day. The results for this day's observations are presented in **Table 4** and **Figures 7 and 8**.

TABLE 4 WP OBSERVATIONS – 24/2/2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Upwind/downwind	Downwind	downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind
Date and time	24/02/21 8:34	24/02/20 8:55	24/02/21 9:00	24/02/21 9:24	24/02/2021 9:48	24/02/21 10:03	24/02/21 10:20	24/02/21 10:33	24/02/21 10:48	24/02/21 11:05	24/02/21 11:20	24/02/21 11:38	24/02/21 11:55	24/02/21 12:14	24/02/21 12:34	24/02/21 12:58	24/02/21 13:16	24/02/21 13:30	24/02/21 13:53	24/02/21 14:13
Wind direction	NE	NE	NE	NE	NE	NE	NE	NE	NW	NE	N	N	NE	NE	NE	NE	NE	NE	NE	NE
Wind speed (m/s)	5	5	5	5	5	4	4	4	3	5	4	5	4	4	3	1	1	0	0	0
Cloud cover (octa)	7	7	7	7	7	7	6	6	6	6	6	7	6	6	6	6	6	6	6	6
Temperature (Deg C)	20	20	20.5	20.5	20.8	21	21	21.7	22.4	22.5	22	21	21	23	24.8	26	26	25.8	25	25
Rain	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Hedonic Tone	0	-1	-1	-2	0	1	0	-1	-1	-1	0	0	-2	-1	-1	0	0	0	0	1
Character Descriptor	Percentage of odour character detected																			
No odour	77%	68%	73%	53%	63%	32%	98%	5%	55%	33%	87%	82%	0%	67%	87%	83%	78%	52%	78%	45%
Fragrant	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	22%	0%
Sweet	8%	0%	0%	0%	0%	63%	0%	95%	45%	67%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sea/marine	0%	0%	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	48%	0%	0%
Woody, resinous	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	0%	0%
Cooked vegetables	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	53%
Chemical	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Silage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Like gasoline, solvent	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	15%	0%	0%	0%	0%	0%	0%	0%	2%
Putrid, foul, decayed	0%	32%	27%	47%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dead animal	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	100%	33%	12%	0%	0%	0%	0%	0%
Feecal (like manure)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%
Intensity Descriptor	Percentage of intensity detected																			
No odour	77%	68%	73%	53%	63%	32%	98%	5%	47%	33%	87%	82%	0%	67%	87%	83%	78%	52%	78%	45%
Very weak	15%	32%	27%	35%	37%	53%	2%	38%	43%	38%	13%	15%	43%	27%	13%	15%	22%	33%	13%	40%
Weak	8%	0%	0%	10%	0%	15%	0%	50%	8%	18%	0%	2%	48%	7%	0%	2%	0%	15%	8%	15%
Distinct	0%	0%	0%	2%	0%	0%	0%	7%	2%	10%	0%	2%	8%	0%	0%	0%	0%	0%	0%	0%
Strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



