

Odour Management Plan

Omaha Wastewater Treatment Plant



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Odour Management Plan

Omaha Wastewater Treatment Plant

Client: Watercare Services Limited

Co No.: N/A

Prepared by

AECOM New Zealand Limited

8 Mahuhu Crescent, Auckland 1010, PO Box 4241, Auckland 1140, New Zealand
T +64 9 967 9200 F +64 9 967 9201 www.aecom.com

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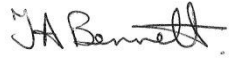

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1.0 Introduction

1.1 Purpose

This Odour Management Plan (OMP) provides details of the steps required to manage potential odours associated with the operation of the Omaha Wastewater Treatment Plant (the WWTP). Under General Condition 12 of consent bundle BUN20454939, which includes Discharge Permits DIS60050490, DIS60050606 and DIS60050574, and Land Use Consent LUC60012037, this OMP forms part of the WWTP Environmental Management Plan (EMP).

Specific Conditions 49 and 50 of the Air Discharge Permit (DIS60050574) state the following:

-
49. *The consent holder is to prepare and maintain an Odour Management Plan, as part of the Environmental Management Plan, to describe measures to control and reduce the potential for odour generation to occur, which could give rise to off-site effects.*
50. *As a minimum, the Odour Management Plan is to include the following:*
- a. Locations of dissolved oxygen meters located in anaerobic ponds adjacent to the edge of the ponds and in other ponds if required;*
 - b. Methods and frequency of information collection from the dissolved oxygen meters;*
 - c. Alert/response levels*
-

The intent of this OMP is to ensure Watercare Services Limited (Watercare), as the consent holder, operates and manages the WWTP in a manner which will:

- Avoid, remedy or mitigate potential odours arising from the plant; and
- Assure compliance with the conditions of the Air Discharge Permit (DIS60050574).

This OMP outlines procedures for Watercare staff and sub-contractors to follow, under both normal and abnormal operating conditions.

1.2 OMP approval and acceptance procedures

In accordance with Specific Condition 51 (DIS60050574), during preparation of this OMP consultation will be undertaken with owners/occupiers of the properties immediately adjacent to the WWTP and any other key stakeholders within the surrounding community. This includes submission of a draft for comment and allowing 10 working days for stakeholder response. A summary of the consultation process and stakeholder feedback will be included in Appendix A once the consultation process and review is complete.

Immediately upon approval from Auckland Council's Northern Monitoring Team Leader this OMP becomes operable. As such, all WWTP operations shall be carried out in general accordance with the provisions in this OMP.

1.3 Responsibility and authority

Watercare Services Limited (Watercare) has the overall responsibility for ensuring that the procedures outlined in this OMP are followed. All Watercare staff and sub-contractors working at the WWTP must be aware of the procedures within this OMP and the conditions of the Resource Consents.

In the event that changes to the plan are required, it is the responsibility of Watercare to ensure that:

- Any updates and/or amendments are reflected in a revised OMP;
- All Watercare staff and sub-contractors are aware of the revised OMP; and
- The conditions of the Air Discharge Permit continue to be met

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2.0 Site Description

2.1 WWTP Site layout

The WWTP site is located on Jones Road, Tawharanui Peninsula, approximately 75km north of central Auckland and is comprised of a treatment plant and a group of main irrigation fields (Figure 1). A secondary irrigation field is located approximately 3km east of the plant at the southern end of the Mangatawhiri Sand Spit on the Omaha Golf Course. The WWTP site covers an area of approximately 52ha and is designated for 'Wastewater Purposes' under the Auckland Unitary Plan: Operative in part (AUP: Op).

The WWTP services the Omaha, Point Wells and Matakana communities. Under the Resource Consent bundle (BUN20454939) Watercare will continue to treat raw sewage at the WWTP and proposes to discharge an increased quantity of treated wastewater from the WWTP to the irrigation fields located on the WWTP and Omaha Golf Course (Figure 1). This will include an extension of the main irrigation fields to include an extra 9.1ha of irrigation field which has been proposed for the northern extent of the WWTP site.

