In the matter of Planning Application 21/04275/OUT

I am a resident of Bucknell and I very strongly object to the Hawkwell development proposal, for the following reasons:

1) Air pollution

2) Traffic, parking

3) Light pollution

4) Damage to environment, habitats and wildlife

5) Water and Drainage, flooding

6) Noise

7) Safety

1) Air pollution

The impact of the proposed Hawkwell village on air quality will be unacceptable for Bucknell. Our village is already suffering from significant air pollution primarily from the Ardley incinerator facility which is operated by Viridor, in addition to the emissions from the motorway nearby.

Of primary concern is the existing high level of pollutants emitted from the incinerator stack which is located only a few hundred yards from Bucknell. The Hawkwell development would firstly expose Bucknell to further unacceptable increases of air pollutants and secondly it would house thousands of additional people directly in the primary fallout region of the incinerator stack. These pollutants include PM2.5, PM0.1, NOx, dioxins, polycyclic aromatic hydrocarbons, heavy metals and many additional toxins and carcinogens (see further below). Every year, the Ardley incinerator facility emits an estimated 6.3 tons of particulates (only PM10 is reported) and 314.8 tons NOx [Viridor Ardley erf Permit emission levels, EA and reported https://ukwin.org.uk/]. In addition, PM2.5 levels are only modelled and not measured, and it is estimated that the even much more dangerous yet unreported PM0.1 dominates the emissions.

It should be emphasized that the government agrees with, and accepts, the conclusion reached by COMEAP that "**there are no absolute safe levels of PM2.5**" [The mortality effects of long-term exposure to particulate air pollution in the UK, Committee on the Medical Effects of Air Pollution, Dept of Health, 2010 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf]. The COMEAP report concluded: "it is recognised that there are no absolutely safe levels of PM, one of the main pollutants of concern. Evidence suggests that **health effects can still occur well below these limits**. Any improvement in air quality will have positive health consequences and **the UK has a target to reduce** average concentrations of PM 2.5 at urban background locations **by 2 µg/m^3** (a reduction of 15% on 2010 levels)" by 2020." By comparison, the resulting PM10 levels emitted by the Ardley incinerator stack is **4-12 mg /m^3** [Environment Agency Ardley EfW Facility report 1st Quarter 2015]. PM0.1 levels are unknown. PM2.5 levels are assumed to be about half of the reported PM10 levels. The stack emissions exceed environmental levels of PM2.5 discussed by COMEAP as harmfull more than **thousand fold** and dilution of the plume by distance is the only mechanism to reduce local exposure levels.

In their report, COMEAP estimated the burden of PM air pollution in the UK in 2008 to be equivalent to nearly **29,000 deaths** and an associated loss of population life of **340,000 life years** lost. In comparison, a study in 2006 found that **reducing PM by 10 μg/m^3** would extend lifespan in the UK by **five times** more than eliminating casualties on the roads, or three times more than eliminating passive smoking" "There is likely to be an overlap in the health burden associated with ambient concentrations of particulate matter (PM) and NO_2"

Even more concerning is the fact Public Health England concluded that even finer particles PM0.1, which are much more dangerous to human health than PM2.5, likely constitute > 99% of incinerator particle emissions, and are completely unregulated and are not measured and monitored by the environment agency. [https://www.gov.uk/government/publications/municipal-waste-incinerator-emissions-to-air-impact-on-health] PHE concluded: **Ultrafine Particles (PM0.1) from incinerator emissions:** These are fully unregulated, they are not monitored, they represent > 99% number of particles emitted, they represent > 99% of particle surface area, they pass directly into the blood stream. Furthermore, surface chemistry creates radicals and complex organic pollutants, PM0.1 (and PM2.5) adsorb metals and carcinogenic polycyclic aromatic hydrocarbons (PAH) which is not yet well characterised in the scientific literature.

In December 2012, the Environment Agency (EA) issued guidance for England on how to assess PM10 and PM2.5 emissions using an Emissions Factor (EF) based on the quantity of waste incinerated. (Pollution inventory reporting – incineration activities guidance note (Environment Agency, 2012), page 15. https://www.gov.uk/government/publications/pollution-inventory-reporting-guidance-notes) However, the EA admits that 'very few, if any' operators have been following its Guidance (8.5.18 reply to FOI request to EA National Request Ref. NR85604). With reporting thresholds set at 1 tonne a year for both PM10 and PM2.5, and the EA's Emission Factor of 0.022 kg of PM10 and PM2.5 per tonne of waste combusted, every incinerator burning over 45,455 tonnes of waste per year should report PM2.5 and PM10 emissions (as 0.022 kg × 45,455 tonnes = 1 tonne). (Pollution inventory reporting (Environment Agency, 2012), page 15). A DEFRA minister has said 'there is no commercially available' equipment for the continuous monitoring of PM10 or PM2.5, 3 so the EA's Pollution Inventory contains no separate data for either PM10 or PM2.5 (19.4.18 answer to Parliamentary Question PQ 135379 asked by David Drew MP on 13.4.18). A query made to the Environment Agency confirmed that the Ardley EfW facility has not followed this guidance.

