Conditions of Contract

Procurement Title: PFAS Risk Screening Project Phase 4, Work Package 5 - Landfill Emissions Assessment

Contract number: [redacted]

Services

Document Version: October 2019

1. DEFINITIONS

1.1. In the Contract, unless the context otherwise requires the following words and expressions shall have the following meanings assigned to them.

1.1.1. Agency
The Environment Agency, its successors and assigns.

1.1.2. Agency Property
All property issued or made available for use by the Agency to the Contractor in connection with the Contract.

1.1.3. The Appendix
The Appendix to these Conditions.

1.1.4. Consumer Prices Index
The Consumer Prices Index (CPI) (all items) (United Kingdom)

1.1.5. The Contract
These Conditions including the Appendix, any Special Conditions, Specification, Pricing Schedule, Contractor's tender, acceptance letter and any relevant documents agreeing modifications exchanged before the Contract is awarded, and any subsequent amendments or variations agreed in writing.

1.1.6. The Contractor
The person, firm company or body who undertakes to supply the Services to the Agency as defined in the Contract.

1.1.7. Contract Period
The time period stated in the Appendix or otherwise provided in the Contract, for the performance of the Services.

1.1.8. Contractor Personnel
means all directors, officers, employees, agents, consultants and contractors of the Contractor and/or of any sub-contractor engaged in the performance of its obligations under this Contract

1.1.9. Contract Price
The price exclusive of VAT set out in the Contract for which the Contractor has agreed to supply the services.

1.1.10. Contract Supervisor
Any duly authorised representative of the Agency notified in writing to the Contractor for all purposes connected with the Contract. Any Notice or other written instruction given by or made to the Contract Supervisor, shall be taken as given by or made to the Agency.

1.1.11. Contracting Authority
means any contracting authorities (other than the Environment Agency) as defined in regulation 2 of the Public Contract Regulations 2015 (SI 2015/102) (as amended).

1.1.12. Data Protection Legislation
means: (i) the General Data Protection Regulation (Regulation (EU) 2016/679) or GDPR, the Law Enforcement Directive (Directive (EU) 2016/680) ("LED") and any applicable national implementing Laws as amended from time to time (ii) the Data Protection Act 1998 ("DPA 1998") and/or the Data Protection Act 2018 ("DPA 2018") to the extent that it relates to processing of personal data and privacy; (iii) all applicable Law about the processing of personal data and privacy

1.1.13. Data Protection Schedule
The Schedule attached to this Contract describing how the Parties will comply with the Data Protection Legislation.

1.1.14. Intellectual Property Rights
All Intellectual Property Rights including without limitation, patents, patent applications, design rights, registered designs, utility models, trade and service marks and applications for same, copyright know-how, rights in semi-conductor chip topography, and in each case whether protectable at law or not, and if protectable, whether an application has been made for such protection or not, and all similar industrial, commercial, monopoly or other intellectual property rights whether present or future, vested or contingent wherever protected.

1.1.15. Law
means any law, subordinate legislation within the meaning of Section 21(1) of the Interpretation Act 1978, bye-law, enforceable right within the meaning of Section 2 of the European Communities Act 1972, regulation, order, regulatory policy, mandatory guidance or code of practice, judgment of a relevant court of law, or directives or requirements with which the Contractor is bound to comply

1.1.16. Notice
Any written instruction or notice given to the Contractor by the Contract Supervisor, delivered by:

i. hand delivery to the Contractor’s registered office or other address notified for the purposes of the Contract and deemed to have been served at the date and time of delivery;

First class post to the Contractor’s registered office. Such Notices are deemed to have been served 48 hours after posting.

1.1.17. Results
All things produced in performing the Services including maps, plans, photographs, drawings, tapes, statistical data, experimental results, field data, analysis of results, published and unpublished results and reports, inventions, computer programmes and user documentation.

1.1.18. The Resulting Rights
All Intellectual Property Rights in the Results that are originated, conceived, written or made by the Contractor, whether alone or with others in the performance of the Services or otherwise resulting from the Contract.

1.1.19. Permission
Express permission given in writing before the act being permitted.

1.1.20. Services
All Services detailed in the Specification including any additions or substitutions as may be requested by the Contract Supervisor.

1.1.21. Regulations
Means the Public Contract Regulations 2015 (SI 2015/102) as amended.

1.2. Except as set out above and in the Data Protection Schedule, the Contract shall be interpreted in accordance with the Interpretation Act 1988.

1.3. All headings in these Conditions are for ease of reference only, and shall not affect the construction of the Contract.

1.4. Any reference in these Conditions to a statutory provision will include all subsequent modifications.

1.5. All undefined words and expressions are to be given their normal English meaning within the context of this Contract. Any dispute as to the interpretation of such undefined words and expressions shall be settled by reference to the definition in the Shorter Oxford English Dictionary.

2. PRECEDENCE

To the extent that the following documents form the Contract, in the case of conflict of content, they shall have the following order of precedence:

- Conditions of Contract including Appendix, Data Protection Schedule and any Special Conditions;
- Specification;
- Pricing Schedule;
- Social Value Schedule
- KPI Schedule
- Drawings, maps or other diagrams.

3. CONTRACT SUPERVISOR

The Contractor shall strictly comply with any instruction given by the Contract Supervisor concerning or about the Contract provided such instructions are reasonable and consistent with the nature, scope and value of the Contract. All such instructions shall be in writing. The Contractor is not obliged to comply with any verbal instruction from the Contract Supervisor that is not confirmed in writing within 7 working days.

4. THE SERVICES

4.1. The Contractor shall provide all staff, equipment, materials and any other requirements necessary for the performance of the Contract using reasonable skill, care and diligence, and to the reasonable satisfaction of the Contract Supervisor.

4.2. The Contractor shall only employ in the execution and superintendence of the Contract persons who are suitable and appropriately skilled and experienced. The Contract Supervisor shall be at liberty to object to and require the Contractor to remove any person employed in or about the Contract who is unsuitable, misconducts himself, is incompetent or negligent in the performance of his duties or persists in conduct which could endanger the health or safety of others. Such persons shall not be employed again on the Contract without the Permission of the Contract Supervisor.

5. ASSIGNMENT

5.1. The Contractor shall not assign, transfer or sub-contract the Contract, or any part of it, without the Permission of the Contract Supervisor.

5.2. Any assignment, transfer or sub-contract entered into, shall not relieve the Contractor of any of his obligations or duties under the Contract.

5.3. Nothing in this Contract confers or purports to confer on any third party any benefit or any right to enforce any term of the Contract.

6. CONTRACT PERIOD

The Contractor shall perform the Services within the time stated in the Appendix, subject to any changes arising from Condition 10 (Variations,) and/or Condition 11 (Extensions of time.).

7. PROPERTY

7.1. All property issued by the Agency to the Contractor in connection with the Contract shall remain the property of the Agency, and shall be used in the execution of the Contract, and for no other purpose whatsoever without the prior approval of the Contract Supervisor.

7.2. The Contractor shall keep all Agency Property in safe custody and good condition, set aside and clearly marked as the property of the Agency.

7.3. On expiry or earlier termination of the Contract the Contractor shall, if so required, either surrender such property to the Agency or otherwise dispose of it as instructed by the Contract Supervisor.

8. MATERIALS

8.1. The Contractor shall be responsible for establishing his own sources of supply for goods and materials and will be responsible for ensuring the reasonable and proper conduct by his suppliers and staff whilst on the Agency's premises.

8.2. The Contractor shall not place, or cause to be placed, any orders with suppliers or otherwise incur liabilities in the name of the Agency or any representative of the Agency.

9. SECURITY

9.1. The Contractor shall be responsible for the security of all goods and equipment belonging to the Agency and used by the Contractor in the provision of the Services, belonging to the Contractor, or Contractors staff, or sub-contractors whilst on Agency premises.

9.2. This Condition shall not prejudice the Agency's rights under Condition 15.

10. VARIATIONS

10.1. The Contract Supervisor may vary the Contract by adding to, deleting or otherwise modifying the Services to be supplied, by written order to the Contractor provided such variations are reasonable and consistent with the nature, scope and value of the Contract.

10.2. The value of any such variation, other than any variation arising out of Condition 10.3, shall be determined by reference to the rates contained in the Pricing Schedule. Where the Services so ordered are not covered in the Pricing Schedule, they shall be valued at a fair and reasonable rate agreed between the Contract Supervisor and the Contractor.

10.3. Where a variation is the result of some default or breach of the Contract by the Contractor or some other cause for which he is solely responsible, any additional cost attributable to the variation shall be borne by the Contractor.

10.4. The Contractor may also propose a variation to the Services but no such variation shall take effect unless agreed and confirmed in writing by the Contract Supervisor.

10.5. No variation shall have the effect of invalidating the Contract, or placing the Contract at large, if that variation is reasonably consistent with the nature, scope and value of the Contract. The Agency may vary the Contract to comply with a change in English Law. Such a change will be effected by the Contract Supervisor notifying the Contractor in writing.

10.6. The Agency may assign, novate or otherwise dispose of its rights and obligations under the Contract or any part thereof to:

10.6.1. any Contracting Authority; or

10.6.2. any other body established by the Crown or under statute in order substantially to perform any of the functions that had previously been performed by the Agency; or

10.6.3. any private sector body which substantially performs the functions of the Agency, provided that any such assignment, novation or other disposal shall not increase the burden of the Contractor's obligations under the Contract.

10.7. Any change in the legal status of the Agency such that it ceases to be a Contracting Authority shall not affect the validity of the Contract. In such circumstances the Contract shall bind and inure to the benefit of any successor body to the Agency.

11. EXTENSIONS OF TIME

11.1. Should the performance of the Contract be directly delayed by any cause beyond the reasonable control of the Contractor, and provided that the Contractor shall first have given the Contract Supervisor written notice within five working days after becoming aware that such delay was likely to occur, then the Contract Supervisor, if satisfied that this Condition applies:

11.1.1. in the case of any delay of which the Agency is not the cause, may grant the Contractor such extension of time, as in his opinion is reasonable, having regard without limitation, to any other delays or extensions of time that may have occurred or been granted under the Contract. The Contract Price shall not increase as a result of such an extension of time.

11.1.2. in the case of any delay of which the Agency is the cause, shall grant the Contractor a reasonable extension of time to take account of the delay.

11.2. No extension of time shall be granted where in the opinion of the Agency the Contractor has failed to use reasonable endeavours to avoid or reduce the cause and/or effects of the delay.

11.3. Any extension of time granted under this Condition shall not affect the Agency’s rights to terminate or determine the Contract under Conditions 13 and 14.

12. DEFAULT

12.1. The Contractor shall be in default if he:

12.1.1. fails to perform the Contract with due skill, care, diligence and timeliness;

12.1.2. refuses or neglects to comply with any reasonable written instruction given by the Contract Supervisor;

12.1.3. is in breach of the Contract.

12.2. Where in the opinion of the Contract Supervisor, the Contractor is in default, the Contract Supervisor may serve a Notice giving at least five working days in which to remedy the default.

12.3. If the Contractor fails to comply with such a Notice the Contract Supervisor may, without prejudice to any other rights or remedies under the Contract, take over for as such a period as is necessary the performance of the relevant part of the Contract and make other arrangements for its completion. Any extra costs arising from this action, will be paid by the Contractor or deducted from any monies owing to him.