FIGURE 7 WP NORTH TIMARU OBSERVATIONS – 24/2/2021

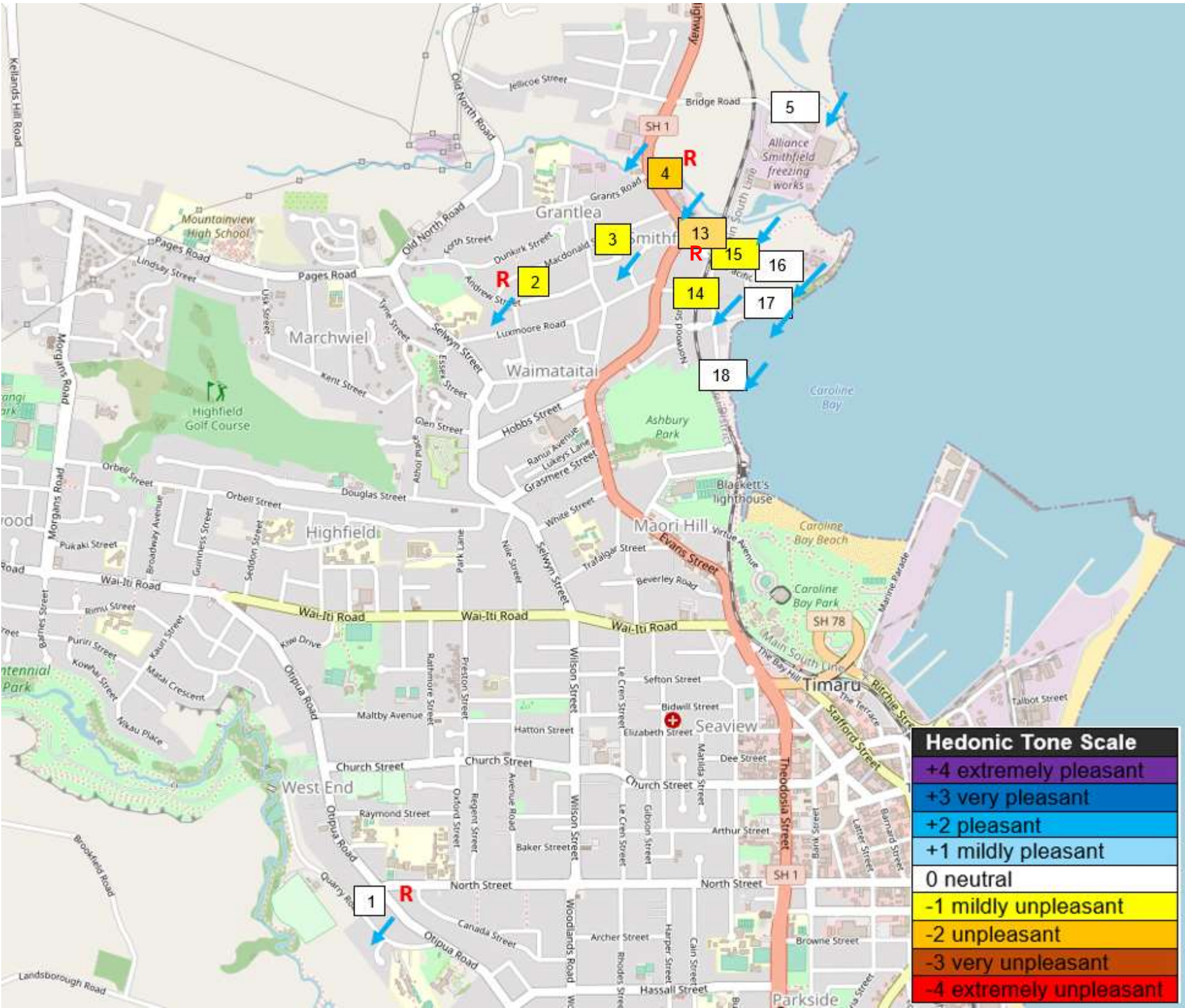
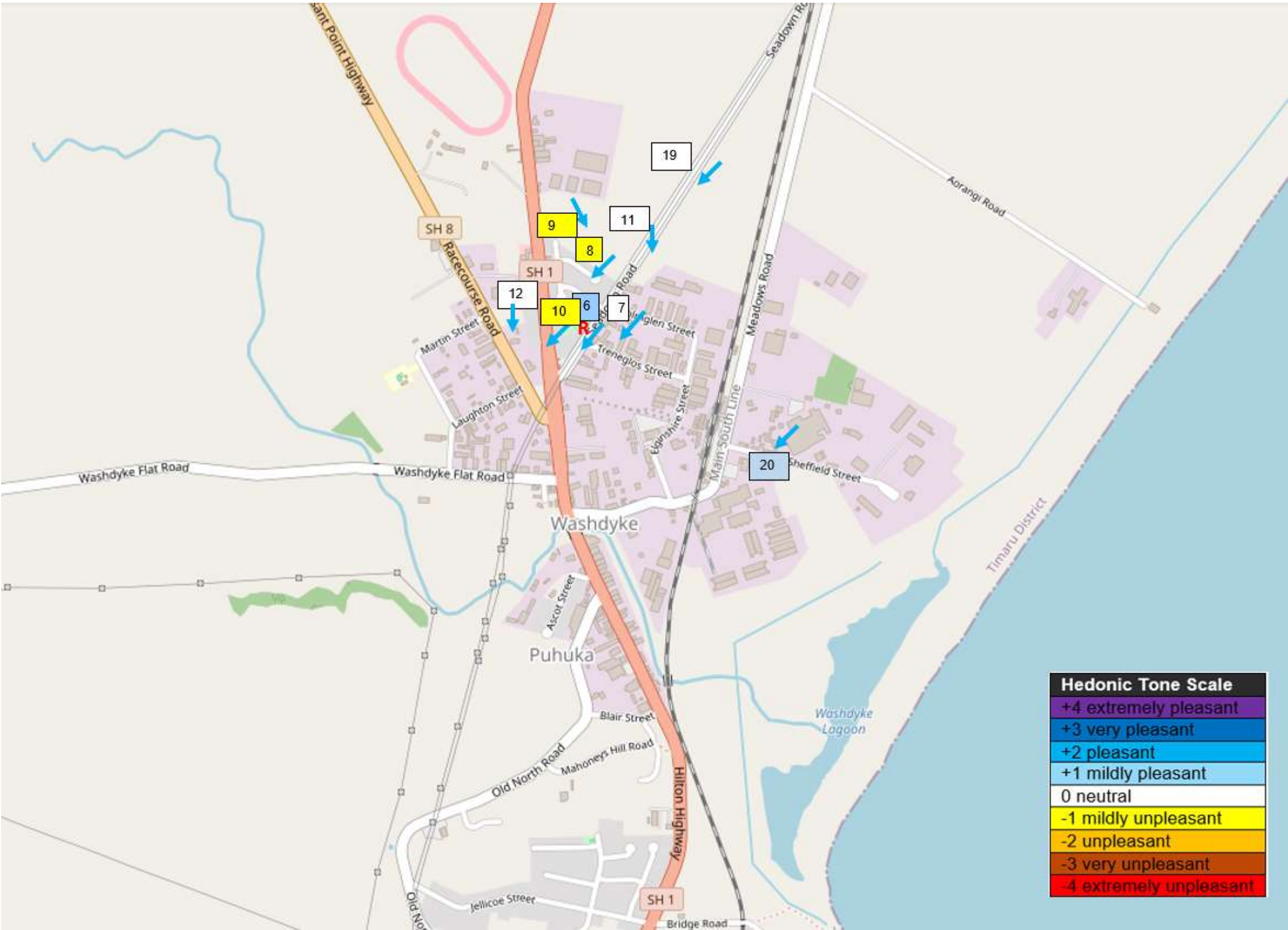




FIGURE 8 WP WASHDYKE OBSERVATIONS – 24/2/2021



### 3.3.1 Day 3 Summary

During Day 3 there were light to fresh north easterly breezes (3 – 5 on the Beaufort Scale) in the morning, however the winds died out in the early afternoon. It was a mostly overcast day with warm temperatures (20 - 25 deg C).