The treatment plant is located in the western portion of the WWTP site and consists of three treatment ponds: an aerated lagoon, an oxidation pond and storage dam; and additional treatment devices (refer to Figure 1). The main irrigation fields are located in the north of the WWTP site and are comprised of approximately:

- 7.6ha of eucalyptus plantation;
- 5.5ha of native scrub;
- 4.3ha of grassland; and
- 9.1ha of mixed scrub and fernland (proposed).

The secondary irrigation field is located on the southern half of Omaha Golf Course and is divided into discrete management blocks consisting of approximately 5.7ha of golf course play area and 0.6ha of sand dunes.

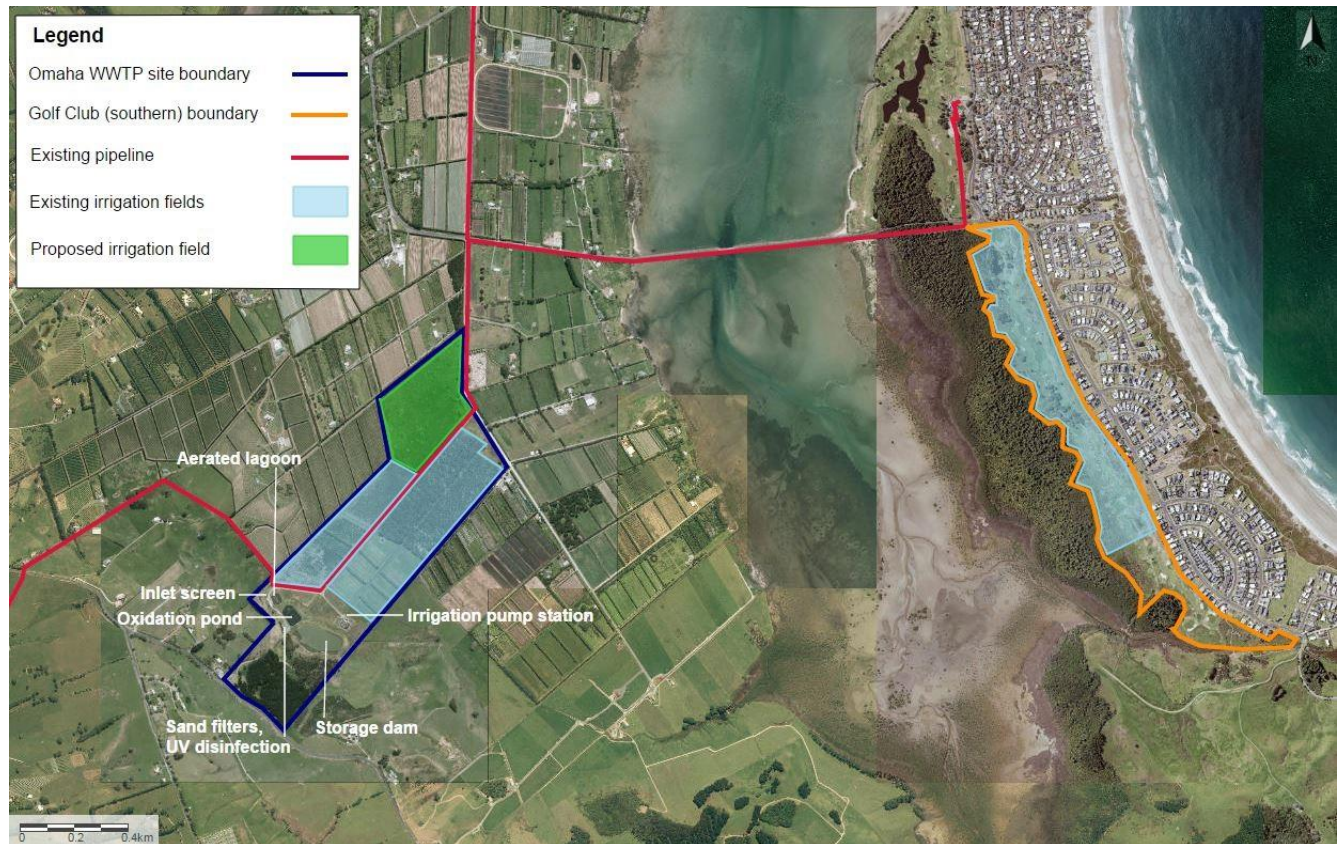
2.2 Site activities

The WWTP treats raw sewage by means of a six-stage treatment process. During the first three stages of treatment, wastewater is processed through the pond system comprising:

- Aerated lagoon – after passing through the inlet screen, the wastewater undergoes a Modified Ludzack-Ettinger activated sludge process which removes BOD₅ and reduces total nitrogen and ammonia concentrations.
- Oxidation pond – receives wastewater from the aeration pond where it undergoes further polishing treatment (i.e. aeration and settling).
- Storage dam – stores the wastewater before it receives the final three stages of treatment. The storage dam also provides buffer storage during periods of heavy rain, particularly through the winter months.

