Memo Report

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Air Quality Statement – Calder Valley Skip Hire

1 Background Information

1.1 This memo note sets out the results of additional sensitivity tests undertaken for the proposed Small Waste Incineration Plant (SWIP) at Calder Valley Skip Hire (CVSH).

1.2 Planning permission was granted for the SWIP (amongst other development) by Appeal Decisions dated 4 February 2020. The planning application was accompanied by a full environmental statement under the EIA Regulations which was revised in July 2019 and included air quality assessments. The Planning Inspector concluded overall that the effect of the proposal for the SWIP on living conditions in the local area, with particular reference to air quality, would be acceptable and would not conflict with the development plan or the NPPF, with particular reference to its location relative to populated areas as well as environmental and amenity impacts.

1.3 CVSH subsequently applied for an Environmental Permit application to operate the Schedule 13 SWIP. An appeal was made by CVSH against the deemed refusal of the Environmental Permit application. The appeal was dismissed by an Appeal Decision dated 5 July 2023. The main reason for refusal was the potential effect of nearby trees on dispersion of emissions from the SWIP relative to the discharge height of the stack.

1.4 The Planning Inspector had the benefit of expert evidence that the roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height, and the degree of atmospheric turbulence. This was accounted for in the modelling by the parameter called the surface roughness length. In reaching his conclusions the Planning Inspector had meticulously examined all relevant considerations concerning air quality including air dispersion modelling, stack height calculation and the discharge height of the stack, local topography, surface roughness effects such as the neighbouring woodland and building effects, the meteorological data used and the results of various sensitivity tests.

1.5 Against that background CVSH considers the above-mentioned Permitting Appeal Decision dated 5 July 2023 to be perverse in material respects as well as procedurally unfair. This is especially so as regards the Permitting Inspector's reasons for, in effect, disregarding paragraph 188 of the NPPF and his treatment of the Planning Inspector's Appeal Decisions. CVSH's position is fully reserved, and this Memo Report is submitted and the additional sensitivity tests set out below have been undertaken entirely without prejudice to CVSH's position in this regard.

1.6 The site is shown below. The stack is located on the northern green building and has been installed, although it is not shown on this image.

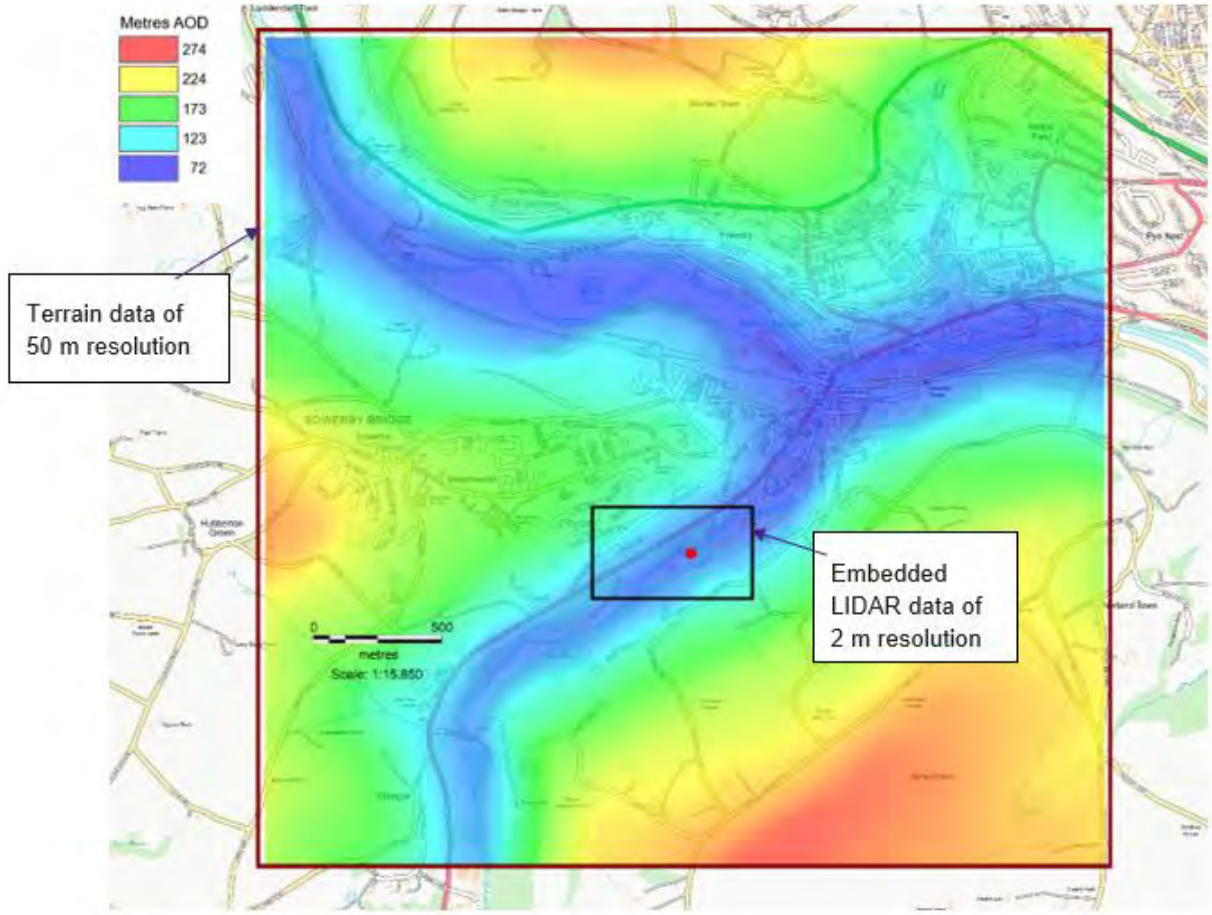
1.7 RPS Arboriculturists visited the site in April 2023 and prepared *The Tree/Woodland Assessment Plan, RPS Drawing no. 800 P03* which sets out the heights of the nearest trees to the stack. This is included as Appendix A to this memo note. These heights should be compared with the discharge height of the stack which is at 96m AOD. Reference should also be had to the Permitting Inspector's Table at paragraph 32 of the Appeal Decision dated 5 July 2023 which is based upon *The Tree/Woodland Assessment Plan*. As noted on the Plan, and acknowledged

