Non-Technical Summary

Lower Link farm is in St Mary Bourne, near Andover and is the headquarters of Vitacress Salads Ltd (VSL). The site is 28 Ha and comprises watercress beds, salad washing and packing facilities, transport yard, and offices.

The site has two existing consents to discharge:

P.5767/H/95 01: Effluent from Watercress beds discharging to the Bourne Rivulet.

P.5768 has three parts each referring to discharge to the Eastern Channel, an ordinary watercourse that discharges to the Bourne Rivulet:

- P.5768/H/95 01: Trade Effluent comprising Rinse Water from Factory Processes
- P5768/H/95 02: Watercress Bed Effluent and Process effluent
- P5768/H/95 03: Watercress bed effluent and Site Drainage

This application is for the variation of the two Consents to Discharge to combine them into one new environmental permit, update effluent components for watercress growing and vegetable washing, and to outline future water treatment.

This application pack contains all the relevant information and documentation to support the application, and a summary of the application is presented here.

Hydrogeological Risk Assessment (HRA)

The HRA has been undertaken by specialist hydrogeologists Firth Consultants in response to an Environment Agency request to assess the potential infiltration discharge of watercress bed and factory effluent to ground under current operating conditions and under ozone water treatment conditions. The conclusions of the HRA are:

- The risk modelling has shown that infiltration of cress bed effluent to ground does not present an unacceptable risk to groundwater or related receptors.
- The risk modelling has shown that infiltration of factory wash water to groundwater and related receptors will not exceed surface water and groundwater thresholds and will be acceptable.
- The risk modelling has shown a potential risk to groundwater and related receptors from infiltration of factory wash water without ozone treatment. However, comparison of the model results with measured concentrations in groundwater shows that the risks have been significantly overpredicted for some pesticides (e.g. those that are expected to degrade rapidly in the subsurface such as fosetyl aluminium). For others, such as chlorantraniliprole, the predicted concentrations in groundwater are similar to those measured in the baseline data.
- The maximum measured concentration of chlorantraniliprole in groundwater exceeds the groundwater threshold of 0.03 µg/L but is below the DWS of 0.1 µg/L. The predicted concentration remains in this range, and therefore there is no net impact.

H1 Surface Water Screening Assessment (H1 Assessment)

A H1 Assessment has been undertaken by specialist consultants RMA Environmental, at the request of the Environment Agency to consider the effect of the discharge into the surface water system (as opposed to the groundwater system). The H1 Assessment had to take account of the fact that the discharge from the watercress beds and factory into the Eastern Channel occurs at a point where there is no upstream flow and therefore no dilution of the discharge prior to it reaching the Bourne Rivulet. To take account of this, two basic scenarios have been modelled: firstly, assuming no dilution, and secondly assuming an equivalent dilution from the Bourne Rivulet at the confluence with the Western Channel, for comparative purposes.

Following the approach described above the H1 Assessment includes the following detailed scenarios:

- watercress bed discharges to the Eastern Channel of the Bourne Rivulet (without dilution).
- watercress bed discharges to the Eastern Channel of the Bourne Rivulet (with dilution).
- factory discharges to the Eastern Channel of the Bourne Rivulet (without dilution).
- factory discharges to the Eastern Channel of the Bourne Rivulet (with dilution).
- factory discharges to the Eastern Channel of the Bourne Rivulet (ozonation, no dilution).
- factory discharges to the Eastern Channel of the Bourne Rivulet (ozonation, dilution); and
- watercress bed discharges to the Western Channel of the Bourne Rivulet.

Modelling for the factory discharge was based on mean and maximum concentration data of specific substances from the recent analyses for a suite of pesticides covering Acetamiprid, Azadirachtin, Azoxystrobin, Boscalid, Chlorantraniliprole, Difenoconazole, Dimethomorph, Fludioxonil, Fluopicolide, Fluopyram, Fosetyl aluminium, Mandipropamid, Metalaxyl, Propamocarb-HCl, Pyraclostrobin, Spinosad and Trifloxystrobin.