In addition to the high and dangerous levels of PM2.5 and PM0.1, the Ardley incinerator emits many other toxic substances. Instantaneous Levels for Bucknell, which are calculated and modelled based on permit levels, are typically: NOX 9 microgram/m^3 , Sulfur diodide 2.2 microgram/m^3, Carbon monoxide 2.2 microgram/m^3, Hydrogen Chloride 430 nanogram/m^3, Hydrogen Fluoride 43 nanogram/m^3 TOC 430 nanogram/m^3, Ammonia 215 nanogram/m^3, Mercury 2.2 nanogram/m^3, Cadmium and Thallium 2.15 nanogram/m^3, Other metals 22 nanogram/m^3, Dioxins and furans 4.3 femtogram/m^3, BaP 5.9 picogram/m^3. [www.plumeplotter.com/Ardley]. Note for example that the **Cadmium and thallium level** from the incinerator emissions is **3072%** of what is considered the background level.

Dioxin emission levels are also of significant concern, and actual emissions are accepted to be much higher than those reported on the basis of biannual checks. The reason is that startup and other events are responsible for peak emissions of dioxins, furans and PCB's from incinerators. These are

not recorded in infrequent checks. The following information is adapted from a report on dioxin emissions by incinerators by [Dearden, J. C., Proof of Evidence submitted on behalf of Residents Against Incineration (RAIN) regarding proposals at Ince Marshes, Ellesmere Port, Cheshire (2008)]:
“Dioxin emission levels from incinerators are measured once or twice a year by external assessors who have to give prior notice of their visits. It is thus likely that operators ensure that a plant is running under optimal conditions for a visit. If much more frequent or continuous measurements are made, the total dioxin emissions are found to be very much higher than those calculated from biannual measurements. De Fré and Wevers [1998] found that emissions measured using the European standard method EN 1948 over a 6-hour period were 30 to 50 times lower than the average over a two-week continuous period. Reinmann et al [2006] showed that use of continuous dioxin sampling enabled operators to reduce dioxin emissions by a factor of 10, through careful control of operating conditions. True dioxin emissions from the Ardley incinerator, which would be subjected only to biannual checks, are thus likely to be very much higher than claimed.
Incinerators do not, for various reasons, run under optimal conditions all the time. Grosso et al [2007] found that even under steady-state conditions total dioxin release varied between 1.5 and 45 microgram TEQ per tonne of waste burned, depending on whether activated carbon was used and how fly-ash was collected. Sam-Cwan et al [2007] investigated the post-combustion re-synthesis of dioxins, and found that levels at waste heat boiler outlets were 10.8 – 13.6 times higher than at the furnace outlets, whilst water spray cooling was very effective at removing dioxins. Peel’s Environmental Statement [2007] states: “Each energy recovery boiler includes an economiser to cool the flue gas to temperatures suitable for the air emission control equipment”. It thus appears that the Peel process would significantly increase dioxin levels in the flue gases prior to treatment, and consequently would make reduction of dioxin levels more difficult.
Incinerators have to be shut down on occasion, both for routine maintenance and because of operating problems. It has been observed that during shutdown and startup, the levels of dioxins and other pollutants can be much higher than under optimal operation. Tejima et al [2007] tested the dioxin stack emissions of an MSW incinerator under conditions of startup, steady state and shutdown. They found concentrations of WHO-TEQ dioxin of 36 – 709 microgram.m-3 during startup, 2.3 microgram.m-3 during steady state operation, and 2.5 – 49 microgram.m-3 during shutdown. They estimated that 41% of the total annual emissions could be attributed to the startup period, assuming three startups per year. L.-C. Wang et al [2007] found that a single startup could contribute about 60% of the PCDD/F emissions for one whole year of normal operations; hence, assuming three startups per year, 64% of total annual emissions could come from startup. H.C. Wang et al [2007] found that during startup the PCDD/F removal efficiency was only 42% with selective catalytic reduction, compared with > 99% during normal operation.
It is clear from the above that levels of pollutants emitted from incinerators can vary greatly, and can exceed the statutory limits placed upon their emission. (It must be noted here that those limits are generally based on what is achievable and measurable, rather than what is safe [House of Commons 2001]). In 2001 Greenpeace carried out a review of the performance of municipal waste incinerators in the U.K. [Greenpeace 2001]. They found that for the ten incinerators that they reviewed, there were 546 self-reported limit exceedances in the two years 1999 and 2000, covering HCl, SO2, NOx, CO and particulates. It is noted that there were no reported exceedances of limits for dioxins or other substances that are not continuously measured. The Greenpeace report says that “it is difficult to accept that this is truly the case. High levels of pollutants in the gases often indicate a malfunction in the system or poor combustion of waste. For example, high levels of carbon monoxide would indicate poor combustion conditions under which increased production of dioxins, particles of incomplete combustion and other pollutants might be expected. Similarly, high levels of hydrogen chloride may be the result of large amounts of chlorine in the system, which again would provide improved conditions for dioxin formation. These peaks in production of dioxins and other hazardous substances are unlikely to be recorded by sampling undertaken only for a few hours, twice a year”.