The treated wastewater undergoes further purification in stages four to six. During this phase of process the wastewater passes through sub-surface gravel beds prior to receiving pressure filtration and UV disinfection. Treated wastewater is pumped to the main irrigation fields adjacent to the WWTP and piped to the secondary irrigation field via the Broadlands Drive Causeway. Treated wastewater is discharged to the fields via surface and subsurface drip irrigation systems.

Odour is the main discharge to air with the potential to result in adverse effects due to the existing and proposed activities of the WWTP, and is primarily associated with the treatment of wastewater in the pond system. Odour is also associated with other areas of the plant, namely screening and filter systems, and the storage dam.

DRAFT**Figure 1 Omaha WWTP and irrigation field layout****2.3 Surrounding land uses**

The land surrounding the WWTP is comprised of farmland and rural properties (Figure 1). The irrigation field on Omaha Golf Course is surrounded by the Omaha Taniko Wetlands Scientific Reserve to the west and the Omaha settlement to the east. The sites are separated by the Waikokopu Creek, Whangateau Harbour, while Little Omaha Bay is located on the eastern side of Mangatawhiri Sand Spit.

2.4 Potential sensitive receptors**2.4.1 WWTP processing plant and main irrigation fields**

The properties surrounding the WWTP are rural properties; Table 1 provides a list of potential sensitive receptors located in a 1km radius of the plant.

Table 1 Potential Omaha WWTP sensitive receptors

| Address | Distance from the WWTP (m) | Direction from the plant | Contact details |
|-----------------|----------------------------|--------------------------|-----------------|
| 201 Takatu Road | 320 | SW | |
| 191 Takatu Road | 380 | W | |
| 169 Takatu Road | 400 | NW | |
| 189 Takatu Road | 401 | WNW | |
| 271 Takatu Road | 440 | SE | |
| 640 Takatu Road | 640 | NW | |
| 281 Takatu Road | 645 | SE | |

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| Address | Distance from the WWTP (m) | Direction from the plant | Contact details |
|-------------------|----------------------------|--------------------------|-----------------|
| 139 Takatu Road | 660 | WNW | |
| 596 Whitmore Road | 575 | WSW | |
| 134 Jones Road | 720 | E | |
| 69 Takatu Road | 730 | NNW | |
| 569 Whitmore Road | 734 | SW | |
| 69 Takatu Road | 743 | NW | |
| 90 Jones Road | 954 | NE | |
| 126 Jones Road | 957 | ENE | |

2.4.2 Secondary irrigation field (Omaha Golf Course)

The eastern extent of the Omaha Golf Course is surrounded by residential properties; however, the treated wastewater is discharged to the area via sub-surface drip irrigation (approximately 15-50cm below surface) and as such, it is unlikely that any odour is emitted during discharge to the irrigation field.

3.0 Odour Management**3.1 Routine odour monitoring**

Watercare staff, or sub-contractors, will conduct routine odour checks of the WWTP. This will require walking around the perimeter of the treatment ponds to assess the presence of potential odour and characterise any odours found. These odour checks should commence at the most upwind boundaries of the ponds to ensure the odour is monitored from the location of least offense to the location of greatest potential offense. In order to effectively assess potential odours the person undertaking the monitoring should stay for at least 5 minutes at each location and record the measurements and odour characteristics as per the odour monitoring form (Appendix B).

Under normal conditions, these routine checks should be undertaken fortnightly at minimum during calm wind conditions (less than 3m/s) and in the early morning, when odours are generally at their worst. Frequency may need to be increased during periods where the potential for odour is higher (i.e. during hot weather in summer) or in response to a complaint (refer to Section 5.0). The type of odour that is typical of a wastewater treatment plant can be described as: pungent, earthy/peaty, sweet, acrid, sulphuric, rotten and sewage.