13. TERMINATION

13.1. The Agency may immediately, without prejudice to any other rights and remedies under the Contract, terminate all or any part of the Contract by Notice in writing to the Contractor, Receiver, Liquidator or to any other person in whom the Contract may become vested, if the Contractor:

13.1.1. fails in the opinion of the Contract Supervisor to comply with (or take reasonable steps to comply with) a Notice under Condition 12.2.

13.1.2. becomes bankrupt or insolvent, or has a receiving order made against him, or makes and arrangement with his creditors or (being a corporation) commences to be wound up, not being a voluntary winding up for the purpose of reconstruction or amalgamation, or has a receiver, administrator, or administrative receiver appointed by a Court.
'Termination under the Regulations'
13.2. The Agency may terminate the Contract on written Notice to the Contractor if:

13.2.1. the contract has been subject to a substantial modification which requires a new procurement procedure pursuant to regulation 72(9) of the Regulations;

13.2.2. the Contractor was, at the time the Contract was awarded, in one of the situations specified in regulation 57(1) of the Regulations, including as a result of the application of regulation 57(2), and should therefore have been excluded from the procurement procedure which resulted in its award of the Contract; or

13.2.3. The Contract should not have been awarded to the Contractor in view of a serious infringement of the obligations under the Treaties and the Regulations

that has been declared by the Court of Justice of the European Union in a procedure under Article 258 of the TFEU.

14. DETERMINATION

14.1. Without prejudice to any other rights or remedies under the Contract, the Agency reserves the right to determine the Contract at any time by giving not less than one month's Notice, (or such other time period as may be appropriate).

14.2. The Agency shall pay the Contractor such amounts as may be necessary to cover his reasonable costs and outstanding and unavoidable commitments necessarily and solely incurred in properly performing the Contract prior to determination.

14.3. The Agency will not pay for any costs or commitments that the Contractor is able to mitigate and shall only pay those costs that the Agency has validated to its satisfaction. The Agency's total liability under this Condition shall not in any circumstances exceed the Contract Price that would have been payable for the Services if the Contract had not been determined.

15. INDEMNITY

15.1. Without prejudice to the Agency's remedies for breach of Contract, the Contractor shall fully indemnify the Agency and its staff against any legally enforceable and reasonably mitigated liability, loss, costs, expenses, claims or proceedings in respect of:

15.1.1. death or injury to any person;

15.1.2. loss or damage to any property excluding indirect and consequential loss;

15.1.3. infringement of third party Intellectual Property Rights

which might arise as a direct consequence of the actions or negligence of the Contractor, his staff or agents in the execution of the Contract.

15.2. This Condition shall not apply where the damage, injury or death is a direct result of the actions, or negligence of the Agency or its staff.

16. LIMIT OF CONTRACTOR'S LIABILITY

16.1. The limit of the Contractor's liability for each and every claim by the Agency, other than for death or personal injury, whether by way of indemnity or by reason of breach of contract, or statutory duty, or by reason of any tort shall be:

16.1.1. the sum stated in the Appendix;

16.1.2. if no sum is stated, the Contract Price or five million pounds whichever is the greater.

17. INSURANCE

17.1. The Contractor shall insure and maintain insurance against liabilities under Condition 15 (Indemnity) in the manner and to the values listed in the Appendix to these Conditions. If no sum is stated, the value insured shall be £5M (five million pounds.)

17.2. If specifically required by the Agency, nominated insurances shall be in the joint names of the Contractor and the Agency.

17.3. The Contractor shall, upon request, produce to the Contract Supervisor documentary evidence that the insurances required are fully paid up and valid for the duration of the Contract.

18. PREVENTION OF FRAUD AND CORRUPTION

18.1. The Contractor shall not offer, give, or agree to give anything, to any person an inducement or reward for doing, refraining from doing, or for having done or refrained from doing, any act in relation to the obtaining or execution of the Contract or for showing or refraining from showing favour or disfavour to any person in relation to the Contract.

18.2. The Contractor shall take all reasonable steps, in accordance with good industry practice, to prevent fraud by the Contractor's staff and the Contractor (including its shareholders, members and directors) in connection with the Contract and shall notify the Agency immediately if it has reason to suspect that any fraud has occurred or is occurring or is likely to occur.

18.3. If the Contractor or the Contractor's staff engages in conduct prohibited by this clause 18 or commits fraud in relation to the Contract or any other contract with the Crown (including the Agency) the Agency may:

18.3.1. terminate the Contract and recover from the Contractor the amount of any loss suffered by the Agency resulting from the termination, including the cost reasonably incurred by the Agency of making other arrangements for the supply of the Goods and any additional expenditure incurred by the Agency throughout the remainder of the Contract; or

18.3.2. recover in full from the Contractor any other loss sustained by the Agency in consequence of any breach of this clause.

18.4. The Contractor shall not, directly or indirectly through intermediaries commit any offence under the Bribery Act 2010 (as amended), in any of its dealings with the Agency.

19. MONITORING AND AUDIT

19.1. The Contract Supervisor may inspect and examine the Services being carried out on the Agency's premises, or elsewhere at any reasonable time. Where the Services are being performed on other than the Agency's premises, reasonable notice to inspect shall be given to the Contractor. The Contractor shall give all such facilities as the Contract Supervisor may reasonably require for such inspection and examination.

20. CONTRACT PRICE

20.1. The Contract Price will be paid by the Agency to the Contractor as amended by (a) any Variations ordered under Condition 10 (Variations) or (b) Conditions 20.3 and 20.4.

20.2. In addition to the Contract Price, the Agency will pay to the Contractor such Value Added Tax (if any) as may properly be chargeable at rates ruling at the time of invoice.

20.3 The Contract Price may be adjusted with effect from 1st April of each year by the percentage increase or decrease in the Consumer Prices Index during the previous year, as follows:

20.3.1 The Parties may agree to increase the Contract Price to reflect increases in the Contractor's direct costs of delivering the Services:

- up to a maximum of the percentage increase in the Consumer Prices Index during the previous year, which shall be capped at 4%; and
- subject to the Contractor providing in writing not less than one month before the proposed change (i) notice of the proposed change to the Contract Price and (ii) such evidence as the Agency may reasonably require demonstrating the increase in the Contractor's direct costs of delivering the Services.

20.3.2 The Agency may, by written notice to the Contractor, require the Contractor to reduce the Contract Price up to a maximum of the percentage decrease in the Consumer Prices Index during the previous year.

20.4 If an adjustment to the Contract Price under Condition 20.3 is disputed, the Contract Price then in force shall continue to apply pending determination of the dispute in accordance with Condition 29. Any adjustment to the Contract Price following determination shall be deemed to apply with effect from 1st April. Within one month of the appropriate adjustment being determined, the Agency shall pay the Contractor any outstanding sums due in respect of its purchases of Services since 1st April of the relevant year, together with any applicable VAT, or the Contractor shall refund the Agency for any excess amounts paid since 1st April, and shall repay any VAT due to be repaid, as appropriate.

21. INVOICING AND PAYMENT

21.1. Invoices shall only be submitted for work already satisfactorily completed, and accompanied by such information as the Contract Supervisor may reasonably require to verify the Contractor's entitlement to payment. Such invoices will be paid in 30 days from receipt by the Agency.

21.2. If any sum is payable under the Contract by the Contractor to the Agency, whether by deduction from the Contract or otherwise, it will be deducted from the next available invoice.

21.3. If the Contractor enters into a sub-contract with a supplier for the purpose of performing its obligations under the Contract, it shall ensure that a provision is included in the sub-contract which requires payment to be made of all sums due from it to the sub-contractor within 30 days from the receipt of a valid invoice.

22. INTELLECTUAL PROPERTY RIGHTS

22.1. All Prior Rights used in connection with the Services shall remain the property of the party introducing them. Details of each party's Prior Rights are set out in the Prior Right Schedule to this contract.

22.2. All Results shall be the property of the Agency.

22.3. The Resulting Rights in any Results, and any interim results shall, from the time they arise, be the property of the Agency and the Agency shall be free, should it so wish, to apply at its own expense for patent or other protection in respect of the Results or any interim results. The Agency's intention to apply for such patent or other protection shall be notified to the Contractor. Such applications for patents or other registered intellectual property rights shall be filed in the name of the Agency.

Unless otherwise agreed in writing between the Contractor and the Agency, the Contractor hereby:

22.3.1. assigns to the Agency all Resulting Rights

22.3.2. grants the Agency a non-exclusive, non-transferable (save for the purposes of sub-licensing, reorganisation or transfer to a successor body, for the purposes of all the successor body's normal business use), irrevocable , royalty free perpetual licence to the Agency in respect of all the Contractor's Prior Rights necessary in order for the Agency to use or exploit the Resulting Rights.

22.4. The Contractor undertakes to the Agency not to use, exploit or deal with any of the Agency's Prior Rights, other than in the performance of the Contract unless the Contractor has first obtained a written licence from the Agency, in specific terms to do so.

22.5. The Agency undertakes to the Contractor not to use or exploit the Contractor's Prior Rights, save as provided in Condition 22.3.2.

22.6. The Contractor warrants to the Agency that the performance of the Services, the Contractor's Prior Rights and the Results shall not in any way infringe any intellectual property rights of any third party.

22.7. If the Contractor is prevented from carrying out his obligations under the Contract due to any infringement or alleged infringement of any Intellectual Property Rights, the Agency may without prejudice to any other rights and remedies under the Contract, exercise the powers and remedies available to it under Conditions 13 and 14, Termination and Determination respectively.

22.8. The Contractor shall not be liable if such infringement arises from the use of any design, technique or method of working provided by or specified by the Agency.

22.9. The Contractor waives in favour of the Agency its rights to object to derogatory treatment of the Results of the Work and the Contractor also agrees that he will not assert or seek to enforce against the Agency and/or any other person, firm or company any of its moral rights as defined in the Copyright Designs and Patents Act 1988 (as amended) without the prior agreement of the Agency.

22.10. The Contractor shall not be liable for any consequential losses, damage or injuries arising from third party misuse of the Results, of which the Contractor is not aware.

23. WARRANTY

The Contractor warrants that the Services supplied by him will be discharged with reasonable skill, care and diligence.

24. STATUTORY REQUIREMENTS

The Contractor shall fully comply with all relevant statutory requirements in the performance of the Contract, including, but not limited to the giving of all necessary notices and the paying of all fees.

25. ENVIRONMENT, SUSTAINABILITY AND DIVERSITY

25.1. The Contractor in the performance of this Contract should adopt a sound proactive environmental approach, designed to minimise harm to the environment, to conserve energy, water, wood, paper and other resources, reduce waste and phase out the use of single-use plastic, ozone depleting substances and minimise the release of greenhouse gases, volatile organic compounds and other substances

damaging to health and/or the environment, and be able to provide proof of so doing to the Agency on demand.

25.2. The Agency is committed to ensuring that workers employed within its supply chains are treated fairly, humanely and equitably. The Agency expects the Contractor to share this commitment and to understand any areas of risk associated with this and work to ensure they are meeting International Labour Standards. The Contractor ensures that it and its sub-contractors and its supply chain:

25.2.1. comply with the provisions of the Modern Slavery Act 2015;

25.2.2. pay staff fair wages (and pays its staff in the UK not less than the Foundation Living Wage Rate); and

25.2.3. Implement fair shift arrangements, providing sufficient gaps between shifts, adequate rest breaks and reasonable shift length, and other best practices for staff welfare and performance.