The first observation (Location 1) was made on Otipua Road where a Smelt It notification had been lodged about alleged 'gasoline/solvent/oily' odours. WP undertook an observation approximately 10 minutes after the notification was received. WP detected intermittent weak gasoline/solvent like odours associated with traffic emissions on the busy road.

A series of observations were made (Locations 2 – 4) in response to Smelt It notifications downwind of Alliance Smithfield. Very weak 'putrid, foul, decayed' odour consistent with that which is discharged from Alliance was detected approximately 1 km southwest of the facility. This odour was rated to have a mildly unpleasant hedonic tone. Approximately 500 m downwind of the facility (Location 4) the odour was detected at intensities up to 3 (distinct) and considered to be 'unpleasant' on the hedonic tone. No odour was observed at the upwind observation site (Location 5).

In response to another Smelt It notification at Flemington St, WP undertook a plume assessment of alleged odours from the Rooney palm kernel store. Mildly pleasant, sweet odour was detected at intensities of 1 (very weak) to 2 (weak) at the location of the notification (Location 6). Tracking of the plume identified that more intense (up to 3 – strong) 'sweet' odours consistent with that observed from the palm kernel store were observed in the wider environment (Locations 8 – 10). These locations were between 50 and 300 m from the Rooneys site. These more intense odours were considered as 'mildly unpleasant'. No odour was detected in the upwind monitoring location.

From mid-day through to the early afternoon another plume mapping exercise was conducted around the Alliance freezing works (Locations 13 – 18). Unpleasant 'putrid/foul/decayed' odour was observed continuously at Location 13 (approximately 500 m from southwest of Alliance) with intensities between 1 (very weak) and 3 (distinct). Mildly unpleasant odour consistent with that from Alliance was observed at Locations 14 and 15, the furthest of which was 650 m from the site. Location 13 was a response to a Smelt it notification which also described 'meaty, rancid, dead animal, odours'.

On this date the Alliance plume extended approximately 1 km downwind and was approximately 450 m wide. The plume around the Rooneys palm kernel store extended approximately 250 m downwind and was approximately 250 m wide.

## 3.4 Day 4 – 25<sup>th</sup> February 2021

On this date one odour scout (WP) was used to make observations throughout the day. The results for this day's observations are presented in **Table 5** and **Figures 9 and 10**.

TABLE 5 WP OBSERVATIONS – 25/2 /2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Upwind/downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind
Date and time	25/02/2021 8:45	25/02/2021 9:04	25/02/2021 9:25	25/02/2021 9:48	25/02/2021 10:07	25/02/2021 10:21	25/02/2021 10:40	25/02/2021 10:58	25/02/2021 11:40	25/02/2021 12:00	25/02/2021 12:20	25/02/2021 12:38	25/02/2021 12:52	25/02/2021 13:13	25/02/2021 13:25	25/02/2021 14:00	25/02/2021 14:21	25/02/2021 14:40
Wind direction	SE	SE	SE	SE	SE	SE	SE	SE	E	E	SE	SE	SE	SE	SE	ESE	E	SE
Wind speed (m/s)	2	1	2	2	1	1	1	2	0	0	2	2	2	1	1	1	2	2
Cloud cover (octa)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Temperature (Deg C)	18	17	16	16	16	16	16	16	16	17	17	17	17	16	17	17	17	17
Rain	Drizzle	Drizzle	Drizzle	Drizzle	Drizzle	Drizzle	Drizzle	Drizzle	Steady	Drizzle	Misty	Drizzle	Misty	Misty	Misty	None	Misty	None
Hedonic Tone	-2	0	0	-2	-2	-2	-1	0	-1	0	-2	0	-1	-1	0	0	0	0
Character Descriptor	Percentage of odour character detected																	
No odour	45%	75%	90%	0%	12%	8%	58%	100%	73%	100%	45%	95%	70%	80%	80%	100%	87%	88%
Sweet	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%
Woody, resinous	18%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Burnt, Smoky	28%	7%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	5%	8%	0%	0%	8%
Cooked vegetables	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Rubbish	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%
Sickening	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Tar-like	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
Like gasoline, solvent	0%	13%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	3%
Dead animal	0%	0%	0%	100%	88%	75%	42%	0%	0%	0%	55%	5%	25%	8%	10%	0%	12%	0%
Feecal (like manure)	0%	0%	0%	0%	0%	0%	0%	0%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other – oily wool	3%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Intensity Descriptor	Percentage of intensity detected																	
No odour	43%	75%	90%	0%	12%	8%	58%	100%	73%	100%	45%	95%	67%	80%	80%	100%	87%	88%
Very weak	33%	20%	8%	13%	43%	48%	15%	0%	17%	0%	33%	2%	32%	17%	20%	0%	10%	10%
Weak	22%	5%	2%	73%	38%	43%	25%	0%	8%	0%	15%	3%	2%	2%	0%	0%	3%	2%
Distinct	2%	0%	0%	13%	7%	0%	2%	0%	2%	0%	7%	0%	0%	2%	0%	0%	0%	0%
Strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



