

# MICROPOLLUTANTS AND THE RIVER COLNE

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## Summary:

In just a 22-month period, the water samples collected from the river Colne were seen to contain 267 different substances by Gas Chromatography – Mass spectroscopy alone. At least 85 of these carry an Environmental Hazard classification, ranging from harmful, through to very toxic to aquatic life. 150 of the substances found to carry a Human hazard classification. A number of substances (25) carry classifications which state they can cause cancer or are suspected of causing cancer. There were 17 substances detected that can/may damage fertility or the unborn child. None of the substances are native to our natural water system.

Numerous outfalls are present in this area and have often been shown to be misconnected to. Sewage treatment works (STW) also discharge to the river Ver and Colne although the latter at Blackbirds Farm does not ‘spill’ under storm conditions. These sources may account for many of the substances and chemicals found to be present. Misconnected outfalls will discharge raw, untreated sewage and chemical waste combined with road and agricultural run-off. STW’s will discharge treated sewage unless discharging under storm conditions when dilute raw sewage will enter the rivers. Treated sewage (final effluent) cannot be expected to be totally ‘clean’ however. STW’s are only designed to deal with the basics of human existence, using a biological process. Everything else that arrives there may – or, crucially, may not – get some treatment on the way through. But if it does, it isn’t by design.

The large number of industrial substances is of concern, with some of those being present in large volume along kilometres of the river Colne water. The detection of agricultural chemicals may be explained to some extent by run off after use in local fields. However, industrial and pharmaceutical substances have also been found at high levels and their entry method is not clear as they do not necessarily relate to obvious point sources of pollution. In addition to this there was an obvious pollution event in December 2021, when petrol components were detected along the River.

Apart from the large number of Industrial, agricultural and pharmaceutical substances, the levels of PAHs are concerning. Some PAHs have breached their MAC-EQS in the water but the accumulation of PAHs in the sediment is particularly remarkable. These values were high at the time of testing and accumulation may only increase these levels. The values should be addressed to determine if irreversible damage is being done to our environment.

Specific testing of the River Colne sediment has shown the POPs (PFAS, PAHs, PCBs, dioxins and Furans) present. There is considerable variation in concentration in the levels between sites. There are also High levels of heavy metals, a number significantly higher than the WHO values for soil. As these POPs chemicals accumulate the levels will potentially increase.

The substances found in the River water and sediment varied in their potential source and use, from agricultural, pharmaceutical, Industrial, road/traffic pollutants, incomplete combustion, human waste and Industrial waste. The substances also varied in their chemical grouping, there were a significant number of Persistent Organic Pollutants detected in the form of PAH’s and on a lesser scale PCBs, PFOAs (By LC-MS), Dioxins and Furans. The source of these pollutants may also be varied.

The potential for these river water and sediment polluting substances to impact our drinking water aquifers will increase. Substances that are usually present in small amounts in plastics such as monomers or stabilisers have found their way into an observation borehole, along with other substances that are prevalent in the River Colne. It should be noted that Affinity do not use this borehole for the source of drinking water, it is for monitoring the quality and levels of the groundwater.

Our findings strongly suggest that our environment and water ecosystems are being irretrievably damaged and that there is potential for contaminating our water supply therefore risking harm to ourselves. As the number of outfalls increase, so too will the number of substances in the river that can then seep through the soil, gravels and chalk and potentially reach our drinking water aquifers.

Where raw sewage is present the bacteria, such as E.Coli, and viruses present a significant risk of adversely affecting the health of the general public and animals accessing the river

We have found two endocrine disrupters, four carcinogenic/or potentially carcinogenic and two substances that may damage fertility or the unborn child in a control sample from an observation borehole. A substance that carries a carcinogenic and fertility damaging classification has been found in all samples from Knutsford playing fields to Lairage land in all the samples taken over the eighteen months of this study.

This level of pollution in our rivers, that is likely to increase without meaningful remedial action, must dictate there is an increased risk of water supply aquifers becoming contaminated and it will become increasingly difficult, if not impossible, to remove all those pollutants from the supply. The water sampled from the observation borehole, as with all water samples, was analysed only by a generic GC-MS process. Had a wider range of analytical processes been available to us there is no doubt the number of micro pollutants discovered would significantly increase.

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## 1.0 Background

The origins of this project were founded in trying to establish the source of an obvious persistent, misconnected but difficult to trace, polluting outfall into the river Colne in Oxhey park, Watford. The lead of Community Connections CIC (CCCIC) who focus their work in the Watford area arranged for a water sample to be taken and analysed in the hope that pollutants identified may give indication as to the location of the source.

It was already known that water quality in the area was generally poor as indicated by very low scores in the monitoring of invertebrate species using the anglers riverfly monitoring initiative (ARMI) <https://www.riverflies.org> protocols. The target species are good indicators of water quality.

Sites are monitored very regularly and an expected standard (a trigger level) can be set in consultation with the Environment Agency (EA). Any trigger breach should then invoke a pollution investigation by the EA. Sadly that is no longer the case as resource and funding cuts have meant the EA now publicly state that low level diffuse pollution is unlikely to be investigated.

So, we were largely on our own and this led to the water quality analysis that set us on the road of this project. The results of that analysis were made known to the Colne Valley Fisheries Consultative (CVFC).

CVFC were already active in the area (despite there being no angling interest due the lack of fish) and had been since 2012/13 when we became aware of a number of 'Category 1' pollution incidents on the upper Colne. A 'Cat 1' incident is largely determined by the EA as a significant fish mortality. The incidents observed often coincided with heavy rain events and a relationship between them and the many discharging outfalls to river we were discovering became obvious.

Apart from through the efforts of CCCIC and CVFC there was no attention being paid to the upper Colne and representation for it was woeful. CVFC (a voluntary and unfunded organisation) quickly logged and recorded all the outfalls in the area and beyond, developed a pollution reporting app and an invasive species version soon followed. They were also soon co-ordinating the riverfly hub in the area and hosted the recording of results on our website <https://www.cvfc.org.uk>

It was through this continued work and our questioning of the Water companies, the catchment host (CaBA based approach) and the local authorities that we finally achieved some traction and this was very much the forerunner to the current Rediscovering the River Colne project in the Watford area. Finally, people who had the resources and were actually responsible for the state of the rivers were taking notice - having been shown the way by a group of volunteers. Even now that response is still not at the level that is necessary but at least we have a start.

CVFC is a delivery partner in that project and recently arranged for the EA to undertake fish population surveys at three locations through the area we had undertaken the water quality sampling. Biomass and species mix were very poor but that was no surprise of course. It is obvious that the methodology used by the EA for determining a Cat 1 incident could not be applied in this area – it is arguably outdated and requires urgent revision.

The aim of this study is to confirm the dire state the river is in, to bring that to the attention of the agencies and authorities that should be taking a far more pro-active approach to resolving the issues and of course to provide some facts to the general public who can take decisions about allowing their children and pets to freely access the river.

Hopefully that in turn will lead to increased public awareness of the issues and will inform them how better to respect the aquatic environment.

We also intend this to be a catalyst that will bring about further and more comprehensive research not only in the immediate study area but across the whole catchment.

## 2.0 River Colne area of study

This study initiated with the sampling sites Knutsford Playing fields, Shaftsbury Road, Oxhey Park and Lairage Land. It then expanded upriver to include the River Ver as a control, and Munden House Ford on the River Colne to show the pollution area. It then expanded to include a site close to the source of the River Colne, Coursers Road and one between the source and Munden House ford, Tykes Water Radlett. The approximate location of these is shown in Figure 1.

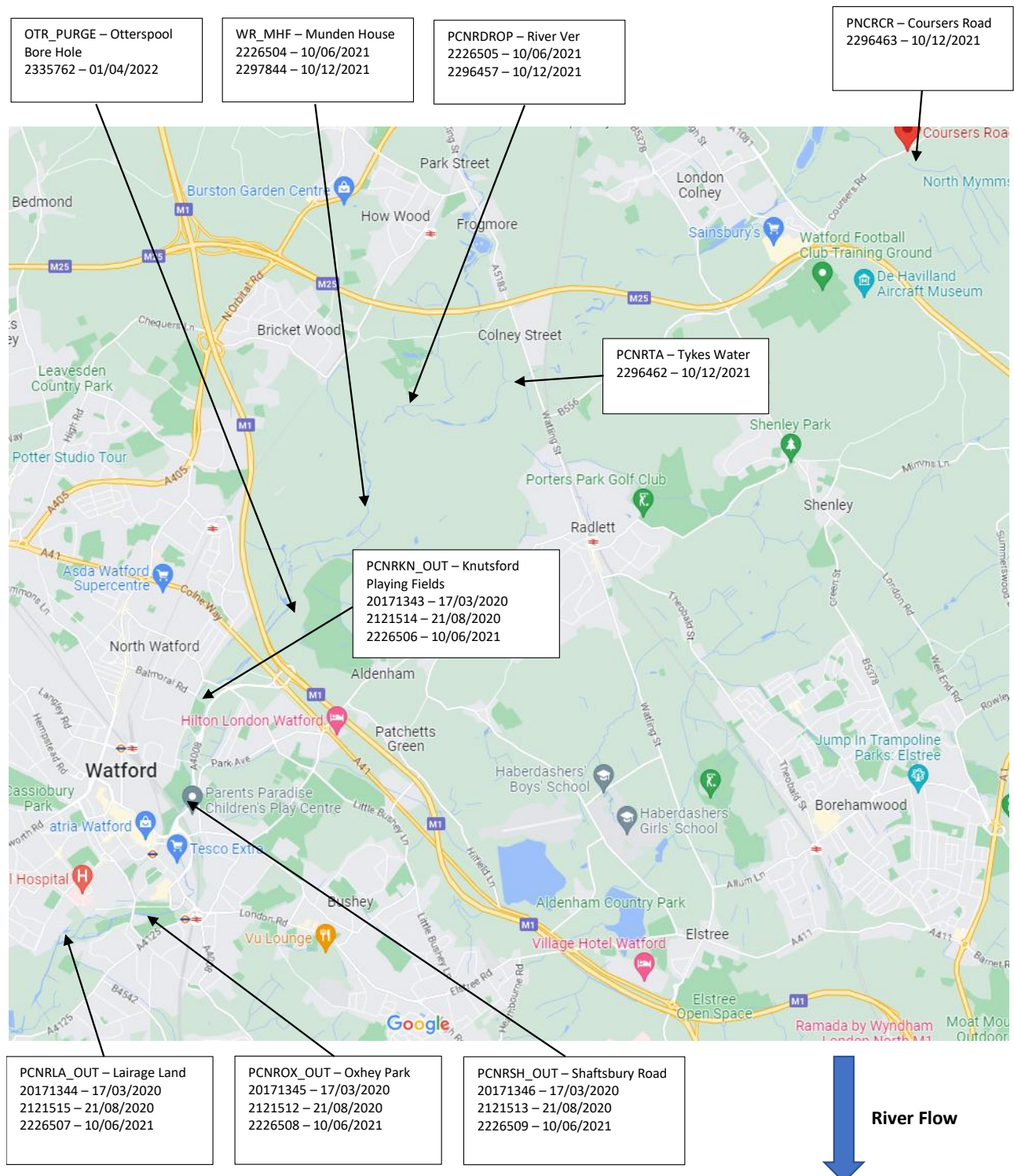


Figure 1 - Map showing the approximate location of the sampling sites





Figure 2 - KnutsfordPlaying Fields outlet (17.3.2021)



Figure 3 - Shaftsbury Road outlet (17.03.2021)





Figure 4 - Oxhey Road outlet (17.03.2021)



Figure 5 - Lairage Land outlet (17.03.2021)







*Figure 6 - River Ver sampling site*

### **3.0 Water Quality Study with Affinity water**

The study was initiated in 2019, Affinity water took samples of water initially in 4 locations and then analysed the samples by a generic GC-MS (Gas Chromatography-Mass Spectroscopy) method. The list of chemicals supplied were reported in values of ug/L, Volatile organic compounds were highlighted.

The GC-MS method is a good method that can detect chemicals that can volatilise and are relatively non-polar. The substances are volatilised to convert them to a gas, then pass through a special column and get separated as the substances will travel at different rates through the column, mostly due to interaction or lack of interaction with the GC-column whilst being carried by an inert gas. The individual chemicals are then identified by mass spectroscopy using the NIST library to identify the substances.

This method obviously has limits, it cannot identify chemicals that do not volatilise under the conditions of the GC method (this would include salts, heavy metals, chemicals that have a higher molecular weight (approximately 800 daltons), chemicals that do not interact with the GC column, substances that do not separate sufficiently for identification etc.

It was initially thought that the results would lead us to where potential pollutants were entering the river, perhaps by a mis-connection. However, the first set of GC-MS results for the four sites on the River Colne started to show us how complex this study was to become.

### 3.1 Overview of some Regulations/Directives

#### Water Framework Directive

The Water Framework directive (WFD) 2000/60/EC entered into UK, it was initiated in Europe to ensure that all coastal and inland waters reach and maintain a good status. This study is limited to the chemical pollutants only which are listed in directive 2008/105/EC. This Directive sets out controls for the environmental hazardous pollutants by the implementation of Environmental Quality standards for the annual average (AA-EQS) and Maximum allowable concentration (MAC-EQS) for **priority substances** and **eight other pollutants**. These substances include **metals** cadmium, lead, mercury and nickel, and their compounds; **benzene;polyaromatic hydrocarbons (PAH)**; and several **pesticides**.

Several of these priority substances are classed as **hazardous**. These substances have been chosen due to their significant risk to the aquatic environment. The EQS are thresholds which aim to maintain the good quality of substances in natural waters. There are different EQs for inland surface waters (rivers and lakes) and for other surface waters (transitional, coastal and territorial waters). The thresholds are shown in either an average value (over 1 year), annual average AA. To prevent against long term exposure to pollutants in the aquatic environment and the Maximum allowable concentration MAC of the substance. This is to prevent against short exposure to these pollutants, which can occur in pollution leaks. Where the MAC-EQS are marked as 'not applicable'. The AA-EQS values are considered protective against short-term pollution peaks in continuous discharges since they are significantly lower than the values derived on the basis of acute toxicity.

The AA and MAC are in line with the Water Framework Directive 2000/60/EC. The figures quoted in this report are for Inland surface waters encompass rivers and lakes and related artificial or heavily modified water bodies.

Note 11: For the group of priority substances of polyaromatic hydrocarbons (PAH) (No 28), the biota EQS and corresponding AA-EQS in water refer to the concentration of benzo(a)pyrene, on the toxicity of which they are based. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water.

Unless otherwise indicated, the biota EQS relate to fish.

This study has only looked at the chemical/pollutants and not any physio-chemical, biological parameters stated in the Water Framework directive. The list in Annex I, listing the environmental quality standards for priority substances and certain other pollutants uses a number of different analytical techniques which were not all available during this study.

There are 8 PAH's listed, 5 of which are grouped together, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene. The purpose of this is that only Benzo(a)pyrene needs to be monitored for the Annual average (AA-EQS) and EQS-biota.

**The Ground Water Directive, a daughter Directive of the WFD**, came into force in 2006 (2006/118/EC) and sets to protect groundwater against pollution and deterioration. It sets quality standards for nitrates and pesticides (Annex I)

Active substances in pesticides, including their relevant metabolites, degradation and reaction products (1) 0,1 µg/l 0,5 µg/l (total) (2) and a framework for establishing threshold values (Annex II).

#### The Water Industry act of 1991

This act controls trade effluent. One of the reasons of this initiation was to preserve and protect our environment and maintain drinking water quality.

This stipulates that trade effluent discharged into the public sewer requires prior consent that may dictate conditions and limits of the discharge.

“any liquid, either with or without particles of matter in suspension in the liquid, which is wholly or partly produced in the course of any trade or industry carried on at a trade premises”

### **Prioritisation and Early warning system**

A prioritisation and Early warning system (PEWS) for England was developed by the Environment agency. The aim of is to monitor and horizon screening work to produce a list of chemicals which act as an early warning system for identifying emerging issues.

It lists the chemicals detected along with a traffic light system to denote their environmental effect on surface water, ground water, soil, biota, sediment and overall. Priority 1 – red, is high risk, high certainty, Priority 2, amber, High risk, low certainty, Priority 3, yellow, low risk, low certainty and Priority 4, green, low risk low certainty.

### **3.2 Overview of Chemicals – generic type**

#### **Polycyclic Aromatic Hydrocarbons (PAH's)**

PAH's are a group of chemicals composed of carbon and hydrogen. PAH's are formed from processes such as incomplete combustion of natural (coal, crude oil and wood) and man-made combustion sources such as car emissions.

PAHs can also be produced by bacteria and plants also the maturation of crude oil. Exposure is usually associated with inhalation. However, they are found in water-ways as pollutants. It is suspected that the PAHs enter water sources through fossil fuel combustion, petroleum spills, road runoff, industrial wastewater, leaching from creosote treated wood and dry and wet deposition (Karyab et al., 2013). PAHs have been detected in drinking water, rivers and lakes, groundwater, wastewater, seawater and sediments.

**Polycyclic Aromatic Hydrocarbons (PAHs)** are hazardous for human health and the environment. A significant number of PAHs are classified as carcinogenic, mutagenic, and reprotoxic. PAHs can be found in a number of consumer products and are restricted due to their high concerns, but also common environmental contaminants. They are also classified as Persistent Organic Pollutants (POP's)

16 of the hundreds of PAH's have been designated as high priority pollutants by the European Chemical Agency (ECHA) due to their toxic , mutagenic carcinogenic and oestrogenic effect on humans:

Acenaphthene, Acenaphthylene, Anthracene, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[g,h,i]perylene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene , Fluorene, Indeno[1,2,3-c,d]pyrene , Phenanthrene, Pyrene, Naphthalene.

5 of these PAH's are listed in Annex I of the Environmental Quality Standards Directive (EQSD; Directive 2008/105/EC amended by Directive 2013/39/EU): These are the higher molecular weight PAH's, consisting of 5 or 6 rings and have been grouped together, the result for Benzo(a)pyrene is used as a marker for the other 4. These 5 PAH's have an affinity for particulate matter and are persistent in the environment with biodegradation rates in the order of months to years (European Union, 2008, 2012). They also bioaccumulate within organisms and are toxic, with effect concentrations reported in the low µg/l range (European Union, 2008, 2012). With the exception of benzo(g,h,i)perylene, these 5 PAH's have been classified as carcinogenic, with benzo(a)pyrene being the most carcinogenic of the group (European Union, 2012). Benzo(a)pyrene, benzo(k)fluoranthene and benzo(g,h,i)perylene have been listed as substances of very high concern (SVHCs) under the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

These 5 PAHs persist in the environment, accumulate in biota and food chains, and have potential adverse effects on aquatic life and humans, they are classed as priority hazardous substances (PHS) and ubiquitous PBTs (uPBTs).

benzo(a)pyrene,  
benzo(b)fluoranthene,  
benzo(k)fluoranthene,  
benzo(g,h,i)perylene,  
indeno(1,2,3-cd)pyrene.



Four of these, (benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene) are listed in Annex III of the Persistent Organic Pollutants (POPs) Regulation (EC 850/2004). In June 2016, January 2019, and June 2018, benzo(a)pyrene, benzo(k)fluoranthene, and benzo(g,h,i)perylene, respectively, were listed as substances of very high concern (SVHCs) under the REACH Regulation (EC/1907/2006)

Further to these, some smaller PAHs, naphthalene, anthracene and fluoranthene are listed with their own individual AA and MAC values.

The setting of a biota EQS reflects the PBT characteristics of this group of substances. The biota EQS is driven by risks to human health. The Directive (2013/39/EU) also specifies maximum allowable concentration EQSs (MAC EQSs) for the individual PAHs, except indeno(12,3-cd)pyrene. MAC EQSs are thresholds set to protect aquatic life from short-term toxic effects.

However, the contribution that groundwater makes to the surface water status failures is also considered as part of the WFD and the Groundwater Directive (2006/118/EC as amended by 2014/80/EU). If groundwater contributes more than 50% of the PAH load in any surface water status failure then the groundwater body will also go to poor chemical status. We will be assessing this further as we develop water body classifications for the draft river basin plans

## **PFAS**

Per and Polyfluoroalkyl substances. These are man-made, synthetic substances that have a number of fluorine atoms attached to the (carbon) alkyl chain. This carbon to fluorine bond is so strong that these substances can accumulate over time in the environment, they do not easily break down, some bioaccumulate. A number of these substances are classified as Persistent Organic Pollutants. PFAS is a generic term for thousands of chemicals (around 12 000). Their use is prolific in industry and household goods, from non-stick coatings on our cookware, repellents on our water-proof textiles, coatings, toys, packaging, fire-fighting foams to name a few.

PFAS have been found in human blood, and food sources such as fish, meat and fruit. PFAS have now become ubiquitous.

PFAS from products can enter the water-ways and they are difficult to remove so can end up in our tap water.

There are increasing regulations for PFAS as they have been linked to health risks such as cancer, hormonal dysfunction, weakened immune system and Environmental damage. There is a proposal underway from February 2023 to ban PFAS. This would take place after a period of 18 months to 12 years.

These substances are not easy to detect using Gas Chromatography-Mass Spectroscopy, liquid chromatography- mass spectrometry is usually used which is far more expensive.

## **Polychlorinated Biphenyls – PCB**

These are man-made substances which are very stable to high temperatures and pressures. They are also termed as Persistent organic pollutants. There are around 209 different PCBs, Polychlorinated Biphenyls. They differ in the level of chlorine and also toxicity, they are highly carcinogenic and since 2001 have listed as a POP and can no longer be produced. The disposal of PCBs and equipment contaminated with PCBs has a sunset date of 2028.

They have proven to pose risks to human and animal health, such as cancer and reproduction problems, due to their toxic and bio-accumulative properties. They were banned from use in 1987 in the UK, prior to this they were industrial classified mainly as an Industrial use chemical. But can be found leaching and being washed from landfill sites.

## Dioxins

Like PAH, PCB and PFOA, PFAS, Dioxins are also classified as POPs and as such will accumulate and persist in the environment. Dioxins have been shown to cause adverse developmental effects in fish, birds, and mammals at low exposure levels.

They can be produced by a number of processes such as

- Incineration of municipal solid waste
- Incineration of medical waste
- Secondary copper smelting
- Wood fires
- Land application of sewage sludge
- Cement kilns
- Coal fired power plants
- Residential wood burning
- Chlorine bleaching of wood pulp

Surface water bodies can become contaminated when rainwater carries soil containing dioxins into surface water and when some industries discharge their dioxin-contaminated waste directly into surface water. Dioxins do not easily dissolve in water, so they tend to settle to the bottom and cling to the sediment.