25.3. The Contractor should support the Agency to achieve its Public Sector Equality Duty by complying with the Agency's policies (as amended from time to time) on Equality, Diversity and Inclusion (EDI). This includes ensuring that the Contractor (and their sub-contractors) in the delivery of its obligations under this Contract:

25.3.1. eliminates discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;

25.3.2. advances equality of opportunity between people who share a protected characteristic and those who do not; and

25.3.3. fosters good relations between people who share a protected characteristic and those who do not.

25. PUBLICITY

The Contractor shall not advertise or publicly announce that he is supplying Services or undertaking work for the Agency without the Permission of the Contract Supervisor.

26. LAW

This Contract shall be governed and construed in accordance with the Law, and subject to the jurisdiction of the courts of England.

27. WAIVER

27.1. No delay, neglect or forbearance by the Agency in enforcing any provision of the Contract shall be deemed to be a waiver, or in any other way prejudice the rights of the Agency under the Contract.

27.2. No waiver by the Agency shall be effective unless made in writing.

27.3. No waiver by the Agency of a breach of the Contract shall constitute a waiver of any subsequent breach.

28. ENFORCEABILITY AND SURVIVORSHIP

28.1. If any part of the Contract is found by a court of competent jurisdiction or other competent authority to be invalid or legally unenforceable, that part will be severed from the remainder of the Contract which will continue to be valid and enforceable to the fullest extent permitted by law.

28.2. The following clauses shall survive termination of the Contract, howsoever caused: 13, 14, 15, 22, 23, 24, 27, 29, 30, 31, 32 and 33.

29. DISPUTE RESOLUTION

29.1. All disputes under or in connection with this agreement shall be referred first to negotiators nominated at a suitable and appropriate working level by the Agency and the Contractor.

29.2. If the parties' negotiators are unable to resolve the dispute within a period of forty five days from its being referred to them, the dispute shall be referred at the instance of either party to the parties' respective senior managers or directors (supported as necessary by their advisers).

29.3. If the parties' respective senior managers or directors are unable to resolve the dispute within forty five days the dispute shall be referred to the Centre for Dispute Resolution who shall appoint a mediator and the parties shall then submit to the mediator's supervision of the resolution of the dispute.

29.4. Recourse to this dispute resolution procedure shall be binding on the parties as to submission to the mediation but not as to its outcome. Accordingly all negotiations connected with the dispute shall be conducted in strict confidence and without prejudice to the rights of the parties in any future legal proceedings. Except for any party's right to seek interlocutory relief in the courts, no party may commence other legal proceedings under the jurisdiction of the courts or any other form of arbitration until forty five days after the appointment of the mediator.

29.5. If, with the assistance of the mediator, the parties reach a settlement, such settlement shall be put in writing and, once signed by a duly authorised representative of each of the parties, shall remain binding on the parties.

29.6. The parties shall bear their own legal costs of this dispute resolution procedure, but the costs and expenses of mediation shall be borne by the parties equally.

29.7. Any of the time limits in Conditions 30 may be extended by mutual agreement. Such agreed extension shall not prejudice the right of either party to proceed to the next stage of resolution.

30. GENERAL

30.1. Neither party to the Contract will be liable to the other for any delay in performing or failing to perform its obligations (other than a payment obligation) under the Contract because of any cause outside its reasonable control. Such delay or failure will not constitute a breach of the Contract and the time for performance of the affected obligation will be extended by a reasonable period.

30.2. The Contract contains the whole agreement between the parties and supersedes all previous communications, representations and arrangements, written or oral. It is accepted that the Contract has not been entered into on the basis of any representations that are not expressly contained in the Contract.

31. FREEDOM OF INFORMATION ACT

31.1. The Agency is committed to open government and to meeting its responsibilities under the Freedom of Information Act 2000 (as amended) ('Act') and the Environmental Information Regulations 2004 (as amended) (Regulations').

31.2. The Contractor agrees that:

31.2.1. All information submitted to the Agency may need to be disclosed by the Agency in response to a request under the Act or the Regulations; and

31.2.2. The Agency may include information submitted (in whole or in part) in the publication scheme which it maintains under the Act or publish the Contract, including from time to time agreed changes to the Contract, to the public.

31.3. If the Contractor considers that any of the information included in its tender, or that it has submitted to the Agency or that is otherwise contained in the Contract, is commercially sensitive, it shall identify and explain (in broad terms) what harm may result from disclosure if a request is received, and the time period applicable to that sensitivity. The Contractor acknowledges that if it has indicated that information is commercially sensitive, such information may still be required to be disclosed by the Agency under the Act or the Regulations. The receipt of any material marked 'confidential' or equivalent by the Agency shall not be deemed to infer that the Agency agrees any duty of confidentiality by virtue of that marking.

32. DATA PROTECTION

32.1. In the event that the Contract requires data to be processed within the meaning of the Data Protection Legislation the Data Protection Schedule shall be completed by the Parties and provisions and definitions therein shall apply and bind the Parties as part of this Contract.

33. BREAK CLAUSE

DEFINITION

33.1 Price – Means the price submitted by the Contractor as outlined in the pricing schedule.

33.2 Year – Means a financial year, which runs from 1 April to 31 March.

33.2 Subject to the Agency's full discretion, Year 2 shall follow the completion of Year 1 and Year 3 shall follow completion of Year 2. The Agency shall inform the Contractor by written communication, no later than 30 days prior to the start of the new Year, whether the Agency wishes to proceed with Year 2 and subsequently Year 3. The Consultant should respond within two weeks to confirm that they are able to undertake the work defined as Year 2 and Year 3, for the price submitted in their bid, subject to any reasonable adjustments allowed in Clause 20.

34.5 Following award for Year 1, the Contractor has submitted and the Agency has accepted the supply price for Year 2 and Year 3, should the later Years be required. No costs incurred up to and for works associated with Year 2 and Year 3 shall be chargeable to the Agency, should they decide not to proceed with Year 2 or Year 3.

Appendix to Conditions Services

Ref: [redacted]
Title: Landfill Emissions Assessment

			Condition
1	Contract Supervisor		3

[redacted]

Address:
Environment Agency Head Office
Horizon House
Deanery Road
Bristol
BS1 5AH

2	Contractor		

Gutteridge, Haskins and Davey Limited

Address:
Level 1, Building 49
Thornton Science Park,
Pool Lane
Chester
CH2 4NU

3	Completion		6
Contract Start Date		18/11/2022	
Contract End Date		31/03/2025	
4	Delivery		11

Address:
Insert delivery address if different to above

5	Insurance		17
Professional Indemnity Min. Cover		£5 million	
Third Party Minimum Cover		£5 million	
Public Liability Min. Cover		£5 million	
6	Limit on Liability		16
Limit on Contractors Liability		£ 5 million	

SCHEDULE 1 – SPECIFICATION

Specification for PFAS Risk Screening Project Phase 4 – Work Package 5 - Landfill Emissions Assessment

1. Background to the EA

The Environment Agency (EA) was set up to protect and improve the environment. The EA helps people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion. It also plays a key role in improving the quality of our water, land, and air by tackling pollution by working with businesses to help them comply with environmental regulations. The ultimate objective is for the EA to deliver a healthy and diverse environment to enhance people's lives and contribute to economic growth.

The EA works as part of the DEFRA group (Department for Environment, Food & Rural Affairs), and together with the rest of government, local councils, businesses, civil society groups and local communities it aims to create a better place for people and wildlife.

The EA is currently working under its five-year action plan (EA2025). This plan ties in with the Government's 25 Year Environment Plan.

The plan sets out 3 long term goals:

- A nation resilient to climate change
- **Healthy air, land, and water**
- Green growth and a sustainable future

Healthy air, land and water is the overarching goal for this project. By tackling land contamination through the assessment and implementation of mitigation measures where risks are deemed unacceptable, the aim is to protect and clean-up these valuable resources.

The plan states: "Unless we act now the state and condition of our natural resources will continue to decline and the ecological crisis will deepen. Failing to act is not an option. Clean air, land and water are critical for our health, sustain wildlife and provide essential services that support our lifestyles and economy. They provide the natural capital on which we all depend."

2. Background to the Project

This document sets out the strategy for procuring the project titled **Landfill Emissions Assessment.** This work programme is sub-divided into four 'Lots' which sit under the overarching PFAS Risk Screening Project which is now entering Phase 4 (2022 – 2025).

The wider PFAS Risk Screening Project, aims to assess and tackle the risks arising from a group of **"forever chemicals"** which are contaminating soil, groundwater, surface waters and gases that may pose a risk to human health. These four 'lots' build

on previous work undertaken jointly by the EA and Defra on PFAS and a wider range of persistent organic pollutants (POPs). These chemicals are causing a global pollution problem. And the nature and scale of the problem in the UK is only now being fully realised.

Polyfluoroalkyl and perfluoroalkyl substances (PFAS) are a broad group of synthetic fluorinated organic chemicals which are extremely persistent in the environment. Some are bio-accumulative and toxic, and/or highly mobile. PFAS are a group of more than 4,700 man-made chemicals (OECD, 2018), the two most well-known of which are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS).

PFAS are used in a wide variety of consumer products and industrial applications because of their unique chemical and physical properties, including oil, water and stain repellence, temperature and chemical resistance, and surfactant properties. PFAS have been used as surfactants (including aqueous film fire-fighting foams (AFFFs), non-stick metal coatings for frying pans, paper food packaging, creams and cosmetics, textiles for furniture and waterproof outdoor clothing, paints and photography, chrome plating, pesticides, and pharmaceuticals and as polymer manufacturing.

Persistent organic pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes. POPs persist in the environment for long periods, are capable of long-range transport, bioaccumulate in human and animal tissue and biomagnify in food chains and have potentially significant impacts on human health and the environment. Exposure to POPs can cause serious health problems including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and even diminished intelligence.

Increasing awareness of the widespread presence of PFAS and POPs in environmental media has heightened regulatory concerns about their potential risks to human health and the environment. A recent evidence review by the EA has identified large data gaps in relation to the uses, sources, and mass emissions of PFAS/POPs in the UK. This report recommends further research and investigative work to evaluate the sources both current and legacy that are contributing to the widespread nature of these contaminants.

To ensure effective allocation of resources and appropriate targeting of mitigation actions, we need to better understand the sources of PFAS/POPs, the pathways by which these chemicals can impact key receptors and the relative significance of these substances in environmental media.

This work programme builds on previous work undertaken by:

a) **Defra (2019 – 2022) Landfill Leachate Survey (POPs Project)** –

- Phase 1 - included a literature review, confirmation of site selection for a survey of landfill leachate and analytical method development and optimisation.
- Phase 2 - included the site selection, sampling methodology, collection, and analysis of 50 raw and treated landfill leachates samples from 18 permitted operational and closed non-hazardous landfill sites.

b) Environment Agency PFAS Risk Screening Project (2020-2022) -

- Phase 3 - included the site selection, sampling methodology, collection, and analysis of 106 raw and treated landfill leachate and groundwater samples from 27 permitted and non-permitted closed and historical landfill sites.

This work will also build on the landfill leachate project conducted in Ireland and published by Harrad et al. 2019[1]. The work will include sampling, analysis, interpretation and reporting on landfill leachate, gas condensate, groundwaters and leachate treatment plant (LTP) bio-solids (sludges).