FIGURE 9 WP WASHDYKE OBSERVATIONS – 25/2/2021

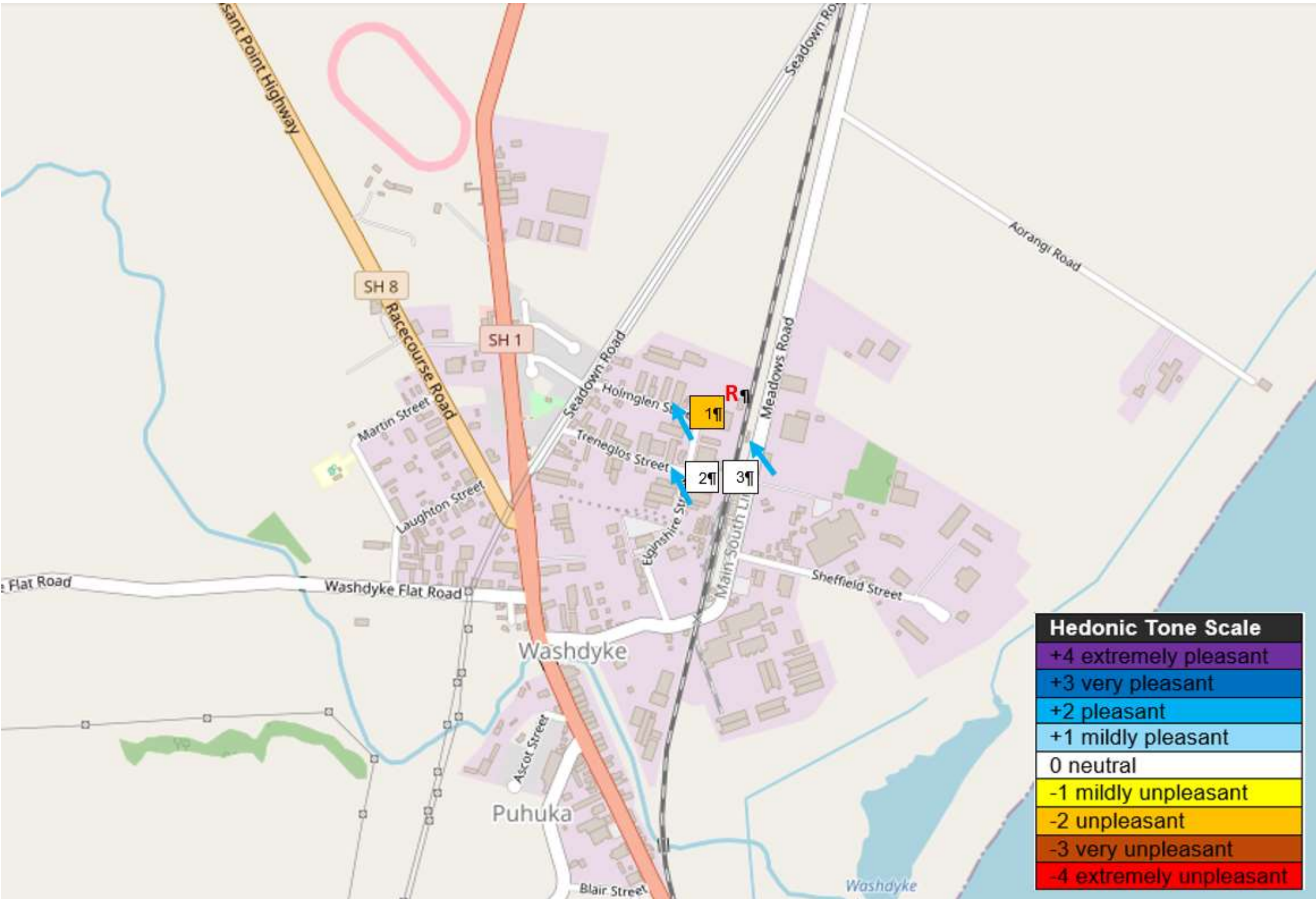
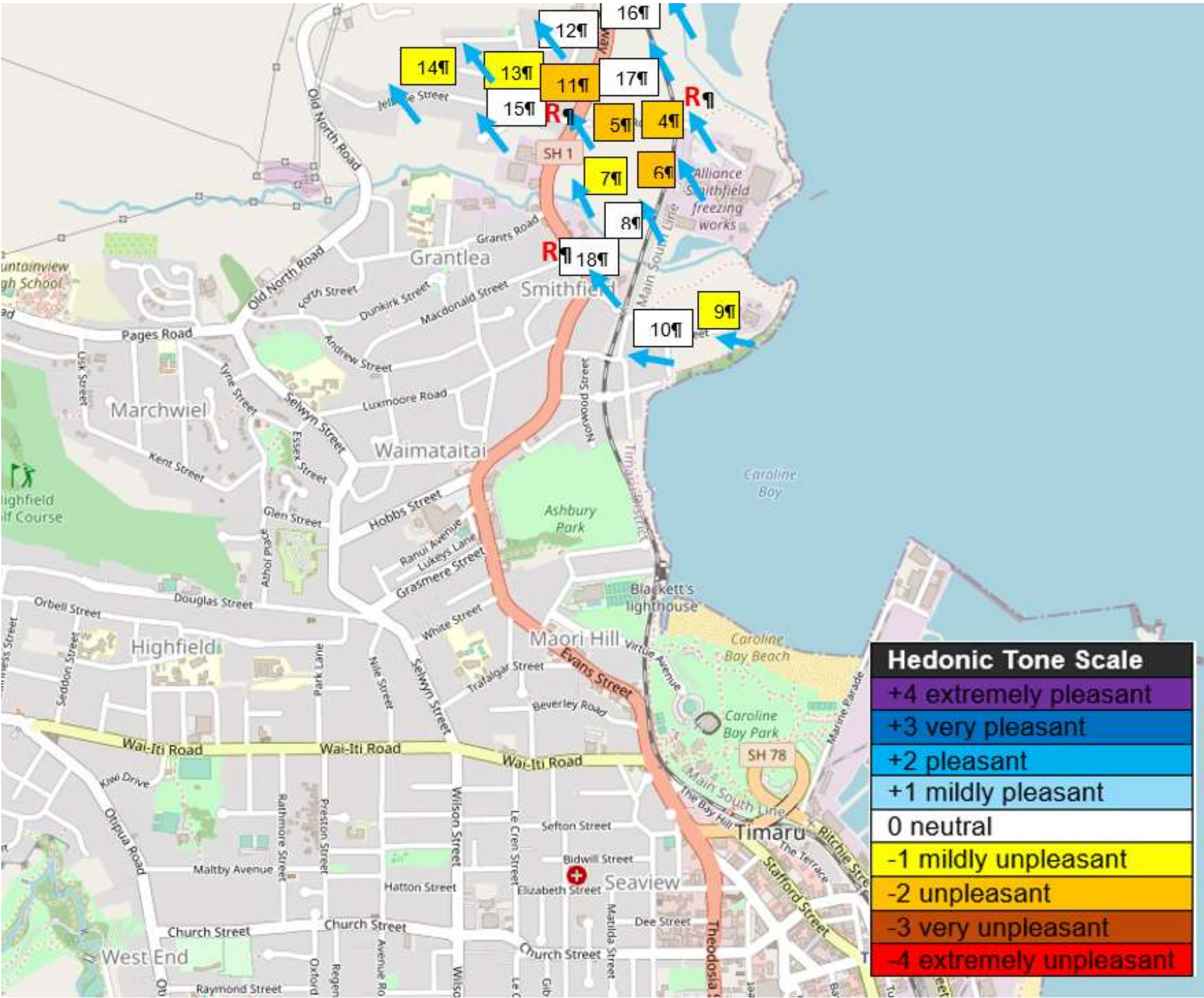