### 3.3 GC-MS results - format

From the 17<sup>th</sup> March 2020 until the 10<sup>th</sup> December 2021 4 sets of samples have been taken from the River Colne. These samples were collected away from the banks of the river and below the surface. These samples were then analysed by a generic GC-MS method and the results, as supplied, can be found in the Annex. The results tabulate chemical name, CAS number and range of substance found in micrograms per litre.

This amounted to a lot of data, as a significant number of substances were found at each testing site, at each sample collection date. It has been difficult to determine what data to highlight in this report as most, if not all the substances, should not be, native components of a River.

The data has been displayed in a number of ways.

1. For each set of data, each sampling date, there is an overview of the findings.
2. As this study is to look at the pollutants in the River Colne due to the change in aquatic species population, the data documented and discussed concentrates on the substances that are harmful to the environment at the time of writing. For each date of sample collection all the substances known to be hazardous to the environment have been tabulated. In most cases this is a significant amount of data which, just by the different environmental hazardous substances listed, gives a good indication of the extent of pollution in the River Colne.
3. Further to this, the substances that were present in all four of the initial sampling sites as of the 17<sup>th</sup> March 2020, (Knutsford Playing Field, Shaftsbury Road, Oxhey Park and Lairage land), irrespective of their classification, on each sampling date, are documented. On the second, third and fourth sampling dates the substances found in all sites on each sampling date are shown in bold.
4. Substances that are present at high levels or are of specific interest, irrespective of their classification have also been highlighted
5. Finally, the EQS, AA and MAC for the substances found in each round of testing are tabulated.

The classification of the substances shown are at the time of writing this report, however, a number of substances are also shown in annex III of Registration, Evaluation, Authorisation and restriction of chemicals. REACH (EC) 1907/2006 as potential environmentally hazardous chemicals and it may only be a matter of time until they are given an environmental hazard classification.

### 3.4 First set of testing and results 17th March 2020

The first set of results, from samples taken at Knutsford playing fields (sample ID 2071343), Shaftsbury Road (Sample ID 2071346), Oxhey Park (Sample ID 2071345) and Lairage land (Sample ID 2071344). The full GC-MS results are shown in the appendix -

The data was surprising for a number of reasons.

- The significant number of substances found in each sampling location:  
Knutsford Playing field – 32 substances (Full data shown in the Appendix - Table 25)  
Shaftsbury Road – 41 Substances (Full data shown in the Appendix - Table 26)  
Oxhey Park – 67 substances (Full data shown in the Appendix -Table 27)  
Lairage Land – 34 substances (Full data shown in the Appendix -Table 28)
- A significant number of the substances, 32 substances, carry an environmental hazard phrase i.e. H4xx, are classified as hazardous to the aquatic environment These are shown in Table 1
- There were a number of substances that showed in all four sample areas. That equates to the substances being present in at least 4.2km of the River Colne. These substances are shown in Table 2. 12 of which are hazardous to the environment.  
This raises concern at where the substances are entering the River Colne, at what levels and how long have they been present.  
Given an average river width (10m.), depth (0.5m) and flow ( $1\text{m}^3/\text{s}^{-1}$ ), when a substance is found at  $1\mu\text{g}/\text{L}$  and is found in all 4 consecutive sites, Knutsford to lairage, making the assumption that the chemical is present throughout the river, there is 0.021kg of that substance present at any one time. This figure becomes alarmingly high if we multiply this up for a day or a greater period of time such as 18 months for the consistent offenders.
- Where will all these substances be transported to? The majority of substances do not degrade quickly. They can be taken up by aquatic animals and plants, mammals drinking from the water, absorption into the surrounding soil and river bed and potential transfer to the aquifer - i.e. these substances will not be isolated to an area but will be dispersed by various means.
- A paper titled: *Faecal sterols as indicators of sewage contamination in estuarine sediments of the Tay Estuary, Scotland: an extended baseline survey* A. D. Reeves and D. Patton cites a list of faecal sterols are indicators of sewage contamination. These include coprostanol, which decreases as the distance from the contamination site increases downstream (Brown and Wade, 1984) which was found during our testing at Shaftsbury Road and a greater level at Oxhey Park.
- Other indicators of untreated sewage contamination are Cholesterol, cholestanol, caffeine, campesterol,  $\beta$ -sitosterol and stigmastol, these can come from a number of sources. Caffeine is partially excreted in urine and is increasingly ubiquitous to rivers and coastal waters. The effect of caffeine on aquatic animals/ecosystems is causing increasing concern due to its effect on aquatic life. These substances were also found during testing suggesting that there had been sewage ingress into the River and may be the result of misconnections, storm spills or even final treated effluent from STW's.
- The other substances come from varied applications and are listed as being used in a significant number of uses from paints to metal cleaning.
- The dynamic nature of the River and added complications such as weather, drainage, filtering by plants, etc make it difficult to trace the route of substances.
- The largest concentration of environmentally hazardous chemicals was found in the Shaftsbury Road and Oxhey park locations. These sites are where the sewage indicator, Coprostanol was detected.



Fipronil, a topical pet pesticide, was found in all 4 locations. The level of this substance in a well-known pet spot on treatment for fleas is ~10%. This substance is typically absorbed into the dog blood but potential exists for it to be washed off into the water within the first few days of application. For a large dog (20-30kg) this equates to a treatment of 134mg of Fipronil per month. The concentrations and area over which this substance was detected was not expected.

- A number of substances detected and listed are in line with the WFD for AA and MAC.. The majority of these were PAH's. None of which had greater levels than the MAC. Benzo[b]fluoranthene was found at <0.1ug/L in all samples taken and the maximum allowable concentration is 0.017. Whereas we do not have exact values, it is possible that this substance was present at higher levels than acceptable for the environment by MAC values.
- The samples taken on the 17<sup>th</sup> March 2020 contained a number of pollutants listed in the Drinking water directive, WFD, have controlled release values published and are also listed in the PEWS.
- Ethanol, 2-butoxy-, phosphate (3:1)(78-51-3) was found at 1-5ug/L, at Oxhey park and this is a substance that can be found in coatings and is a raw material in plastic.

Table 1 Environmentally hazardous substances found in the Rive Colne against location (values in ug/L) on the 17th March 2021

Substance name(CAS number)	Knutsford Playing Field	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP Environmenta
Hexyl Cinnamaldehyde (101-86-0)			<0.1		H317	H400, H411
Metaldehyde (108-62-3) <sup>(5-1)</sup>				<0.1	H228, H310, H361f	H412
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H302, H351, H360f	H411
Fipronil (120068-37-3) <sup>(5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H301, H311, H331, H372,	H400, H410
Galaxolide (1222-05-5) <sup>(5-3)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H400, H410
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (126-86-3) <sup>(5-2)</sup>	0.1 - 1		0.1 - 1	0.1 - 1	H317, H318	H402, H412
Pyrene (129-00-0) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	None	H400, H410
1,3-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester (137-89-3)			0.1 - 1		H360 (may damage fert)	H400
Phytol (150-86-7)		<0.1			H315	H400, H410
Boscalid (188425-85-6) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H411
Atrazine (1912-24-9) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	H317, H373	H400, H410
Benzo[ghi]perylene (191-24-2) <sup>(1,2,3)</sup>		<0.1	<0.1		None	H400, H410
Stigmastanol (19466-47-8)			0.1 - 1		None	H413
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	H350	H400, H410
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H302	H400, H410
Benzo[k]fluoranthene (207-08-9) <sup>(1,2,3)</sup>		<0.1			H350	H400, H410
Chrysene (218-01-9)			<0.1		H341, H350	H400, H410
Tri-allate (2303-17-5)	<0.1	<0.1	<0.1	<0.1	H302, H307, H373	H400, H410
Propyzamide (23950-58-5) <sup>(4)</sup>	<0.1	<0.1	<0.1	<0.1	H351	H400, H410
Benzenesulfonamide, N-butyl (3622-84-2) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	Not classified	H412
Benzo[a]pyrene (50-32-8) <sup>(3)</sup>		<0.1	<0.1		H317, H340, H350, H360FD	H400, H410
Benzo[a]anthracene (56-55-3) <sup>(1,2,3)</sup>		<0.1	<0.1		H350	H400, H410
Cholest-4-en-3-one (601-57-0)			<0.1		Not Classified	H413
Propiconazole-I (60207-90-1)	<0.1	<0.1		<0.1	H360D, H317, H302	H400, H410
Octocrylene (6197-30-4)			<0.1		None	H410
Hexa(methoxymethyl)melamine (68002-20-0)	<0.1	<0.1	<0.1	<0.1	None	H412
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate (6846-50-0)			<0.1		H361	H412
4-Piperidinone, 2,2,6,6-tetramethyl- (826-36-8)		<0.1	<0.1		H290, H302, H314, H317	H412
Diflufenican (83164-33-4)		<0.1	<0.1		Not classified	H412
Terbutryne (886-50-0) <sup>(1)</sup>		<0.1	<0.1	<0.1	H302	H400, H410
2-Methoxynaphthalene( 93-04-9)			<0.1		H319	H411

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 2 - Substances found in all four locations of first sampling in 2020 – irrespective of environmental classification 17th March 2021

Substance name(CAS number)	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP environmental
2,5-cyclohexadien-1-one, 2,6-bis(1,1-dimethylethyl)-4-hydroxy-4-methyl-( 1000401-12-0)	<0.1	<0.1	<0.1	<0.1	Unknown
N,N,N',N'-Tetraacetylenediamine( 10543-57-4) <sup>(5-4)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H411
Fipronil (120068-37-3) <sup>(5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
Lidocaine(137-58-6) <sup>(5-4)</sup>		0.1-1	0.1-1	0.1-1	Unknown
Galaxolide (1222-05-5) <sup>(5-3)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H400, H410
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
2-Propanol, 1-chloro-, phosphate (3:1)( 13674-84-5)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None
Boscalid (188425-85-6) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H411
Atrazine (1912-24-9) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
2,2,2-Trichloro-1-phenylethanol( 2000-43-3)	<0.1	<0.1	<0.1	<0.1	Not classified
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
Tri-allate( 2303-17-5)	<0.1	<0.1	<0.1	<0.1	H400, H410
Propyzamide( 23950-58-5) <sup>(4)</sup>	<0.1	<0.1	<0.1	<0.1	H400, H410
Carbamazepine( 298-46-4) <sup>(2,5-2)</sup>	<0.1	<0.1	<0.1	<0.1	None
Tetramethyl succinimide( 3566-61-8)	<0.1	<0.1	<0.1	<0.1	None
Benzenesulfonamide, N-butyl ( 3622-84-2) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H412
Neophytadiene( 504-96-1)	<0.1	<0.1	<0.1	<0.1	
Cholesterol( 57-88-5) <sup>(5-4)</sup>	>5	>5	>5	>5	Not classified
<b>Caffeine( 58-08-2)</b> <sup>(5-4)</sup>	0.1 - 1	0.1 - 1	1 - 5	0.1 - 1	Not classified
Hexa(methoxymethyl)melamine( 68002-20-0)	<0.1	<0.1	<0.1	<0.1	H412
Triethyl citrate( 77-93-0)	<0.1	<0.1	<0.1	<0.1	Not classified
Triethyl phosphate( 78-40-0)	<0.1	<0.1	<0.1	<0.1	Not classified
.gamma.-Sitosterol( 83-47-6)	0.1 - 1	0.1 - 1	1 - 5	0.1 - 1	Unknown

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS...<sup>(5-4)</sup> substance listed as Priority 4 in PEWS



### Additional substances of concern

A few additional substances have been selected for highlighting, Coprostanol, Cholestan-3-ol, (3.beta.,5.beta.)-(360-68-9) is also known as Coprostanol and is a common biomarker for the presence of human faecal matter in the environment as it is a bihydrogenation of cholesterol. This was found at both Shaftsbury Road and Lairage Land sites. It was also surprising to see high levels of Sulphur (1-5ug/L) at Knutsford playing fields and Lairage land – it is unclear if this is from contamination or a natural source as it is essential for plant growth but also harmful in excessive amounts.

Ethanol, 2-butoxy-, phosphate (3:1) (78-51-3) was found at 1-5ug/L, at Oxhey park and this is a substance that can be found in coatings and is a raw material in plastic.

A PAH, Indeno[1,2,3-d]pyrene (193-39-5), not listed in any previous table is also found at Shaftsbury Road and Lairage land.

DEET, (134-62-3) was found in both Oxhey park and Lairage Land sites

Table 3 - Substances found in the River Colne on the 17<sup>th</sup> March 2020 and listed in the WFD 2000/60/EC

Substance Name (CAS Number)	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	AA-EQS	MAC-EQS	EQS Biota ( )
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Atrazine( 1912-24-9)	<0.1	<0.1	<0.1	<0.1	0,6	2,0	
Benzo[ghi]perylene (191-24-2) <sup>(1,2,3)</sup>		<0.1	<0.1		see footnote 11	8,2 × 10 <sup>-3</sup>	see footnote 11
Indeno[1,2,3-cd]pyrene( 193-39-5)		<0.1	<0.1		see footnote 11	not applicable	see footnote 11
Benzo[b]fluoranthene( 205-99-2)	<0.1	<0.1	<0.1	<0.1	see footnote 11	0,017	see footnote 11
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	<0.1	<0.1	<0.1	<0.1	0,0063	0,12	30
Benzo[k]fluoranthene( 207-08-9)		<0.1			see footnote 11	0,017	see footnote 11
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>		<0.1	<0.1		1,7 × 10 <sup>-4</sup>	0,27	5
Terbutryne (886-50-0) <sup>(1)</sup>		<0.1	<0.1	<0.1	0,065	0,34	

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

### 3.5 Second batch of sampling and results 21<sup>st</sup> August 2020

The second set of results, from samples taken at Knutsford playing fields (sample ID 2121514), Shaftsbury Road (Sample ID 2121513), Oxhey Park (Sample ID 2121512) and Lairage land (Sample ID 2121512). The full GC-MS results are shown in the appendix -

The surprising number of substances found in the first batch of River Colne samples led to a second round of sampling at the same sites.

- The number of substances found.
- Knutsford Playing field – 95 (Full data shown in the Annex Table 29 )  
Shaftsbury Road – 54 (Full data shown in the Annex Table 30 )  
Oxhey Park – 81 (Full data shown in the Annex Table 31 )
- Lairage Land – 59(Full data shown in the Annex Table 32 )
- In the first set of results on the 17<sup>th</sup> March 2020, a total of 35 separate environmentally hazardous substances were detected. During this second round of testing 44 separate substances carrying an environmentally hazardous classification were found. These are tabulated in Table 4
- Significantly more substances were found at Knutsford Playing Field than the other 3 sites. This included 31 environmentally hazardous substances. The increased concentration found at Knutsford Playing Fields strongly suggest that there was a spillage/release into the river at this point or upstream/wash off/river off-shoots.
- The high levels of Environmentally hazardous substances, Tri-(2-chloroethyl) phosphate( 115-96-8) (general use plasticizer in coatings, textile, fire resistant foams. , 1H-Benzotriazole( 95-14-7), a biocide, inhibitor were all found at 1-5 or greater in Knutsford Playing field and decreasing levels at the next sampling site Shaftsbury Road. With the exception of 1H-Benzotriazole( 95-14-7) which was not detected at Shaftsbury Road.
- 50 substances (16 of which are environmentally hazardous) were found in all four testing sites, tabulated in Table 5 This is over double the number of substances which were found in all our sites on the 17<sup>th</sup> March 2020, 5 months earlier.
- Benzenesulphonamide, N-butyl (3622-84-2) is a plasticiser and was found at 1-5ug/L in Shaftsbury Road, Oxhey Park and Lairage land sites. It has previously been documented as found in effluent from wastewater treatment sites and makes its way into ground water
- Coprotanol, Caffeine and Continine, substances linked to sewage pollution were found at high levels in both the Knutsford Playing Fields and Oxkey Park (1-5ug/L.) Continine is a nicotine by-product found in urine. Cholesterol at levels greater than 5ug/L were found in all four sites. This strongly suggests that there was a significant amount of effluent entering the River Colne. This data suggests that these pollution event/s could be at, or close to Knutsford Playing Fields and Oxhey Park. It could be higher up the river, however and carried down to these sites. However, due to the dynamic nature of rivers and runoffs it is difficult to confirm. This does not take away from the fact that significant levels of effluent/sewage markers were found.
- A number of phthalates di-n-butyl phthalate (86-74-8) and bis (-ethylhexyl)phthalate (117-81-7), Diethyl phthalate (84-61-7) and Dicyclohexyl phthalate (84-61-7) were found at the Knutsford Playing Field site, at 1-5ug/L with the exception of Diethyl phthalate which was present at >5ug/L. Phthalates are known as plasticisers and are found in a significant number of consumer and industrial products, from toys, plastics, insecticides to building materials. A number are environmentally hazardous and some toxic to reproduction. It is not expected that these are a product of human waste but Industry waste/leached from landfill.
- 1H-Benzotriazole (95-53-4), known as a corrosion inhibitor for copper was found at high levels in Knutsford Playing Fields >5ug/L and 1-5ug/L in the Lairage land sites.

- In addition to these there are also a large number of substances that are found in personal care products present such as N,N,N',N'-Tetraacetyleneethylenediamine (CAS 10543-57-4), Chloroxylenol (88-04-0) and Galaxolide (1222-05-5)
- There is also suggestion of an industrial spill/entry of substances into the River. Substances such as Hexa(methoxymethyl)melamine CAS 68002-20-0, a formaldehyde polymer, , Tri-(2-chloroethyl) phosphate (CAS 115-96-8) found in coatings and furniture, Benzenesulfonamide, 4-methyl- (CAS 70-55-3), pesticides and pharmaceuticals, industrial raw material 2-Propanol, 1-chloro-, phosphate (3:1) (13674-84-5), flame retardant. Tributyl phosphate (CAS 126-73-8) and Caprolactam (CAS 105-60-2) adhesives, coatings and industrial starting material, The above are more indicative of industrial chemicals. Sadly, high levels of these use of chemicals are prevalent in all samples.
- Like the first set of samples there were a significant number of PAH's present in the samples. PAHs are still present. There could potentially have been a breach in MAC for four of the PAH,s Benzo[ghi]perylene, Benzo[a]fluoranthene, Fluoranthene and Terbutryene. Benzo[b]pyrene did breach the MAC of 0.017ug/L at the Knutsford playing field.
- Further to this a significant number of substances were also listed in the Drinking water directive, have controlled release values published and are also listed in the PEWS
- Sulphur is also present at high levels at the Knutsford playing fields.
- DEET, (134-62-3) was found in all sites at 0.1-1ug/L concentrations

Table 4 - Environmentally hazardous Substances found in during the second sampling 17th March 2020 an 21st August 2021

Substance Name(CAS Number)	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP Environmental
2,4-Dimethylphenol( 105-67-9)	<0.1				H301, H311, H314, H317	H411
1,2,3-Propanetriol, 1-acetate( 106-61-6)	<0.1				H315, H319	H412
Metaldehyde (108-62-3) <sup>(5-1)</sup>	<0.1	<0.1		<0.1	H228, H310, H361f	H412
Triphenyl phosphate( 115-86-6) <sup>(5-2)</sup>	0.1 - 1					H400, H411
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	1 - 5	0.1 - 1	0.1 - 1	0.1 - 1	H302, H351, H360f	H411
Benzophenone( 119-61-9) <sup>(5-2)</sup>	0.1 - 1		<0.1		H373 (liver, kidney) (oral)	H412
Fipronil (120068-37-3) <sup>(5-1)</sup>			<0.1		H301, H311, H331, H372,	H400, H410
Anthracene( 120-12-7) <sup>(1,2,3)</sup>	<0.1				H315	H410
Galaxolide (1222-05-5) <sup>(5-3)</sup>	0.1 - 1	<0.1	0.1 - 1	<0.1	None	H400, H410
Diphenylamine( 122-39-4)		<0.1			H301, H311, H331, H373	H400, H410
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (126-86-3) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H317, H318	H402, H412
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.1 - 1	<0.1	<0.1	<0.1	None	H400, H410
Benzophenone-3( 131-57-7)			<0.1		None	H400, H411
Phytol( 150-86-7)		<0.1			H315	H400, H410
Benzenesulfonamide( 1678-25-7)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H411
Boscalid (188425-85-6) <sup>(5-2)</sup>				0.1 - 1	None	H411
Atrazine (1912-24-9) <sup>(1,2,3)</sup>	<0.1	<0.1	<0.1	<0.1	H317, H373	H400, H410
Benzo[ghi]perylene (191-24-2) <sup>(1,2,3)</sup>		<0.1			None	H400, H410
Stigmastanol( 19466-47-8)	0.1 - 1		0.1 - 1		None	H413
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H350	H400, H410
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H302	H400, H410
Benzo[k]fluoranthene (207-08-9) <sup>(1,2,3)</sup>	<0.1				H350	H400, H410
Chrysene( 218-01-9)	<0.1				H341, H350	H400, H410
Cresyl diphenyl phosphate( 26444-49-5)				<0.1	None	H400, H410
Benzenesulfonamide, N-butyl ( 3622-84-2) <sup>(5-2)</sup>		1 - 5	1 - 5	1 - 5	Not classified	H412
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H317, H340, H350, H360FD	H400, H410
Triisopropylphosphate( 513-02-0)		<0.1	<0.1	<0.1	H226, H315, H319, H335	H400
Dibenz[a,h]anthracene( 53-70-3) <sup>(1,2,3)</sup>	<0.1				H350	H400, H410
Benzo[a]anthracene( 56-55-3)	0.1 - 1	<0.1	<0.1	<0.1	H350	H400, H410
Cholest-4-en-3-one( 601-57-0)			0.1 - 1		Not Classified	H413

Propiconazole-I( 60207-90-1)	0.1 - 1	<0.1	0.1 - 1	0.1 - 1	H360D, H317, H302	H400, H410
Octocrylene( 6197-30-4)	0.1 - 1		0.1 - 1	<0.1	None	H410
Hexa(methoxymethyl)melamine( 68002-20-0)	<0.1	<0.1	<0.1	0.1 - 1	None	H412
Diflufenican( 83164-33-4)			<0.1		Not classified	H412
di-n-butyl phthalate( 84-74-2)	>5	1 - 5			H360DF	H400
Carbazole( 86-74-8)	<0.1				H341	H411
Terbutryne (886-50-0) <sup>(1)</sup>	<0.1	<0.1	0.1 - 1	<0.1	H302	H400, H410
Myclobutanil( 88671-89-0)			<0.1		H302,H319, H341, H351, H361d	H411
Thymol( 89-83-8)			<0.1		H314, H302	H411
Coumarin( 91-64-5)	<0.1		<0.1		H302, H317	H412
2-Methoxynaphthalene( 93-04-9)	<0.1				H319	H411
1H-Benzotriazole( 95-14-7)	>5			1 - 5	H302, H319	H411
o-Toluidine( 95-53-4)	<0.1	<0.1	<0.1	<0.1	H301, H319, H331, H350	H400
p-Isopropyltoluene( 99-87-6)	<0.1				H226,, H331, H304,	H411