The UK has committed, under the UN Stockholm Convention, to work towards the elimination of substances recognised as Pops. This includes understanding where these substances are unintentionally released and developing methods to deal with this. It is understood that the legacy from POPs in landfill waste is a potential source of POPs release into groundwater, surface waters and air. Defra has committed to investigate improvements in the 2017 UK national implementation plan and it also links to the Government 25-year environment plan to minimise the risk of chemical contamination in our water.

The EA is focussing on developing better regulatory tools to deliver chemicals and waste legislation requirements and working with Defra to ensure that environmental considerations are understood and incorporated appropriately into the UK policy and regulatory response. To achieve this and expand our abilities in the future, we plan to target resource at selected activities that provide the greatest progress to meeting these aims. A key area for this work plan, and the tendered project is to build on our understanding of landfill leachate PFAS and POPs chemical profiles and the potential pathways of their emissions in the environment. In addition, landfill operators, as part of their permit conditions, are required to regularly monitor for fugitive emissions to local groundwater resources and air quality. This project will help us to ensure that monitoring at landfill sites is fit for purpose and that the substances analysed are relevant to the landfill in question, with particular regard to PFAS, POPs and priority hazardous substances.

The objective of this work programme is to improve our overall understanding of the scale and extent of PFAS, POPs and other hazardous substances from landfill emissions (leachate and gases) and their potential impact pathways on the terrestrial/fresh and water/marine environments.

The programme will therefore build an overall picture of landfill leachate and gaseous substances that are known to be, or that we suspect to be, harmful to the environment and explore their potential exposure pathways. This may be used to inform policy and regulation.

While POPs and PFAS have not been quantified/reported in landfill gases, they are known to occur in landfill leachate.

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[1] Harrad S, Drage DS, Sharkey M, Berresheim H. Brominated flame retardants and perfluoroalkyl substances in landfill leachate from Ireland. Sci Total Environ. 2019;695:133810. doi:10.1016/j.scitotenv.2019.133810 June 2018 54

3. Objectives

The Landfill Emission Assessment work programme is part of the PFAS risk screening project, Phase 4 (2022/23 – 2024/25) it builds on the outputs of previous studies outlined above. This work programme has been broken down into a series of four discrete but interlinked work packages or Lots. The intention being that each work package will be competitively tendered under one ITT. Each Lot will be evaluated separately, and a contract will be awarded for each Lot. A Tenderer may bid for any number of Lots under this ITT and if they are successful on more than one Lot then the Agency may choose to award both Lots under a single contract.

Note: while the work packages sitting under this programme are being run as discrete activities, they are interlinked and will all focus on different elements of the same topic i.e. PFAS and POPs emissions from landfills. For this reason, collaboration, liaison, and the sharing of information between those responsible for each work package is vital and will be actively encouraged.

The overarching objectives of the current studies (outlined below as four separate work packages) is to build on the outputs from preceding studies, to act on recommendations and to improve our understanding and knowledge. This will be achieved by developing sampling programmes to collect leachate, gas condensate, biosolids (sludges), groundwater, surface water and landfill gas from a variety of landfills and Sewage Treatment Works (STW) and/or Wastewater Treatment Works (WWTWs) and analyse for a number of POPS, PFAS and other hazardous substances (see Table 4).

4. Summary of the requirement

The four lots comprise of:

Landfill Emission Assessment Lots

- **Lot 1** - Targeted sampling and assessment of non-hazardous raw and treated leachates, gas condensates and bio-solids (sludges) from a variety of on-site leachate treatment plants to evaluate percentage removal of PFAS and POP substances.
- **Lot 2** - Assessment of PFAS and POPs in non-hazardous landfill leachate compared to other sources within domestic and industrial wastewaters.
- **Lot 3** - Assessment of PFAS and POPs emissions/releases from non-hazardous landfill leachates to surface and groundwaters from unlined and lined non-hazardous landfills.
- **Lot 4** - Study of a PFAS suite and other trace gas emissions from non-hazardous landfills.

5. Key Deliverables

An activity schedule has been written for each Lot, which contains the Key deliverables. For Lot 1 and 3, Year 1 (2022-23), shows a pattern of tasks and deliverables which are also applicable to Years 2 and 3. Lot 2 shows activities to price

for Year 1 and sampling requirements for years 2 and 3. For Lot 4, whilst Year 1 of this work package will feed off the outputs of the 2021/22 Phase 3 PFAS Risk Screening Project and Phases 1 and 2 of the Defra/EA POPs in landfill leachate survey, Years 2 and 3 of these tasks will build on the outputs of the preceding year and will therefore be subject to some reasonable adjustment once the contract has been awarded.

Note: These lots will be run on a three-year rolling basis (2022/23 – 2024/25) with the outputs and recommendations from each year feeding into the next. Whilst the contract will be set-up and costed for three years (costings to be provided for each of the three yearly stages as separate pricing schedules), each year should be treated as a separate - but linked - stage. Each of the three stages will be separated with a contract break clause to enable review of the outputs and decisions made with regard how best to progress into the subsequent year. Years 2 and 3 may be subject to change depending on the outputs of the proceeding stage but the activity schedule will form the basis for the required work.

6. Indicative Project Programme

Lots 1, 2, 3 and 4 will be awarded on a three-year basis and broken down into Stages 1-3 for each of the financial years (2022/23 – 2024/25). Each stage should deliver the year 1 tasks detailed below. And each stage will be separated with a contract break clause to facilitate review, discussion, and agreement on the approach in readiness for commencement at the start of the following financial year (subject to agreement, supplier performance and value for money of the proposed next stage activities).

The deadline for delivery of Stage 1 is 31st March 2023. Delivery for the subsequent two follow-on stages will be 31st March 2024 and 2025 respectively.

The Contractor is required to provide a programme (in the form of a Gantt chart) which will allow completion of all tasks by the agreed deadlines.

Lot 4 - It is acknowledged that until Year 1 works have been completed it is not possible to develop accurate costings for year 2 and 3. For tendering purposes, an estimate of potential costs for year 2 and 3 should be provided based on the analytical suite provided.

Lot 4 Year 1 (2022/23) – To be costed on the basis of the task list provided above with the aim of researching and designing the approach, undertaking a pilot study and, dependant on the outputs, scoping the year 2 implementation phase

Lot 4 Year 2 (2023/24) and 3 (2024/25) – To be costed on the basis of the information provided in the Specification and implementing the recommendations from the preceding year.

7. Project Governance

We anticipate a minimum of fortnightly update calls between the EA and the Contractor. In addition, meetings will be required upon the delivery of the key project outputs, including the interim outputs. The format of these meetings will depend on the nature and type of information to discuss and the situation in relation to COVID-19 restrictions. The Project Manager should be kept fully apprised of project developments and progress, to include any deviations from the agreed scope.

Lead Team: Chemicals Strategic and Regulatory Planning

Associated Teams: (Environment & Business) Landfill, DfR and Waste Climate Change, Water Quality Strategic Planning, Groundwater, Chemicals Assessment Unit, (RAE) Land and Water, Local Groundwater & Contaminated Land

8. Intellectual Property Rights

The findings and outputs delivered from this project will remain the Property of the EA throughout.

9. Quality Assurance

The Contractor will set out a process for the safe collection of high-quality samples including methods of quality assurance and quality control detailing the collection of field/equipment blanks. All analysis must adhere to relevant quality standards MCERTS etc.

10. Health, Safety and Sustainability Requirements

The sampling exercises detailed under Lots1 – 4 below will be undertaken at infrastructure locations agreed between the EA and the operator. Sites have been selected where access is easy, landowners are amenable and sampling points are suitably located. The EA Project Manager in liaison with the local EA staff will coordinate access. The consultant will comply with all appropriate H&S procedures and detail these protocols prior to the site visit.

The EA will work with suppliers who pursue sustainability in their operations, thereby ensuring the EA is not contracting with a supplier whose operational outputs run contrary to EA's objectives.

It is Government policy to use procurement to help deliver their social value objectives. Therefore, we have considered which of the Social Value Model themes would be most relevant and applicable to this procurement in order to ensure additional sustainability and social value considerations are incorporated into the delivery of this work. For this procurement we will focus on:

Theme 3: Fighting climate change

Working towards net zero greenhouse gas emissions is a priority for Government and particularly for Defra and the EA. The EA has a commitment to achieve Net Zero by 2030. The Contractor should consider how they can deliver **additional climate benefits**, including through more effective environmental stewardship. The Contractor should provide a social value method statement demonstrating effective measures to work towards net zero greenhouse gas emissions in their own operations. They should also include measures to influence and support staff, suppliers, customers, and communities through the delivery of the contract to work towards net zero. This method statement should include a plan outlining what they will achieve and by when.

The Contractor should also provide a copy of their current environmental policy and any environmental accreditation schemes such as ISO 14001 or EMAS which they have been awarded or are working towards.

The Contractors will need to approach sustainability with a focus on the entire life cycle of the project (stages 1 -3) and plan and deliver a sustainability progress report at the end of each stage, outlining what they have achieved and what their next steps are.

11. Data Sources supplied

The following key resources have been provided:

Document / information	Lot No.
Defra (2019 – 2022) Landfill Leachate Survey (POPs Project) – Phase 2 data set Excel Spreadsheet: '2022-05 RAW Results Master file for EA_final'	1/2/3/4
PFAS Phase 3 Risk Screening Task 8 - Data Exploration Report 2022 and data set Excel spreadsheets:	1/2/3/4

‘Appendix A PFAS Task8a descriptive statistics’ ‘Appendix D PFAS Task 8A raw data_NI’ Reports: ‘Task 8 Monitoring Report’ ‘PFAS Task 8 – Data Exploration Report Draft 25-05-22’	
Excel spreadsheet: ‘2022 EA Chemical determinants List_methods_LOD_example data’	1/2/3/4
USEPA Other Test Method 45 (OTM-45) Measurement of Selected Per- and Polyfluorinated Alkyl Substances from Stationary Sources	4
Investigation of the Composition and Emissions of Trace Components in Landfill Gas (2002) (Report Reference: P1-438TR)	4
Quantification of trace components in landfill gas (2004) (Report reference: P1-491TR)	4
Investigation and quantification of gas produced from landfilling inorganic waste (2007) (Report reference: P1-516 2b)	4
LFTGN04 - Guidance for monitoring trace gas components in landfill gas v2 (2010)	4
LFTGN05 – Guidance for monitoring enclosed landfill flares v2 (2010)	4
LFTGN08 – Guidance for monitoring landfill gas engine emissions v2 (2010	4

12. *Specification for Lot 1 - Targeted sampling and assessment of non-hazardous raw and treated leachates, gas condensates and biosolids (sludges) from a variety of leachate treatment plants to evaluate percentage removal of PFAS and POP substances*

This task focuses on sampling, analysis and assessment of raw and treated non-hazardous landfill leachates, gas condensates and biosolids (sludges) from a variety of on-site landfill leachate treatment plants (LTP). For the purposes of costing a maximum twelve landfills will be sampled, the final site numbers and location will be agreed in the sampling plan. Four sets of samples will be collected and evaluated over a 24-month period. Data evaluation and reporting should include, but not be limited to:

- understanding the behaviour/partitioning of PFAS and POPs suite in liquid and bio-solid effluents
- evaluating efficiency and efficacy of LTP across non-hazardous landfills with respect to PFAS and POPs
- calculating percentage removal of various PFAS and POP substances from the LTPs.
- calculating annual removal/discharge volumes (leachate and biosolids) at each site and identify the disposal routes of the biosolids and leachates.
- establishing how and what sampling is undertaken by landfill operators to meet discharge consent limits.