at paragraph 32 of the Appeal Decision, the distance from the stack to a group of trees as shown on the Plan is the distance from the stack to the nearest tree in the group. Most of the trees are well over 50m distant from the stack. It should be noted that the Permitting Inspector excluded from the Table at paragraph 32 most of the trees between the stack and Rochdale Road, in particular the group of trees G1 and G2 on the Plan, by reason of those trees having a life expectancy of less than 10 years or being in 'poor' or 'poor/fair' condition.

1.8 The site is in a valley and the terrain was an important consideration in the assessment. A micro grid of terrain across the site was embedded within a coarser grid covering the wider terrain beyond the site. The treatment of terrain was fully examined and accepted by the Planning Inspector, was agreed between the parties in the Permitting Appeal and was not brought into question in the Permitting Inspector's decision. Paragraphs 3.19 to 3.24 of the 2019 Air Quality Assessment[1] outline what complex terrain and surface roughness was used in the model. The sides of the valley are wooded and many of the trees are consequently at a higher elevation than the top of the stack. The figure below summarises the terrain data used.

[1] RPS Environmental Statement Addendum – Additional Air Quality Assessment Calder Valley Skip Hire Small Waste Incineration Plant dated 2nd July 2019

Figure 3.2 Complex Terrain Data Used in Model



1.9 Several sensitivity tests were undertaken which included an alternative meteorological site, an assessment of calm conditions and the use of a varying surface roughness length. The results are provided in Appendix F of the Air Quality Assessment. All of those sensitivity tests were thoroughly examined by the Planning Inspector. However, having regard to paragraph 35 of the Permitting Appeal Decision it does not appear that the Permitting Inspector considered the assessment of calm conditions in Appendix F of the Air Quality Assessment.

1.10 Following the Permitting Inspector's decision, independent advice has been sought from CERC, the developer of the ADMS dispersion model used in the assessment and experts in air dispersion modelling. CERC was asked to visit the site and to review the air quality assessment to determine whether the effect of the trees had been included appropriately in the modelling. CERC's report is included in Appendix B to this memo note.

1.11 CERC agreed that the approach undertaken in the 2019 assessment was appropriate. They also included a few additional sensitivity tests which predicted very similar results. In particular, in response to the Permitting Inspector's observations CERC state that they do not recommend representing trees as buildings in the ADMS air dispersion model. Nonetheless, CERC tested the 'trees as buildings' scenario as one of its sensitivity tests. CERC found that there was no significant difference in treating the trees as though they were buildings as compared with the results of the original RPS modelling in which the results were found to be negligible. This additional test carried out by CERC was conservative in the sense that it included many of the trees which the Permitting Inspector had excluded from his above-mentioned Table as appears from Figure 6.1 in the CERC report.