Staff and sub-contractors undertaking the checks should record the following (refer to the example monitoring form in Appendix B):

- Date and time
- Weather (i.e. overcast, fine)
- Wind direction and wind speed
- Pond colour and level
- Dissolved oxygen measurements where applicable (refer to Figure 2)
- The intensity (refer to Table 2), frequency and duration of the odour.

DRAFT**Table 2 Odour intensity measures**

| Odour intensity | Intensity level | General guide |
|-----------------|-----------------|---------------------------------------|
| Extreme | 6 | Odour is overpowering inciting nausea |
| Very strong | 5 | |
| Strong | 4 | |
| Distinct | 3 | Odour is obvious |
| Weak | 2 | |
| Very Weak | 1 | Odour not present at all |
| Not perceptible | 0 | |

If an odour is detected during a monitoring event that exceeds an intensity level of 4 (refer to Table 2) further investigations will be required. This will require Watercare staff (or sub-contractor) to conduct offsite monitoring to determine the perceptibility of the odour offsite. This will require walking upwind of the odour to avoid desensitisation and then walking back towards the WWTP to determine how far the odour has travelled. This should be recorded on the monitoring form (Appendix B).

3.2 Inlet screen and filter monitoring

During routine daily inspection and maintenance checks (Refer to the Omaha WWTP Environmental Management Plan) Watercare staff (or sub-contractors) are to undertake an inspection of the inlet screens and filters for blockages. Any debris observed shall be removed from the screens to reduce potential odour generation.

3.3 Dissolved Oxygen (DO) Monitoring

The aeration lagoon is divided into three zones: anoxic, aeration and settling. The anoxic and aeration areas are mixed and aerated using fan and rotary lobe blowers controlled by dissolved oxygen (DO) sensors. These provide air to sub-surface fine bubble diffusers.

The oxidation pond is also fitted with surface aerators and fine bubble sub-surface diffusers to maintain positive DO levels.

Inadequate oxygen supply can cause the formation of anaerobic pockets and the evolution of hydrogen sulphide (H₂S) and other odorous gases. Hence for odour management purposes, DO concentrations must be maintained at an average of more than 2 g/m³. In order to control and reduce the potential for odour generation regular monitoring of DO measurements must be undertaken (refer to Omaha WWTP Ground and Surface Water Monitoring Programme, 2017).

3.3.1 Methods and frequency

DO meters are located in the aeration pond adjacent to the ponds edge (Refer Figure 2). These meters measure DO autonomously. As such, DO sampling is continuously reported directly to plant operations via a remote monitoring and control system (SCADA).

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Figure 2 The location of two autonomous DO meters in the WWTP aeration pond



3.3.2 Response levels

For odour management purposes DO levels must remain above 2 g/m^3 , averaged over any six hour period. Should average DO levels fall below this threshold, immediate response is required to maintain aerobic conditions (i.e., positive dissolved oxygen levels) in the ponds to prevent the development of conditions favourable to H_2S generation.

3.4 Pond maintenance

Regular pond maintenance shall be undertaken to ensure the treatment pond shorelines are free of weeds to allow easy cleaning and prevent accumulations of scum, grease, and other organic material that may decay and become an odour source at the water's edge.

4.0 Contingency and Incident Management

In the event of an odorous discharge Watercare is to take immediate steps to remedy and mitigate any potential adverse effects.

In instances where Watercare staff (or sub-contractors) identify a noticeable moderately objectionable or offensive odour (intensity level 4 or higher; Table 2), or a complaint is laid (refer to section 5.0), actions are to be taken to inform the Northern Operations Controller immediately. Thereafter, the following procedures are to be implemented in the event of a requirement for notification to the Auckland Council.

Watercare staff are to locate the odour source and identify if the source can be quickly neutralised or mitigated. In such instances, the necessary action must be taken to stop the odour. Actions could include:

- Dampening the area with water or deodorant spray and keeping the deodorising handkit nearby to control odour as mitigating activities proceed;
- Removing and containing (i.e. remove or bury contaminated soil) the odorous material, and washing the area down with water or spray with deodorant; and

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- Disposing of odorous material in a manner that does not cause further release of odour. Comply with all Council waste requirements when disposing of odorous material.