For costing purposes, use tables 1 and 4

Table 1 – Indicative numbers of sites, sampling frequency and samples

Maximum No sites[(a)]	12	
Frequency of site visits	4 visits over a 24-month period[(b)]	
Number of samples per site visit (leachate)	24[(c)]	96 samples (total)
Number of samples per site visit (gas condensate)	12[(d)] 1 visit in year 1 only	12 samples (total)
Number of samples per site visit (bio-solid/ sludge)	12[(e)]	48 samples (total)
No. of sample blanks[(f)]		4

Notes

(a) Sites will contain a mixture of LTP technologies used in the UK e.g., Sequence Batch Reactor (SBR), Reed Beds (RB), Ultra Filtration (UF), Nano Filtration (NF), Reverse Osmosis (RO) and Constructed Wetlands (CW).

(b) 1 sampling collection round to be completed by 30/11/2022

(c) Based on 12 sites, 2 leachate samples per visit/site – i.e., 1 raw pre-treatment and 1 post-treatment (additional samples may be considered)

(d) Based on 1 sample from each site – **Year 1 ONLY** taken from terminal gas knockout pot closest to the gas engine or flare
(e) Based on 1 sample from each site per site visit
(f) A mixture of field and equipment blanks, number to be confirmed in the sampling plan

Sample analysis (landfill leachate, gas-condensate and LTP bio-solids)

Samples should be targeted for the following substances based on: Busch et al. (2010)[2]; Harrad et al. 2019[3] & 2020[4]); Peruzzo et al. (2019)[5]; Masoner (2014)[6]; Eggen et al. (2010)[7]; Oman & Junestedt (2007)[8]) where possible.
See Table 4 below for a full list of substances requiring analysis. A Fully targeted quantitative analysis is required for all substances.
Note: The EA acknowledges that accredited methods might not be available for all the priority substances within a landfill leachate/gas-condensate or bio-solid matrices.

Activity Schedule for Lot 1 – Targeted sampling and assessment of non-hazardous landfill raw and treated leachates, gas condensates and bio-solids (sludges) from a

[2] Busch J, Ahrens L, Sturm R, Ebinghaus R. Polyfluoroalkyl compounds in landfill leachates. Environ Pollut. 2010 May;158(5):1467-71. doi: 10.1016/j.envpol.2009.12.031. Epub 2010 Jan 6.Environ Pollut. 2010. PMID: 20053490

[3] Harrad S, Drage D, Sharkey M, Berresheim H. 2019. Brominated flame retardants and perfluoroalkyl substances in landfill leachate from Ireland. Science of the Total Environment 695 (2019) 133810, 06 August, pp. 1-7.

[4] Harrad S, Drage D, Sharkey M, Berresheim H. 2020. Perfluoroalkyl substances and brominated flame retardants in landfill – related air, soil and groundwater from Ireland. Science of the Total Environment 705 (2020) 135834, pp 1-8.

[5] Peruzzo M, Valsecchi S, Scalco A, Polesello S, Cavalli S. 2019. Perfluoroalkyl acid concentrations in liquid wastes: a survey campaign and implications for waste disposal. Norman Bulletin, Issue 6, Oct 2019 http://www.norman-network.net

[6] Masoner JR, Kolpin DW, Furlong ET, Cozzarelli IM, Gray JL, Schwab EA. Contaminants of emerging concern in fresh leachate from landfills in the conterminous United States. Contaminants of emerging concern in fresh leachate from landfills in the conterminous United States. Environ Sci Process Impacts. 2014;16(10):2335- 54. doi: 10.1039/c4em00124a.Environ Sci Process Impacts. 2014. PMID: 25111596

[7] Eggen T, Moeder M, Arukwe A.E Municipal landfill leachates: a significant source for new and emerging pollutants. Science of the Total Environment 2010 Oct 1;408(21):5147-57. doi: 10.1016/j.scitotenv.2010.07.049. Epub 2010 Aug 8.Sci Total Environ. 2010.

[8] Oman CB, Junestedt C. Chemical characterization of landfill leachates--400 parameters and compounds. Waste Manag. 2008;28(10):1876-91. doi: 10.1016/j.wasman.2007.06.018. Epub 2007 Sep 14.Waste Manag. 2008. PMID: 17869498

variety of leachate treatment plants to evaluate percentage removal of PFAS and POP substances

Task 1. **Start-up workshop to discuss the approach and refine scope**

Half day workshop (probably online) where the EA will provide a background to the project and the overarching aims and objectives. The Contractor will then present their scope of works and their understanding of the commission as well as additional thoughts for project enhancement. Data requirements/provision will be discussed and any potential overlaps with other related 'lots' under the Landfill Emissions Assessment work package where there is the potential for data and information sharing. Detailed discussion and critical evaluation of the approach will help refine and enhance the scope for this Lot.

Deliverable: A refined specification to include all comments and suggestions from the start-up workshop

Task 2. **Agree project plan**

The Contractor will produce a project plan which will include, but not be limited to:

- a specification on how budgets will be used (note this should include staff day rates, overnight accommodation, food etc.)
- agreed milestones and deliverables
- overarching plan for years 1, 2 and 3 including data interpretation communications/ meeting schedule

Deliverable: A standalone report detailing the project plan

Task 3. **Site identification and sample collection methodology**

The Contractor will set out a site selection process based on previous work undertaken by Defra/EA (2022) to include a wide range of primary and tertiary on-site landfill leachate treatment plant technologies such as sequence batch reactors (SBR), methane stripping plants (MSP), ultra (UF) and nano filtration (NF), reverse-osmosis (RO), reed beds (RB) and constructed wetlands (CW).

The Contractor will set out a process for the safe collection of high-quality samples including methods of quality assurance and quality control detailing the collection of field/equipment blanks. The sampling plan will detail the sites to be sampled, confirm how many samples will be collected, and determinants to be analysed (based on the prioritised substances in Table 4).

The Contractor will gather relevant data on site operations, leachate treatment plant specifications, treatment retention time, annual volumes of treated leachate, annual

discharge volumes, removal of bio-solids, waste pathways and any other relevant information required to help contextualise and interpret the findings.

Deliverables:

- **A standalone report summarising the site selection process and sampling plan**
- **A questionnaire to gather relevant site and operational information and data**

Task 4. **Sample collection and analysis**

The EA will help to facilitate access to the landfill sites. However, the Contractor will be responsible for liaising with the Environment Agency and site operator(s) to agree suitable sampling times and provide the operator(s) with risk assessments/safe ways of working and indemnity insurance documentation. Note that some operators may require the contractor to undertake site-specific safety induction.

The EA will provide suitable sampling equipment (pumps, plastic and stainless-steel bailers, buckets, jugs), however other equipment, such as, ATEX approved dip tapes, personal landfill gas alarm, field measuring probes, portable batteries for pumps, cleaning chemicals, and consumables (PFAS free gloves, wipes, bailer rope, cool boxes etc) will be supplied by the Contractor. The purchase of any additional sampling equipment will need to be agreed with the EA.

The Contractor will:

- arrange for the preparation, transportation, and analysis of the leachate, gas condensate and bio-solids/sludge samples by a competent laboratory for the agreed analytical suite (Table 4) with a suitable analytical performance. Laboratory analysis will be conducted using recommended pre-treatment and analytical method, based on the most up to date methods used by the chosen commercial analytical laboratory. Any sub-contracted work to another laboratory must be agreed in writing with the EA in advance.
- complete each round of site sampling ensuring samples are delivered to the laboratory within 48 hours of sampling in suitable containers (as instructed by the laboratory).
- provide a suitable vehicle. Permission to drive on any landfill must be sort from the landfill operator(s). It should be assumed that this may not be permitted.
- work with the EA to provide the results in a suitable excel/database format.
- summarise the results using standard statistical techniques.

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Excel /database of results`**

Task 5. **Data Interpretation & Reporting**
The Contractor will produce an interpretative report evaluating the analytical results and background information collected for each site and the objectives outlined in Lot 1 objectives section.
The Contractor will produce a non-technical summary in addition to the main interpretative report. The main report should include, but not be limited to:

- understanding the behaviour/partitioning of PFAS and POP substances in leachate and bio-solid effluents
- evaluating efficiency and efficacy of LTP across non-hazardous landfills in relation to the removal of PFAS and POPs in landfill leachates and bio-solids
- calculating the percentage removal of various PFAS and POP substances from the LTPs.
- calculating the annual removal/discharge volumes (leachate and biosolids) at each site and identify the disposal routes of the biosolids and leachates.
- establishing how and what sampling is undertaken by landfill operators to meet discharge consent limits, and identify potential routes of exposure to the wider environment
- compare the findings with other studies conducted in the other countries.
- provide recommendations on what type of monitoring and analytical regime maybe required in the future.

- **Deliverables:**
- **A standalone interim interpretative report including presentation of the results and recommendations for years 2 and 3 (year 1)**
- **A standalone interpretative report including presentation of the results (Year 3)**
- **Non-technical summary report (Year 3)**

Task 6. Close-out
A day long workshop that will enable the consultant to present all outputs associated with this activity. To facilitate comment, critical review, and next steps.

- **Deliverables:**
- **A successful close-out meeting that enables discussion relating to all deliverables, including recommendations for further work, to include all comments made by reviewing parties**
- **Clear recommendations at the end of Years 1 and 2 for subsequent stages of the project**
- **To be followed by delivery of a finalised reports**

The EA requires the supplier to propose a methodology and approach to deliver the tasks outlined in the scope (for Stages 1-3), which are summarised in the table below.