1.12 It appears from paragraph 37 of his Appeal Decision that the Permitting Inspector believed that the surface roughness length is applied in the modelling as an abstraction, unrelated to the site-specific parameters of the site. He was wrong to hold that belief and failed to ask for clarification on that subject.

1.13 The CERC report explains that the complex terrain module, which is site-specific, is used in combination in the modelling with the spatially varying surface roughness file, taking into account the woodland. As CERC states on page 11 of its report: *"For each modelled hour, the complex terrain module calculates the wind and turbulence due to the combined effect of the spatial variations in terrain height and surface roughness across the modelling domain, including within the site itself. These are then used to calculate pollutant dispersion."* (emphasis supplied). Consequently, the air dispersion modelling is a detailed site-specific assessment and, alongside RPS, it enabled CERC to conclude that the sensitive receptors are all sufficiently far from the source, i.e. the stack, that the pollutant concentrations at these receptors are not sensitive either to the detailed characteristics of the trees or to the fact that the discharge height of the stack is lower than most of the trees.

1.14 Whilst CERC agreed that the presence of the trees was considered in the modelling appropriately, additional sensitivity tests have been undertaken by RPS. It is not that RPS consider that these additional sensitivity tests are essential. On the contrary, RPS maintains that its 2019 Air Quality Assessment was robust and it is again observed that the Planning Inspector so found. However, in undertaking these additional sensitivity tests RPS has gone above and beyond that which is essential or required in order to demonstrate yet again that the impacts are negligible. It was agreed with Calderdale Council in a meeting on 8th December 2023 that these sensitivity tests would be undertaken.

1.15 The results in this memo note have been derived following the same approach used in the 2019 Air Quality Assessment for the planning application and appeal and therefore this report supplements that assessment for the additional sensitivity tests. Both of these additional sensitivity tests have been conducted on a conservative basis in that they have taken into account the presence of nearby woodland without excluding from the test those trees which the Permitting Inspector excluded from his Table on account of those trees having a life expectancy of less than 10 years or of being in 'poor' or 'poor/fair' condition.

1.16 Two additional sensitivity tests have been undertaken:

1. Use of Numerical Weather Prediction (NWP) meteorological data.
2. Consideration of concentrations in column of air above modelled receptors

2 Sensitivity Test 1

2.1 In the 2019 assessment, meteorological data from Leeds-Bradford Airport from 2013 to 2017 was used in the modelling. A sensitivity test using meteorological data from Bingley for 2013 to 2017 was included in Appendix F of the 2019 air quality assessment.

2.2 A further sensitivity test using the ADMS option to model 'calm' meteorological data (i.e. meteorological data with wind speed at 10 m less than 0.75 $m.s^{-1}$) was undertaken and the results were also presented in Appendix F of the 2019 air quality assessment.

2.3 The model has been rerun using NWP meteorological data for 2018 to 2022 for the site and enabling 'calm' conditions. This data is, therefore, site-specific.

2.4 The supplier of the NWP data advised that the NWP takes trees into account to the extent that: "The roughness length generated by the NWP models takes account of tree coverage. The issue is how representative this is as the NWP model we use for the UK (NEMS4 has a grid size of 16 km^2 – a spatial resolution of 4 km). The way to refine this is to include a representative roughness length in ADMS when running it".

2.5 The representative roughness length has been included in ADMS as outlined in the 2019 assessment.

Table 1. Long-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits)

Receptor ID	Receptor	PC from Table 5.1 of 2019 assessment	Long-Term NO_2 PC Using NWP data	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	0.17	0.14	0	29.7	29.8	Negligible
2	9 Breck Lea	0.08	0.06	0	28.2	28.2	Negligible
3	Sacred Heart Catholic Primary	0.08	0.07	0	28.1	28.2	Negligible
4	Haugh End House	0.10	0.09	0	28.2	28.3	Negligible
5	84 Rochdale Road	0.24	0.31	1	30.4	30.7	Negligible
6	Highfield Jerry Lane	0.20	0.26	1	28.8	29.0	Negligible
7	Spring Bank Industrial Estate	3.18	2.78	7	28.4	31.2	N/A
8	Mill West (AQMA)	0.19	0.15	0	35.5	35.7	Negligible
9	Ivy Cottage	0.23	0.16	0	28.1	28.3	Negligible
10	Cottage	0.16	0.12	0	28.1	28.2	Negligible
11	Black Sowerby Croft	0.18	0.12	0	28.1	28.2	Negligible
12	Prospect Terrace	0.03	0.04	0	28.0	28.1	Negligible
13	Hullen Edge	0.03	0.03	0	28.0	28.1	Negligible
14	Bank House	0.18	0.11	0	28.1	28.2	Negligible
15	Mill House Farm	0.23	0.23	1	28.3	28.6	Negligible
16	Mill House Lodge	0.17	0.18	0	30.0	30.1	Negligible