Where the odour source cannot be quickly located and mitigated, then an element of judgement is required and management strategies should be applied according to the circumstance. Management options may include, but are not restricted to:

- Notify the Auckland Council Team Leader - Northern Monitoring;
- Identify the source of the odour. Consider the predicted wind direction and potential downwind effects on adjacent properties. Bear in mind that weather and wind direction are highly variable;
- Identify the chemicals, materials and equipment needed to control the odour (i.e. oxygen transfer to increase DO levels if they fall below trigger levels);
- Plan the necessary measures and implement as soon as practicable;
- Treat and contain areas which have been identified as the potential odour source;
- Modify the treatment process to reduce odour whilst also ensuring that treated effluent quality requirements are met;
- Erect and operate a deodorizing system; and
- Keep the Northern Operations Controller and Auckland Council area officer informed of progress.

Once the identified odour has been mitigated, repeat an odour check at the boundary and if necessary, repeat the appropriate remedy procedure(s) until the emission has been rectified. Once the issue is resolved staff members (sub-contractors involved) must record the incident and communicate any updates/ lessons learnt as required. Further actions may include the following:

- Implement additional actions that are relevant to the circumstance; e.g. public warning notice;
- Review how the incident occurred, recording all relevant information (i.e. where, when, how it occurred, remedy actions, who was on site and the outcomes). Identify how the response to such an incident can be improved in the future; and
- If required, update the relevant aspects of the OMP, liaise with Northern Operations Controller and Auckland Council area officer for approval.

Where the odour is suspected to be from an off-site source (and there are no reasonable grounds for the operator to remedy the problem) relevant notes should be recorded and the Northern Operations Controller and Auckland Council area officer should be notified accordingly.

5.0 Responding to Complaints

In the event a complaint is received regarding a potential odour emission from the WWTP, Watercare must record the complaint immediately (refer to example odour complaint record form in Appendix C). The record will include the following details:

- The date, time, location and nature of the complaint;
- The name, contact details and address of the complainant (unless they wish to remain anonymous);
- The actions taken to remedy the issue;
- Any equipment failure and remedial action taken;
- The weather conditions at the time of the complaint, including estimates of wind direction and strength, temperature and cloud cover; and
- The date and details of the staff member logging the entry.

In accordance with condition 10, the details of any complaints that may compromise consent compliance must be reported to Auckland Council's Northern Monitoring Team Leader within 24 hours

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of the complaint being received, or on the next working day. Details of all other complaints must be included in the plant's annual report.

6.0 Roles and Responsibilities

6.1 Northern Operations Controller

The Northern Operations Controller, is responsible for:

- Ensuring odour management and controls are adequate and performing as expected;
- Identifying the potential need for further controls;
- Being the central point of contact for all complaints;
- Ensuring complaints are assessed and dealt with;
- Dealing with the resolution of any complaints which are deemed significant;
- Liaising with Auckland Council to provide a progress update on any complaint deemed significant (from acknowledgement of complaint to resolution);
- Liaising with local stakeholders to provide a progress update on any complaint deemed significant (from acknowledgement of complaint to resolution); and
- Ownership of complaints that have been made and ensuring action is being taken to identify and, where appropriate, mitigate the cause.

6.2 Watercare staff and sub-contractors

All staff shall be made aware of the odour control methods that have been established as part of standard operating procedures for the plant. All relevant staff and sub-contractors are to be trained on odour management, odour control issues and any other matters relevant to this OMP.

7.0 Training and Competencies

The Northern Operations Controller must undertake a periodic review of the training needs for all staff and sub-contractors to ensure effective odour monitoring and management and ensure all people performing tasks on behalf of the WWTP have the appropriate training and competency to reduce the potential for odour emissions.

Training provisions will ensure that all staff:

- Are fully aware of the requirements of the OMP and familiar with the plant's operational procedures;
- Are fully aware of the requirements of resource consents applicable to WWTP operations;
- Understand the responsibilities and potential effects of their individual jobs and actions required to ensure effective odour management;
- Are competent to carry out any actions required under this OMP for which they are responsible;

The Northern Operations Controller is responsible for ensuring that all training provided is recorded and that these records are kept on file.