There is increasing and mounting evidence that incinerator emission causes a wide range of **health problems including cancer and death**. Many recent studies in Europe have used **epidemiology** and showed a direct correlation between cancer incidence and distance to incinerator facilities. The following summarises the findings from **a recent authorative review**: [P.W. Tait et al. 2019. The Health Impact of waste incineration: A systematic Review. Aus. New Zea J. Public Health. Vol. 44, Isue 1, Pages 40-48 https://doi.org/10.1111/1753-6405.12939]
This review collects and summarises the literature on the topic and concluded that there are systematic and significant health effects found in epidemiology studies. Furthermore they collect the available **toxicology** as follows:
"*Cell Function and damage*:
-human A459 cells to particulate matter from incinerator atmospheric samples found increased production of reactive oxygen species and reduced cell viability.
-significantly increased T-cell activation in incineration workers.
Dioxins and furans (PCDD/Fs)
-In older incinerators levels 4.7 times higher and PCDF levels 21.2 times higher compared to the local population
- dioxin concentrations in breast milk and found significantly higher concentration in mothers exposed to theolder, compared to the modern, incinerator.
-The dominance of food ingestion among exposure pathways
Heavy Metals
-significantly higher mercury levels in the incinerator workers and exposed group compared to controls
-significant but mild increase in maternal and newborn blood lead
-significantly higher concentrations of urinary and blood arsenic in workers compared to age- and sex-matched Residents.
Polycyclic aromatic hydrocarbons
-urinary PAH metabolites were 15 and 3.5 times higher in incineration workers compared to the controls
-significantly higher urinary PAH in workers at an older incinerator compared to a more modern one. In addition to the concerns regarding dioxins (above), particulates and heavy metals."

The conclusions regarding **tumor and cancer incidence that is explicitly linked to incinerator exposure** is as follows:
Non-Hodgkin lymphoma
-has been associated with waste incinerator exposure
-relationship was established between dioxin exposure and non-Hodgkin lymphoma;
-in older incinerators exposure levels greater than 0.4 fg/m3 resulted in an odds ratio of 2.3 (95%CI1.4–3.8)

The EA reported Ardley ERF dioxin direct exposure in Bucknell [Source: Permit emissions Viridor for Ardley ERF] is 4 fg/m3, which is **10 times the concentration** that in one cited study [Tait et al 2019] has been shown **to double the risk for non-Hodgkin lymphoma**

-an increased risk of sarcoma related to exposure to incinerators. The only exposure associated with a significant odds ratio was for levels greater than 6 fg/m 3 dioxin species (OR 3.27; 95%CI 1.35–7.93)

The Ardley ERF dioxin direct exposure is 4fg/m3, which **is 2/3rd the concentration** that in one cited study has been shown to **triple the risk for soft tissue sarcoma**

Bowel cancer

-significant bowel cancer risk ratios for mortality in men (RR 2.1; 95%CI 1.1–4.4), and incidence in women (RR 2.0; 95%CI 1.3–3.06).

Other cancers

Multiple studies found different correlations

In one study all cancer risks were above unity but only slightly, with an overall cancer mortality risk ratio of 1.06 (95%CI 1.04–1.09; p<0.0001).