FIGURE 10 WP NORTH TIMARU OBSERVATIONS – 25/2/2021





#### 3.4.1 Day 4 Summary

Day 4 was a drizzly day with south easterly breezes. The temperatures were mild, 16 – 18 deg C.

In response to a Smelt It notification WP made his first observation on Elginshire St downwind from Carters Tires (Location 1). The complainant had detected a 'burning rubber' type smell. WP observed similar odours at intensities between 1 (very weak) and 3 (distinct). WP considered the odour to be 'unpleasant' on the hedonic tone scale. No burning rubber odours were detected at the upwind Location (Location 3).

The remainder of the day was spent mapping the odour plume from Alliance Smithfield. Smelt It notifications were received from Bridge Road, Cook Street, and Evans Street, during the survey. All of these complaints referred to meaty, rancid, dead animal, decayed like odours which are consistent with those observed at the Alliance facility. WP observed 'unpleasant' odour of a similar character at Locations 4, 5, and 6, which were between 200 and 500 m from the site. In response to a Smelt It notification WP also observed 'unpleasant' dead animal like odour with intensities between 0 (no odour) and 3 (distinct) at Cook St, which is approximately 600 m from the Alliance site.

Mildly unpleasant odour was observed at Locations 7, 9, 13 and 14.

On this date the odour plume from the Alliance facility was up to 900 m downwind from the facility and approximately 400 m wide.

### 3.5 Day 5 – 26<sup>th</sup> February 2021

On this date one odour scout (WP) was used to make observations throughout the day. The results for this day's observations are presented in **Table 6** and **Figures 11 and 12**.

TABLE 6 WP OBSERVATIONS – 26/2/2021

Location ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Upwind/downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Downwind	Upwind	Downwind	Downwind	Upwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind	Downwind
Date and time	26/2/21 8:38	26/2/21 8:55	26/2/21 9:12	26/2/21 9:28	26/2/21 9:47	26/2/21 10:03	26/2/21 10:23	26/2/21 10:50	26/2/21 11:05	26/2/21 11:50	26/2/21 12:10	26/2/21 0:00	26/2/21 12:40	26/2/21 12:55	26/2/21 13:10	26/2/21 13:25	26/2/21 13:40	26/2/21 14:00	26/2/21 14:14	26/2/21 14:29	26/2/21 14:46
Wind direction	N	N	NE	NE	NE	NE	NE	NE	NE	NE	N	N	NE	NE	NE	NE	NE	NE	NE	NE	NE
Wind speed (m/s)	0	0	0	0	0	0	1	1	0	0	1	1	1	1	3	4	2	3	2	1	2
Cloud cover (octa)	8	8	8	8	8	0	7	6	7	7	7	7	8	8	8	8	8	8	8	8	8
Temperature (Deg C)	18	18	18	19	18	19	19	20	20	22	21	21	21	21	20	20	20	20	19	19	19
Rain	None	None	None	None	None	0	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Hedonic Tone	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	-3	-3	0	0	-1	-1	-1
Character Descriptor	Percentage of odour character detected																				
No odour	0%	83%	8%	23%	25%	88%	15%	90%	70%	80%	78%	85%	100%	98%	0%	0%	100%	90%	62%	47%	72%
Fragrant	0%	0%	0%	0%	2%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fruity	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%
Sea/marine	100%	7%	0%	77%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Woody, resinous	0%	0%	0%	0%	43%	0%	85%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chemical	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%	3%	2%	42%	0%
Compost	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Silage	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Oily, fatty	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%
Like gasoline, solvent	0%	10%	7%	0%	3%	2%	0%	5%	7%	2%	0%	0%	0%	0%	0%	0%	0%	3%	3%	2%	2%
Fishy	0%	0%	85%	0%	15%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Putrid, foul, decayed	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%	27%
Paint-like	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%
Dead animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	3%	0%
Sewer odour	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	15%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Other - Diesel fumes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	7%	0%
Intensity Descriptor	Percentage of intensity detected																				
No odour	0%	83%	8%	23%	25%	88%	15%	90%	70%	80%	78%	85%	100%	98%	0%	0%	100%	90%	62%	47%	72%
Very weak	20%	15%	27%	22%	35%	2%	27%	7%	18%	13%	5%	10%	0%	2%	2%	0%	0%	8%	37%	8%	27%
Weak	70%	2%	37%	53%	38%	5%	58%	3%	12%	7%	13%	3%	0%	0%	45%	20%	0%	2%	2%	20%	2%
Distinct	10%	0%	28%	2%	2%	5%	0%	0%	0%	0%	3%	2%	0%	0%	42%	67%	0%	0%	0%	23%	0%
Strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%	13%	0%	0%	0%	2%	0%
Very strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Extremely strong	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FIGURE 11 WP NORTH TIMARU OBSERVATIONS – 26/2/2021