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS...<sup>(5-4)</sup> substance listed as Priority 4 in PEWS



Table 5 - Substances found in all four locations in this second round of testing. Those in bold indicate that they have been found in all 4 sites on the 1st (17/03/2020) and 2nd (21/08/2020) testing

Substance Name (CAS Number)	Knuttsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP environmental
N,N,N',N'-Tetraacetylenediamine(10543-57-4) <sup>(5-4)</sup>	1 - 5	0.1 - 1	>5	0.1 - 1	None	None
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	1 - 5	0.1 - 1	0.1 - 1	0.1 - 1	H302, H351, H360f	H411
<b>Galaxolide (1222-05-5)<sup>(5-3)</sup></b>	<b>0.1 - 1</b>	<b>&lt;0.1</b>	<b>0.1 - 1</b>	<b>&lt;0.1</b>	<b>None</b>	<b>H400, H410</b>
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (126-86-3) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H317, H318	H402, H412
Diphenyl sulfone( 127-63-9)	<0.1	<0.1	<0.1	<0.1	H302	None
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.1 - 1	<0.1	<0.1	<0.1	None	H400, H410
Dimethyl phthalate( 131-11-3)	0.1 - 1	<0.1	<0.1	<0.1	Not Classified	Not classified
N,N-Diethyl-m-toluamide( 134-62-3) <sup>(5-4)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H315, H319	None
<b>2-Propanol, 1-chloro-, phosphate (3:1)( 13674-84-5)</b>	<b>1 - 5</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302</b>	<b>None</b>
Tris-(1,3-dichloroisopropyl) phosphate( 13674-87-8) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H351	None
Benzenesulfonamide( 1678-25-7)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H411
<b>Atrazine( 1912-24-9)<sup>(1,2,3)</sup></b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>H317, H373</b>	<b>H400, H410</b>
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene( 1999-85-5)	<0.1	<0.1	<0.1	<0.1	Not Classified	Not classified
<b>Benzo[b]fluoranthene( 205-99-2)</b>	<b>0.1 - 1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>H350</b>	<b>H400, H410</b>
<b>Fluoranthene (206-44-0)<sup>(1,2,3,5-1)</sup></b>	<b>0.1 - 1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>H302</b>	<b>H400, H410</b>
Carbamazepine( 298-46-4) <sup>(2,5-2)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H302, H317, H334	None
Tetramethyl succinimide( 3566-61-8)	<0.1	<0.1	<0.1	<0.1	Unknown	Unknown
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H317, H340, H350, H360FD	H400, H410
Dimetridazole( 551-92-8)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H315, H319, H335	None
Benzo[a]anthracene (56-55-3) <sup>(1,2,3)</sup>	0.1 - 1	<0.1	<0.1	<0.1	H350	H400, H410
<b>Cholesterol( 57-88-5)<sup>(5-4)</sup></b>	<b>&gt;5</b>	<b>&gt;5</b>	<b>&gt;5</b>	<b>&gt;5</b>	<b>Not Classified</b>	<b>Not classified</b>
<b>Caffeine( 58-08-2)<sup>(5-4)</sup></b>	<b>1 - 5</b>	<b>0.1 - 1</b>	<b>1 - 5</b>	<b>0.1 - 1</b>	<b>H302</b>	<b>Not classified</b>
Propiconazole-I( 60207-90-1)	0.1 - 1	<0.1	0.1 - 1	0.1 - 1	H360D, H317, H302	H400, H410
2-(Methylmercapto)benzothiazole ( 615-22-5)	0.1 - 1	<0.1	<0.1	<0.1	H315, H319, H335	Not classified
Hexa(methoxymethyl)melamine( 68002-20-0)	<0.1	<0.1	<0.1	0.1 - 1	None	H412
Triethyl phosphate( 78-40-0)	<0.1	<0.1	<0.1	<0.1	H312, H319	Not classified

.gamma.-Sitosterol( 83-47-6)	1 - 5	0.1 - 1	1 - 5	0.1 - 1	Unknown	Unknown
Stigmasterol( 83-48-7)	1 - 5	0.1 - 1	0.1 - 1	0.1 - 1	H302, H312, H315, H319, H332, H335	None
Chloroxylonol( 88-04-0)	1 - 5		0.1 - 1	<0.1	H302, H315, H317, H319	Not classified
Benzenesulfonamide, 2-methyl- ( 88-19-7)	<0.1	<0.1	<0.1	<0.1	H302	Not Classified
Terbutryne (886-50-0) <sup>(1)</sup>	<0.1	<0.1	0.1 - 1	<0.1	H302	H400, H410
2(3H)-Benzothiazolone( 934-34-9)	1 - 5	0.1 - 1	0.1 - 1	0.1 - 1	H302, H312, H332	None
o-Toluidine( 95-53-4)	<0.1	<0.1	<0.1	<0.1	H301, H319, H331, H350	H400

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup> Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup> Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup> Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

### Additional substances of concern

The table below shows the additional substances to the ones previously listed due to their environmental hazard or prevalence. The high levels, sewage trace indications, substances used in personal use products and substances used in industrial products.

Both p-Cresol (4-methylphenol) 106-44-5 and m-Cresol (3-methylphenol) are listed as VOC, Volatile Organic Compounds.

Table 6 - Additional substances of concern found in the River Colne samples 21 August 2021

Substance Name (CAS Number)	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP environmental
N,N,N',N'-Tetraacetylenediamine(10543-57-4) <sup>(5-4)</sup>	1 - 5	0.1 - 1	>5	0.1 - 1	None	None
Sulfur (S8)(10544-50-0)	1 - 5					None
Caprolactam(105-60-2)		>5	1 - 5	1 - 5	H302, H315, H319, H332, H335	None
bis(2-ethylhexyl)phthalate (DEHP)(117-81-7) <sup>(1,3,5-1)</sup>	1 - 5				H360FD	None
Tributyl phosphate(126-73-8) <sup>(4)</sup>		1 - 5	>5	>5	H302, H315, H351	None
2-Propanol, 1-chloro-, phosphate (3:1)(13674-84-5)	1 - 5	0.1 - 1	0.1 - 1	0.1 - 1	H302 (majority - not RR)	
Coprostanol, Cholestan-3-ol, (3.beta.,5.beta.)-(360-68-9)	1 - 5		1 - 5	0.1 - 1	Not classified	None
Cotinine(486-56-6)	1 - 5	0.1 - 1	1 - 5		H302, H315, H319, H335	None
Lidocaine(137-58-6) <sup>(5-4)</sup>		0.1 - 1	0.1 - 1	0.1 - 1	Unknown	Unknown
Benzenesulfonamide, 4-methyl-(70-55-3)		1 - 5		1 - 5	Not classified	Not Classified
Diethyl phthalate(84-66-2)	>5				Not classified	Not classified
Dicyclohexyl phthalate(84-61-7)	1 - 5				H317, H360D	Not Classified
di-n-butyl phthalate(84-74-2)	>5	1 - 5			H360DF	H400
Chloroxylenol(88-04-0)	1 - 5		0.1 - 1	<0.1	H302, H315, H317, H319	Not classified
Indeno[1,2,3-cd]pyrene <sup>(1,2,3)</sup>		0.1 - 1	<0.1	0	<0.1	
1H-Benzotriazole(95-14-7)	>5			1 - 5	H302, H319	H411
Benzenesulfonamide(98-10-2)		1 - 5	1 - 5	1 - 5	H302	Not classified
p-Cresol (4-methylphenol) <sup>(1)</sup> 106-44-5		<0.1	0	0	H314, H311, H301	None
m-Cresol (3-methylphenol)(108-39-4) <sup>(1)</sup>		<0.1	0	0	H314, H311, H301	None
Phenanthrene(85-01-8) <sup>(1,2,3)</sup>		<0.1	0	<0.1	H302	

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 7 - Substances found in the River Colne on the 21st August 2020 and listed in the WFD 2000/60/EC

Substance Name (CAS Number)	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	AA-EQS (2)	MAC-EQS (4)	EQS Biota (12)
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Atrazine( 1912-24-9)	<0.1	<0.1	<0.1	<0.1	0,6	2,0	
Benzo[ghi]perylene (191-24-2) <sup>(1,2,3)</sup>		<0.1			see footnote 11	8,2 × 10 <sup>-3</sup>	see footnote 11
Indeno[1,2,3-cd]pyrene( 193-39-5)	0.1 - 1	<0.1		<0.1	see footnote 11	not applicable	see footnote 11
Benzo[b]fluoranthene( 205-99-2)	0.1 - 1	<0.1	<0.1	<0.1	see footnote 11	0,017	see footnote 11
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.1 - 1	<0.1	<0.1	<0.1	0,0063	0,12	30
Benzo[k]fluoranthene( 207-08-9)	<0.1				see footnote 11	0,017	see footnote 11
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.1 - 1	<0.1	<0.1	<0.1	1,7 × 10 <sup>-4</sup>	0,27	5
Terbutryne (886-50-0) <sup>(1)</sup>	<0.1	<0.1	0.1 - 1	<0.1	0,065	0,34	

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

### 3.6 Third batch of sampling and results 10<sup>th</sup> June 2021

As with any study, it is good practice to have a base-line/standard with which results can be compared to. The River Ver, at Drop Lane, was chosen as one location and Munden House ford, a location further upriver on the River Colne. – these locations are shown in Figure 1

The third set of results, from samples taken at the river Ver (sample ID 2226505), Munden House Ford (sample ID 2226504), Knutsford playing fields (sample ID 2226506), Shaftsbury Road (Sample ID 2226509), Oxhey Park (Sample ID 2226508) and Lairage land (Sample ID 2226507). The full GC-MS results are shown in the appendix -

- The number of substances found:  
River Ver – 26 substances (Full data shown in the Appendix Table 33)  
Munden House Ford 38 substances (Full data shown in the Appendix Table 34)  
Knutsford Playing field –48 substances (Full data shown in the Appendix Table 36)  
Shaftsbury Road –48 Substances (Full data shown in the Appendix Table 35)  
Oxhey road – 53 substances (Full data shown in the Appendix Table 37)  
Lairage Land – 48 substances (Full data shown in the Appendix Table 38)
- 24 Environmentally hazardous substances were detected in the samples collected on the 21<sup>st</sup> June 2021. These are shown in Table 8
- The sample from the River Ver had significantly less substances present than the original 4 sampling sites, Knutsford Playing fields, Shaftsbury Road, Oxhey Park and Lairage Land. However, the number of environmentally hazardous substances found were surprising. The River Ver sample did not contain any substance, that was not found in any of the other sampling sites.
- Simazine, Diphenylamine and Boscalid were all found in the River Ver sample and have uses in agriculture. Simazine is listed in the Water Framework Directive-EQS, Drinking Water Directive and has controlled release conditions,
- Benzenesulphonamide, N-butyl (CAS 3622-84-2) was found at 1-5ug/L in the River Ver sample. As this sample was taken as a potential, baseline, this was not expected. The use of this is as a plasticiser additive. Metaldehyde (108-62-3), Squalene (111-02-4) and Tri-(2-Chloroethyl)phosphate (115-96-8) are all substances used in Industry which were all found in the River Ver and the River Colne samples.
- 2,4,7,9-Tetramethyl-5-decyne-4,7-diol(126-86-3), a substance used in the coatings industry was found to be greater than 5ug/L in all the River Colne samples, this includes Munden House Estate sampling site. This suggests that it has entered the River Colne prior to Munden House Ford A more accurate level is not known, but this environmentally hazardous chemical must have entered the River Colne at a high concentration to be at these levels in the River. This length of River Colne equates to 8.1 km.
- Another industrial substance found was Diethylene Glycol dibutyl ether (112-73-2). This is primarily used as a solvent and was found in all sites from Munden House ford to the Lairage Land.
- In addition to this a significant number of pharmaceutical substances, products, were found from Munden House ford to the Lairage land including:  
N,N-Diethyl-m-toluamide, DEET,  
Lidocaine,  
2,2,2-Trichloro-1-phenylethanol,  
Carbamazepine,  
Crotamiton,  
Neophytadiene,  
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl  
Ketamine.



- Both the industrial and pharmaceutical waste could suggest that these have been purposely emptied into the water-system/river.
- Caffeine and Cholesterol were found in most samples although Coprostanol was not detected, was below the detection limit, in these samples.
- PAH's were prevalent in both the River Ver and River Colne samples.
- 7 substances were found that are listed with EQS.6 falling below the MAC. Benzo[b]fluoranthene was potentially over the MAC, at 5 sites including the River Ver with a value between 0.01ug/L – the MAC being 0.017ug/L.
- A number of the other substances found were also restricted by one of the aforementioned regulations..
- A significant number of substances found seem to be present in all the River Colne samples. The expansion of the sampling locations was to find a baseline, control and to confirm that the pollutants were originating from around the Knutsford Playing field area by comparing the results from Munden House ford. However, from this set of results, has not allowed us to do this. It has highlighted that the pollution is also further, up-river, towards the source of the Colne. The River Ver does contain less pollutants, but still contains substances that do not belong in the natural habitat.
- DEET was found to be present in all River Colne samples

Table 8 - Environmentally hazardous Substances found in during in the third sampling sites 10th June 2021

Substance Name (CAS Number)	River Ver	Munden House Ford	Shaftsbury Road	Knutsford Playing Fields	Oxhey Park	Lairage Land	CLP Human	CLP environmental
Metaldehyde (108-62-3) <sup>(5-1)</sup>	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H228, H310, H361f	H412
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H351, H360f	H411
Fipronil (120068-37-3) <sup>(5-1)</sup>		0.1 - 1					H301, H311, H331, H372,	H400, H410
Galaxolide (1222-05-5) <sup>(5-3)</sup>		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H400, H410
Simazine( 122-34-9) <sup>(1,2,3)</sup>	0.01 - 0.1				0.01 - 0.1		H351	H400, H410
Diphenylamine( 122-39-4)	0.01 - 0.1	0.01 - 0.1					H301, H311, H331, H373	H400, H410
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (126-86-3) <sup>(5-2)</sup>		>5	>5	>5	>5	>5	H317, H318	H402, H412
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H410
Benzenesulfonamide( 1678-25-7)				0.01 - 0.1	0.01 - 0.1		None	H411
Boscalid (188425-85-6) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1		0.1 - 1	0.1 - 1	0.1 - 1	None	H411
Atrazine (1912-24-9) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H317, H373	H400, H410
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H350	H400, H410
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H400, H410
Ethanone, 2,2-dimethoxy-1,2-diphenyl-( 24650-42-8)		0.01 - 0.1					H302, H373	H412
4H-Inden-4-one, 1,2,3,5,6,7-hexahydro-1,1,2,3,3-pentamethyl-( 33704-61-9)				0.01 - 0.1			H315, H317, H319	H411
Benzenesulfonamide, N-butyl	#####		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	Not	H412

( 3622-84-2) <sup>(5-2)</sup>							classified	
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.01 - 0.1				0.01 - 0.1	0.01 - 0.1	H317, H340, H350, H360FD	H400, H410
Triisopropylphosphate( 513-02-0)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H226, H315, H319, H335	H400
Benzo[a]anthracene (56-55-3) <sup>(1,2,3)</sup>	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H350	H400, H410
Cholest-4-en-3-one( 601-57-0)	0.01 - 0.1		0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	Not Classified	H413
Hexa(methoxymethyl)melamine( 68002-20-0)		0.1 - 1	0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	None	H412
4-Piperidinone, 2,2,6,6-tetramethyl-( 826-36-8)					0.1 - 1	0.1 - 1	H290, H302, H314, H317	H412
Diflufenican( 83164-33-4)					0.01 - 0.1	0.01 - 0.1	Not classified	H412
Terbutryne (886-50-0) <sup>(1)</sup>		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H400, H410

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup> Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup> Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup> Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 9 - Substances found in all 4 of the initial testing locations. Those in bold have been found in all 4 locations during this testing and the previous 2.

Substance Name (CAS Number)	River Ver	Munden House Ford	Shaftsbury Road	Knutsford Playing Fields	Oxhey Park	Lairage Land	CLP Human	CLP environmental
Indano[2,1-d]1,3-dioxane,( 102688-70-0)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Unknown	Unknown
N,N,N',N'- Tetraacetylenediamine( 10543-57-4) <sup>(5-4)</sup>		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	None
Benzenesulfonamide, N-ethyl-2-methyl-( 1077-56-1)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not Classified	-
Metaldehyde (108-62-3) <sup>(5-1)</sup>	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H228, H310, H361f	H412
Squalene( 111-02-4)	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H304	None
Diethylene glycol dibutyl ether( 112-73-2)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not Classified	None
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H351, H360f	H411
<b>Galaxolide (1222-05-5)<sup>(5-3)</sup></b>		<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>None</b>	<b>H400, H410</b>
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (126-86-3) <sup>(5-2)</sup>		>5	>5	>5	>5	>5	H317, H318	H402, H412
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H410
N,N-Diethyl-m-toluamide( 134-62-3) <sup>(5-4)</sup>		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H315, H319	None
<b>2-Propanol, 1-chloro-, phosphate (3:1)( 13674-84-5)</b>	<b>0.01 - 0.1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302</b>	
Lidocaine( 137-58-6)		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302	None
<b>Atrazine( 1912-24-9)<sup>(1,2,3)</sup></b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>H317, H373</b>	<b>H400, H410</b>
2,2,2-Trichloro-1-phenylethanol( 2000-43-3)		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.01 - 0.1	H315, H319	Not classified
<b>Benzo[b]fluoranthene( 205-99-2)</b>	<b>0.01 - 0.1</b>		<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>H350</b>	<b>H400, H410</b>

Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H400, H410
Carbamazepine( 298-46-4) <sup>(2,5-2)</sup>		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302, H317, H334	None
Tetramethyl succinimide( 3566-61-8)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Unknown	Unknown
Benzenesulfonamide, N-butyl ( 3622-84-2) <sup>(5-2)</sup>	1-5		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	Not classified	H412
Crotamiton( 483-63-6) <sup>(5-4)</sup>		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H315, H317, H319	None
Neophytadiene( 504-96-1)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Unknown	Unknown
Triisopropylphosphate( 513-02-0)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H226, H315, H319, H335	H400
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-( 5306-85-4)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not Classified	Not classified
Benzo[a]anthracene( 56-55-3)	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H350	H400, H410
Cholesterol( 57-88-5) <sup>(5-4)</sup>	>5	>5	>5	>5	>5	>5	Not Classified	Not classified
Caffeine( 58-08-2) <sup>(5-4)</sup>	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.1 - 1	H302	Not classified
Ketamine( 6740-88-1)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not available	Not available
Triethyl citrate( 77-93-0)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not classified	Not classified
Triethyl phosphate( 78-40-0)		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H312, H319	Not classified

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS



Table 10 - Substances found in the River Colne on the 10th June 2021 and listed in the WFD 2000/60/EC

Substance Name (CAS Number)	River Ver	Munden House Ford	Shaftsbury Road	Knutsford Playing Fields	Oxhey Park	Lairage Land	AA-EQS	MAC- EQS	EQS Biota
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Simazine( 122-34-9) <sup>(1,2,3)</sup>	0.01 - 0.1				0.01 - 0.1		1	4	
Atrazine( 1912-24-9)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0,6	2,0	
Indeno[1,2,3-cd]pyrene( 193-39-5)	0.01 - 0.1		0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	see footnote 11	not applicable	see footnote 11
Benzo[b]fluoranthene( 205-99-2)	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	see footnote 11	0,017	see footnote 11
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0,0063	0,12	30
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.01 - 0.1				0.01 - 0.1	0.01 - 0.1	1,7 × 10 <sup>-4</sup>	0,27	5
Terbutryne (886-50-0) <sup>(1)</sup>		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0,065	0,34	

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup> Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup> Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup> Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

### 3.7 Fourth batch of sampling and results 10<sup>th</sup> December 2021

The pollution levels at Munden House Ford, in the third batch of testing, indicated that this was the close to the entry point of a pollution event or the majority of pollutants were entering the River Colne closer to the Rivers source. Two more sampling locations were added upstream to Munden House Ford, Tykes water Radlett and, closest to the River Colne source, Coursers Road. These locations can be seen in Figure 1

The Fourth set of results, from samples taken at the river Ver (sample ID 2226505), Coursers Road (sample ID 2296463), Tykes Water Radlett (sample ID 2296462), Munden House Ford (sample ID 2297844), Knutsford playing fields (sample ID 2226506), Shaftsbury Road (Sample ID 2296461), Oxhey Park (Sample ID 2296460) and Lairage land (Sample ID 2296459). The full GC-MS results are shown in the appendix -

- The number of substances found.  
Coursers Road - 63 substances - (Full data shown in the Appendix )  
Tykes Water Radlett 82 substances - (Full data shown in the Appendix )  
River Ver - 52 substances - (Full data shown in the Appendix )  
Munden House Ford – 76 substances - (Full data shown in the Appendix )  
Knutsford Playing field – 67 substances - (Full data shown in the Appendix )  
Shaftsbury Road – 70 substances - (Full data shown in the Appendix )  
Oxhey road – 89 substances - (Full data shown in the Appendix )  
Lairage Land – 114 substances - (Full data shown in the Appendix )
- There were significantly more environmentally hazardous substances found in this round of testing, totalling 75 – these are tabulated in Table 11
- There is strong evidence of a petrol spill/contamination of the River Colne. This is evident from the number of benzene based substances such as Ethyl benzene (100-41-4), Azo benzene (103-33-3), Benzene, 1,4-dimethyl (105-05-5), Toluene (108-88-3), MBTE(1634-04-4), o-Xylene and m+p-Xylene (108-38-3 + 106-42-3). In total there are 8 Benzene based substances. And 5 naphthenic substances which are also a component of petrol. It is worth noting that the samples were not taken from the surface of the river, but the body of water and no petrol ‘slick’ was observed during sample acquisition. It is unclear if all the benzene based substances are from unleaded petrol.
- The highest levels of 1,2,4-Trimethylbenzene and Ethylbenzene were found at the Lairage land site, however, lesser amounts of the aforementioned chemicals were found upstream.
- MBTE is an additive in unleaded petrol – which strongly suggests the presence of unleaded petrol which was only found in the Lairage land sample.
- Tetrachloroethene (127-18-4), a substance used for cleaning metal parts was found in the Ver.
- The sewage substance, coprostanol was found in most of the River Colne samples, but not in the River Ver. Coursers Road, the testing site closest to the source of the River Colne, did not appear to have this substance present. The potential sewage pollution appears to start around Tykes water Radlett. This is backed up by the high levels of Caffeine, Cholesterol and cotinine.
- 2 PCBs were found at the Coursers Road site. 2,3-Dichlorobiphenyl (16605-91-7) and 2,4,5-trichlorobiphenyl (16606-02-3) These are classified as Persistent Organic Pollutants and are listed in the E-PRTR (166/2006)

- A large number of agricultural chemicals were all found at the Coursers Road sampling site. Prosulcarb was also found at Tykes water and the River Ver.  
 Silthiofam (175217-20-6)  
 Boscali(188425-85-6)  
 Pendithalin (40487-42-1)  
 Prosulcarb (52888-80-9)  
 Aclonifen (74070-46-5)  
 Diflufenican (83164-33-4) was determined to be in all River Colne samples and Propyzamide (23950-58-5) was found at greater than 5ug/L at the Coursers road site and all other sampling sites.
- This is accompanied with numerous personal care product substances Benzophenone-3 (131-57-7) and DEET in all River Colne samples. and a number of pharmaceutical/intermediates  
 Dietridazole (55-92-8)  
 Teramethyl succinimide (3566-61-8)  
 Neophytadiene (504-96-1).
- 2,4,7,9-Tetramethyl-5-decyne-4,7-diol( 126-86-3) is still found in all the River Colne sites from Munden House ford to Lairage land at levels greater than 5ug/L. This was also found at this level in June 2021 (lesser amounts prior to this) Even if this has been an intermittent release, this is still a significant level of environmental hazardous substance polluting the river.
- Most concerning was the presence of two PCB substances at the source of the River Colne, 2,3-Dichlorobiphenyl (16605-91-7) and 2,4',5-Trichlorobiphenyl (16606-02-3). These PCBs can come from hazardous waste sites, illegal dumping or leaks from electrical transformers.
- In addition to this the Coursers site also had the highest number and level of herbicides, pesticides and fungicides with Propyzamide at levels greater than 5ug/L.
- A surprising substance, hexachloroethane was found at low levels at Tykes water. The source is unclear but can be a by-product of incineration of chlorinated products or used during a manufacturing process, such as aluminium. Another use is as a research chemical.
- A large number of PAH substances were found throughout the river Colne and Ver.  
 Benzo[b]fluoranthene breached the MAC level in all sites tested.  
 Benzi[ghi]perylene breached the MAC values in all but the Knutsford playing field sample.  
 Benzo[k]fluoranthene breached MAC levels at the River Ver, Munden house ford and Knutsford playing Field  
 Aclonifen breached the MAC at Coursers Road
- A number of other substances found in the River Colne and Ver at this time were listed in one of the aforementioned regulations.