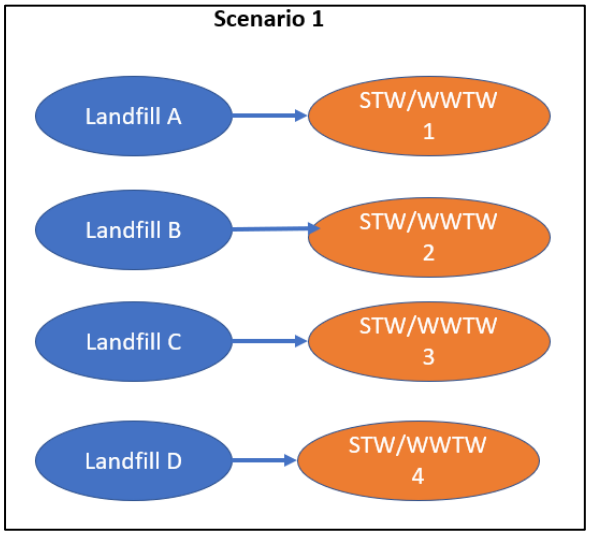
Deliverables Table Lot 1 - Targeted sampling and assessment of non-hazardous landfill raw and treated leachates, gas condensates and biosolids (sludges) from a variety of leachate treatment plants to evaluate percentage removal of PFAS and POPs

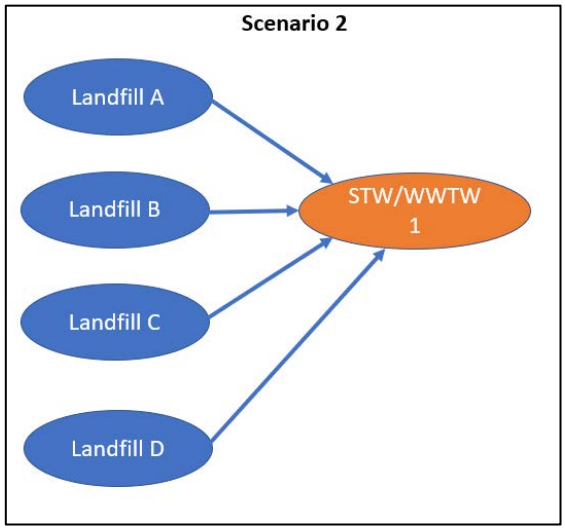
Lot No.	Task No.	Requirement	Deliverable	Anticipated start date for Year 1	Anticipated completion date for Year 1
Lot 1	Task 1	Start-up workshop to discuss approach and refine scope	A refined specification to include all comments and suggestions from the start-up workshop	November 2022	
Lot 1	Task 2	Project Plan	A standalone report detailing budget allocation, agreed milestones, communications, and meetings schedule		November 2022
Lot 1	Task 3	Site identification and sample collection plan	A standalone report outlining the site selection process and sampling programme Draft questionnaire for site operators		November 2022
Lot 1	Task 4	Sample Collection and Analysis	Sample collection log Laboratory data certificates Excel/database of results		(Sample collection) 31/11/2022 (Sample analysis) 19/12/22
Lot 1	Task 5	Data Interpretation and reporting	A standalone Interpretative report and non-technical summary report		06/02/2023
Lot 1	Task 6	Close-out and final reporting	A successful close-out meeting. Final report	27/03/23	

13. Specification for Lot 2 - Assessment of PFAS/POPs in non-hazardous landfill leachate compared to domestic and/or industrial wastewater

This task aims to assess the proportional loading of PFAS and POPs from raw and treated non-hazardous landfill leachates against those reported at wastewater/sewage treatment works. By pairing targeted landfills with WwTW/STW, sampling of raw and treated landfill leachates will be compared with the influent and effluent from the WwTW/STW. For the purposes of costing a maximum number of five landfills paired with WwTW/STW will be sampled, the final site numbers and location will be agreed in the sampling plan. Four sets of samples from five targeted landfills and WwTW/STW will be collected and evaluated over a 24-month period.

In year 1, the Contractor will work with the EA to identify suitable target landfills where the non-hazardous landfill leachate is either (a) discharged to fowl sewer and/or (b) tankered from the landfill site to a WwTW/STW. We want to pair up landfills with either WwTW or STW where landfill leachate is accepted from a single landfill source or an WwTW/STW that has multiple landfill sources which can all be sampled as depicted in scenarios 1 and 2 below.





Note: Sampling, analysis, and reporting be carried out in years 2 and 3.

The Contractor will need to work in close collaboration with the successful contractor for Lot 1. It may be possible to use some of the same landfill sites and cross reference data results.
This task is based on targeted sampling, analysis and assessment and comparison of leachates from a variety of non-hazardous landfills and WwTW/STW to include, but not be limited to:

- Improving our understanding of the discharge of hazardous substances from non-hazardous landfills (operational and/or closed)
- Defining the proportion of PFAS and POPs substances from landfill sites compared to other potential sources by comparing the annual discharge load

(concentration & volume) of selected PFAS and POPs in landfill leachates to other sources received at either WwTW or STW.

- Applying and calculating a projection of annual load of specific PFAS and POPs substances (e.g., PFOS, PFOA) from landfills in England (those actively managing landfill leachate) against WwTW/STW.

For costing purposes, use tables 2 and 4

Table 2 - Indicative numbers of sites, sampling frequency and samples

Maximum No sites[(a)]	5 landfills and their paired WwTW/STW	
Frequency of site visits	4 visits over a 24-month period[(b)]	
Number of samples per site visit (leachate)	20[(c)]	80 samples (total)
No of sample blanks[(d)]		8

Notes

(a) Non-Hazardous landfill sites need to be paired with either a STW/WWTW

(b) Sampling to be carried out in years 2 and 3

(c) Based on five landfill sites, 1 or 2 landfill leachate samples e.g., 1 raw pre-treatment and 1 post-treatment or 1 raw leachate if no on-site treatment and 2 samples (influent and effluent) from STW/ WWTW per visit per site

(d) A mixture of field and equipment blanks, number to be confirmed in the sampling plan

Sample analysis (landfill leachate and wastewaters)

See Table 4 for a full list of substances requiring analysis. A fully targeted quantitative analysis is required for all substances.

Note: The EA acknowledges that accredited methods might not be available for all the priority substances within a landfill leachate matrix.

Activity Schedule for Lot 2 – Assessment of PFAS and POPs in non-hazardous landfill leachate compared to domestic and/ industrial wastewater

Task 1. **Start-up workshop to discuss the approach and refine scope**

Half day workshop (probably online) where the EA will provide a background to the project and the overarching aims and objectives. The Contractor will then present their scope of works and their understanding of the commission as well as additional thoughts for project enhancement. Data requirements/ provision will be discussed and any potential overlaps with other related 'Lots' under the Landfill Emissions Assessment work package where there is the potential for data and information sharing. Detailed discussion and critical evaluation of the approach will help refine and enhance the scope for this Lot.

Deliverable: A refined specification to include all comments and suggestions from the start-up workshop

Task 2. **Agree project plan**

The Contractor will produce a project plan which will include, but not be limited to:

- a specification on how budgets will be used (note this should include staff day rates, overnight accommodation, food etc.)
- agreed milestones and deliverables
- overarching plan for years 1, 2 and 3 including data interpretation communications/ meeting schedule

Deliverable: A standalone report detailing the project plan

Task 3. **Site identification and sampling plan**

The Contractor will set out a site selection process to pair up non-hazardous landfills with WwTW/STW as described in Lot 2 objectives section.

The Contractor will develop a sampling plan for the safe collection of high-quality samples including methods of quality assurance and quality control detailing the collection of field/ equipment blanks. The sampling plan will detail the sites to be sampled, confirm how many samples will be collected, and determinants to be analysed (Table 4).

The Contractor will gather relevant data on landfill and WwTW/STW site operations, treatment plant specifications, treatment retention times, annual volumes of treated leachate discharge, annual treatment volumes at WwTW/STW, waste pathways and any other relevant information required to contextualise and interpret the data collected.

Deliverables:

- **Standalone report summarising site selection process and sampling plan**
- **A questionnaire to gather all relevant site and operational information and data from landfill operators**

Task 4. **Sample collection and analysis of landfill leachates and influent/effluent waste waters (Years 2 and 3 only)**

The EA will help to facilitate access to the landfill sites. However, the Contractor will be responsible for liaising with the Environment Agency and site operator(s) to agree suitable sampling times and provide the operator(s) with risk assessments/safe ways of working and indemnity insurance documentation. Note that some operators may require the contractor to undertake site-specific safety induction. The Contractor will need to negotiate access to sample at WWTW/STW.

The EA will provide suitable sampling equipment (pumps, plastic and stainless-steel bailers, buckets, jugs), however other equipment, such as, ATEX approved dip tapes, personal landfill gas alarm, field measuring probes, portable batteries for pumps, cleaning chemicals, and consumables (PFAS free gloves, wipes, bailer rope, cool boxes etc) will be supplied by the Contractor. The purchase of any additional sampling equipment will need to be agreed with the EA.

The Contractor will:

- arrange for the preparation, transportation, and analysis of the leachate and domestic/industrial wastewater samples by a competent laboratory for the agreed analytical suite (Table 4) with a suitable analytical performance. Laboratory analysis will be conducted using recommended pre-treatment and analytical method, based on the most up to date methods used by the chosen commercial analytical laboratory. Any sub-contracted work to another laboratory must be agreed in writing with the EA in advance.
- complete each round of site sampling ensuring samples are delivered to the laboratory within 48 hours of sampling in suitable containers (as instructed by the laboratory).
- provide a suitable vehicle. Permission to drive on any landfill must be sort from the landfill operator(s). It should be assumed that this may not be permitted.
- work with the EA to provide the results in a suitable excel/database format.
- summarise the results using standard statistical techniques.

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Excel data spreadsheet/database**
-

Task 5. **Data Interpretation & Reporting**

The Contractor will produce an interpretative report evaluating the analytical results and background information collected for each site and the objectives outlined in Lot 2 objectives above.

The Contractor will produce a non-technical summary in addition to the main interpretative report. The main report should include, but not be limited to:

- Improving our understanding of the discharge of hazardous substances from non-hazardous landfills (operational and/or closed)
- Defining the proportion of PFAS and POP substances from non-hazardous landfill sites compared to other potential sources by comparing the annual discharge load (concentration & volume) of selected PFAS and POPs in landfill leachates to other sources received at either WwTW/STW.

- Applying and calculating a projection of annual load of specific PFAS/POPs substances (e.g., PFOS, PFOA) from non-hazardous landfills in England (i.e. those actively managing landfill leachate) against WwTW/STW.

- **Deliverables:**
- **A standalone interim interpretative report including presentation of the results and recommendations for years 2 and 3 (year 1)**
- **A standalone interpretative report including presentation of the results (Year 3)**
- **Non-technical summary report (Year 3)**

Task 6. **Close-out**

A day long workshop that will enable the consultant to present all outputs associated with this activity. To facilitate comment, critical review, and next steps.

- **Deliverables:**
- **A successful close-out meeting that enables discussion relating to all deliverables, including recommendations for further work, to include all comments made by reviewing parties**
- **Clear recommendations at the end of Years 1 and 2 for subsequent stages of the project**
- **To be followed by delivery of a finalised reports**

The EA requires the supplier to propose a methodology and approach to deliver the tasks outlined in the scope (for Stages 1-3), which are summarised in the table below.

Deliverables Table Lot 2 - Assessment of PFAS/POPs in non-hazardous landfill leachate compared to domestic and/or industrial wastewater

Lot No.	Task No.	Requirement	Deliverable	Anticipated start date for Year 1	Anticipated completion date for Year 1
Lot 2	Task 1	Start-up workshop to discuss approach and refine scope	A refined specification to include all comments and suggestions from the start-up workshop	November 2022	

Lot 2	Task 2	Project Plan	A standalone report detailing budget allocation, agreed milestones, communications, and meetings schedule		November 2022
Lot 2	Task 3a Task 3b	Sample collection plan and data gathering Site pairing confirmation	A standalone report outlining the site selection process and sampling programme Draft questionnaire for site operators An Standalone report confirming site selection and pairing with WwTW/STW for sampling in Years 2 and 3		November 2022 16/01/2023
Lot 2	Task 4	Sample collection	Sample collection log Laboratory data certificates Excel/ database results		Years 2 and 3
Lot 2	Task 5	Data Interpretation and reporting	Standalone Interpretative report and non-technical summary report		Report for year 1 by 06/03/23
Lot 2	Task 6	Close-out and final reporting	A successful close-out meeting. Final report	27/03/23	

14. Specification for Lot 3 - Assessment of PFAS and POPs emissions/releases from non-hazardous landfill leachates to surface and groundwaters from unlined and lined landfills

This task aims to gather additional non-hazardous landfill leachate and groundwater/ surface water samples and evaluate PFAS and POPs emissions to the environment via contaminant migration from unlined and lined landfills to the underlying and surrounding groundwaters and/or surface waters. For the purposes of costing a maximum of 10 landfills will be sampled (raw leachate and up & down hydraulic groundwater/ surface water) final site numbers and locations will be agreed in the sampling plan. Four sets of samples will be collected, analysed, and evaluated over a 24-month period. This task builds on the work undertaken in Phase 3 of the PFAS Risk Screening Project.