-Garcia-Perez found tumors of the pleura (1.71, 1.34–2.14), stomach (1.18,1.10–1.27), liver (1.18, 1.06–1.30), kidney (1.14, 1.04–1.23), ovary (1.14, 1.05–1.23), lung (1.10, 1.05–1.15),leukemia (1.10, 1.03–1.17), colon–rectum (1.08, 1.03–1.13) and bladder (1.08, 1.01–1.16). "

In addition to the above mentioned evidence, there are numerous other uncharacterised carcinogenic and toxic substances that are emitted from incinerator stacks. Many of these have not yet been explicitly researched. A list of toxins of further interest is found from the field measurements of incinerator emissions by Leach et al: [J.Leach, A.Blanch, A.C.Bianchi . Volatile organic compounds in an urban airborne environment adjacent to a municipal incinerator, waste collection centre and sewage treatment plant . Atmospheric Environment Volume 33, Issue 26, November 1999, Pages 4309-4325]

They have used GC-MS method to identify the following substances:

1) 2-Methylpropane
(2) n-Butene
(3) 1,3-Butadiene
(4) n-Butane
(5) Methyl mercaptan
(6) Chloroethane
(7) Fluorotrichloromethane (F.11)
(8) Isopentane
(9) 2-Methylbutane
(10) 2-Methylbutene-1
(11) 2-Methyl-1,3-butadiene
(12) n-Pentane
(13) Ethyl mercaptan
(14) Dimethylsulphide
(15) 2-Methyl-2-butene
(16) Dichloromethane
(17) Carbon disulphide
(18) Freon-113
(19) Propanal
(20) Propanol-1
(21) Propyl mercaptan
(22) 2,2-Dimethylbutane
(23) 2,3-Dimethylbutane
(24) methyl-tertiary butyl ether (m TBE)
(25) 2-Methyl pentane
(26) 3-Methyl pentane
(27) Butanone-1
(28) n-Butanal
(29) n-Hexane
(30) Pentanone-2
(31) Trichloromethane (chloroform)

(32) 2-Methyl pentene-1
(33) 2-Methylfuran
(34) 1,2-Dichloroethane
(35) 1,1,1-Trichloroethane
(36) Carbon tetrachloride
(37) Ethanol
(38) Benzene
(39) Butanone-2
(40) Cyclohexane
(41) Propanol-2
(42) 2,2,3-Trimethylbutane
(43) Thiophene
(44) Bromodichloromethane
(45) Trichloroethylene
(46) Diethylsulphide
(47) 2,5-Dimethylfuran
(48) Butanethiol
(49) n-Heptane
(50) 2,2,4-Trimethylpentane
(51) Methylcyclohexane
(52) 2,2,4-Trimethylpentene-2
(53) Pentanal
(54) Mercapto acetic acid
(55) Dimethyldisulphide
(56) Methylbenzene (Toluene)
(57) 2-Methylthiophene
(58) 1-Chloro-2,3-epoxypropane
(59) n-Butanol
(60) Chlorodibromomethane
(61) Methyl isobutylketone
(62) 1,1,2,2-Tetrachloroethylene
(63) Octene-1
(64) n-Octane
(65) Hexanal
(66) 2,2-Dimethylheptane
(67) Ethylbenzene
(68) 1,3-Dimethylbenzene
(69) 1,2-Dimethylbenzene
(70) Chlorobenzene
(71) Tribromomethane
(72) Styrene
(73) Dimethytrisulphide
(74) n-Nonane
(75) Nonene-1
(76) Heptanal
(77) Isopropylbenzene
(78) a-Pinene
(79) Camphene
(80) 1,5-Cyclooctadiene
(81) Cyclooctene
(82) 2,4-Dimethyl-4-vinylcyclohexane

(83) n-Propylbenzene
(84) l-Chloroheptane
(85) n-Decane
(86) Benzaldehyde
(87) 1,2-Dichlorobenzene
(88) p-Cymene
(89) 1,3,5-Trimethylbenzene
(90) 1-Ethyl-2-methylbenzene
(91) 1,2,4-Trimethylbenzene
(92) Octanal
(93) Limonene
(94) 1,2,3-Trimethylbenzene
(95) 2,3-Dihydroindene
(96) Indene
(97) 1-Chlorooctane
(98) 1,2-Dichlorobenzene
(99) n-Undecane
(100) 1-Methyl-3-propylbenzene
(101) 1-Methyl-2-propylbenzene
(102) 1,4-Dimethyl-3-ethylbenzene
(103) 1,3-Dimethyl-3-ethylbenzene
(104) 2-Dimethyl-4-ethylbenzene
(105) 1,3-Dimethyl-4-ethylbenzene
(106) 1,2,3,5-Tetramethylbenzene
(107) 1,2,3,4-Tetramethylbenzene
(108) n-Dodecane
(109) Naphthalene
(110) 1-Chlorodecane
(111) n-Tridecane
(112) 2-Methylnaphthalene
(113) 1-Methylnaphthalene
(114) Biphenyl
(115) Indole (benzo(b)pyrrole)
(116) Indole-3-acetic acid
(117) 1,2-+1,3-Dimethylnaphthalene
(118) Skatole
(119) n-Pentadecane
(120) n-Hexadecane
(121) 1-Phenyldecane
(122) Pristane
(123) n-Heptadecane
(124) n-Dodecylbenzene
(125) n-Octadecane
(126) Phytane
(127) Tridecylbenzene
(128) a C18 aldehyde
(129) n-Nanodecane
(130) Phenanthrene
(131) a C12 phenylated ether
(132–141) Mixture of C12–C15 iso-alkenes and cyclo-alkenes
(141–148) Mixture of C12–C15 alkyl phenylated compounds