Table 11- Environmentally hazardous Substances found in during in the fourth sampling sites 10th December 2021

	Coursers Road	Tykes water Radlett	River Ver – Drop Lane	Munden House ford	Knutsford Playing Fields	Shafsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP environmental
Ethyl benzene( 100-41-4) <sup>(3)</sup>							0.1 - 1	1 - 5	H225, H304, H373	H412
Azobenzene( 103-33-3)				0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302, H341, H373	H400, H410
n-Propylbenzene( 103-65-1)						0.01 - 0.1	0.1 - 1	0.1 - 1	H304, H226, H304,	H411
Benzene, 1,4-diethyl-( 105-05-5)						0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H226, h304, H318	H411
2,4-Dimethylphenol( 105-67-9)	0.01 - 0.1								H301, H311, H317	H411
1,2-Dibromoethane( 106-93-4)								0.01 - 0.1	H301, H311, H335, H350,	H411
Benzene, 1-methyl-4-propyl-( 1074-3-3)							0.01 - 0.1	0.01 - 0.1	H317, H225	H411
Metaldehyde (108-62-3) <sup>(5-1)</sup>	0.1 - 1			0.01 - 0.1	0.1 - 1		0.1 - 1	0.1 - 1	H228, H310,	H412
1,3,5-Trimethylbenzene( 108-67-8)						0.1 - 1	0.1 - 1	0.1 - 1	H226, H335,	H411
Triphenyl phosphate( 115-86-6) <sup>(5-2)</sup>		0.1 - 1						0.1 - 1		H400, H411
Tri-(2-chloroethyl) phosphate (115-96-8) <sup>(5-1)</sup>	0.1 - 1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H351,	H411
2,4,6-Tribromophenol( 118-79-6)				0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	H302, H319,	H400
Naphthalene, 1,2,3,4-tetrahydro-( 118-74-2)								0.01 - 0.1	H314, H319	H411
Fipronil (120068-37-3) <sup>(5-1)</sup>				0.1 - 1				0.1 - 1	H301, H311, H372,	H400, H410
Anthracene( 120-12-7) <sup>(1,2,3)</sup>		0.01 - 0.1							H315	H410
Galaxolide (1222-05-5) <sup>(5-3)</sup>		0.01 - 0.1		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	None	H400, H410
Diphenylamine( 122-39-4)	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H301, H311, H373	H400, H410
2,4,7,9-Tetramethyl-5-decyne-4,7-diol (122-39-4) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	>5	>5	>5	>5	>5	>5	H317, H318	H402, H412
<b>Tetrachloroethene ( 127-18-4)<sup>(3,5-1)</sup></b>			0.1 - 1						H351	H411
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H410
Benzophenone-3( 131-57-7)				0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H411
sec-Butylbenzene( 135-98-8)							0.01 - 0.1	0.01 - 0.1	H226, H315,	H411
4-tert-Octylphenol( 140-66-9)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1				0.01 - 0.1	0.01 - 0.1	H315	H400, H410
Phytol( 150-86-7)			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		0.01 - 0.1		H315	H400, H410
2,3-Dichlorobiphenyl( 16605-91-7)	0.01 - 0.1								H373,	H400, H410
2,4',5-Trichlorobiphenyl( 16606-02-3)	0.01 - 0.1								H373,	H400, H410
Benzenesulfonamide( 1678-25-7)	0.01 - 0.1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H411
Silthiofam( 175217-20-6)	0.1 - 1								H373,	H411
Boscalid (188425-85-6) <sup>(5-2)</sup>	0.1 - 1								None	H411
Atrazine (1912-24-9) <sup>(1,2,3)</sup>			0.01 - 0.1	0.01 - 0.1					H317, H373	H400, H410
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H410
Stigmastanol( 19466-47-8)		0.1 - 1		0.01 - 0.1	0.01 - 0.1		0.1 - 1		None	H413
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1			0.01 - 0.1	0.01 - 0.1		H302	H400, H410
Benzo[k]fluoranthene (207-08-9) <sup>(1,2,3,5-1)</sup>			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1				H350	H400, H410
Chrysene( 218-01-9)		0.01 - 0.1		0.01 - 0.1		0.01 - 0.1		0.01 - 0.1	H341, H350	H400, H410

Tri-allylate( 2303-17-5)	0.1 - 1	0.01 - 0.		0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302, H307,	H400, H410
Propyzamide( 23950-58-5) <sup>(4)</sup>	>5	0.01 - 0.	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	H351	H400, H410
Cresyl diphenyl phosphate( 26444-4)		0.01 - 0.					0.01 - 0.1	0.01 - 0.1	None	H400, H410
Benzenesulfonamide, N-butyl ( 3622-84-2) <sup>(5-2)</sup>	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Not classified	H412
Pendimethalin( 40487-42-1) <sup>(4)</sup>	0.1 - 1	0.01 - 0.		0.01 - 0.1					H317	H400, H410
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H317, H340, H360FD	H400, H410
Prosulfocarb( 52888-80-9)	0.1 - 1	0.01 - 0.	0.01 - 0.1						H317, H302	H411, H411
Dibenz[a,h]anthracene( 53-70-3) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	H350	H400, H410
Benzo[a]anthracene( 56-55-3)	0.01 - 0.1	0.01 - 0.	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H350	H400, H410
Naphthalene, 2,6-dimethyl-( 581-42-1)								0.01 - 0.1	No CLP	H400, H410
Bixafen( 581809-46-3)		0.01 - 0.							No CLP	H400, H410
Cholest-4-en-3-one( 601-57-0)					0.01 - 0.1				Not Classified	H413
Octocrylene( 6197-30-4)		0.01 - 0.		0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	None	H410
Hexachloroethane( 67-72-1)		0.01 - 0.							H319, H351	H400, H410
Hexa(methoxymethyl)melamine( 680-00-0)			0.1 - 1			0.01 - 0.1			None	H412
Aclonifen( 74070-46-5) <sup>(1,5-4)</sup>	0.1 - 1								H351, H317	H400, H410
Tefluthrin( 79538-32-2)								0.01 - 0.1	H330, H310,	H400, H410
Diflufenican( 83164-33-4)	0.1 - 1	0.01 - 0.		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not classified	H412
N-Phenylsuccinimide( 83-25-0)	0.01 - 0.1	0.01 - 0.	0.01 - 0.1						H302, H312,	H400, H410
N-nitrosodiphenylamine( 86-30-6)					0.01 - 0.1				H317, H351, H373	H410
Fluorene( 86-73-7)					0.01 - 0.1			0.01 - 0.1	No CLP	H400, H410
Terbutryne (886-50-0) <sup>(1)</sup>			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H400, H410
Quinmerac (breakdown product)( 9000-00-0)	0.1 - 1								No CLP	H412
Naphthalene (91-20-3) <sup>(1,2,3)</sup>							0.01 - 0.1	0.1 - 1	H351, H302	H400, H410
2-Methylnaphthalene( 91-57-6)						0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H411
Coumarin( 91-64-5)	0.01 - 0.1	0.01 - 0.	0.01 - 0.1	0.01 - 0.1			0.01 - 0.1		H302, H317	H412
2-Methoxynaphthalene( 93-04-9)		0.01 - 0.							H319	H411
1,2,4-Trimethylbenzene( 95-63-6)						0.1 - 1	0.1 - 1	1 - 5	H335, H319, H332, H226	H411
2,4,5-Trichlorophenol( 95-95-4)				0.01 - 0.1	0.01 - 0.1				H319, H315,	H400, H410
2,4-Di-tert-butylphenol( 96-76-4)	0.1 - 1	0.1 - 1					0.1 - 1	0.1 - 1	H315, H318	H400, H410

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS... <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 12 - Substances found in all 4 of the initial testing locations. Those in bold have been found in all 4 locations during this testing and the previous 3 test dates.

Substance Name (CAS Number)	Coursers Road	Tykes water Radlett	River Ver - Drop Lane	Munden House ford	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP environmental
Benzene, (2-isothiocyanatoethyl)-( 2257-09-2)					0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302, H319	Not classified
Azobenzene( 103-33-3)				0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302, H341, H350, H373	H400, H410
<b>N,N,N',N'-Tetraacetylenediamine( 10543-57-4)<sup>(5-4)</sup></b>	<b>0.1 - 1</b>	<b>1 - 5</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>None</b>	<b>None</b>
m+p-Xylene( 108-38-3+106-42-3)					0.1 - 1	0.1 - 1	1 - 5	>5		
Toluene( 108-88-3) <sup>(3,4)</sup>					0.1 - 1	0.1 - 1	1 - 5	>5	H225, H315, H361d, H336, H304	Not Classified
Squalene( 111-02-4)	0.1 - 1	0.1 - 1		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H304	None
<b>Tri-(2-chloroethyl) phosphate (115-96-8)<sup>(5-1)</sup></b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302, H351, H360f</b>	<b>H411</b>
<b>Galaxolide (1222-05-5)<sup>(5-3)</sup></b>		<b>0.01 - 0.1</b>		<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>None</b>	<b>H400, H410</b>
Diphenylamine( 122-39-4)	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H301, H311, H331, H373	H400, H410
Tributyl phosphate( 126-73-8) <sup>(4)</sup>		0.1 - 1			0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	<b>H302, H315, H351</b>	<b>None</b>
2,4,7,9-Tetramethyl-5-decyne-4,7-diol( 126-86-3)	0.1 - 1	0.1 - 1		>5	>5	>5	>5	>5	H317, H318	H402, H412
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H410
Benzophenone-3( 131-57-7)				0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H400, H411
N,N-Diethyl-m-tolamide( 134-62-3) <sup>(5-4)</sup>	0.01 - 0.1	0.1 - 1		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H315, H319	None
<b>2-Propanol, 1-chloro-, phosphate (3:1)( 13674-84-5)</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302 (majority - not RR)</b>	
Tris-(1,3-dichloroisopropyl) phosphate( 13674-87-8) <sup>(5-2)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H351	None
1H-Benzotriazole, 5-methyl-( 136-85-6)				0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H314, H318	None
Benzenesulfonanilide( 1678-25-7)	0.01 - 0.1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	None	H411
Indeno[1,2,3-cd]pyrene( 193-39-5)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.01 - 0.1	0.1 - 1	0.01 - 0.1	H351	None



.alpha.,alpha.'-Dihydroxy-m-diisopropylbenzene( 1999-85-5)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not Classified	Not classified
2,2,2-Trichloro-1-phenylethanol( 2000-43-3)		0.01 - 0.1		0.1 - 1	0.1 - 1	0.01 - 0.1	0.1 - 1	0.01 - 0.1	H315, H319	Not classified
<b>Benzo[b]fluoranthene (205-99-2)</b> <sup>(1,2,3)</sup>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.1 - 1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>0.01 - 0.1</b>	<b>H350</b>	<b>H400, H410</b>
Propylamide( 23950-58-5) <sup>(4)</sup>	>5	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	<b>H351</b>	<b>H400, H410</b>
1,2-Benzisothiazole( 272-16-2)	0.01 - 0.1	0.1 - 1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		
<b>Carbamazepine(298-46-4)</b> <sup>(2,5-2)</sup>				<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302, H317, H334</b>	<b>None</b>
<b>Tetramethyl succinimide( 3566-61-8)</b>				<b>1 - 5</b>	<b>1 - 5</b>	<b>1 - 5</b>	<b>1 - 5</b>	<b>1 - 5</b>		
Coprostanol, Cholestan-3-ol, (3.beta.,5.beta.)-( 360-68-9)		0.1 - 1		0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	Not classified	None
Benzenesulfonamide, N-( 3622-84-2) <sup>(5-2)</sup>	<b>1 - 5</b>	<b>1 - 5</b>	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Not classified	H412
Crotamiton( 483-63-6) <sup>(5-4)</sup>				0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H302, H315, H317, H319	None
Cotinine( 486-56-6)				1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	H302, H315, H319, H335	None
Indane( 496-11-7)					0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.1 - 1	H226, H304,	No CLP
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	<b>H317, H340, H350, H360FD</b>	<b>H400, H410</b>
Neophytadiene( 504-96-1)	0.1 - 1	0.01 - 0.1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1		
Dimetridazole( 551-92-8)				0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	H315, H319, H335	None
Benzo[a]anthracene (56-55-3) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	<b>H350</b>	<b>H400, H410</b>
<b>Cholesterol( 57-88-5)</b> <sup>(5-4)</sup>	>5	>5	>5	>5	>5	>5	>5	>5	<b>Not Classified</b>	<b>Not classified</b>
<b>Caffeine( 58-08-2)</b> <sup>(5-4)</sup>	<b>0.1 - 1</b>	<b>1 - 5</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>0.1 - 1</b>	<b>H302</b>	<b>Not classified</b>
Vitamin E( 59-02-9)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not classified	Not classified
2-(Methylmercapto)benzothiazole( 615-22-5)		0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H315, H319, H335	Not classified
Triethyl citrate( 77-93-0)		0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not classified	Not classified
Ethanol, 2-butoxy-, phosphate (3:1)( 78-51-3)	0.01 - 0.1	0.1 - 1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.1 - 1	Not classified	Not classified
Diflufenican( 83164-33-4)	0.1 - 1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	Not classified	H412
.gamma.-Sitosterol( 83-47-6)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	?	?
.gamma.-Sitostenone( 84924-96-9)	0.1 - 1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		

Terbutryne (886-50-0) <sup>(1)</sup>			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	H302	H400, H410
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<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 13 - Additional substances of concern

Substance Name (CAS Number)	Coursers Road	Tykes water Radlett	River Ver - Drop Lane	Munden House ford	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	CLP Human	CLP environmental
Caprolactam( 105-60-2)			1 - 5						H302, H315, H319, H332, H335	None
m+p-Xylene( 108-38-3+106-42-3)					0.1 - 1	0.1 - 1	1 - 5	>5	H315, H332, H312, H226, H304	
Butanedioic acid, dimethyl ester (106-65-0) <sup>(5-4)</sup>								>5		
Toluene( 108-88-3) <sup>(3,4)</sup>					0.1 - 1	0.1 - 1	1 - 5	>5	H225, H315, H361d, H336, H304	Not Classified
Benzene( 71-43-2) <sup>(1,2,3)</sup>								0.1-1	H225, H315,H319, H304, H340, H350, H372	
Lidocaine(137-58-6) <sup>(5-4)</sup>				0.1-1		0.1-1	0.1-0.1			
Primidone( 125-33-7)				0.1 - 1		1 - 5		0.1 - 1	H302, H351	None
Indeno[1,2,3-cd]pyrene <sup>(1,2,3)</sup>	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.01 - 0.1	0.1 - 1	0.01 - 0.1		
Flufenacet (142459-58-3) <sup>(5-1)</sup>	1-5									
MTBE( 1634-04-4)							0.1 - 1	1 - 5	H315, H225, H225,	No CLP
2(3H)-Benzothiazolone( 934-34-9)		1 - 5		0.1 - 1				0.1 - 1	H302, H312, H332	None
o-Xylene( 95-47-6)							0.1 - 1	1 - 5	H226, H312, H332, H315	None

<sup>(1)</sup>Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

Table 14 - Substances found in the River Colne on the 10th December 2021 and listed in the WFD 2000/60/EC

	Coursers Road	Tykes water Radlett	River Ver - Drop Lane	Munden House ford	Knutsford Playing Fields	Shaftsbury Road	Oxhey Park	Lairage Land	AA-EQS	MAC-EQS	EQS Biota
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Anthracene( 120-12-7)		0.01 - 0.1							0,1	0,1	
Tetrachloroethene ( 127-18-4) <sup>(3,5-1)</sup>			0.1 - 1						10	not applicable not applicable	
4-tert-Octylphenol ( 140-66-9)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1				0.01 - 0.1	0.01 - 0.1	0,1		
Atrazine( 1912-24-9)			0.01 - 0.1	0.01 - 0.1					0,6	2,0	
Benzo[ghi]perylene( 191-24-2)	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1		0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	see footnote 11	8,2 × 10 <sup>-3</sup>	see footnote 11
Indeno[1,2,3-cd]pyrene( 193-39-5)	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.1 - 1	0.01 - 0.1	0.1 - 1	0.01 - 0.1	see footnote 11	not applicable	see footnote 11
Benzo[b]fluoranthene ( 205-99-2)	0.01 - 0.1	0.01 - 0.1	0.1 - 1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	see footnote 11	0,017	see footnote 11
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1			0.01 - 0.1	0.01 - 0.1		0,0063	0,12	30
Benzo[k]fluoranthene ( 207-08-9)			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1				see footnote 11	0,017	see footnote 11
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	1,7 × 10 <sup>-4</sup>	0,27	5
Benzene( 71-43-2) <sup>(1,2,3)</sup>								0.1 - 1	10	50	
Aclonifen( 74070-46-5) <sup>(1,5-4)</sup>	0.1 - 1								0,012	0,04	
Terbutryne (886-50-0) <sup>(1)bisphenol</sup>			0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0.01 - 0.1	0,065	0,34	
Naphthalene (91-20-3) <sup>(1,2,3)</sup>							0.01 - 0.1	0.1 - 1	2	130	

### 3.7 Consistent offenders

There have been specific substances that have consistently appeared, at least, at the first four initial sites. They have been in all samples over the 18 month period of testing at Knutsford Playing Field, Shaftsbury Road, Oxhey Park and the Lairage land. These substances are shown below in Table 15 along with potential uses. 4 of these 11 substances carry classifications hazardous to the environment.

The majority of these substances are also listed as a water pollutant, 2 of which are PAHs, 2 potential indicators of sewage, 2 personal care substances and 3 pharmaceutical substances, 2 industrial.

Table 15 - Substances found in all 4 sites during all testing times (17/3/2020-10/12/2021)

Substance name	CAS Number		Technical function (what is the function of the substance)	CLP Human	CLP Environmental
N,N,N',N'-Tetraacetylenediamine(10543-57-4) <sup>(5-4)</sup>	10543-57-4		Personal care	None	None
Tri-(2-chloroethyl) phosphate <sup>(5-1)</sup>	115-96-8		Paints / varnishes / coatings; Automotive; Flooring; Furniture; Adhesives / sealants	H302, H351, H360f	H411
Galaxolide (1222-05-5) <sup>(5-3)</sup>	1222-05-5		Personal care; Cleaning	None	H400, H410
Pyrene (129-00-0) <sup>(1,2,3,5-1)</sup>	129-00-0	Priority Hazardous substance PAH	-	None	H400, H410
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5		Construction; Adhesives / sealants; Paints / varnishes / coatings	H302	
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	205-99-2	Priority Hazardous substance PAH	-	H350	H400, H410
Carbamazepine	298-46-4		Pharmaceuticals	H302, H317, H334	None
Tetramethyl succinimide	3566-61-8		Pharmaceuticals		
Cholesterol <sup>(5-4)</sup>	57-88-5		Potential indication of sewage: Personal care; Pharmaceuticals	Not Classified	Not classified
Caffeine( 58-08-2) <sup>(5-4)</sup>	58-08-2		Potential indication of sewage: Personal care	H302	Not classified
.gamma.-Sitosterol	83-47-6		Plant steroid, pharmaceutical	Unknown	Unknown

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup> Listed in the EU Drinking water Directive recast 2020/84-01, Annex 1, Part B (Chemical parameters) <sup>(3)</sup> Listed in E-PRTR (166/2006)- 01, Annex II (Pollutants) <sup>(4)</sup> Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

#### 4.0 Sediment analysis

Sediment samples were taken at 0.3m at the locations listed below to correlate with the data collated from the River Colne to date. The samples were taken on 11/3/2022. We were interested/concerned that the filtering effect of the sediment could be capturing pollutants and building up to dangerous levels for the environment.