This task is based on targeted sampling, analysis and assessment of raw non-hazardous landfill leachates and groundwater/surface waters from a variety of unlined and lined non-hazardous landfills based on, but not limited to:

- Refining a sampling programme based on the data collected in Phase 3 and reviewing the findings in the Jacobs report PFAS Phase 3 Risk Screening Task 8 - Data Exploration Report 2022.
- Evaluating existing and newly acquired leachate and groundwater/ surface water data, site operational data and aquifer characteristics.
- Create a schematic conceptual site model for each landfill site from data collected, identifying source, pathway, and receptors and risks to surface and groundwater

For costing purposes, use tables 3 and 4

Table 3 - Indicative numbers of sites, sampling frequency and samples for the purpose of costing

Maximum No sites[(a)]	10	
Frequency of site visits	4 visits over a 24-month period[(b)]	
No. samples per site (leachate and groundwater)	40[(c)]	160 samples (total)
No. blank samples[(d)]		8

Notes

(a) Maximum 10 operational/closed/historic non-hazardous landfills based on Phase 3 work

(b) Sampling to be carried out in years 2 and 3

(c) Based on ten landfill sites, 1 raw landfill leachate samples and 3 groundwater samples (1 up and 2 down hydraulic gradient) at each site

(d) A mixture of field and equipment blanks, number to be confirmed in the sampling plan

Sample analysis (landfill leachate, groundwater / surface water)
See Table 4 for a full list of substances requiring analysis. A fully targeted quantitative analysis is required for all substances.
Note: The Environment Agency acknowledges that accredited methods might not be available for all the priority substances within a landfill leachate matrix.

Activity Schedule for Lot 3 – Assessment of PFAS/POP emissions/releases to surface and groundwaters from unlined and lined non-hazardous landfills

Task 1. **Start-up workshop to discuss the approach and refine scope**

Half day workshop (probably online) where the EA will provide a background to the project and the overarching aims and objectives. The Contractor will then present their scope of works and their understanding of the commission as well as additional thoughts for project enhancement. Data requirements/provision will be discussed and any potential overlaps with other related 'Lots' under the Landfill Emissions Assessment work package where there is the potential for data and information sharing. Detailed discussion and critical evaluation of the approach will help refine and enhance the scope for this Lot.

Deliverable: A refined specification to include all comments and suggestions from the start-up workshop

Task 2. **Agree project plan**

The Contractor will produce a project plan which will include, but not be limited to:

- a specification on how budgets will be used (note this should include staff day rates, overnight accommodation, food etc.)
- agreed milestones and deliverables
- overarching plan for years 1, 2 and 3 including data interpretation communications/ meeting schedule

Deliverable: A standalone report detailing the project plan

Task 3. **Refining sampling programme, site identification and collection methodology**

The Contractor will set out a site selection process which will identify suitable non-hazardous unlined and lined landfill sites for sampling in years 2 and 3. The process should include, but not be limited to:

- A review of sampling data collected in Phase 3 and reviewing the findings in the Jacobs report, PFAS Phase 3 Risk Screening Task 8 - Data Exploration Report 2022.
- Gathering relevant data on site operations (type of waste, age, depth, landfill design and engineering design and construction (where relevant), borehole

design, depth, aquifer characteristics and any other relevant information required to contextualise and interpret the analytical data collected.

- The Contractor will set out a process for the safe collection of high-quality samples including methods of quality assurance and quality control detailing the collection of field/equipment blanks. The sampling plan will detail the sites to be sampled, confirming how many samples will be collected, and determinants to be analysed (Table 4) and health and safety precautions.

Deliverables:

- **A standalone report summarising the site selection process and sampling plan**
- **A questionnaire to gather all relevant site and operational information and site data**

Task 4. **Sample collection and analysis (Year 2 and 3)**

The EA will help to facilitate access to the landfill sites. However, the Contractor will be responsible for liaising with the Environment Agency and site operator(s) to agree suitable sampling times and provide the operator(s) with risk assessments/safe ways of working and indemnity insurance documentation. Note that some operators may require the contractor to undertake site-specific safety induction.

The EA will provide suitable sampling equipment (pumps, plastic and stainless-steel bailers, buckets, jugs), however other equipment, such as, ATEX approved dip tapes, personal landfill gas alarm, field measuring probes, portable batteries for pumps, cleaning chemicals, and consumables (PFAS free gloves, wipes, bailer rope, cool boxes etc) will be supplied by the Contractor. The purchases of any additional sampling equipment will need to be agreed with the EA.

The Contractor will:

- arrange for the preparation, transportation, and analysis of the leachate, groundwater and/or surface water samples by a competent laboratory for the agreed analytical suite (Table 4) with a suitable analytical performance. Laboratory analysis will be conducted using recommended pre-treatment and analytical method, based on the most up to date methods used by the chosen commercial analytical laboratory. Any sub-contracted work to another laboratory must be agreed in writing with the EA in advance.
- complete each round of site sampling ensuring samples are delivered to the laboratory within 48 hours of sampling in suitable containers (as instructed by the laboratory).
- provide a suitable vehicle. Permission to drive on any landfill must be sort from the landfill operator(s). It should be assumed that this may not be permitted.
- work with the EA to provide the results in a suitable excel/database format.

- summarise the results using standard statistical techniques.

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Excel data spreadsheet/database results**

Task 5. **Data Interpretation & Reporting**

The Contractor will produce an interpretative report to include, but not be limited to:

- reviewing and evaluating the results from:
  - the Jacobs report PFAS Phase 3 Risk Screening Task 8 - Data Exploration Report 2022
  - landfill operator leachate and groundwater/ surface water data, site operational data and aquifer characteristics to identify landfill sites suitable for leachate and groundwater/ surface water sampling in years two and three.
- creating schematic conceptual site model for each landfill site from data collected to identify source, pathway, and receptors and risks to surface and groundwater

- **Deliverables:**
- **A standalone interim interpretative report including presentation of the results and recommendations for years 2 and 3 (year 1)**
- **A standalone interpretative report including presentation of the results (Year 3)**
- **Non-technical summary report (Year 3)**

Task 6. Close-out

A day long workshop that will enable the consultant to present all outputs associated with this activity. To facilitate comment, critical review, and next steps.

- **Deliverables:**
- **A successful close-out meeting that enables discussion relating to all deliverables, including recommendations for further work, to include all comments made by reviewing parties**
- **Clear recommendations at the end of Years 1 and 2 for subsequent stages of the project**
- **To be followed by delivery of a finalised reports**

The EA requires the supplier to propose a methodology and approach to deliver the tasks outlined in the scope (for Stages 1-3), which are summarised in the table below.

Deliverables Table Lot 3 - Assessment of PFAS and POPs emissions/releases from non-hazardous landfill leachates to surface and groundwaters from unlined and lined landfills

Lot No.	Task No.	Requirement	Deliverable	Anticipated start date for Year 1	Anticipated completion date for Year 1
Lot 3	Task 1	Start-up workshop to discuss approach and refine scope	A refined specification to include all comments and suggestions from the start-up workshop	November 2022	
Lot 3	Task 2	Project Plan	A standalone report detailing budget allocation, agreed milestones, communications, and meetings schedule		November 2022
Lot 3	Task 3	Site selection, sample collection plan and data gathering	A standalone report outlining the site selection process and sampling programme Draft questionnaire for site operators		21/11/2022
Lot 3	Task 4	Sample Collection and Analysis	Sample collection log Laboratory data certificates Excel/ database		Year 2 and 3

Lot 3	Task 5	Data Interpretation and reporting	A standalone Interpretative report		20/02/2023
Lot 3	Task 6	Close-out and final reporting	A successful close-out meeting. Final report	27/03/23	

15. Specification for Lot 4 - Study of a PFAS suite and other trace gas emissions from non-hazardous landfills

This task aims to:

- identify PFAS and qualify and quantify the potential release from non-hazardous landfills involving the sampling from key gas emission locations around targeted landfills, including where possible:
    - gas condensates
    - raw gas (wellheads) from the gas field
    - raw gas inlet to either landfill gas engine and/or flare
    - combustion gas treatment systems (landfill engines and flares stacks)

- sample and analyses landfill trace gases as described in Appendices 2 and 3 in the EA report, The Quantification of trace components in landfill gas (P1-491 TR) to update our existing records.

In year 1 the Contractor will:

- undertake a literature review (including grey literature) focussing on gaseous PFAS emissions from waste combustion technologies focussing on landfills.
- refine and review sampling and analytical methods described in the documents listed below and the literature review (above) to develop and design a trace gas (including a PFAS suite) sampling plan for years 2 and 3:
    - USEPA Other Test Method 45 (OTM-45) Measurement of Selected Per- and Polyfluorinated Alkyl Substances from Stationary Sources
    - Investigation of the Composition and Emissions of Trace Components in Landfill Gas (2002) (Report Reference: P1-438TR)
    - Quantification of trace components in landfill gas (2004) (Report reference: P1-491TR)
    - Investigation and quantification of gas produced from landfilling inorganic waste (2007) (Report reference: P1-516 2b)
    - LFTGN04 - Guidance for monitoring trace gas components in landfill gas v2 (2010)
    - LFTGN05 – Guidance for monitoring enclosed landfill flares v2 (2010)
    - LFTGN08 – Guidance for monitoring landfill gas engine emissions v2 (2010)

- Review existing landfill leachate data from the phase 2 Defra/EA landfill leachate survey to identify suitable landfill sites to sample gas condensate from.

- Refine and review sampling and analytical techniques to analysis a PFAS suite in used engine oils from landfill gas engines.

- Produce a sampling plan and carry out field sampling of:

- gas condensates from a series of gas knockout pots.
- used engine oils from landfill gas engines.

For costing purposes, assume a maximum of 24 gas-condensate samples and use the determinant list (Table 4) and 8 used engine oil samples . The final number of sites and locations will be agreed in the sampling plan.

- Review and evaluate data from gas condensate analysis, annual trace gas analysis (5 years collected from landfill operators) to and landfill gas engine oil samples to identify landfill sites suitable for trace gas (including a PFAS suite) sampling in years 2 and 3

- Identify laboratories that can achieve the analytical requirements to provide representative trace gas including a PFAS suite that is above expected limits of detection/ quantification (some method development can be explored as part of this contract with respect to PFAS)

- Identify suppliers of suitable trace gas sampling equipment for years 2 and 3

- Produce a sampling plan for the sampling and analysis of trace gas (including a PFAS suite) for years 2 and 3

If viable, in year 2, undertake gas sampling, analysis, and assessment based on year one recommendations:

- trial PFAS trace gas sampling methods (gas well head and inlet to the landfill gas engine/ flare) at a non-hazardous landfill site with known PFAS in gas concentrate and/or used engine oils from landfill gas engines.
- undertake sampling of raw trace gases as reported in Appendices 2 and 3in The EA report, ‘Quantification of trace components in landfill gas’ (P1-491 TR) at 6 non-hazardous landfill sites from the inlet to the landfill gas engine/ flare

If viable, in year 3, undertake gas sampling, analysis, and assessment based on years 1 and 2 recommendations:

- undertake further PFAS sampling at 3 identified non-hazardous landfill sites at the gas field wellhead with agreed methodology

- trial gas sampling methods (emissions from GUP engine stacks and flare stacks) at a site with known PFAS

Sample analysis (gas-condensate)

See Table 4 for a full list of substances requiring analysis. A fully targeted quantitative analysis is required for all determinants.