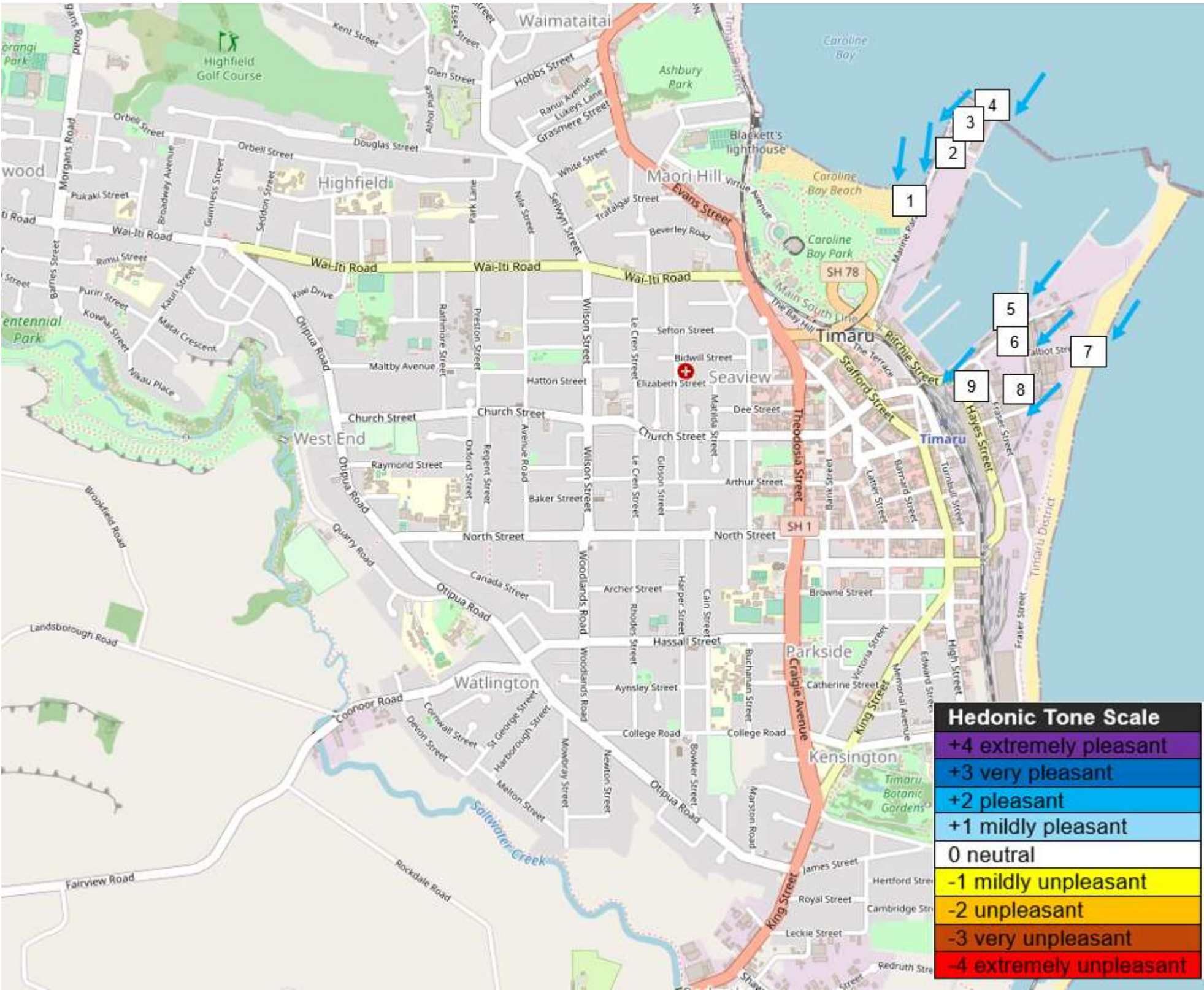
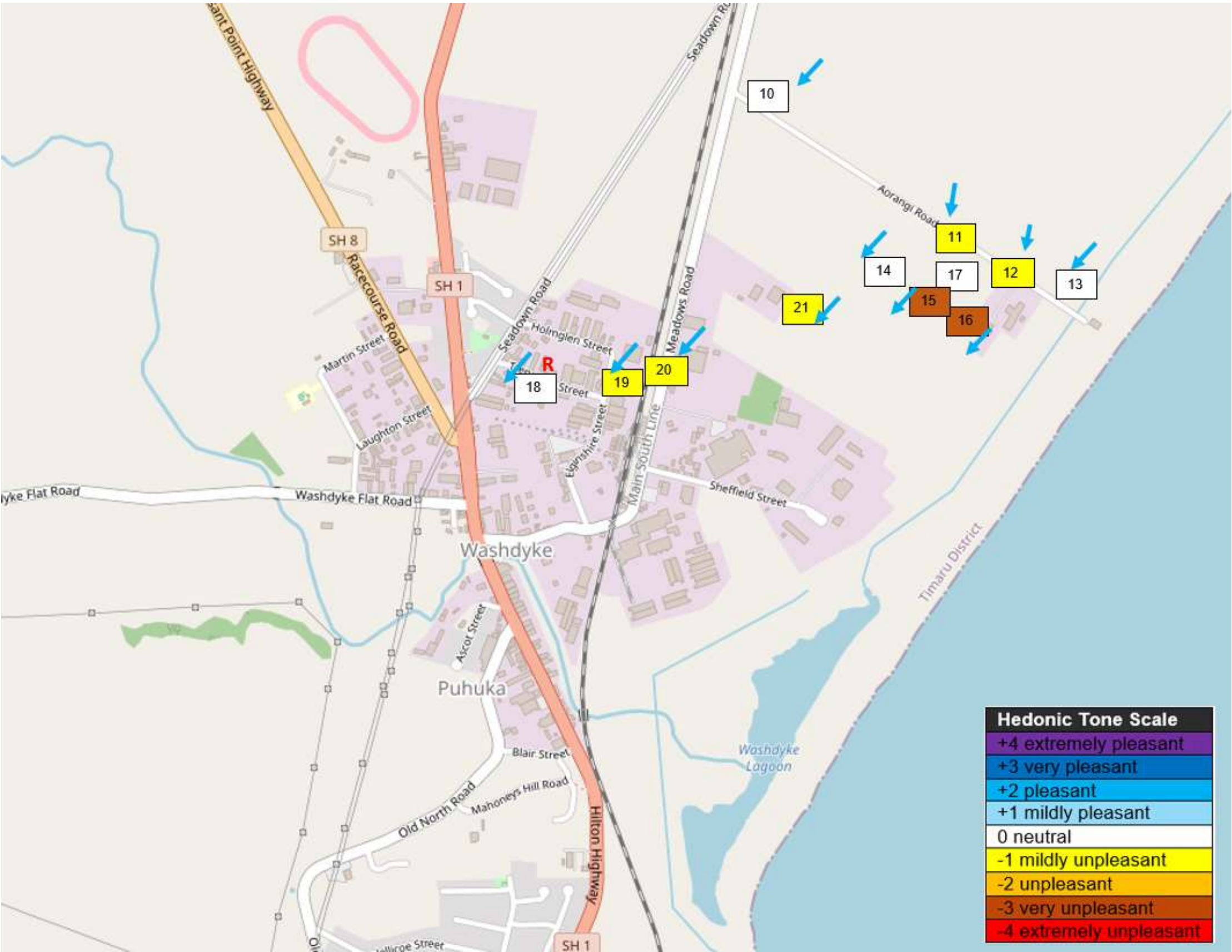