The data has been slightly modified from the supplied data. Any values that indicate that the level is below the threshold of quantitation have been removed to make it easier to see read. In addition to this any substances not observed above the limit of quantitation have been removed. The full data is in the appendix.

The analysis for Polybrominated Diphenyl Ethers (PBDE's) and Polychlorinated Naphthalenes (PCN's) were not detected above the limit of quantitation.

#### 4.1 PAH and Phenol - Sediment

Table 17 shows the phenols and speciated PAH found in the sediment of the River Colne. The values are in mg/kg, that is a factor of 3 larger than the GC-MS results.

p-cresol is classified as a VOC so it was not expected. This is listed in the Drinking water Directive, Water Framework directive and the E-PRTR

The values for the PAH are concerning. In the River Colne water, the levels were significantly lower. To put this into perspective the total levels of PAH over the 2 years of testing, in respective locations have been tabulated against the closest sediment sample point and shown in Figure 7 for The downstream Knutsford Park sediment and River Colne water, Figure 8 at the Lairage Land and Figure 9 at Oxhey Park..

This confirms that the PAH's do have an affinity for the soil and are filtered out of the water and accumulate in the sediment of the River. Being bio accumulative this number will potentially increase more over the coming years.

In addition to the 16 speciated PAHs. The following PAHs were also found.

Table 16 - PAH found in addition to the 16 speciated PAH

		Upstream of bridge at South Mimms Park	Downstream of confluence of Radlett Brook	Downstream of the Radlett Road outfall	Ver adjacent to Drop lane immediately downstream of 'stepping stones'	Upstream of the footbridge at the ford on the Munden estate	Downstream of the Knutsford Park outfall	Downstream of the Oxhey Park outfall	Lairage Land
Acenaphthylene	mg/kg	0.85	0.27	0.47	<0.05	0.25	0.74	< 0.05	< 0.05
Acenaphthene	mg/kg	0.67	< 0.05	0.3	<0.05	< 0.05	0.24	< 0.05	< 0.05

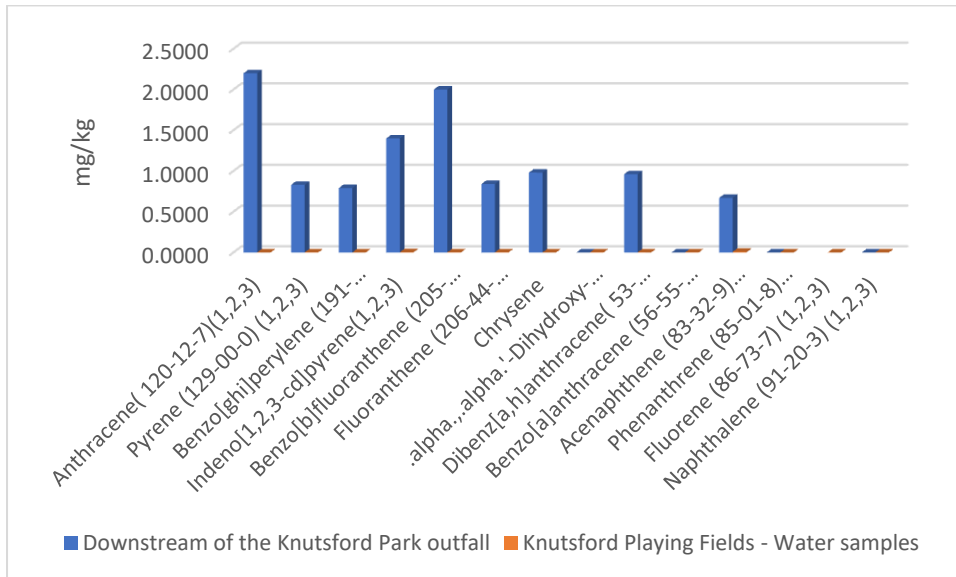


Figure 7 - PAH values in mg/kg found in the sediment (blue) and the total for each PAH from the River at the Knutsford Playing Field location from all samples.

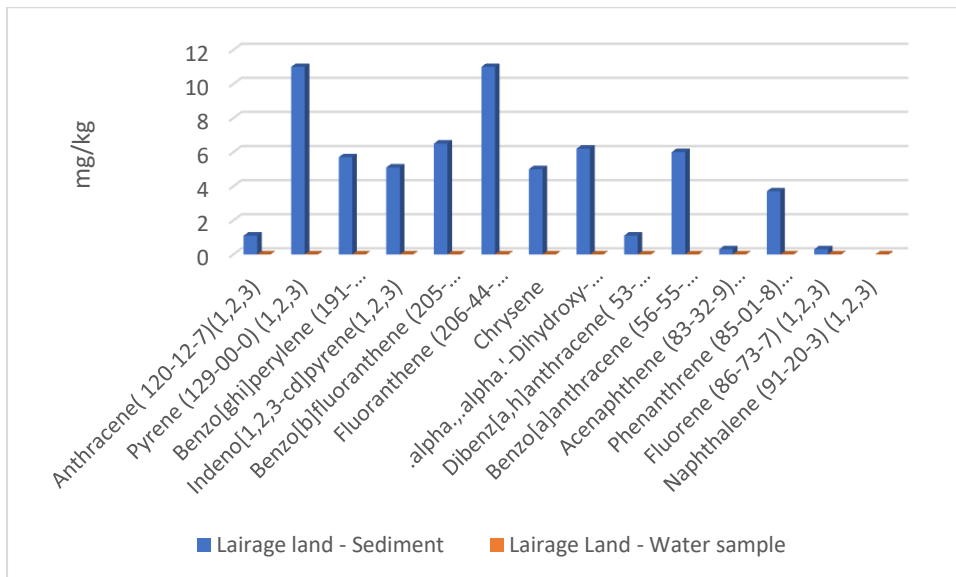


Figure 8 - PAH values in mg/kg found in the sediment (blue) and the total for each PAH from the River at the Lairage Land location from all samples.

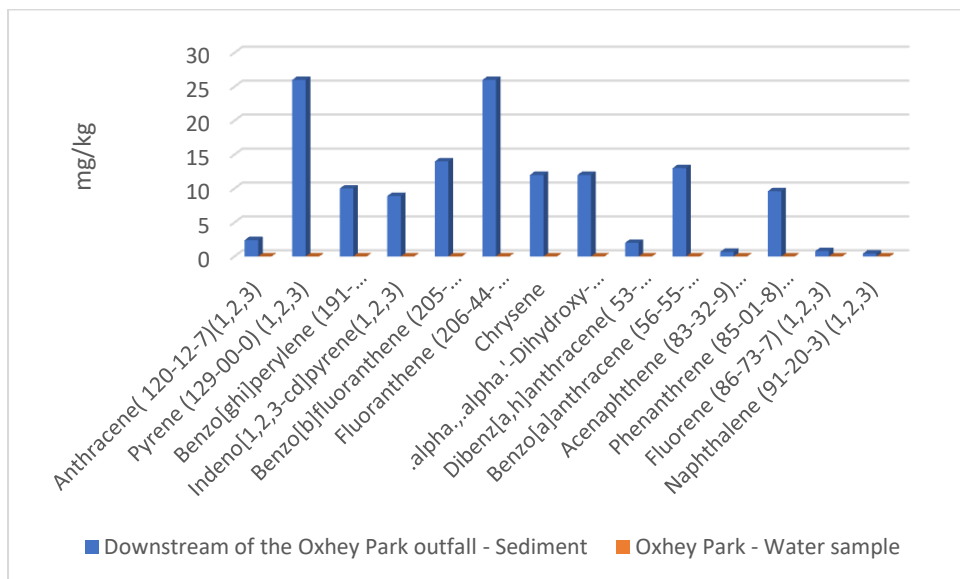


Figure 9 - PAH values in mg/kg found in the sediment (blue) and the total for each PAH from the River at the Oxhey Park location from all samples.

Table 17 - Table Phenols and Speciated PAH's in mg/kg found in the River sediment

Substance	Upstream of bridge at South Mimms Park	Downstream of confluence of Radlett Brook	Downstream of the Radlett Road outfall	Ver adjacent to Drop lane immediately downstream of 'stepping stones'	Upstream of the footbridge at the ford on the Munden estate	Downstream of the Knutsford Park outfall	Downstream of the Oxhey Park outfall	Lairage land
Anthracene (120-12-7) <sup>(1,2,3)</sup>		0.21	0.81	1.1	0.6		2.4	1.1
Pyrene(129-00-0) <sup>(1,2,3,5-1)</sup>	2.6	2.2	8.4	14	6.8	2.2	26	11
Benzo[ghi]perylene (191-24-2) <sup>(1,2,3)</sup>	1	0.91	3.2	6.8	3	0.83	10	5.7
Indeno[1,2,3-cd]pyrene <sup>(1,2,3)</sup>	0.94	0.82	2.9	5.8	2.7	0.79	8.9	5.1
Benzo[b]fluoranthene (205-99-2) <sup>(1,2,3)</sup>	1.8	1.1	4.6	9.9	4.6	1.4	14	6.5
Fluoranthene (206-44-0) <sup>(1,2,3,5-1)</sup>	2.4	2.1	8.1	13	6.3	2	26	11
Chrysene	1.1	0.98	3.4	6.1	3.4	0.84	12	5
Benzo[a]pyrene (50-32-8) <sup>(1,2,3)</sup>	1.2	1.1	4.1	7.4	3.5	0.98	12	6.2



Dibenz[a,h]anthracene( 53-70-3) <sup>(1,2,3)</sup>	0.2		0.75	1.2	0.6		2	1.1
Benzo[a]anthracene (56-55-3) <sup>(1,2,3)</sup>	1.2	1.1	4.7	6.7	3.2	0.96	13	6
Acenaphthene (83-32-9) <sup>(1,2,3)</sup>				0.24			0.67	0.3
Phenanthrene (85-01-8) <sup>(1,2,3)</sup>	0.59	0.74	3	3.9	2.1	0.67	9.6	3.7
Fluorene (86-73-7) <sup>(1,2,3)</sup>			0.25	0.37			0.79	0.3
Naphthalene (91-20-3) <sup>(1,2,3)</sup>							0.41	
<b>Speciated Total EPA-16 PAHs</b>	13.6	12.3	47.7	81	39.4	11.1	<b>148</b>	69.8
p-Cresol (4-methylphenol)(106-44-5) <sup>(2,3)</sup>			1.4					

## 4.2 Heavy metals - sediment

It has been difficult to find limits for heavy metals in River sediment/rivers. WHO published a table of permissible limits for heavy metals in soils in 1996. Using this table as a guideline, the only heavy metal with all its sample values lower than the target value was Nickel. Limit values for the remaining metals Antimony, Arsenic, Mercury and Silver could not be found or are not available..

Table 18 - WHO permissible limits for heavy metals in plant and soil.

Elements	*Target value of soil (mg/kg)	***Permissible value of plant (mg/kg)
Cd	0.8	0.02
Zn	50	0.60
Cu	36	10
Cr	100	1.30
Pb	85	2
Ni	35	10

\*Target values are specified to indicate desirable maximum levels of elements in unpolluted soils  
Source: Denneman and Robberse 1990; Ministry of Housing, Netherlands 1994

\*\*\*Source: WHO (1996) **Table 11:** WHO permissible limits for heavy metals in plant and soil.

Table 19 - Aqua regia extractable heavy metals found in the sediment samples from the River Colne and Ver in mg/kg (ppm). Those in *Italics* exceed the WHO desirable level

Heavy Metals / Metalloids (Aqua regia extractable)	Colne immediately downstream of the Raddlett	Colne immediately downstream of the Raddlett	Colne at Lairage land	Colne immediately downstream of the Knutsford	Colne immediately upstream of the footbridge	Ver adjacent to Drop lane immediately downstream of	confluence of	Colne immediately downstream of	Colne immediately upstream of bridge at
Antimony	8.3	6.2	7.5		3.6	7.2			4.5
Arsenic	11	6.3	8.3	9	6.6	11	8.5		11
Cadmium	1.9	0.9	1.8	0.5	1.1	1.6	0.5		0.9
Chromium	45	32	55	37	31	39	42		28
Copper	260	100	180	33	97	280	43		48
Lead	290	140	410	97	170	420	52		85
Mercury	0.8	0.4	0.8	0.4	0.4	1.2			
Nickel	27	18	27	23	20	35	24		24
Silver	3.3	1.8	5.5	1	2.4	2	2.7		
Zinc	590	310	520	120	280	560	140		190

### 4.3 PCBs - sediment

PCBs had a variety of industrial uses, such as electrical equipment, plastics, coatings and cement to name a few until they were banned in the UK due to the damaging effect to human health. PCBs can leach from landfill sites and also have the ability to absorb organic matter and re-emerge. They are also said to bind tightly to soil

Table 20 - PCBs by GC-MS expressed in in mg/kg in the River Colne sediment

	Colne immediately downstream of the Oxhey Park outfall	Colne immediately downstream of the Radlett Road outfall	Colne at Lairage land	Colne immediately downstream of the Knutsford Park outfall	Colne immediately upstream of the footbridge at the ford on the Munden estate	Ver adjacent to Drop lane immediately downstream of 'stepping stones'	Colne immediately downstream of confluence of Radlett Brook	Colne immediately upstream of bridge at South Mimms Park
<b>PCB Congener 28</b>	<b>0.005</b>	<b>0.005</b>	<b>0.006</b>	<b>0.007</b>	<b>0.006</b>		<b>0.003</b>	<b>0.006</b>
<b>PCB Congener 52</b>	<b>0.002</b>	<b>0.004</b>	<b>0.005</b>		<b>0.005</b>	<b>0.003</b>		
<b>PCB Congener 101</b>	<b>0.003</b>	<b>0.003</b>	<b>0.007</b>		<b>0.007</b>	<b>0.006</b>	<b>0.003</b>	
<b>PCB Congener 118</b>	<b>0.004</b>		<b>0.005</b>		<b>0.008</b>	<b>0.008</b>		
<b>PCB Congener 138</b>	<b>0.006</b>	<b>0.005</b>	<b>0.011</b>		<b>0.011</b>	<b>0.008</b>	<b>0.004</b>	
<b>PCB Congener 153</b>	<b>0.004</b>		<b>0.011</b>		<b>0.009</b>	<b>0.01</b>		
<b>PCB Congener 180</b>	<b>0.004</b>		<b>0.007</b>		<b>0.005</b>	<b>0.007</b>		
<b>Total PCBs</b>	<b>0.028</b>	<b>0.017</b>	<b>0.052</b>		<b>0.051</b>	<b>0.042</b>	<b>0.011</b>	
<b>PCB Congener 118</b>	<b>0.004</b>		<b>0.005</b>		<b>0.008</b>	<b>0.008</b>		

#### 4.4 PFAS - sediment

PFOA are listed, like PAH as Persistent Organic Pollutants (POPs). Whereas PAH are created often as a by-product of combustion, and are bio-accumulative and toxic, PFOA are additionally classified as forever chemicals as they are man-made.

The drinking water inspectorate has set a 10ng/L (0.01ug/kg) limit for PFOS and PFOA. The values below are in ug/kg. The values found in all locations are significantly higher than this 0.01ug/kg limit.

Table 21 - PFAS by LV-MS expressed in ug/kg found in the River Colne sediment

PFAS Suite 3		Colne immediately downstream of the Oxhey Park outfall	Colne immediately downstream of the Radlett Road outfall	Colne at Lairage land	Colne immediately downstream of the Knutsford Park outfall	Colne immediately upstream of the footbridge at the ford on the Munden	Ver adjacent to Drop lane immediately downstream of	Colne immediately downstream of confluence of Radlett Brook	Colne immediately upstream of bridge at South Mimms Park
PFOS C8 Sulphonate	µg/kg	1.1	1.6	0.9	1.5	0.5	1.1	0.4	0.5
PFOA C8 Carboxylic acid	µg/kg	0.1							
PFDA C10 Carboxylic acid	µg/kg	0.2	0.1	0.2					
PFUdA C11 Carboxylic acid	µg/kg	0.1							
PFDoA C12 Carboxylic acid	µg/kg	0.2							

#### 4.5 Dioxins - sediment

International Toxic Equivalents (TEQ) have been developed to show the degree of toxicity of a mixture of dioxins. The “Toxic Equivalent” (TEQ) scheme weighs the toxicity of the less toxic compounds as fractions of the toxicity of the most toxic TCDD. Each compound is attributed a specific “Toxic Equivalency Factor” (TEF). This factor indicates the degree of toxicity compared to 2,3,7,8-TCDD, which is given a reference value of 1.

The total 2,3,7,8 Furans and Dioxins along with TEQ are shown in Table 22. These can be seen to vary significantly between sites with a significantly high 2,3,7,8 Dioxin value of 3370 detected in the River Ver sediment, this location also has the highest value for 2,3,7,8, Furans.

It has been difficult to find a dioxin and Furan value to compare the sediment data. However, EU Directive /2000/76/EC does define the total of dioxins and furans, defined as the sum of individual dioxins and furans as specified in Annex I of the said regulation to be 0.3ng/L for the waste water from cleaning of exhaust gases.

*Table 22 - Total 2,3,7,8, dioxins and Furans (ng/kg and TEQ values found in the sediment of the River Colne (TEQ2 values – non-detected congeners at zero*

<b>Sample</b>	<b>Total 2,3,7,8-Furans ng/kg</b>	<b>Total 2,3,7,8-Dioxins ng/kg</b>	<b>TEQ (WHO) Mammals</b>	<b>TEQ (WHO) Fish</b>	<b>TEQ (WHO)-Birds</b>
<b>Oxhey Park</b>	<b>246</b>	<b>1650</b>	<b>12</b>	<b>12</b>	<b>26.1</b>
<b>Radlett</b>	<b>197</b>	<b>1310</b>	<b>9.97</b>	<b>9.44</b>	<b>21.14</b>
<b>Lairage</b>	<b>289</b>	<b>1740</b>	<b>13.7</b>	<b>13.5</b>	<b>31.6</b>
<b>Knutsford</b>	<b>8.14</b>	<b>46.9</b>	<b>0.181</b>	<b>0.278</b>	<b>0.0794</b>
<b>Munden Footbridge</b>	<b>162</b>	<b>803</b>	<b>7.93</b>	<b>7.39</b>	<b>15.2</b>
<b>Ver Drop Lane</b>	<b>566</b>	<b>3370</b>	<b>29</b>	<b>28.3</b>	<b>55.6</b>
<b>Radlett Brook</b>	<b>65.8</b>	<b>411</b>	<b>3.66</b>	<b>3.39</b>	<b>12.3</b>
<b>South Mimms</b>	<b>77.6</b>	<b>290</b>	<b>6.37</b>	<b>6.82</b>	<b>18.9</b>

## 5.0 Borehole sample – Otterspool

This borehole is close in proximity to the River Colne at Munden house. This is classified as an observation borehole, for monitoring the quality and the level of water only and is not used for public water supply. Affinity Water advise that all public water supply abstraction boreholes in the upper Colne are blended together and treated centrally at a large water treatment works and is subject to rigorous treatment, with extensive monitoring to ensure safe and wholesome drinking water is provided to the public at all times. A sample was taken from this borehole to determine if the pollutants could potentially filter through into an aquifer for drinking water. The sample was taken on the 1<sup>st</sup> April 2022

Three of the substances found have also been found in all of our initial testing sites throughout all four test dates (shown in bold). A number of these substances have been listed in the various water regulations, some of which are not only dangerous to the environment, they also carry human hazards, such as H351 – suspected of causing cancer.

However, it was more concerning to find substances that were seen far less frequently, if at all, in our testing. Such as Bisphenol A, which is a monomer and used to make polymeric materials. The monomeric substance is usually at low ppm concentrations in polymeric materials.

Butylated Hydroxy Toluene has not been observed throughout our GC-MS analysis of the River Colne water so this was far from expected. This substance is only used at low levels in products for stability.

Tetrachloroethane is a Volatile Organic Compound, it was used in automotive products prior to 2003 and is used as a solvent and cleaning fluid.

Table 23 - GC-MS results from the borehole water sampled at Otterspool in ug/L. Bold substances denote that they have been found in all initial sampling sites on all testing dates.

Chemical Name	CAS number	Potential use	ug/L	
<b>Tri-(2-chloroethyl) phosphate<sup>(5-1)</sup></b>	<b>115-96-8</b>	<b>Plasticiser, flame retardant</b>	<b>0.01-0.1</b>	<b>H411, H302, H351, H360f</b>
<b>Galaxolide (1222-05-5)<sup>(5-3)</sup></b>	<b>1222-05-5</b>	<b>Personal use</b>	<b>0.01-0.1</b>	<b>H400, H410</b>
Simazine( 122-34-9) <sup>(1,2,3)</sup>	122-34-9	Herbicide	0.01-0.1	H400, H410, H351
Primidone	125-33-7	Pharmaceutical	0.1-1.0	H302, H351
Tetrachloroethene ( 127-18-4) <sup>(3,5-1)</sup>	127-18-4	VOC	0.1-1.0	H411, H351,
Butylated Hydroxytoluene	128-37-0	Antioxidant	0.01-0.1	H400
<b>2-Propanol, 1-chloro-, phosphate (3:1)</b>	<b>13674-84-5</b>	<b>Flame retardant</b>	<b>0.01-0.1</b>	<b>H302</b>
1H-Benzotriazole, 5-methyl-	136-85-6	Biocide/antiseptic	0.01-0.1	H314, H318
Lidocaine	137-58-6	Pharmaceutical	0.01-0.1	H302
Atrazine <sup>(1,2,3)</sup>	1912-24-9	Herbicide	0.01-0.1	H400, H410, H317, H373
Atrazine desethyl	6190-65-4	Potential degradation product of Atrazine	0.01-0.1	H302, H319, H332
Benzenesulfonamide, 4-methyl-	70-55-3	Plasticiser, intermediate for pesticides	0.01-0.1	Not classified
Triethyl citrate	77-93-0	Plasticiser, solvent	0.01-0.1	Not classified
Bisphenol A <sup>(2,5-1)</sup>	80-05-7	Intermediate/monomer	0.1-1	H400, H410, H318, H317, H335, H360F

<sup>(1)</sup> Listed in the EU Water Framework directive (2000/60/EC) as a priority hazardous substance, annex X <sup>(2)</sup>Listed in the EU Drinking water Directive recast 2020/84-01. Annex 1, Part B (Chemical parameters) <sup>(3)</sup>Listed in E-PRTR (166/2006)- 01. Annex II (Pollutants) <sup>(4)</sup>Listed in Freshwater specific pollutants and operational environmental standards (EQS) <sup>(5-1)</sup> Substance listed as Priority 1 in PEWS <sup>(5-2)</sup> substance listed as Priority 2 in PEWS <sup>(5-3)</sup> substance listed as Priority 3 in PEWS. <sup>(5-4)</sup> substance listed as Priority 4 in PEWS

## 6.0 Discussion of findings

This study has shown that the River Colne contains a plethora of substances which are non-native to the River and natural environment. Man-made substances, a number of persistent organic pollutants, are polluting our River water and river sediment. They are potentially polluting the source waters that are used and treated to provide our drinking water supply.