In conclusion regarding the air quality objection to Hawkwell development, the above summarises evidence from the literature and reports accepted by government that fine particulates and other toxins and carcinogens are currently polluting Bucknell significantly already. The additional pollution from the Hawkwell village is therefore unacceptable. Bucknell parish council have objected to the incinerator pollution by sending a Ministerial Submission on the topic to Victoria Prentis on 24/08/2020.

The Air Quality Chapter for the 21/04275/OUT proposal is highly inadequate and cannot be accepted for the following reasons: Firstly, it does not include existing pollution sources and the additive effect of the Hawkwell development. Second it is highly un-quantitative. There is no quantitative information included or assessed on the pollution burden to the Bucknell area. Third, by proposing to increase pollution, with regard to PM2.5 alone it is directly against the **UK target to reduce** average concentrations of PM 2.5 at urban background locations **by 2 μg/m^3** by 2020 [COMEAP report 2010].

Furthermore, the assessment for the 21/04275/OUT proposal by the Environmental Health Officer is highly inadequate [Public document, email sent by Mr Neil Whitton 20 January 2022 10:19]. This email states: "Air Quality: Having read the Air Quality Chapter of the ES I am satisfied with its findings."
This statement falls short of what would be expected from the Environmental Health Office and lacks any specific information or evaluation. There is no evidence that the Environmental Health and Licensing for Cherwell District Council performs any evaluation besides a perfunctory reading of the submitted Air Quality Chapter, which is shown to be fundamentally defective and flawed (see above). As for the Air Quality Chapter, the Environmental Health Officer's conclusion 1) fails to consider existing air and environmental pollution, 2) fails to make quantitative conclusions regarding additional air pollution from the development, 3) fails to show awareness for the UK target to reduce average concentrations of PM 2.5 at urban background locations by 2 μg/m^3 by 2020 and 4) it fails to consider local government policy for Health Equality measures and 5) it fails to meet the Core Values of the Civil Service, in particular Objectivity: 'basing your advice and decisions on rigorous analysis of the evidence' (Civil Service Code, 2015). The conclusion by the Environmental Health Officer must therefore be rejected as inexpert, uninformed and lacking rigour.

2) Traffic, parking

The increase in traffic and parking cannot be properly supported by the existing roads. In 'Chapter 2 Site description and Proposed Development it is written :

" 2.4.12 The realignment of the lower end of Bucknell Road as part of the transport proposals in the area, together with the provision of traffic management and/or calming measures on Bucknell Road, will ***effectively reduce traffic numbers and ensure the avoidance of local traffic impacts eg in Bucknell***."

This evaluation is incorrect. With the arrival of thousands of additional cars, Bucknell will very clearly experience much higher volumes of traffic, that the roads are not designed to support. The conclusions in the traffic evaluation must be rejected. The increased traffic and parking that is expected is added to the objections to the Hawkwell development

3) Light pollution

The proposed development will create significant light pollution very close to Bucknell. This adds to the existing light pollution from the Ardley incinerator and the motorway

4) Damage to environment and wildlife habitat

The proposed development would destroy valuable habitat for wildlife. Wildlife would be displaced not just from site development at the proposed Hawkwell village location, but also from the increased air pollution, light pollution, noise and destruction of the environment.

5) Water and Drainage

The existing water and drainage network is already insufficient and contributes to floodings in the village. More than 3000 new homes close by cannot be supported by the existing water and drainage facilities.

6) Noise

The Hawkwell village and associated traffic and industry would create noise pollution for Bucknell

7) Safety

The proposed development would create a very high density of inhabitants. The associated traffic will strongly decrease road safety

yours

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