FIGURE 12 WP WASHDYKE OBSERVATIONS – 26/2/2021



### 3.5.1 Day 5 Summary

Day 5 was a warm (18 – 20 deg C) day that started off overcast but cleared up later in the day. There were light to calm wind conditions in the morning but a north easterly breeze developed in the early afternoon.

In the morning WP undertook a survey of the Timaru Port area (Locations 1 – 9) to determine if any of the fish processing plants/industries were contributing to odour levels in this environment. Distinct ‘fishy’ odours were detected in close proximity to the Sanford fish processing facility, however these odours were very localised and not observable beyond 50 – 100 m from the facility. None of the observations in the port/docks area were considered to be unpleasant and were all rated as having a ‘neutral’ hedonic tone.

The remainder of the observations were made in the Washdyke area from mid-day – mid afternoon, focusing on odours from South Canterbury By Products. Odours consistent with that discharged from South Canterbury By Products (like dead animal) were detected as far away as 1.5 km southwest of the facility (Location 19). Very unpleasant putrid/foul/decayed odour was continuously detected at locations 15 and 16 approximately 200 m downwind of South Canterbury By Products.

At Location 20 mildly unpleasant chemical/sulfur like odours which were thought to be associated with the NZ Light Leathers factory were observed. These odours were observed at intensities between 0 (no odour) and 4 (strong). Location 20 was approximately 90 m downwind of the NZ Light Leathers factory.

## 4 Conclusion

This report presents the results of a five day Timaru odour scout monitoring program undertaken by NZ Air in February 2021 on behalf of Environment Canterbury.

Odour observations were primarily made in Washdyke and Timaru North. Odour scouts were used to map odour plumes coming from a number of industrial facilities within these regions. Odour plumes from the Rooneys palm kernel storage facility, South Canterbury By Products, and Alliance Smithfield were mapped extensively.

‘Sweet’ odour from the Rooneys palm kernel storage facility were observed up to 300 m from the facility. The odour scouts were able to validate odour complaints (reported on the Smelt It app) relating to odours discharged from this facility.