The River water analysis by GC-MS analyses specific substances, the substances that volatilise under the Gas chromatography method conditions, which limits this method to a molecular weight of around 800 daltons and less polar molecules.

Using the GC-M-S method 267 substances were found in the River water alone.

We have briefly looked at a number of regulations to protect our water-ways and drinking water. Most concentrate on Persistent organic pollutants and agricultural chemicals. The Environment Agency (EA) has produced the Priority and Early Warning System. This PEWS takes actual results from water-ways with the aim of using a real-time approach is to keep up with today's trends in chemical use and substances that are more prevalent today in our water-ways. These substances have been classified by their risk to the environment. We compared this to our findings and there is a lack of parity in between our findings and the EA -PEWS (Table 24 – shows the substances found in the River Colne and PEWS).

The source of these pollutants is potentially from Sewage waste, Industrial waste, Pharmaceutical waste, Agriculture and traffic/road run-off. These could be from direct entry into the river, wash-off from the surrounding areas and water seeping through the soil, carrying pollutants from landfill sites.

The number of substances detected at each site was concerning, the highest number of substances being the last testing date on 10<sup>th</sup> December 2021 at the Lairage land. 114 substances were detected by GC-MS alone. It maybe that a number of the substances are insignificant in concentration but their accumulative effect may be detrimental. An overview of the substances clearly shows that there has been a number of pollution events around this time. The detection of Petrol components, possibly other benzene-based solvents, substances linked to sewage, herbicides, pesticides, fungicides, pharmaceutical drugs, industrial chemicals and substances found in personal care products clearly show that the River Colne (and River Ver) are being polluted.

Coprasanol (CAS 360-68-9) has been linked to sewage contamination and this has been detected in each round of testing (1-5ug/L to 0.1-1ug/L), this coupled with the cholesterol and caffeine being ever present, strongly suggests that the River Colne has been subjected to a number of sewage outfalls. This is a major issue as not only does untreated sewage contain the substances we have detected it also contains bacterial and viruses, such as E.coli and Hepatitis A. These can cause symptoms such as stomach upsets, skin, ear eye and chest infections, and sore throat. There have been a significant number of reports of people falling ill after contact with river-water due to the sewage content.

N,N,N',N'-Tetraacetythylenediamine and Galaxolide have been present in all of the initial four sites throughout this study – both of these come from personal care products and more concerning, Galaxolide has been found in the water of the observation borehole.

Sewage entering the river by various means may also explain the vast number of personal use substances and also some Industrial biased substances. However, the high concentration and prevalence of some substances would be difficult to explain by these outfalls. The level of 2,4,7,9-tetramethyl-5-decyne-4,7-diol (TMDD), a chemical used in paper, ink, pesticide, and adhesive industries as a wetting and anti-foaming agent has been found at >5ug/l at 5 Colne outfall sites. Tri-(2-chloroethyl)phosphate and 2-Propanol, 1-chloro-, phosphate have been observed in all the Knutsford to Lairage land sites, that is 4.2km over an 18 month This substance was also found in the Observation borehole.

Also found by GC-MS was a number of PAH's, classified as Persistent Organic Pollutants. The level and frequency of PAHs make them quite ubiquitous to the River Colne. A number of PAH's have been noted to be present at above the Maximum allowable concentration (MAC-EQS) for inland waters, others are fairly close to this level. Using the Knutsford Playing Field to Lairage land data, we can state that the annual average (AA-EQS) for Benzo[b]fluoranthene has been exceeded. There is potential that more AA-EQS have been exceeded but the GC-MS qualitative data range is too wide to be able determine this. Two PAHs, Pyrene and Benzo[b]fluoranthene have been present in all four of these sites during this testing programme.



The level of PAH's found in the sediment were significantly higher than the River finding, about 100 times. This may be that they have been filtered out as they have an affinity for the sediment. The timeframe it has taken for the PAHs to build up to this level is not known. It may be that this high PAH value will keep increasing as PAHs enter the River.

Another range of substances listed in the POP regulation is PFAS, these are determined by LC-MS and were found in the sediment. They were found in all sampling sites, Oxhey Park contained the biggest PFAS cocktail. It would be interesting, if not worrying, to know how much of these now ubiquitous substances are in the River water

The value for Dioxins and Furans in the sediment seemed significantly high. These were not detected in the water samples and this may be due to the GC-MS method used. These values should be followed up.

The heavy metal values of the sediment are high compared to the WHO recommended values for soil. The highest heavy metals were determined to be from the River Ver at drop Lane with levels of zinc at least 10 times higher than the WHO value, lead nearly 5 times higher and copper 7 times higher. Lairage Land also had excessively high values. Knutsford Playing fields had the lowest heavy metal values with only lead being slightly higher than the WHO value.

The Borehole is close to the River Colne between Munden House ford and Knutsford Playing fields. 3 of the 11 consistent offenders found in the River Colne between Knutsford Playing Fields and Lairage Land have shown up in the observation borehole, Galaxolide (personal use), Tri-(2-chloroethyl)phosphate and 2-Propanol, 1-chloro, phosphate (both industrial use). Bisphenol A, which is a monomer for polymers and is classified as endocrine disruptor (ED) was detected in the borehole. As this had not been too prolific in our water samples this was not expected. More concerning was detecting Butylated hydroxytoluene, this substance had not been detected in any of the River samples, it is used as an antioxidant at low levels. Very few VOC's have been detected through this study with exception of the products of the petrol pollution in December 2021. So, it was surprising to find the VOC, tetrachloroethene in the borehole. Four of the substances found in the observation Borehole are classified as either potentially or actually carcinogenic to humans. These were Tri-(2-chloroethyl) phosphate, Tetrachloroethene (127-18-4) and Bisphenol A. Tetrachloroethene is also listed in the Drinking Water Directive with a parametric value of 10ug/L, this was found at 0.1-1ug/L in this experimental borehole. And 2 substances that cause damage to fertility or/and the unborn child. As pollution events increase, it is expected that the number of substances will increase in our potential water supply.

It has already been found that PFAS, a generic term which includes PTFE (Teflon) and other fluorinated substances are not detected by GC-MS but by more complex methods of LC-MS. The observation Borehole samples was not analysed by LC-MS so we do not know their level present. A number of PFAS have been found in tap water and in human blood.

Only the generic GC-MS was carried out on this sample. It was surprising to see no PAH's present in the borehole as they seemed ubiquitous in the River water and sediment. There potentially could be numerous other substances present, such as PFAS, Dioxins, Furans, not detected by this method.

These substances have been filtered through by water to the aquifer, over a period of time. The time-frame is unknown and will be variable and this causes challenges in being able to accurately monitor pollution. The pollution we can detect in our rivers/sediment today, will potentially end up in our aquifers at a later date. It is possible that PAHs may start to show in due course.

Without positive action now, our water sources may become very difficult, if not impossible to remove specific pollutants that enter our aquifers. .

We should also bear in mind that as substance information on toxicology to the environment and human health increase, the classification of substances may change. This is an ongoing action plan by both ECHA and the HSE. Chemicals that we deem non-toxic today, may well become toxic in the future.



Table 24 - Substances found in the River Colne and also listed in the PEWS (EA)

The colours used below indicate the priority of concern for surface and ground water in which Red = Priority 1, Orange = Priority 2, Yellow = Priority 3 and Green = Priority 4; For soil, biota and sediment the colours indicate need for further consideration (red), no further consideration (green) or insufficient information (white)

Chemical name	Use	Overall	Surface water	Ground water	Soil	Biota	Sediment
2,4,7,9-Tetramethyl-5-decyne- 4,7-diol	Wetting/antifoaming agent	Orange	Orange	Green	Green	Green	Green
Benzenesulfonamide, N-butyl	Plasticiser	Orange	Orange	Orange	Green	Green	Green
Benzenesulfonanilide	Industrial intermediate	Yellow	Yellow	Yellow	White	White	White
Benzophenone	Lifestyle	Orange	Orange	Orange	Green	Green	Green
bis(2-ethylhexyl)phthalate (DEHP)	Plasticiser	Red	Red	Red	Red	Red	Red
Caffeine	Lifestyle	Green	Green	Green	Green	Green	Green
Cholesterol	Natural and industrial chemical	Green	Green	Green	Green	Green	Green
Crotamiton	Pharmaceutical	Green	Green	Green	Green	Green	White
Fluoranthene	PAH	Red	Red	Red	Green	Red	Red
Metaldehyde	Molluscicide	Red	Red	Orange	Red	Green	Green
N,N,N',N'-Tetraacetylenediamine	Various	Green	Green	Green	Green	Green	Green
N,N-Diethyl-m-toluamide	Biocide/insect repellent	Green	Green	Green	Green	Green	Green
Pyrene	PAH	Red	Red	Red	Green	Red	Red
Tri-(2-chloroethyl) phosphate	Flame retardant	Red	Red	Red	Red	Red	Red
Triphenyl phosphate (TPHP)	Flame retardant	Orange	Orange	Orange	Green	Red	Red
Tris (1,3-dichloroisopropyl) phosphate	Various, Additive flame retardant	Orange	Orange	Orange	Red	Red	Red
Homosalate / (Benzoic acid, 2- hydroxy-, 3,3,5- trimethylcyclohexyl ester)	Cosmetics (white list) UV Filter	Red	Red	Red	Red	Green	Green
Cocaine	Illegal drug	Orange	Orange	Orange	Red	Red	White
Dimethyl succinate	Chemical synthesis, paint & coating additives, pigments solvents & viscosity adjustors, cosmetics	Green	Green	Green	Green	Green	Green
Galaxolide (HHCB)	Personal care products	Orange	Orange	Yellow	Red	Red	Red
Bisphenol A	Plasticiser	Red	Red	Red	Red	Red	Red
Boscalid (Nicobifen)	Herbicide	Orange	Orange	Orange	Green	Green	Red

Carbamazepine	Pharmaceutical	Yellow	Yellow	Yellow	Red	Green	Red
Diclofenac	Pharmaceutical	Red	Red	Green	Green	Green	Red
Fipronil	Biocide	Red	Red	Red	Red	Red	Green
Flufenacet (Fluthiamide)	Herbicide	Red	Red	Red	Green	Green	Green
Gabapentin	Pharmaceutical	Yellow	Yellow	Green	Green	Green	Green
Lidocaine (Diocaine)	Pharmaceutical	Green	Green	Green	Red	Green	Green
Tetrachloroethylene / Perchloroethylene	Cleaning solvent in dry cleaning and textile processing and in the manufacture of fluorocarbons.  Widespread uses in formulation,	Orange	Orange	Orange	Red	Red	Red

## 7.0 Conclusion

The water in the river is demonstrably of very poor quality. That clearly impacts negatively on the ecological system as a whole and in some areas that can be clearly confirmed by sampling the abundance and variety of invertebrate life. The results returned by the riverfly monitoring initiative in the water/sediment sample study area indicate marked downturns in the numbers and species of invertebrates at a number of locations.

The poorest of those riverfly results 'scores' however are found localised to the urban area around Watford but it is not necessarily the case that the micropollutants found here are so significantly different to areas where better riverfly scores are achieved – both up and, crucially, downstream. It is possible therefore that something is being missed in that urban area. It may be that a broader spectrum of analytical process is required – targeted LC-MS on the river water for example. CVFC are already engaging with a number of supporters in the hope that further analysis can be achieved. This study generally needs now to be undertaken at locations further downstream and the Colne and its many tributaries total hundreds of miles of river before the confluences with the Thames at Staines

The number of pollutants entering the River Colne through the many and varied routes is significant, some of which are bio accumulate and will persist for years. This has already been seen for PFAS in drinking water and which have also been recorded in human blood worldwide. This suggests that these chemicals are potentially polluting the source waters that are used and treated to provide our drinking water supply. The constant addition of more and varied chemicals to the river can only ultimately present an increased risk to that drinking water source. Does the capability and capacity exist to remove these chemicals to produce a supply of clean and safe drinking water and, even if that is the case now what does the mid to long term future look like?

The foregoing in this report makes it clear that the routes by which micropollutants enter the river and our groundwater are numerous. It is true to say that sewage treatment works are a significant contributor but the works and the final treated effluent they produce is effectively only the collection point for all that we, the population, send them.

The pollutants we dispose of down our sewers whether deliberately or unwittingly are unlikely to be removed by a process that was not designed so to do. It may be argued therefore that intermittent storm discharges or 'spills' are little more harmful than the constant outflow of pollutants in final treated effluent. Spills do indeed mean that untreated dilute sewage will reach our waterways and we must all strive to reduce those events. What CVFC would argue however, and we believe this report demonstrates, is that we have bigger problems and higher priorities to worry about than storm spills.

## 8.0 Addendum

As the team at CVFC were finalising this report two articles of particular interest were published by Communications and Management for Sustainability (CMS) <http://www.cmscoms.com/> that are entitled: **Toxic 'forever chemicals' found in toilet paper around the world**

and

**Growing number of studies detect antibiotics, medicines and caffeine in groundwater**

The outcomes of these studies are very similar to those recorded by CVFC and in almost every respect support our findings. The studies specifically state that:

Toilet paper samples from around the globe have been found to contain PFAS – the forever chemicals referred to earlier in this document. Toilet paper is a potential major source of PFAS arriving at treatment plants that cannot be removed and may enter the rivers at discharge points. Hence, these forever chemicals build up in sewage sludge that is then spread on land as fertiliser which then can wash off into rivers. PFAS is generic name for a specific class of chemicals and includes a significant number of poly fluorinated substances that are linked to cancer, foetal complications, liver disease, kidney disease, autoimmune disorders and other serious health issues. Some forever chemical hotspots in England were found to have 10 times or more PFAS than the proposed EU safe thresholds

There is significant ongoing increases in the production and use of medicines, antimicrobial and pharmaceutical products. These will break down but will enter the environment and could cause both human and ecosystem health risks. Many chemicals and other pollutants are likely to reach soil and water via treated or untreated wastewater.

Surface waters (rivers and lakes) are most likely to be contaminated, although the report goes on to say that it is crucial to assess the risk to human health and environment from contaminants in groundwater given that in some geologies Groundwater has indeed been shown to collect undegraded pollutants such as anti-inflammatory drugs and pesticides with the risks being obvious. Some rivers interact with groundwater with the pollutants in either being able to exchange.

# Appendix

Table 25: GC-MS Results for Knutsford Playing Fields, 2071343, 17<sup>th</sup> March 2020

GCMS Results for Sample:		2071343	
Compound Name	CAS#	Concentration	Units
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	<0.1	µg/L
1-Propanol, 2-(2-methoxypropoxy)-	13588-28-8	<0.1	µg/L
1-Propanone, 3-chloro-1-phenyl-	936-59-4	<0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,5-cyclohexadien-1-one, 2,6-bis(1,1-dimethylethyl)-4-hydroxy-4-methyl-	1000401-12-0	<0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Fipronil	120068-37-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
Propyzamide	23950-58-5	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Sulfur (S8)	10544-50-0	1 - 5	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	<0.1	µg/L
Tri-allate	2303-17-5	<0.1	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	<0.1	µg/L



Table 26: GC-MS data Shaftsbury Road, 2071346, 17th March 2020

GCMS Results for Sample:		2071346	
Compound Name	CAS#	Concentration	Units
.gamma.-Sitostenone	84924-96-9	<0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	<0.1	µg/L
2,5-cyclohexadien-1-one, 2,6-bis(1,1-dimethylethyl)-4-hydroxy-4-methyl-	1000401-12-0	<0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-Piperidinone, 2,2,6,6-tetramethyl-	826-36-8	<0.1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benz[a]anthracene	56-55-3	<0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	<0.1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Benzo[ghi]perylene	191-24-2	<0.1	µg/L
Benzo[k]fluoranthene	207-08-9	<0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Chloroxylenol	88-04-0	<0.1	µg/L
Cholestan-3-ol, (3.beta.,.5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Diflufenican	83164-33-4	<0.1	µg/L
Ergosta-5,22-dien-3-ol, (3.beta.,.22E,.24S)-	17472-78-5	0.1 - 1	µg/L
Fipronil	120068-37-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	<0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Phytol	150-86-7	<0.1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
Propyzamide	23950-58-5	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Terbutryne	886-50-0	<0.1	µg/L

Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	<0.1	µg/L
Tri-allate	2303-17-5	<0.1	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	<0.1	µg/L

Table 27 GC-MS data Oxhey Park, 2071345, 17th March 2020

GCMS Results for Sample:		2071345	
Compound Name	CAS#	Concentration	Units
(Z)-Decyl icos-9-enoate	1000414-43-4	0.1 - 1	µg/L
.gamma.-Sitostenone	84924-96-9	<0.1	µg/L
.gamma.-Sitosterol	83-47-6	1 - 5	µg/L
1,3-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	137-89-3	0.1 - 1	µg/L
1H-Pyrrole-2,5-dione, 3-ethyl-4-methyl-	20189-42-8	<0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	<0.1	µg/L
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	6846-50-0	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,5-cyclohexadien-1-one, 2,6-bis(1,1-dimethylethyl)-4-hydroxy-4-methyl-	1000401-12-0	<0.1	µg/L
2-Methoxynaphthalene	93-04-9	<0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4,7-Methano-1H-indenol, hexahydro-	37275-49-3	<0.1	µg/L
4-Piperidinone, 2,2,6,6-tetramethyl-	826-36-8	<0.1	µg/L
7-Octen-2-ol, 2,6-dimethyl-	18479-58-8	0.1 - 1	µg/L
Acetaminophen	103-90-2	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benz[a]anthracene	56-55-3	<0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	<0.1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Benzo[ghi]perylene	191-24-2	<0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Butyl citrate	77-94-1	<0.1	µg/L
Caffeine	58-08-2	1 - 5	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Chloroxylonol	88-04-0	0.1 - 1	µg/L

Cholest-4-en-3-one	601-57-0	<0.1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	1 - 5	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	<0.1	µg/L
Cocaine	50-36-2	0.1 - 1	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Cyclohexanol, 5-methyl-2-(1-methylethyl)-	1490-04-6	0.1 - 1	µg/L
Cyclopentaneacetic acid, 3-oxo-2-pentyl-, methyl ester	24851-98-7	0.1 - 1	µg/L
Diflufenican	83164-33-4	<0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Ergosta-5,22-dien-3-ol, (3.beta.,22E,24S)-	17472-78-5	0.1 - 1	µg/L
Ergostanol	09/02/6538	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	1 - 5	µg/L
Ethanol, 2-phenoxy-	122-99-6	<0.1	µg/L
Fipronil	120068-37-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Gabapentin	60142-96-3	<0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
Hexanoic acid, 3,5,5-trimethyl-, hexadecyl ester	1000406-06-7	<0.1	µg/L
Hexanoic acid, 3,5,5-trimethyl-, octadecyl ester	1000406-06-9	<0.1	µg/L
Hexyl Cinnamaldehyde	101-86-0	<0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	<0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Octocrylene	6197-30-4	<0.1	µg/L
Octyl-methoxycinnamate	5466-77-3	<0.1	µg/L
Propyzamide	23950-58-5	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Stigmastanol	19466-47-8	0.1 - 1	µg/L
Terbutryne	886-50-0	<0.1	µg/L
Terpineol	98-55-5	0.1 - 1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	<0.1	µg/L
tri(2-Ethylhexyl) trimellitate	3319-31-1	<0.1	µg/L
Tri-allate	2303-17-5	<0.1	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L

Triethyl phosphate	78-40-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	<0.1	µg/L
Vitamin E	59-02-9	<0.1	µg/L

Table 28 GC-MS data Lairage Land, 2071344, 17th March 2020

GCMS Results for Sample:		2071344	
Compound Name	CAS#	Concentration	Units
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-(2,2,3,5,6-Pentamethylcyclohex-4-enyl)-9-(3,3,4-trimethylcyclohex-1-enyl)-3,6-dimethyl-6ethenyl-dec-4-ene	1000373-94-7	<0.1	µg/L
1,1,6-trimethyl-3-methylene-2-(3,6,9,13-tetramethyl-6-ethenyl-10,14-dimethylene-pentadec-4-enyl)cyclohexane	1000373-94-5	0.1 - 1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,5-cyclohexadien-1-one, 2,6-bis(1,1-dimethylethyl)-4-hydroxy-4-methyl-	1000401-12-0	<0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Campesterol	474-62-4	0.1 - 1	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Chloroxylenol	88-04-0	<0.1	µg/L
Cholesterol	57-88-5	>5	µg/L
Fipronil	120068-37-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Maldehyde	108-62-3	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	<0.1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L

Propyzamide	23950-58-5	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Sulfur (S8)	10544-50-0	1 - 5	µg/L
Terbutryne	886-50-0	<0.1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	<0.1	µg/L
Tri-allylate	2303-17-5	<0.1	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L

Table 29 GC-MS results Knutsford Playing Fields, 2121514, 21th August 2020

GCMS Results for Sample:		2121514	
Compound Name	CAS#	Concentration	Units
(+)-4-Carene	29050-33-7	<0.1	µg/L
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	<0.1	µg/L
.alpha.-Amyrin	638-95-9	<0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.1 - 1	µg/L
.gamma.-Sitosterol	83-47-6	1 - 5	µg/L
1(3H)-Isobenzofuranone	87-41-2	<0.1	µg/L
1,2,3-Propanetriol, 1-acetate	106-61-6	<0.1	µg/L
1,2-Benzisothiazole	272-16-2	<0.1	µg/L
1-Aminocyclopentanecarboxylic acid n-propargyloxycarbonyl-, dodecyl ester	1000329-01-0	<0.1	µg/L
1H-Benzotriazole	95-14-7	>5	µg/L
1H-Indene, 2,3-dihydro-1,1,3-trimethyl-3-phenyl-	3910-35-8	<0.1	µg/L
2(3H)-Benzothiazolone	934-34-9	1 - 5	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.1 - 1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,4-Dimethylphenol	105-67-9	<0.1	µg/L
2,5-Hexanedione	110-13-4	<0.1	µg/L
2H-Indol-2-one, 1,3-dihydro	59-48-3	<0.1	µg/L
2-Methoxynaphthalene	93-04-9	<0.1	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	<0.1	µg/L
2-Propanol, 1-(2-methoxypropoxy)-	13429-07-7	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	1 - 5	µg/L
9,10-Anthraquinone	84-65-1	<0.1	µg/L
Acetamide, N-acetyl-N,N'-1,2-ethanediylbis-	137706-80-0	<0.1	µg/L