Table 2 Short-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits)

Receptor ID	Receptor	PC from Table 5.2 of 2019 assessment	Short-Term NO_2 PC Using NWP data	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	2.7	2.7	1	59	62	Negligible
2	9 Breck Lea	1.8	1.7	1	56	58	Negligible
3	Sacred Heart Catholic Primary	1.7	1.7	1	56	58	Negligible
4	Haugh End House	2.0	2.0	1	56	58	Negligible
5	84 Rochdale Road	3.7	3.7	2	61	64	Negligible
6	Highfield Jerry Lane	1.9	2.0	1	58	60	Negligible
7	Spring Bank Industrial Estate	6.4	7.2	4	57	64	Negligible
8	Mill West (AQMA)	1.7	1.2	1	71	72	Negligible
9	Ivy Cottage	1.0	1.1	1	56	57	Negligible
10	Cottage	0.8	0.8	0	56	57	Negligible
11	Black Sowerby Croft	0.7	0.8	0	56	57	Negligible
12	Prospect Terrace	0.6	0.7	0	56	57	Negligible
13	Hullen Edge	0.7	0.9	0	56	57	Negligible
14	Bank House	1.5	1.4	1	56	58	Negligible
15	Mill House Farm	1.4	1.4	1	57	58	Negligible
16	Mill House Lodge	1.5	1.5	1	60	61	Negligible

2.6 In general, the PCs using the NWP and 'calm' conditions are similar to the PCs using Leeds-Bradford meteorological data from the 2019 assessment. For long-term impacts the PCs are higher using NWP data at receptors 5, 6, 12 and 16. At receptors 5 and 6, the difference is the largest however the NO_2 impacts remain 'negligible' at all receptors.

2.7 For the short-term impacts the PCs are higher using NWP data at receptors 6, 7, 9, 11, 12 and 13. At receptor 7, which is a non-residential receptor. the difference is the largest however the NO_2 impacts remain negligible at all receptors.

3 Sensitivity Test 2

3.1 The 2019 assessment predicted concentrations at several representative receptor location at a height of 1.5 m (i.e. breathing height). A second sensitivity test has been undertaken to consider the concentrations at a range of heights above each of the modelled receptors. Concentrations have been predicted in 1 m increments (i.e. 1.5m, 2.5m, 3.5m etc) above each receptor up to a height of 31.5m. As outlined in the Tree/Woodland Assessment Plan in Appendix A the tallest groups of trees in the area are approx. 30 m. The purpose of this sensitivity test is to understand the potential variation in modelled concentration of pollutant in the column of air above each receptor.

3.2 The following tables summarise the average predicted NO_2 impacts in the column above each sensitive receptor using five years of meteorological data for Leeds-Bradford (2013-2017).

Table 3. Long-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits) – Average of Receptor Heights Modelled

Receptor ID	Receptor	PC from Table 5.1 of 2019 assessment	Long-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	0.17	0.18	0	29.7	29.9	Negligible
2	9 Breck Lea	0.08	0.09	0	28.2	28.3	Negligible
3	Sacred Heart Catholic Primary	0.08	0.10	0	28.1	28.2	Negligible
4	Haugh End House	0.10	0.13	0	28.2	28.3	Negligible
5	84 Rochdale Road	0.24	0.33	1	30.4	30.7	Negligible
6	Highfield Jerry Lane	0.20	0.22	1	28.8	29.0	Negligible
7	Spring Bank Industrial Estate	3.18	4.25	7	28.4	32.7	N/A
8	Mill West (AQMA)	0.19	0.19	0	35.5	35.7	Negligible
9	Ivy Cottage	0.23	0.23	0	28.1	28.4	Negligible
10	Cottage	0.16	0.17	0	28.1	28.3	Negligible
11	Black Sowerby Croft	0.18	0.18	0	28.1	28.3	Negligible
12	Prospect Terrace	0.03	0.04	0	28.0	28.1	Negligible