Odour plumes from the South Canterbury By Products facility were intense and unpleasant within 200 m of the facility, but could be detected as far as 1.5 km from the facility on one day. There were no Smelt It notifications which were attributed to this facility during the NZ Air survey.

Odour consistent with that observed from the Alliance Smithfield plant was observed up to 900 m downwind of the facility. A large number of Smelt It notifications relating to discharges from this facility were received and investigated by the odour scouts. In most cases odour consistent with that discharged from the facility (like dead animal) was observed at or nearby the complainant locations.

Other contributors to odour in the survey area were identified, but emissions from these sources were generally minor and infrequent.



## A. Appendix A – Field sheets and parameter descriptors

## Odour Diary Record Sheet

<b>Name:</b>				<b>Sample site:</b>					
<b>Date (dd/mm/yy):</b>				<b>Sample Start Time (hh:mm):</b>				<b>Rain (Circle one):</b> None / Misty / Drizzle / Steady / Torrential	
<b>Wind direction (coming from)<sup>3</sup>:</b>				<b>Wind Strength<sup>4</sup>:</b>					
<b>Hedonic Tone<sup>5</sup>:</b>				<b>Cloud Cover:</b>				<b>Temperature:</b>	
<b>Approximate Plume Width<sup>6</sup>:</b>				<b>Approximate Plume Length<sup>6</sup>:</b>					

Sample number	Odour Intensity Level (1-6) <sup>2</sup>	Odour descriptor (1-40) <sup>1</sup>		Sample number	Odour Intensity Level (1-6) <sup>2</sup>	Odour descriptor (1-40) <sup>1</sup>		Sample number	Odour Intensity Level (1-6) <sup>2</sup>	Odour descriptor (1-40) <sup>1</sup>
0:10				3:30				6:50		
0:20				3:40				7:00		
0:30				3:50				7:10		
0:40				4:00				7:20		
0:50				4:10				7:30		
1:00				4:20				7:40		
1:10				4:30				7:50		
1:20				4:40				8:00		
1:30				4:50				8:10		
1:40				5:00				8:20		
1:50				5:10				8:30		
2:00				5:20				8:40		
2:10				5:30				8:50		
2:20				5:40				9:00		
2:30				5:50				9:10		
2:40				6:00				9:20		
2:50				6:10				9:30		
3:00				6:20				9:40		
3:10				6:30				9:50		
3:20				6:40				10:00		

Odour samples every 10 seconds. The time between the 10 seconds is disregarded (interval method). Breath normally rather than sniffing.

If odour descriptor is 40 then please describe:

### 3 Wind Direction Orientation Aid



#### Measuring Cloud Cover

Okta No.	Description
0	Clear Sky
1	Sunny
2	Mostly sunny
3	
4	Half the sky is covered in cloud
5	
6	Mostly cloudy
7	Considerable cloudiness
8	Overcast
F	Fog / Mist

### 1 Odour Character Descriptors

1	Fragrant	21	Like blood, raw meat
2	Perfumy	22	Rubbish
3	Sweet	23	Compost
4	Fruity	24	Silage
5	Bakery (fresh bread)	25	Sickening
6	Coffee-like	26	Musty, earthy, mouldy
7	Spicy	27	Sharp, pungent, acid
8	Meaty (cooked, good)	28	Metallic
9	Sea/marine	29	Tar-like
10	Herbal, green, cut grass	30	Oily, fatty
11	Bark-like, birch bark	31	Like gasoline, solvent
12	Woody, resinous	32	Fishy
13	Medicinal	33	Putrid, foul, decayed
14	Burnt, smoky	34	Paint-like
15	Soapy	35	Rancid
16	Garlic, onion	36	Sulphidic
17	Cooked vegetables	37	Dead animal
18	Chemical	38	Faecal (like manure)
19	Etherish, anaesthetic	39	Sewer odour
20	Sour, acrid, vinegar	40	Other(record description)

### 4 Wind Strength Scale

Beaufort Force	Descriptor	Specification on land
0	Calm	Smoke rises vertically.
1	Very Light	Direction of wind shown by smoke drift but not by wind vanes.
2	Light breeze	Wind felt on face, leaves rustle, ordinary wind vane moved by wind.
3	Gentle breeze	Leaves and small twigs in constant motion, wind extends light flag.
4	Moderate breeze	Wind raises dust and loose paper, small branches move.
5	Fresh breeze	Small trees in leaf start to sway, crested wavelets on inland waters.
6	Strong breeze	Large branches in motion, whistling in telegraph wires, umbrellas used with
7	Near gale	Whole trees in motion, inconvenient to walk against wind.
8	Gale	Twigs break from trees, difficult to walk.
9	Strong gale	Slight structural damage occurs, chimney pots and slates removed.
10	Storm	Trees uprooted, considerable structural damage occurs.
11	Violent storm	Widespread damage.
12	Hurricane	Widespread damage.

### 2 Odour Intensity Scale

Intensity Level	Odour intensity
1	Very Weak
2	Weak
3	Distinct
4	Strong
5	Very strong
6	Extremely Strong

### 5 Hedonic Tone

Rating	Descriptor
-4	Extremely unpleasant
-3	Very unpleasant
-2	Unpleasant
-1	mildly unpleasant
0	Neutral
1	Mildly pleasant
2	Pleasant
3	Very Pleasant
4	Extremely Pleasant

Record hedonic tone at the end of the survey as an overall impression