Acetophenone	98-86-2	0.1 - 1	µg/L
Anthracene	120-12-7	<0.1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benz[a]anthracene	56-55-3	0.1 - 1	µg/L
Benzenesulfonamide, 2-methyl-	88-19-7	<0.1	µg/L
Benzenesulfonanilide	1678-25-7	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	0.1 - 1	µg/L
Benzo[b]fluoranthene	205-99-2	0.1 - 1	µg/L
Benzo[k]fluoranthene	207-08-9	<0.1	µg/L
Benzophenone	119-61-9	0.1 - 1	µg/L
Bicyclo[2.2.1]heptane-2,5-dione, 1,7,7-trimethyl-	4230-32-4	<0.1	µg/L
Bicyclo[3.1.0]hexan-2-one, 5-(1-methylethyl)-	513-20-2	<0.1	µg/L
bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	1 - 5	µg/L
Butyl citrate	77-94-1	<0.1	µg/L
Caffeine	58-08-2	1 - 5	µg/L
Campesterol	474-62-4	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.1 - 1	µg/L
Carbazole	86-74-8	<0.1	µg/L
Chloroxylenol	88-04-0	1 - 5	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	1 - 5	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	<0.1	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Coumarin	91-64-5	<0.1	µg/L
Cyclohexanol, 5-methyl-2-(1-methylethyl)-	1490-04-6	<0.1	µg/L
Cyclopentaneacetic acid, 3-oxo-2-pentyl-, methyl ester	24851-98-7	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	<0.1	µg/L
Dicyclohexyl phthalate	84-61-7	1 - 5	µg/L
Diethyl phthalate	84-66-2	>5	µg/L
Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
di-n-butyl phthalate	84-74-2	>5	µg/L
Diphenyl sulfone	127-63-9	<0.1	µg/L
Ergosta-5,22-dien-3-ol, (3.beta.,22E,24S)-	17472-78-5	0.1 - 1	µg/L
Ethyl 4-(ethyloxy)-2-oxobut-3-enoate	1000305-38-2	<0.1	µg/L
Etiracetam	33996-58-6	<0.1	µg/L
Fluoranthene	206-44-0	0.1 - 1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
Hexathiane	13798-23-7	0.1 - 1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L

Indole	120-72-9	<0.1	µg/L
m-Cresol (3-methylphenol)	108-39-4	<0.1	µg/L
Metaldehyde	108-62-3	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	1 - 5	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Octocrylene	6197-30-4	0.1 - 1	µg/L
o-Toluidine	95-53-4	<0.1	µg/L
Oxiranecarboxylic acid, 3-methyl-3-phenyl-, ethyl ester, cis-	19464-95-0	<0.1	µg/L
p-Cresol (4-methylphenol)	106-44-5	<0.1	µg/L
Phenanthrene	85-01-8	<0.1	µg/L
p-Isopropoxyaniline	7664-66-6	<0.1	µg/L
p-Isopropyltoluene	99-87-6	<0.1	µg/L
Propiconazole-I	60207-90-1	0.1 - 1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
p-Toluic acid, 4-nitrophenyl ester	1000307-77-0	<0.1	µg/L
Pyrene	129-00-0	0.1 - 1	µg/L
Stigmastanol	19466-47-8	0.1 - 1	µg/L
Stigmasterol	83-48-7	1 - 5	µg/L
Sulfur (S8)	10544-50-0	1 - 5	µg/L
Terbutryne	886-50-0	<0.1	µg/L
Terpineol	98-55-5	0.1 - 1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Theobromine	83-67-0	<0.1	µg/L
Totarol	511-15-9	0.1 - 1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	1 - 5	µg/L
Triacetin	102-76-1	<0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Triphenyl phosphate	115-86-6	0.1 - 1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vitamin E	59-02-9	<0.1	µg/L

Table 30 GC-MS results Shaftsbury Road, 21215134 21th August 2020

GCMS Results for Sample:		2121513	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	<0.1	µg/L
.gamma.-Sitostenone	84924-96-9	<0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
2(3H)-Benzothiazolone	934-34-9	0.1 - 1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benz[a]anthracene	56-55-3	<0.1	µg/L
Benzenesulfonamide	98-10-2	1 - 5	µg/L
Benzenesulfonamide, 2-methyl-	88-19-7	<0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	<0.1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Benzo[ghi]perylene	191-24-2	<0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Caprolactam	105-60-2	>5	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Cholesterol	57-88-5	>5	µg/L
Cotinine	486-56-6	0.1 - 1	µg/L
Dimethyl phthalate	131-11-3	<0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
di-n-butyl phthalate	84-74-2	1 - 5	µg/L
Diphenyl sulfone	127-63-9	<0.1	µg/L
Diphenylamine	122-39-4	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Gabapentin	60142-96-3	<0.1	µg/L
Galaxolide	1222-05-5	<0.1	µg/L
Hexa(methoxymethyl)melamine	68002-	<0.1	µg/L



	20-0		
Indeno[1,2,3-cd]pyrene	193-39-5	<0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
o-Toluidine	95-53-4	<0.1	µg/L
Phytol	150-86-7	<0.1	µg/L
Primidone	125-33-7	0.1 - 1	µg/L
Propiconazole-I	60207-90-1	<0.1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Stigmasterol	83-48-7	0.1 - 1	µg/L
Terbutryne	886-50-0	<0.1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	<0.1	µg/L
Triallyl isocyanurate	1025-15-6	<0.1	µg/L
Tributyl phosphate	126-73-8	1 - 5	µg/L
Triethyl citrate	77-93-0	<0.1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Triisopropylphosphate	513-02-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L

Table 31 GC-MS results Oxhey Park, 2121512, 21th August 2020

GCMS Results for Sample:		2121512	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	<0.1	µg/L
.gamma.-Sitosterol	83-47-6	1 - 5	µg/L
1,2-Cyclohexanediol, 1-methyl-4-(1-	1946-00-5	0.1 - 1	µg/L

methylethenyl)-			
1H-Indole, 2,3-dihydro-4-methyl-	62108-16-1	<0.1	µg/L
2(3H)-Benzothiazolone	934-34-9	0.1 - 1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	<0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,6-Dimethylphenyl isocyanate	28556-81-2	<0.1	µg/L
2-Propanol, 1-(2-methoxypropoxy)-	13429-07-7	<0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Acetamide, N-acetyl-N,N'-1,2-ethanediyldis-	137706-80-0	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Benz[a]anthracene	56-55-3	<0.1	µg/L
Benzenesulfonamide	98-10-2	1 - 5	µg/L
Benzenesulfonamide, 2-methyl-	88-19-7	<0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	<0.1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Benzoic acid, pentadecyl ester	1000340-22-8	<0.1	µg/L
Benzophenone	119-61-9	<0.1	µg/L
Benzophenone-3	131-57-7	<0.1	µg/L
Benzothiazole	95-16-9	<0.1	µg/L
Butyl citrate	77-94-1	<0.1	µg/L
Caffeine	58-08-2	1 - 5	µg/L
Campesterol	474-62-4	0.1 - 1	µg/L
Caprolactam	105-60-2	1 - 5	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Chloroxylenol	88-04-0	0.1 - 1	µg/L
Cholest-4-en-3-one	601-57-0	0.1 - 1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	1 - 5	µg/L
Cholesterol	57-88-5	>5	µg/L
Cocaine	50-36-2	0.1 - 1	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Coumarin	91-64-5	<0.1	µg/L
Cyclohexanol, 5-methyl-2-(1-methylethyl)-	1490-04-6	0.1 - 1	µg/L
Cyclopentaneacetic acid, 3-oxo-2-pentyl-, methyl ester	24851-98-7	0.1 - 1	µg/L
D-Carvone	2244-16-8	<0.1	µg/L
Dichloroxylenol	133-53-9	<0.1	µg/L
Diflufenican	83164-33-4	<0.1	µg/L

Dimethyl phthalate	131-11-3	<0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenyl sulfone	127-63-9	<0.1	µg/L
Ergosta-5,22-dien-3-ol, (3.beta.,22E,24S)-	17472-78-5	0.1 - 1	µg/L
Ergostanol	6538-02-9	0.1 - 1	µg/L
Fipronil	120068-37-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Gabapentin	60142-96-3	<0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	<0.1	µg/L
Homosalate	118-56-9	0.1 - 1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Myclobutanil	88671-89-0	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	>5	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Octocrylene	6197-30-4	0.1 - 1	µg/L
o-Toluidine	95-53-4	<0.1	µg/L
Phenanthrene	85-01-8	<0.1	µg/L
p-Isopropoxyaniline	7664-66-6	<0.1	µg/L
Propiconazole-I	60207-90-1	0.1 - 1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Stigmast-7-en-3-ol, (3.beta.,5.alpha.,24S)-	18525-35-4	<0.1	µg/L
Stigmastanol	19466-47-8	0.1 - 1	µg/L
Stigmasterol	83-48-7	0.1 - 1	µg/L
Terbutryne	886-50-0	0.1 - 1	µg/L
Terpineol	98-55-5	<0.1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Theobromine	83-67-0	0.1 - 1	µg/L
Thymol	89-83-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	<0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Tributyl phosphate	126-73-8	>5	µg/L
Triethyl citrate	77-93-0	0.1 - 1	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Triisopropylphosphate	513-02-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	<0.1	µg/L
Vitamin E	59-02-9	<0.1	µg/L

Table 32 GC-MS results Lairage Land, 2121515, 21th August 2020

GCMS Results for Sample:		2121515	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	<0.1	µg/L
.alpha.-Amyrin	638-95-9	<0.1	µg/L
.gamma.-Sitostenone	84924-96-9	<0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1H-Benzotriazole	95-14-7	1 - 5	µg/L
2(3H)-Benzothiazolone	934-34-9	0.1 - 1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	<0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	<0.1	µg/L
Atrazine desethyl	6190-65-4	<0.1	µg/L
Benz[a]anthracene	56-55-3	<0.1	µg/L
Benzenesulfonamide	98-10-2	1 - 5	µg/L
Benzenesulfonamide, 2-methyl-	88-19-7	<0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	<0.1	µg/L
Benzo[b]fluoranthene	205-99-2	<0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Butyl citrate	77-94-1	<0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Caprolactam	105-60-2	1 - 5	µg/L
Carbamazepine	298-46-4	<0.1	µg/L
Chloroxlenol	88-04-0	<0.1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Cresyl diphenyl phosphate	26444-49-5	<0.1	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Dimethyl phthalate	131-11-3	<0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L

Diphenyl sulfone	127-63-9	<0.1	µg/L
Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	<0.1	µg/L
Fluoranthene	206-44-0	<0.1	µg/L
Gabapentin	60142-96-3	<0.1	µg/L
Galaxolide	1222-05-5	<0.1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.1 - 1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	<0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	<0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	<0.1	µg/L
Octocrylene	6197-30-4	<0.1	µg/L
o-Toluidine	95-53-4	<0.1	µg/L
Primidone	125-33-7	0.1 - 1	µg/L
Propiconazole-I	60207-90-1	0.1 - 1	µg/L
Propiconazole-II	60207-90-1	<0.1	µg/L
Pyrene	129-00-0	<0.1	µg/L
Stigmasterol	83-48-7	0.1 - 1	µg/L
Terbutryne	886-50-0	<0.1	µg/L
Tetramethyl succinimide	3566-61-8	<0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Tributyl acetylcitrate	77-90-7	<0.1	µg/L
Tributyl phosphate	126-73-8	>5	µg/L
Triethyl phosphate	78-40-0	<0.1	µg/L
Triisopropylphosphate	513-02-0	<0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L

Table 33 GC-MS results River Ver, 222605 10th June 2021

GCMS Results for Sample:		2226505	
Compound Name	CAS#	Concentration	Units
.beta.-Amyrone	638-97-1	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	1 - 5	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.01 - 0.1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.01 - 0.1	µg/L
Cholest-4-en-3-one	601-57-0	0.01 - 0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Simazine	122-34-9	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Stigmasta-5,24(28)-dien-3-ol, (3.beta.,24Z)-	481-14-1	0.1 - 1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L

Table 34 GC-MS results Munden House Ford, 2226504, 10th June 2021

GCMS Results for Sample:		2226504	
Compound Name	CAS#	Concentration	Units
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-Propanol, 2-(2-methoxypropoxy)-	13588-28-8	0.01 - 0.1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benzeneethanol, .alpha.,.alpha.-dimethyl-	100-86-7	0.01 - 0.1	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.01 - 0.1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-	5306-85-4	0.01 - 0.1	µg/L
Diethylene glycol dibutyl ether	112-73-2	0.01 - 0.1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.1 - 1	µg/L
Ethanone, 2,2-dimethoxy-1,2-diphenyl-	24650-42-8	0.01 - 0.1	µg/L
Fipronil	120068-37-3	0.1 - 1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.1 - 1	µg/L
Indano[2,1-d]1,3-dioxane,	102688-70-0	0.01 - 0.1	µg/L
Ketamine	6740-88-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triethyl phosphate	78-40-0	0.01 - 0.1	µg/L

Triisopropylphosphate	513-02-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L

Table 35 GC-MS results Shaftsbury Road, 2226509, 10th June 2021

GCMS Results for Sample:		2226509	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-Propanol, 2-(2-methoxypropoxy)-	13588-28-8	0.01 - 0.1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Caffeine	58-08-2	0.01 - 0.1	µg/L
Campesterol	474-62-4	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.01 - 0.1	µg/L
Cholest-4-en-3-one	601-57-0	0.01 - 0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-	5306-85-4	0.01 - 0.1	µg/L
Diclofenac artifact	15362-40-0	0.01 - 0.1	µg/L
Diethylene glycol dibutyl ether	112-73-2	0.01 - 0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.01 - 0.1	µg/L
Imidazo[4,5-d]imidazole-2,5-(1H,3H)dione, tetrahydro-1,3,4,6-tetramethyl-	10095-06-4	0.01 - 0.1	µg/L
Indano[2,1-d]1,3-dioxane,	102688-70-0	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Isophorone	78-59-1	0.01 - 0.1	µg/L



Ketamine	6740-88-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.01 - 0.1	µg/L
Stigmasterol	83-48-7	0.1 - 1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triethyl phosphate	78-40-0	0.01 - 0.1	µg/L
Triisopropylphosphate	513-02-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.01 - 0.1	µg/L

Table 36 GC-MS results Knutsford Playing Fields, 2226506, 10th June 2021

GCMS Results for Sample:		2226506	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-Propanol, 2-(2-methoxypropoxy)-	13588-28-8	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4H-Inden-4-one, 1,2,3,5,6,7-hexahydro-1,1,2,3,3-pentamethyl-	33704-61-9	0.01 - 0.1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzeneethanol, .alpha.,.alpha.-dimethyl-	100-86-7	0.01 - 0.1	µg/L
Benzenemethanol, .alpha.-[1-(ethylmethylamino)ethyl]-, [R-(R*,S*)]-	48141-64-6	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L

Caffeine	58-08-2	0.01 - 0.1	µg/L
Campesterol	474-62-4	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.01 - 0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-	5306-85-4	0.01 - 0.1	µg/L
Diethylene glycol dibutyl ether	112-73-2	0.01 - 0.1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.01 - 0.1	µg/L
Indano[2,1-d]1,3-dioxane,	102688-70-0	0.01 - 0.1	µg/L
Ketamine	6740-88-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
N,N,N',N'-Tetraacetythylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Pyrazine	290-37-9	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Tricyclo[5.2.1.0(2,6)]dec-4-en-8-one	1000191-39-7	0.01 - 0.1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triethyl phosphate	78-40-0	0.01 - 0.1	µg/L
Triisopropylphosphate	513-02-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.01 - 0.1	µg/L

Table 37 GC-MS results Oxhey Park, 2226508, 10th June 2021

GCMS Results for Sample:		2226508	
Compound Name	CAS#	Concentration	Units
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-Propanol, 2-(2-methoxypropoxy)-	13588-28-8	0.1 - 1	µg/L

2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-Piperidinone, 2,2,6,6-tetramethyl-	826-36-8	0.1 - 1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.01 - 0.1	µg/L
Cholest-4-en-3-one	601-57-0	0.01 - 0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-	5306-85-4	0.01 - 0.1	µg/L
Diclofenac artifact	15362-40-0	0.01 - 0.1	µg/L
Diethylene glycol dibutyl ether	112-73-2	0.01 - 0.1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Imidazo[4,5-d]imidazole-2,5-(1H,3H)dione, tetrahydro-1,3,4,6-tetramethyl-	10095-06-4	0.01 - 0.1	µg/L
Indano[2,1-d]1,3-dioxane,	102688-70-0	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Ketamine	6740-88-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Primidone	125-33-7	0.1 - 1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Simazine	122-34-9	0.01 - 0.1	µg/L
Squalene	111-02-4	0.01 - 0.1	µg/L

Stigmasta-5,24(28)-dien-3-ol, (3.beta.,24Z)-	481-14-1	0.01 - 0.1	µg/L
Stigmasterol	83-48-7	0.1 - 1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L

Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triethyl phosphate	78-40-0	0.01 - 0.1	µg/L
Triisopropylphosphate	513-02-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.01 - 0.1	µg/L

Table 38 GC-MS results Lairage Land, 2226507, 10th June 2021

GCMS Results for Sample:		2226507	
Compound Name	CAS#	Concentration	Units
.beta.-Amyrone	638-97-1	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	1 - 5	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	0.01 - 0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-Piperidinone, 2,2,6,6-tetramethyl-	826-36-8	0.1 - 1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	0.1 - 1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	0.1 - 1	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.01 - 0.1	µg/L
Cholest-4-en-3-one	601-57-0	0.01 - 0.1	µg/L
Cholesta-5,22-dien-3-ol, (3.beta.)-	92218-20-7	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
D-Glucitol, 1,4:3,6-dianhydro-2,5-di-O-methyl-	5306-85-4	0.01 - 0.1	µg/L
Diethylene glycol dibutyl ether	112-73-2	0.01 - 0.1	µg/L

Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.01 - 0.1	µg/L
Indano[2,1-d]1,3-dioxane,	102688-70-0	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Ketamine	6740-88-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.01 - 0.1	µg/L
Stigmasta-5,24(28)-dien-3-ol, (3.beta.,24Z)-	481-14-1	0.1 - 1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triethyl phosphate	78-40-0	0.01 - 0.1	µg/L
Triisopropylphosphate	513-02-0	0.01 - 0.1	µg/L

Table 39 GC-MS results Coursers Road, 2296463, 10th December 2021

GCMS Results for Sample:		2296463	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.1 - 1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-((1S,3aR,4R,7S,7aS)-4-Hydroxy-7-isopropyl-4-methyloctahydro-1H-inden-1-yl)ethanone	1911-78-0	0.1 - 1	µg/L
1(3H)-Isobenzofuranone	87-41-2	0.01 - 0.1	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1H-Pyrrole-2,5-dione, 3-ethyl-4-methyl-	20189-42-8	0.01 - 0.1	µg/L
1-Propanol, 2-(2-hydroxypropoxy)-	106-62-7	0.01 - 0.1	µg/L
2(1H)-Phenanthreneone, 3,4,4a,9,10,10a-hexahydro-6-hydroxy-1,1,4a-trimethyl-7-(1methylethyl)-, (4aS-trans)-	472-37-7	0.01 - 0.1	µg/L

2,3-Dichlorobiphenyl	16605-91-7	0.01 - 0.1	µg/L
2,4',5-Trichlorobiphenyl	16606-02-3	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,4-Dimethylphenol	105-67-9	0.01 - 0.1	µg/L
2,4-Di-tert-butylphenol	96-76-4	0.1 - 1	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	0.01 - 0.1	µg/L
2-Propanol, 1-(2-methoxypropoxy)-	13429-07-7	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-tert-Octylphenol	140-66-9	0.01 - 0.1	µg/L
Acetophenone	98-86-2	0.1 - 1	µg/L
Aclonifen	74070-46-5	0.1 - 1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Boscalid	188425-85-6	0.1 - 1	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Caprolactam	105-60-2	1 - 5	µg/L
Cholesterol	57-88-5	>5	µg/L
Coumarin	91-64-5	0.01 - 0.1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Diflufenican	83164-33-4	0.1 - 1	µg/L
Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Flufenacet	142459-58-3	1 - 5	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Hexathiane	13798-23-7	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
Lup-20(29)-en-3-one	1617-70-5	0.01 - 0.1	µg/L
Metaldehyde	108-62-3	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.01 - 0.1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
N-Phenylsuccinimide	83-25-0	0.01 - 0.1	µg/L

Pendimethalin	40487-42-1	0.1 - 1	µg/L
Propyzamide	23950-58-5	>5	µg/L

Prosulfocarb	52888-80-9	0.1 - 1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Quinmerac (breakdown product)	90717-03-6	0.1 - 1	µg/L
Silthiofam	175217-20-6	0.1 - 1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Sulfur (S8)	10544-50-0	1 - 5	µg/L
Terpineol	98-55-5	0.01 - 0.1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	0.01 - 0.1	µg/L
Tri-allate	2303-17-5	0.1 - 1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.1 - 1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L

Table 40 GC-MS results Tykes Water Radlett, 2296462, 10th December 2021

GCMS Results for Sample:		2296462	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.1 - 1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-((1S,3aR,4R,7S,7aS)-4-Hydroxy-7-isopropyl-4-methyloctahydro-1H-inden-1-yl)ethanone	1911-78-0	0.1 - 1	µg/L
1,2-Benzisothiazole	272-16-2	0.1 - 1	µg/L
2(3H)-Benzothiazolone	934-34-9	1 - 5	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	0.1 - 1	µg/L
2,4-Di-tert-butylphenol	96-76-4	0.1 - 1	µg/L
2-Chloroethyl benzoate	939-55-9	0.01 - 0.1	µg/L
2-Methoxynaphthalene	93-04-9	0.01 - 0.1	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	0.1 - 1	µg/L
2-Propanol, 1-butoxy-	5131-66-8	0.01 - 0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-tert-Octylphenol	140-66-9	0.01 - 0.1	µg/L
9,10-Anthracenedione, 2,7-dimethyl-	3286-01-9	0.01 - 0.1	µg/L
Acetaminophen	103-90-2	0.1 - 1	µg/L
Acetophenone	98-86-2	0.1 - 1	µg/L