Receptor ID	Receptor	PC from Table 5.1 of 2019 assessment	Long-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
13	Hullen Edge	0.03	0.03	0	28.0	28.1	Negligible
14	Bank House	0.18	0.19	0	28.1	28.3	Negligible
15	Mill House Farm	0.23	0.24	1	28.3	28.6	Negligible
16	Mill House Lodge	0.17	0.18	0	30.0	30.1	Negligible

Table 4 Short-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits) – Average of Receptor Heights Modelled

Receptor ID	Receptor	PC from Table 5.2 of 2019 assessment	Short-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	2.7	3.3	1	59	63	Negligible
2	9 Breck Lea	1.8	2.5	1	56	59	Negligible
3	Sacred Heart Catholic Primary	1.7	2.7	1	56	59	Negligible
4	Haugh End House	2.0	3.2	1	56	60	Negligible
5	84 Rochdale Road	3.7	6.1	2	61	67	Negligible
6	Highfield Jerry Lane	1.9	2.9	1	58	60	Negligible
7	Spring Bank Industrial Estate	6.4	12.1	4	57	69	Negligible
8	Mill West (AQMA)	1.7	1.7	1	71	73	Negligible
9	Ivy Cottage	1.0	1.2	1	56	57	Negligible
10	Cottage	0.8	1.0	0	56	57	Negligible
11	Black Sowerby Croft	0.7	1.0	0	56	57	Negligible
12	Prospect Terrace	0.6	0.7	0	56	57	Negligible
13	Hullen Edge	0.7	0.7	0	56	57	Negligible

Receptor ID	Receptor	PC from Table 5.2 of 2019 assessment	Short-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
14	Bank House	1.5	1.7	1	56	58	Negligible
15	Mill House Farm	1.4	1.6	1	57	58	Negligible
16	Mill House Lodge	1.5	1.7	1	60	62	Negligible

3.3 The average predicted concentrations in the column of air above the modelled receptors are higher than the predicted concentrations at ground level. This is unsurprising as higher concentrations are expected at the elevated height near the stack. By the time the plume reaches ground level, additional mixing will occur and concentrations will reduce. The results of this sensitivity test indicates that if the presence of the trees alters the height of the plume, the impacts will still be negligible. There is no change in effect at the nearest part of the AQMA (Mill Bank (AQMA).

3.4 This sensitivity test shows that even if the presence of the trees is expected to alter the height of the plume, the impacts would still be negligible.

3.5 The following tables summarise the **maximum** predicted NO_2 impacts in the column above each sensitive receptor using five years of meteorological data for Leeds-Bradford (2013-2017).

Table 5. Long-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits) – Maximum of Receptor Heights Modelled

Receptor ID	Receptor	PC from Table 5.1 of 2019 assessment	Long-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	0.17	0.21	1	29.7	29.9	Negligible
2	9 Breck Lea	0.08	0.10	0	28.2	28.3	Negligible
3	Sacred Heart Catholic Primary	0.08	0.13	0	28.1	28.3	Negligible
4	Haugh End House	0.10	0.17	0	28.2	28.4	Negligible
5	84 Rochdale Road	0.24	0.50	1	30.4	30.9	Negligible
6	Highfield Jerry Lane	0.20	0.25	1	28.8	29.0	Negligible

Receptor ID	Receptor	PC from Table 5.1 of 2019 assessment	Long-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
7	Spring Bank Industrial Estate	3.18	5.31	13	28.4	33.7	N/A
8	Mill West (AQMA)	0.19	0.20	1	35.5	35.7	Negligible
9	Ivy Cottage	0.23	0.24	1	28.1	28.4	Negligible
10	Cottage	0.16	0.18	0	28.1	28.3	Negligible
11	Black Sowerby Croft	0.18	0.19	0	28.1	28.3	Negligible
12	Prospect Terrace	0.03	0.04	0	28.0	28.1	Negligible
13	Hullen Edge	0.03	0.04	0	28.0	28.1	Negligible
14	Bank House	0.18	0.19	0	28.1	28.3	Negligible
15	Mill House Farm	0.23	0.26	1	28.3	28.6	Negligible
16	Mill House Lodge	0.17	0.19	0	30.0	30.2	Negligible

Table 6 Short-Term NO_2 Impacts at Sensitive Receptors (at long-term IED limits) – Maximum of Receptor Heights Modelled