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8.0 Annual Reporting

A summary of any incidents or complaints regarding odour emission from the WWTP shall be submitted as part of the WWTP's annual report as required by condition 16. This may include the following:

- A summary of data from routine odour monitoring;
- Details of any odour complaints received, actions undertaken to address the issue and follow up with the complainant;
- Critical analysis of plant performance in respect to plant odours; and
- Details of any operational changes and upgrades made to the WWTP.

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Appendix A

Stakeholder
Consultation and
Feedback

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Appendix B

Example Odour
Monitoring Form

Routine Odour Monitoring Form

Site: Omaha WWTP _____

Assessors name: _____

Date: _____

Time: _____

Odour Monitoring

Record pond characteristics and weather conditions in the tables provided below

| Pond characteristics | | | |
|----------------------|----------|-----------|---------|
| | Aeration | Oxidation | Storage |
| Colour | | | |
| DO (mg/L) | | | |
| Water level: | | | |
| High | | | |
| Medium | | | |
| Low | | | |

| Weather data | |
|-----------------------|----|
| Wind direction (tick) | |
| N | S |
| NE | SW |
| E | W |
| SE | NW |
| | |

Plant operation comments:

| Wind speed (tick) | |
|-------------------|-----------------------|
| 0 | _____ Calm |
| 1 | _____ Ligth air |
| 2 | _____ Light breeze |
| 3 | _____ Gentle breeze |
| 4 | _____ Moderate breeze |
| 5 | _____ Strong breeze |
| 6 | _____ Strong Wind |
| 7 | _____ Near gale |

| Odour characteristic | | |
|---|------------------------|---|
| Intensity: | Intensity scale | |
| _____ | Extreme | 6 |
| Duration (transient, sporadic persistent, continuous): | Very strong | 5 |
| | Strong | 4 |
| | Distinct | 3 |
| | Weak | 2 |
| Further comments: | Very weak | 1 |
| | No odour | 0 |

| Cloud cover (tick) | |
|--------------------|--------------------------|
| 0 | _____ Clear sky |
| 1 | _____ Sunny |
| 2 | _____ Mostly sunny |
| 3 | _____ mixed sun/overcast |
| 4 | _____ Overcast |
| 5 | _____ Raining |
| F | _____ Fog/mist |

| Temperature (tick) | |
|--------------------|----------------------|
| Cold | _____ |
| Cool | _____ C° (if known): |
| Mild | _____ |
| Warm | _____ |
| Hot | _____ |

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Appendix C

Example Odour
Complaint Form

Odour Complaint Record Form

Site: Omaha WWTP _____

Recorders name: _____

Date: _____

Time: _____

Complainant details

Note down complainant's details for follow up or indicate if they want to remain anonymous

Name: _____

Anonymous (?): _____

Address: _____

Phone: _____

Complaint: _____

Complaint details

Ask complainant if they can provide further details (see below). Read out options for the complainant to choose from.

Date: _____ Time: _____

Location of odour: _____

Odour intensity (refer to intensity scale): _____

Odour frequency ((transient, sporadic, persistent, continuous): _____

Duration: _____

| Intensity scale | |
|-----------------|---|
| Extreme | 6 |
| Very strong | 5 |
| Strong | 4 |
| Distinct | 3 |
| Weak | 2 |
| Very weak | 1 |
| No odour | 0 |

Weather conditions

Wind direction (tick)

| | |
|----|----|
| N | S |
| NE | SW |
| E | W |
| SE | NW |

Wind speed (tick)

| | | |
|---|-------|-----------------|
| 0 | _____ | Calm |
| 1 | _____ | Ligth air |
| 2 | _____ | Light breeze |
| 3 | _____ | Gentle breeze |
| 4 | _____ | Moderate breeze |
| 5 | _____ | Strong breeze |
| 6 | _____ | Strong Wind |
| 7 | _____ | Near gale |

Cloud cover (tick)

| | | |
|---|-------|--------------------|
| 0 | _____ | Clear sky |
| 1 | _____ | Sunny |
| 2 | _____ | Mostly sunny |
| 3 | _____ | mixed sun/overcast |
| 4 | _____ | Overcast |
| 5 | _____ | Raining |
| F | _____ | Fog/mist |

Temperature (tick)

| | | |
|------|-------|----------------|
| Cold | _____ | |
| Cool | _____ | C° (if known): |
| Mild | _____ | _____ |
| Warm | _____ | |
| Hot | _____ | |