The modelling of the factory discharge, without the ozonation, shows that a number of pesticides fail Tests 3 and 4 for the no dilution and dilution scenarios. The ozone treatment trials achieved a 100% removal rate for all pesticides included in the H1 modelling. The installation of the ozone treatment plant will remove residual pesticides.

Modelling for the watercress bed discharge was based on mean and maximum concentration data of ammoniacal nitrogen (NH4-N), chloride (Cl), iron (Fe), sulphate (SO4), zinc (Zn) and Potassium (K). The modelling shows that all substances are screened out after Test 2.

Prevent & Limit Assessment

Following a request from the Environment Agency in 2018 to investigate the presence of and impacts from residual pesticides in the factory wash effluent, passive sampling was undertaken in 2019 and a considerable amount of sampling and concentration analysis was undertaken from January to December 2022. This work was designed and supervised by the company's group environment manager and agronomist. This work has been drawn together in document 013 Prevent & Limit Summary and document 004 V2 Pesticide Assessment and Analysis, which covers, statistical analysis of detailed water sampling and laboratory analyses; pesticide destruction trials; and a prevent and limit analysis. In summary the program of work comprised:

Pesticide sampling

- 3 sets of passive sampling in 2019 with the University of Portsmouth.
- 12 weekly surface water and factory borehole samples were taken across 3 seasons to reflect the most likely times for pesticides to be applied to crops coming into the factory.
- 12 monthly groundwater samples were taken from upstream and downstream of the operation.

Annual average and maximum concentrations were established for 88 active substance and breakdown products.

- 15 compounds were not able to be analysed to the required level of detection. A laboratory with such capabilities could not be identified and we understand that the EA laboratory cannot achieve such levels either.
- Of the 88 compounds that could be analysed, 19 compounds exceeded either surface water or groundwater thresholds.
- To investigate treatment options for the residual pesticides an Ozone destruction trial was undertaken, based on the fact that ozonation is a recognised method for destructing complex organic compounds in drinking water systems, although its use had not been applied to this industry, as far as VSL is aware. The destruct trial showed that 72 compounds were destroyed by ozone and 16 compounds were significantly reduced. An Ozonation Destruct plant will require planning permission and therefore will be the subject of a permit variation once planning permission is granted.

Prevent and Limit Analysis

VSL acknowledges that it must take all necessary and reasonable measures to:

- prevent the input of hazardous substances into groundwater; and

- limit the input of non-hazardous pollutants to ensure such inputs do not pollute groundwater.

013 Prevent & Limit Summary provides information on:

- Improved understanding of the final effluent quality through pesticide sampling
- Investigating options for salad crops – traceability
- Consideration of pre-discharge treatment to remove pesticides
- Production of a risk assessment to adequately assess the risks to groundwater
- Production of a risk assessment to adequately assess the risks to surface water
- Operator self-monitoring of discharges to surface waters, and shallow aquifer groundwater.

Environmental Management System (EMS) & Improvement Plan

An EMS and Improvement Plan have been developed and are presented in the application pack.

009 V2 VSL Lower Link Farm EMS describes the current operations, and environmental impacts and controls. It provides a description of activities that fall under this permit application, as well as site maps, operating techniques for existing water management and suspended solids and sediment management, and an environmental impacts plan and controls.

The Inlets, effluent sample points and outlets are described. It is important to understand that the sampling points are located at discrete points to ensure a sample of watercress bed effluent is obtainable. However, the water system at Lower Link Farm is interconnected. Therefore, when beds are being cleaned the effluent passing the sample point will be diverted to the farm settlement tank and not discharged at the permitted outlet. The farm settlement tank pipework is accessed by shutting off the water route to the river and opening the pipe to the settlement tank. At these times it will not be possible to take a sample due to the water being 'dirty' and not representative of water discharge to the receiving water.

The Improvement Plan has been written in conjunction with the EMS. It lists the actions to be taken to improve phosphorous outputs from the watercress farm and reduce trace pesticides in factory effluent.

END