Receptor ID	Receptor	PC from Table 5.2 of 2019 assessment	Short-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
1	28 Rochdale Road	2.7	5.0	3	59.4	64	Negligible
2	9 Breck Lea	1.8	4.2	2	56.3	61	Negligible
3	Sacred Heart Catholic Primary	1.7	5.1	3	56.3	61	Negligible
4	Haugh End House	2.0	6.0	3	56.4	62	Negligible
5	84 Rochdale Road	3.7	13.6	7	60.8	74	Negligible
6	Highfield Jerry Lane	1.9	5.9	3	57.6	63	Negligible
7	Spring Bank Industrial Estate	6.4	26.4	13	56.8	83	Slight
8	Mill West (AQMA)	1.7	2.0	1	71.1	73	Negligible

Receptor ID	Receptor	PC from Table 5.2 of 2019 assessment	Short-Term NO_2 PC	PC as % of EAL	AC	PEC	Impact Descriptor
9	Ivy Cottage	1.0	2.6	1	56.3	59	Negligible
10	Cottage	0.8	2.0	1	56.2	58	Negligible
11	Black Sowerby Croft	0.7	1.9	1	56.2	58	Negligible
12	Prospect Terrace	0.6	1.0	0	56.1	57	Negligible
13	Hullen Edge	0.7	0.8	0	56.1	57	Negligible
14	Bank House	1.5	2.1	1	56.2	58	Negligible
15	Mill House Farm	1.4	2.5	1	56.7	59	Negligible
16	Mill House Lodge	1.5	2.3	1	59.9	62	Negligible

3.6 If the maximum concentrations are considered (rather than the average of all receptor heights modelled), the impacts would still be negligible at all receptors except at Spring Bank Industrial Estate where the impact would be slight adverse. The overall effect would still be not significant. This is a conservative approach as the column of air will be mixed, so the average presented previously is the more robust approach.

3.7 This sensitivity test was undertaken using Leeds-Bradford Airport meteorological data. As outlined in Appendix F of the 2019 Air Quality Assessment, there was minimal differences in predicted concentrations using Bingley meteorological data. Therefore, the results would not be materially different if meteorological data for Bingley was used instead.

4 Conclusion

4.1 This report presents the results of two additional sensitivity tests undertaken to further investigate the potential effect of trees on dispersion from the CVSH SWIP. In doing so, RPS have gone above and beyond the methodology usually adopted for the modelling of air quality impacts.

4.2 Planning permission for the development of the site including the SWIP was granted on appeal by the Planning Appeal Decisions dated 4 February 2020. Those Appeal Decisions definitively established the principle of the acceptability of the operation of a SWIP at this location and was so decided by the Planning Inspector after a meticulous examination of the effect of the proposal

on living conditions in the local area with particular reference to air quality including a thoroughgoing analysis of air dispersion modelling evidence.

4.3 An appeal was made by CVSH against the deemed refusal of an Environmental Permit application to operate the Schedule 13 SWIP. The appeal was dismissed by an Appeal Decision dated 5 July 2023. The main reason for refusal was the effect of nearby trees on dispersion of emissions from the SWIP relative to the discharge height of the stack.

4.4 Following the Permitting Inspector's decision, independent advice has been sought from CERC, the developer of the ADMS dispersion model used in the assessment. CERC was asked to visit the site and to review the air quality assessment to determine whether the effect of the trees had been included appropriately in the modelling. CERC agreed that the trees were considered in the assessment appropriately. Although CERC did not consider it appropriate to treat trees as though they were buildings it, nonetheless, carried out a 'trees as buildings' sensitivity test which established that the results were still of negligible impact. Moreover, the CERC report also explains the manner in which the combination of the complex terrain module with the surface roughness length provides a detailed site-specific assessment. The CERC report concluded that the sensitive receptors are all sufficiently far from the source, i.e. the stack, that pollutant concentrations calculated at these receptors are insensitive to the treatment of trees/surface roughness or to the fact that the discharge height of the stack is lower than most of the trees.

4.5 Notwithstanding this, additional sensitivity tests have been undertaken by RPS to provide even greater confidence that the impacts of trees have been fully considered.

4.6 The results of these additional sensitivity tests show that the impacts at all receptors remain negligible and the air quality effects are not significant.

APPENDIX A – TREE/WOODLAND ASSESSMENT PLAN

APPENDIX B – CERC REPORT