Anthracene	120-12-7	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.1 - 1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzonitrile, 2-hydroxy-	611-20-1	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Bixafen	581809-46-3	0.01 - 0.1	µg/L
Butanedioic acid, dimethyl ester	106-65-0	>5	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Caffeine	58-08-2	1 - 5	µg/L
Chloroxylenol	88-04-0	0.1 - 1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	0.01 - 0.1	µg/L
Coumarin	91-64-5	0.01 - 0.1	µg/L
Cresyl diphenyl phosphate	26444-49-5	0.01 - 0.1	µg/L
Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1.alpha.,2.beta.,5.alpha.)-(+/-)-	15356-70-4	0.1 - 1	µg/L
Cyclopentaneacetic acid, 3-oxo-2-pentyl-, methyl ester	24851-98-7	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Didecan-2-yl phthalate	28029-89-2	0.1 - 1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimethyl adipate	627-93-0	1 - 5	µg/L
Dimethyl fumarate	624-49-7	0.01 - 0.1	µg/L
Dimethyl phthalate	131-11-3	1 - 5	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L

Ethanol, 2-[2-(2-methoxyethoxy)ethoxy]-	112-35-6	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.1 - 1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.01 - 0.1	µg/L
Hexachloroethane	67-72-1	0.01 - 0.1	µg/L
Hexanoic acid, (2-hexanoylaminoethyl)-amide	50905-12-9	0.1 - 1	µg/L
Ibuprofen	15687-27-1	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	1 - 5	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.01 - 0.1	µg/L



N-Phenylsuccinimide	83-25-0	0.01 - 0.1	µg/L
Octocrylene	6197-30-4	0.01 - 0.1	µg/L
p-Cresol (4-methylphenol)	106-44-5	0.1 - 1	µg/L
Pendimethalin	40487-42-1	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Propyzamide	23950-58-5	0.01 - 0.1	µg/L
Prosulfocarb	52888-80-9	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Stigmastanol	19466-47-8	0.1 - 1	µg/L
Terpineol	98-55-5	0.1 - 1	µg/L
Tetraethyleneglycol monomethylether	23783-42-8	0.1 - 1	µg/L
Theobromine	83-67-0	0.1 - 1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	0.1 - 1	µg/L
Tri-allate	2303-17-5	0.01 - 0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triphenyl phosphate	115-86-6	0.1 - 1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.1 - 1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L

Table 41 GC-MS results River Ver, 2296457, 10th December 2021

GCMS Results for Sample:		2296457	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-((1S,3aR,4R,7S,7aS)-4-Hydroxy-7-isopropyl-4-methyloctahydro-1H-inden-1-yl)ethanone	1911-78-0	0.1 - 1	µg/L
2-Ethylhexanoic acid	149-57-5	0.1 - 1	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	0.01 - 0.1	µg/L
2-Propanol, 1-(2-methoxypropoxy)-	13429-07-7	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-tert-Octylphenol	140-66-9	0.01 - 0.1	µg/L
9,19-Cyclolanostan-3-ol, 24-methylene-, (3.beta.)-	1449-09-8	0.01 - 0.1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Atrazine desethyl	6190-65-4	0.01 - 0.1	µg/L

Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.1 - 1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzo[k]fluoranthene	207-08-9	0.01 - 0.1	µg/L
Benzothiazole	95-16-9	0.01 - 0.1	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Caprolactam	105-60-2	1 - 5	µg/L
Cholesterol	57-88-5	>5	µg/L
Coumarin	91-64-5	0.01 - 0.1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Dimethyl phthalate	131-11-3	0.01 - 0.1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.1 - 1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.1 - 1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
N-Phenylsuccinimide	83-25-0	0.01 - 0.1	µg/L
Olean-12-en-3-ol, acetate, (3.beta.)-	1616-93-9	0.01 - 0.1	µg/L
Oplopanonyl acetate	132032-86-1	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Phytol	150-86-7	0.01 - 0.1	µg/L
Propylamide	23950-58-5	0.01 - 0.1	µg/L
Prosulfocarb	52888-80-9	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Terpineol	98-55-5	0.01 - 0.1	µg/L
Tetrachloroethene	127-18-4	0.1 - 1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.01 - 0.1	µg/L

Triacetin	102-76-1	0.01 - 0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.01 - 0.1	µg/L

Vitamin E	59-02-9	0.01 - 0.1	µg/L
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Table 42 GC-MS results xxxx, 2297844, 10th December 2021

GCMS Results for Sample:		2297844	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1-((1S,3aR,4R,7S,7aS)-4-Hydroxy-7-isopropyl-4-methyloctahydro-1H-inden-1-yl)ethanone	1911-78-0	0.1 - 1	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	0.01 - 0.1	µg/L
2(3H)-Benzothiazolone	934-34-9	0.1 - 1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,5-Trichlorophenol	95-95-4	0.01 - 0.1	µg/L
2,4,6-Tribromophenol	118-79-6	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	10230-62-3	0.01 - 0.1	µg/L
2-Propanol, 1-(2-methoxy-1-methylethoxy)-	20324-32-7	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Acridine, 9,10-dihydro-	92-81-9	0.01 - 0.1	µg/L
Atrazine	1912-24-9	0.01 - 0.1	µg/L
Azobenzene	103-33-3	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzo[k]fluoranthene	207-08-9	0.01 - 0.1	µg/L
Benzophenone-3	131-57-7	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.01 - 0.1	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.1 - 1	µg/L
Chloroxlenol	88-04-0	0.1 - 1	µg/L

Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	0.01 - 0.1	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Coumarin	91-64-5	0.01 - 0.1	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fipronil	120068-37-3	0.1 - 1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L

Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.01 - 0.1	µg/L
Methocarbamol	532-03-6	0.01 - 0.1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
Octocrylene	6197-30-4	0.01 - 0.1	µg/L
Pendimethalin	40487-42-1	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Phytol	150-86-7	0.01 - 0.1	µg/L
Primidone	125-33-7	0.1 - 1	µg/L
Propyzamide	23950-58-5	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Stigmastanol	19466-47-8	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Terpineol	98-55-5	0.1 - 1	µg/L
Tetramethyl succinimide	3566-61-8	1 - 5	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.01 - 0.1	µg/L
Triacetin	102-76-1	0.01 - 0.1	µg/L
Tri-allate	2303-17-5	0.01 - 0.1	µg/L
Triallyl isocyanurate	1025-15-6	0.01 - 0.1	µg/L
Tributyl acetyl citrate	77-90-7	0.01 - 0.1	µg/L

Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.01 - 0.1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L

Table 43 GC-MS results Munden Road, 2296458, 10th December 2021

GCMS Results for Sample:		2296458	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	0.01 - 0.1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,5-Trichlorophenol	95-95-4	0.01 - 0.1	µg/L
2,4,6-Tribromophenol	118-79-6	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	10230-62-3	0.01 - 0.1	µg/L
2-Propanol, 1-[2-(2-methoxy-1-methylethoxy)-1-methylethoxy]-	20324-33-8	0.01 - 0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Acridine, 9,10-dihydro-	92-81-9	0.01 - 0.1	µg/L
Azobenzene	103-33-3	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzene, (2-isothiocyanatoethyl)-	2257-09-2	0.01 - 0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[k]fluoranthene	207-08-9	0.01 - 0.1	µg/L
Benzophenone-3	131-57-7	0.01 - 0.1	µg/L
eine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.1 - 1	µg/L
Cholest-4-en-3-one	601-57-0	0.01 - 0.1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L

Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fluorene	86-73-7	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Heptafluorobutyric acid, n-octadecyl ester	400-57-7	0.1 - 1	µg/L
Indane	496-11-7	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
Isophorone	78-59-1	0.01 - 0.1	µg/L
m+p-Xylene	108-38-3+106	0.1 - 1	µg/L
Metaldehyde	108-62-3	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L

Neophytadiene	504-96-1	0.1 - 1	µg/L
N-nitrosodiphenylamine	86-30-6	0.01 - 0.1	µg/L
Octocrylene	6197-30-4	0.01 - 0.1	µg/L
p-Cresol (4-methylphenol)	106-44-5	0.01 - 0.1	µg/L
Phytol	150-86-7	0.01 - 0.1	µg/L
Propyzamide	23950-58-5	0.01 - 0.1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Stigmastanol	19466-47-8	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	1 - 5	µg/L
Toluene	108-88-3	0.1 - 1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triallyl isocyanurate	1025-15-6	0.01 - 0.1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.01 - 0.1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L

Table 44 GC-MS results Knutsford Playing Fields, 2296461, 10th December 2021

GCMS Results for Sample:		2296461	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1,2,4-Trimethylbenzene	95-63-6	0.1 - 1	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1,3,5-Trimethylbenzene	108-67-8	0.1 - 1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	0.01 - 0.1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	10230-62-3	0.01 - 0.1	µg/L
2-Methylnaphthalene	91-57-6	0.01 - 0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
Acetophenone	98-86-2	0.1 - 1	µg/L
Azobenzene	103-33-3	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzene, (2-isothiocyanatoethyl)-	2257-09-2	0.01 - 0.1	µg/L
Benzene, 1,4-diethyl-	105-05-5	0.01 - 0.1	µg/L
Benzene, 1-ethyl-4-methyl-	622-96-8	0.1 - 1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzenesulfonilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzophenone-3	131-57-7	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.1 - 1	µg/L
Cholestan-3-ol, (3.beta.,.5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	0.01 - 0.1	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L

Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.01 - 0.1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Hexa(methoxymethyl)melamine	68002-20-0	0.01 - 0.1	µg/L
Indane	496-11-7	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
m+p-Xylene	108-38-3+106	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L

N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
n-Propylbenzene	103-65-1	0.01 - 0.1	µg/L
Pentobarbital	76-74-4	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Primidone	125-33-7	1 - 5	µg/L
Propane, 1,1-dimethoxy-2-methyl-	41632-89-7	0.01 - 0.1	µg/L
Propylamide	23950-58-5	0.1 - 1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
Pyridine, 2-(2-phenylethenyl)-	714-08-9	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	1 - 5	µg/L
Toluene	108-88-3	0.1 - 1	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Tri-allate	2303-17-5	0.01 - 0.1	µg/L
Triallyl isocyanurate	1025-15-6	0.01 - 0.1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.01 - 0.1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L



Table 45 GC-MS results Oxhey Road, 2296460, 10th December 2021

GCMS Results for Sample:		2296460	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1,2,4-Trimethylbenzene	95-63-6	0.1 - 1	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1,3,5-Trimethylbenzene	108-67-8	0.1 - 1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	0.01 - 0.1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.1 - 1	µg/L
2,4,6-Tribromophenol	118-79-6	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	10230-62-3	0.01 - 0.1	µg/L
2,4-Di-tert-butylphenol	96-76-4	0.1 - 1	µg/L
2-Methylnaphthalene	91-57-6	0.01 - 0.1	µg/L
2-Propanol, 1-[2-(2-methoxy-1-methylethoxy)-1-methylethoxy]-	20324-33-8	0.01 - 0.1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-tert-Octylphenol	140-66-9	0.01 - 0.1	µg/L
Acetophenone	98-86-2	0.1 - 1	µg/L
Azobenzene	103-33-3	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzene, (2-isothiocyanatoethyl)-	2257-09-2	0.01 - 0.1	µg/L
Benzene, 1,4-diethyl-	105-05-5	0.01 - 0.1	µg/L
Benzene, 1-ethyl-2,4-dimethyl-	874-41-9	0.01 - 0.1	µg/L
Benzene, 1-ethyl-2-methyl-	611-14-3	0.01 - 0.1	µg/L
Benzene, 1-methyl-4-propyl-	1074-55-1	0.01 - 0.1	µg/L
Benzene, 2-ethyl-1,4-dimethyl-	1758-88-9	0.01 - 0.1	µg/L
Benzenesulfonamide, 4-methyl-	70-55-3	1 - 5	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzophenone-3	131-57-7	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L
Carbamazepine	298-46-4	0.1 - 1	µg/L

Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Coumarin	91-64-5	0.01 - 0.1	µg/L
Cresyl diphenyl phosphate	26444-49-5	0.01 - 0.1	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenyl sulfone	127-63-9	0.01 - 0.1	µg/L

Diphenylamine	122-39-4	0.01 - 0.1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.1 - 1	µg/L
Ethyl benzene	100-41-4	0.1 - 1	µg/L
Fluoranthene	206-44-0	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Indane	496-11-7	0.01 - 0.1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.1 - 1	µg/L
Isophorone	78-59-1	0.01 - 0.1	µg/L
Lidocaine	137-58-6	0.1 - 1	µg/L
m+p-Xylene	108-38-3+106	1 - 5	µg/L
Metaldehyde	108-62-3	0.1 - 1	µg/L
MTBE	1634-04-4	0.1 - 1	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Naphthalene	91-20-3	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-5,7-dimethyl-	21693-54-9	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-5-methyl-	2809-64-5	0.01 - 0.1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
n-Propylbenzene	103-65-1	0.1 - 1	µg/L
Octocrylene	6197-30-4	0.01 - 0.1	µg/L
o-Xylene	95-47-6	0.1 - 1	µg/L
Pentobarbital	76-74-4	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Phytol	150-86-7	0.01 - 0.1	µg/L
Propyzamide	23950-58-5	0.1 - 1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
sec-Butylbenzene	135-98-8	0.01 - 0.1	µg/L
Squalene	111-02-4	0.1 - 1	µg/L
Stigmastanol	19466-47-8	0.1 - 1	µg/L

Terbutryne	886-50-0	0.01 - 0.1	µg/L
Tetramethyl succinimide	3566-61-8	1 - 5	µg/L
Toluene	108-88-3	1 - 5	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	0.01 - 0.1	µg/L
Tri-allate	2303-17-5	0.01 - 0.1	µg/L
Triallyl isocyanurate	1025-15-6	0.01 - 0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.01 - 0.1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L

Table 46 GC-MS results Lairage Land, 2296459, 10th December 2021

GCMS Results for Sample:		2296459	
Compound Name	CAS#	Concentration	Units
.alpha.,.alpha.'-Dihydroxy-m-diisopropylbenzene	1999-85-5	0.01 - 0.1	µg/L
.gamma.-Sitostenone	84924-96-9	0.01 - 0.1	µg/L
.gamma.-Sitosterol	83-47-6	0.1 - 1	µg/L
1,2,4-Trimethylbenzene	95-63-6	1 - 5	µg/L
1,2-Benzisothiazole	272-16-2	0.01 - 0.1	µg/L
1,2-Dibromoethane	106-93-4	0.01 - 0.1	µg/L
1,3,5-Trimethylbenzene	108-67-8	0.1 - 1	µg/L
1H-Benzotriazole, 5-methyl-	136-85-6	0.01 - 0.1	µg/L
1H-Indene, 2,3-dihydro-5-methyl-	874-35-1	0.01 - 0.1	µg/L
2(3H)-Benzothiazolone	934-34-9	0.1 - 1	µg/L
2-(Methylmercapto)benzothiazole	615-22-5	0.01 - 0.1	µg/L
2,2,2-Trichloro-1-phenylethanol	2000-43-3	0.01 - 0.1	µg/L
2,4,6-Tribromophenol	118-79-6	0.01 - 0.1	µg/L
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	126-86-3	>5	µg/L
2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	10230-62-3	0.01 - 0.1	µg/L
2,4-Di-tert-butylphenol	96-76-4	0.1 - 1	µg/L
2-Methylnaphthalene	91-57-6	0.01 - 0.1	µg/L
2-Propanol, 1-[2-(2-methoxy-1-methylethoxy)-1-methylethoxy]-	20324-33-8	0.1 - 1	µg/L
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	0.1 - 1	µg/L
4-tert-Octylphenol	140-66-9	0.01 - 0.1	µg/L
acenaphthene	83-32-9	0.01 - 0.1	µg/L

Acetophenone	98-86-2	0.1 - 1	µg/L
Azobenzene	103-33-3	0.01 - 0.1	µg/L
Benz[a]anthracene	56-55-3	0.01 - 0.1	µg/L
Benzaldehyde	100-52-7	0.01 - 0.1	µg/L
Benzene	71-43-2	0.1 - 1	µg/L
Benzene, (1-methyl-1-propenyl)-, (E)-	768-00-3	0.01 - 0.1	µg/L
Benzene, (2-isothiocyanatoethyl)-	2257-09-2	0.01 - 0.1	µg/L
Benzene, 1,2,3,5-tetramethyl-	527-53-7	0.1 - 1	µg/L
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 - 1	µg/L
Benzene, 1,4-diethyl-	105-05-5	0.01 - 0.1	µg/L
Benzene, 1-ethyl-2,4-dimethyl-	874-41-9	0.01 - 0.1	µg/L
Benzene, 1-ethyl-2-methyl-	611-14-3	0.1 - 1	µg/L
Benzene, 1-ethyl-3-methyl-	620-14-4	1 - 5	µg/L
Benzene, 1-ethyl-4-methyl-	622-96-8	1 - 5	µg/L
Benzene, 1-methyl-4-propyl-	1074-55-1	0.01 - 0.1	µg/L
Benzene, 2-ethyl-1,4-dimethyl-	1758-88-9	0.1 - 1	µg/L
Benzene, 4-ethenyl-1,2-dimethyl-	27831-13-6	0.01 - 0.1	µg/L
Benzenesulfonamide, N-butyl	3622-84-2	1 - 5	µg/L
Benzenesulfonamide, N-ethyl-2-methyl-	1077-56-1	0.01 - 0.1	µg/L
Benzenesulfonanilide	1678-25-7	0.01 - 0.1	µg/L
Benzo[a]pyrene	50-32-8	0.01 - 0.1	µg/L
Benzo[b]fluoranthene	205-99-2	0.01 - 0.1	µg/L
Benzo[ghi]perylene	191-24-2	0.01 - 0.1	µg/L
Benzophenone-3	131-57-7	0.01 - 0.1	µg/L
Bisphenol A	80-05-7	0.1 - 1	µg/L
Butyl citrate	77-94-1	0.01 - 0.1	µg/L
Caffeine	58-08-2	0.1 - 1	µg/L

Carbamazepine	298-46-4	0.1 - 1	µg/L
Chloroxylenol	88-04-0	0.01 - 0.1	µg/L
Cholestan-3-ol, (3.beta.,5.beta.)-	360-68-9	0.1 - 1	µg/L
Cholesterol	57-88-5	>5	µg/L
Chrysene	218-01-9	0.01 - 0.1	µg/L
Cotinine	486-56-6	1 - 5	µg/L
Cresyl diphenyl phosphate	26444-49-5	0.01 - 0.1	µg/L
Crotamiton	483-63-6	0.1 - 1	µg/L
Dibenz[a,h]anthracene	53-70-3	0.01 - 0.1	µg/L
Diflufenican	83164-33-4	0.01 - 0.1	µg/L
Dimethyl phthalate	131-11-3	0.1 - 1	µg/L
Dimetridazole	551-92-8	0.1 - 1	µg/L
Diphenylamine	122-39-4	0.01 - 0.1	µg/L

Ergost-5-en-3-ol, (3.beta.)-	4651-51-8	0.1 - 1	µg/L
Ethanol, 2-butoxy-, phosphate (3:1)	78-51-3	0.1 - 1	µg/L
Ethyl benzene	100-41-4	1 - 5	µg/L
Fipronil	120068-37-3	0.1 - 1	µg/L
Fluorene	86-73-7	0.01 - 0.1	µg/L
Galaxolide	1222-05-5	0.1 - 1	µg/L
Indane	496-11-7	0.1 - 1	µg/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.01 - 0.1	µg/L
Isophorone	78-59-1	0.01 - 0.1	µg/L
m+p-Xylene	108-38-3+106-	>5	µg/L
Metaldehyde	108-62-3	0.1 - 1	µg/L
Methyl Methacrylate	80-62-6	0.01 - 0.1	µg/L
MTBE	1634-04-4	1 - 5	µg/L
N,N,N',N'-Tetraacetylenediamine	10543-57-4	0.1 - 1	µg/L
N,N-Diethyl-m-toluamide	134-62-3	0.1 - 1	µg/L
Naphthalene	91-20-3	0.1 - 1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-	119-64-2	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-1-methyl-	1559-81-5	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-2,6-dimethyl-	7524-63-2	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-2-methyl-	3877-19-8	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-5,7-dimethyl-	21693-54-9	0.01 - 0.1	µg/L
Naphthalene, 1,2,3,4-tetrahydro-5-methyl-	2809-64-5	0.01 - 0.1	µg/L
Naphthalene, 1,2-dimethyl-	573-98-8	0.01 - 0.1	µg/L
Naphthalene, 1,6-dimethyl-	575-43-9	0.01 - 0.1	µg/L
Naphthalene, 2,6-dimethyl-	581-42-0	0.01 - 0.1	µg/L
Naphthalene, 2-methyl-	91-57-6	0.01 - 0.1	µg/L
Neophytadiene	504-96-1	0.1 - 1	µg/L
n-Propylbenzene	103-65-1	0.1 - 1	µg/L
o-Cresol (2-methylphenol)	95-48-7	0.1 - 1	µg/L
Octocrylene	6197-30-4	0.01 - 0.1	µg/L
o-Xylene	95-47-6	1 - 5	µg/L
Pentobarbital	76-74-4	0.01 - 0.1	µg/L
Phenanthrene	85-01-8	0.01 - 0.1	µg/L
Primidone	125-33-7	0.1 - 1	µg/L
Propyzamide	23950-58-5	0.1 - 1	µg/L
Pyrene	129-00-0	0.01 - 0.1	µg/L
sec-Butylbenzene	135-98-8	0.01 - 0.1	µg/L

Squalene	111-02-4	0.1 - 1	µg/L
Tefluthrin	79538-32-2	0.01 - 0.1	µg/L
Terbutryne	886-50-0	0.01 - 0.1	µg/L

Tetramethyl succinimide	3566-61-8	1 - 5	µg/L
Toluene	108-88-3	>5	µg/L
Tri-(2-chloroethyl) phosphate	115-96-8	0.1 - 1	µg/L
Triacetin	102-76-1	0.01 - 0.1	µg/L
Tri-allate	2303-17-5	0.01 - 0.1	µg/L
Triallyl isocyanurate	1025-15-6	0.01 - 0.1	µg/L
Tributyl acetylcitrate	77-90-7	0.1 - 1	µg/L
Tributyl phosphate	126-73-8	0.1 - 1	µg/L
Triethyl citrate	77-93-0	0.01 - 0.1	µg/L
Triphenyl phosphate	115-86-6	0.1 - 1	µg/L
Tris-(1,3-dichloroisopropyl) phosphate	13674-87-8	0.1 - 1	µg/L
Vanillin	121-33-5	0.1 - 1	µg/L
Vitamin E	59-02-9	0.01 - 0.1	µg/L