Note: The EA acknowledges that accredited methods might not be available for all the priority substances within a landfill gas-condensate matrix.

Sample analysis (trace gas samples)

Full list of trace gas substances see Appendix 2 and 3 in Quantification of trace gas components in landfill gas P-491 TR.

Sample analysis (PFAS gas samples)

It is acknowledged that until Year 1 works have been completed it is difficult to develop accurate costings for year 2 and 3. For tendering purposes, an estimate of potential costs for year 2 and 3 should be provided.

Activity Schedule for Lot 4 – Study of a PFAS suite and other trace gas emissions from non-hazardous landfills

Task 1. **Start-up workshop to discuss the approach and refine scope**

Half day workshop (probably online) where the EA will provide a background to the project and the overarching aims and objectives. The Contractor will then present their scope of works and their understanding of the commission as well as additional thoughts for project enhancement. Data requirements / provision will be discussed and any potential overlaps with other related work packages under the Landfill Emissions Assessment work package where there is the potential for data and information sharing. Detailed discussion and critical evaluation of the approach will help refine and enhance the scope for this Lot.

Deliverable: A refined specification to include all comments and suggestions from the start-up workshop

Task 2. **Agree project plan**

The Contractor will produce a project plan which will include, but not be limited to:

- a specification on how budgets will be used (note this should include staff day rates, overnight accommodation, food etc.)
- agreed milestones and deliverables
- overarching plan for years 1, 2 and 3 including data interpretation communications/ meeting schedule

Deliverable: A standalone report detailing the project plan

Task 3. **Literature and evidence review**

The Contractor will undertake a literature (including grey literature) to identify gaseous PFAS emissions from waste combustion technologies with a focus on landfill. Analysis of the results from relevant studies including an appraisal of which PFAS were looked for and which ones were found, analytical methods and performance, the range of concentrations reported. The outputs from this review will be a short-list of relevant PFAS to be analysed in gases, the analytical method, and the desired analytical performance.

We expect a search of academic literature to be carried out using at least one, and preferably more than one appropriate literature database. A search using Google scholar only is not adequate but could be helpful in addition to a literature database. Potential literature databases: Scopus (preferred), Web of knowledge (preferred), Wiley and Science Direct.

Results should be presented to include the following:

- Number of results found with relevant articles listed/highlighted
- Bibliography giving full citations (final bibliography to be published in a digital format e.g. file type - BibTeX - to facilitate a post-project synthesis by the EA)
- Search strategy
- Search sources
- Evaluation of the literature and a supporting knowledge map where appropriate

Deliverable: A standalone report detailing the literature review findings including recommendations for the analytical suite and desired analytical performance for Task 4.

Task 4. Refine field sampling and analytical methodologies for trace gases including a PFAS suite

Review existing and emerging landfill gas sampling and analytical techniques for trace gases including PFAS at landfill sites, this should include, but not be limited to the following documents:

- USEPA Other Test Method 45 (OTM-45) Measurement of Selected Per- and Polyfluorinated Alkyl Substances from Stationary Sources
- Investigation of the Composition and Emissions of Trace Components in Landfill Gas (2002) (Report Reference: P1-438TR)
- Quantification of trace components in landfill gas (2004) (Report reference: P1-491TR)
- Investigation and quantification of gas produced from landfilling inorganic waste (2007) (Report reference: P1-516 2b)
- LFTGN04 - Guidance for monitoring trace gas components in landfill gas v2 (2010)
- LFTGN05 – Guidance for monitoring enclosed landfill flares v2 (2010)
  LFTGN08 – Guidance for monitoring landfill gas engine emissions v2 (2010)

Deliverable: A standalone report summarising the results of the review and recommendations for Task 4.

Task 5. Site identification and sample collection methodology

The Contractor will set out a site selection process by reviewing existing landfill data from the phase 2 Defra/EA landfill leachate survey to identify suitable landfill sites to sample landfill gas condensate.

The Contractor will gather relevant data on site operations, landfill gas management, management of gas condensate, bulk and trace gas data, and any other relevant information required to contextualise and interpret the data collected.

The Contractor will develop a sampling plan and set out a process for the safe collection of gas condensates from the gas collection knockout pots and used engine oils from landfill gas engines. The sampling plan will detail the sites to be sampled, confirm how many samples will be collected, determinants to be analysed (based on the prioritised substances in Table 4) and health and safety precautions.

Deliverables:

- **A standalone report summarising the site selection process and sampling plan**
- **A questionnaire to gather all relevant site and operational information or data from landfill operators**

Task 6. Sample collection and analysis of gas condensates and PFAS in used engine oils from landfill gas engines.

The EA will help to facilitate access to the landfill sites. However, the Contractor will be responsible for liaising with the Environment Agency and site operator(s) to agree suitable sampling times and provide the operator(s) with risk assessments/safe ways of working and insurance documentation. Note that some operators may require the contractor to undertake site-specific safety induction.

The Contractor will provide all suitable sampling equipment and provide a suitable vehicle. Permission to drive on any landfill must be sort from the landfill operator(s). It should be assumed that this will not be possible.

The Contractor will:

- arrange for the preparation, transportation, and analysis of the gas condensate and engine oil samples by a competent laboratory for the agreed analytical suite (Table 4, for gas condensates; agreed PFAS suite) with a suitable analytical performance
- complete each round of site sampling ensuring samples are delivered to the laboratory within 48 hours of sampling in suitable containers
- work with the EA to provide the results in a suitable excel/database format
- summarise the results using standard statistical techniques. The report will set out recommendations and costed proposals for Year 2 of the project.

Laboratory analysis will be conducted using a recommended pre-treatment and analytical method, based on the most up to date methods used by the chosen commercial analytical laboratories. Any sub-contracted analysis to another laboratory must be agreed in writing with the EA in advance. Analytical results will be provided as raw data certificates and

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Agreed Excel/database of the results**

Task 7. **Data Interpretation & Reporting**

The Contractor will produce an interpretative report to include, but not be limited to:

- review and evaluation of the results from gas condensate, engine oil and , previous trace gas analysis to identify landfill sites suitable for gas sampling in years two and three.
- Recommend whether trace gas sampling for a PFAS suite from field gas wellheads, landfill gas engines and flares stacks is viable in years two and three, if so:
    - develop and design a gas sampling plan for years two and three
    - source suppliers of suitable sampling equipment for years two
    - source suitable laboratories to undertake gas analysis

  If not, propose what is required to develop sampling and/or analytical methodologies.

Deliverables:

- **A standalone interpretative report including presentation of results and recommendations for years 2 and 3**

Task 8. **Close-out**

A day long workshop that will enable the consultant to present all outputs associated with this activity. To facilitate comment, critical review, and next steps.

- **Deliverables:**
- **A successful close-out meeting that enables discussion relating to all deliverables, including recommendations for further work, to include all comments made by reviewing parties**
- **Clear recommendations at the end of Years 1 and 2 for subsequent stages of the project**
- **To be followed by delivery of a finalised reports**

Lot 4 - Years 2 and 3

If viable, in year 2, undertake gas sampling, analysis, and assessment based on year one recommendations:

- trial PFAS trace gas sampling methods at gas wellhead and inlet to the landfill gas engine/ flare) at a non-hazardous landfill site with known PFAS in gas concentrate and/or used engine oils from landfill gas engines.

- undertake sampling of raw trace gases as reported in Appendices 2 and 3 in The EA report, 'Quantification of trace components in landfill gas' (P1-491 TR) at 5 non-hazardous landfill sites from the inlet to the landfill gas engine/ flare.

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Excel data spreadsheet/ database of results**
- **A standalone interpretative report including presentation of results and recommendations for year 3**

If viable, in year 3, undertake gas sampling, analysis, and assessment based on years 1 and 2 recommendations:

- undertake further PFAS sampling at 3 identified non-hazardous landfill sites at the gas field wellhead and inlet to landfill gas engine / flare with an agreed methodology.

- trial gas sampling methods (emissions from landfill gas engine stack and flare stack) at a site with known PFAS.

Deliverables:

- **Sample collection log sheet**
- **Laboratory data certificates**
- **Excel data spreadsheet/ database of results**
- **A standalone interpretative report including presentation of results and recommendations for year 3**

Deliverables Table Lot 4 - Study of a PFAS suite and other trace gas emissions from non-hazardous landfills

Lot No.	Task No.	Requirement	Deliverable	Anticipated start date for Year 1	Anticipated completion date for Year 1
Lot 4	Task 1	Start-up workshop to discuss approach and refine scope	A refined specification to include all comments and suggestions from the start-up workshop	November 2022	
Lot 4	Task 2	Project Plan	A standalone report detailing budget allocation, agreed milestones,		November 2022

			communications, and meetings schedule		
Lot 4	Task 3	Literature & evidence review	A standalone report		27/02/2023
Lot 4	Task 4	Sampling and analytical methodology	A standalone report summarising the results		
Lot 4	Task 5	Site identification and sample collection plan for gas condensate sampling	A standalone report outlining the site selection process and sampling programme Draft questionnaire for site operators		31/11/2022
Lot 4	Task 6	Sample Collection and Analysis of gas condensate and used engine oil (GUP) samples	Sample collection log Laboratory data certificates Excel/Database of results.		(Sample collection) 05/12/2022 (Sample analysis) 06/02/2023
Lot 4	Task 7	Data Interpretation and reporting	A standalone Interpretative report and non-technical summary report		27/02/2023
Lot 4	Task 8	Close-out and final reporting	A successful close-out meeting. Final report	27/03/23	

Table 4 - Landfill Leachate/gas condensate - Chemical Determinants List

	Conventional determinants	CAS no	LOD	Units
GENERAL DETERMINANDS AND TOXIC METALS	**General Determinants:**			
	chemical oxygen demand (COD)	na	10	mg/l
	biochemical oxygen demand (BOD)	na	1	mg/l
	total organic carbon (TOC)	na	0.5	mg/l
	dissolved organic carbon (DOC)	na	0.5	mg/l
	pH-value	na	1	pH-units
	ammoniacal-N	7664-41-7	0.015	mg/l as N
	total alkalinity (as CaCO3)	na	5	mg/l
	bicarbonate	na	5	mg/l
	nitrate-N	14797-55-8	1	mg/l as N
	nitrite-N	14797-65-0	5	mg/l as N
	total oxidised nitrogen (TON)	na	1.5	mg/l as N
	total nitrogen (Total N)			mg/l as N
	Total Phosphorus (Total P)			
	electrical conductivity	na	1	µS/cm
	chloride	57-12-5	0.1	mg/l
	sulphates, total	14808-79-8	0.2	mg/l as SO4
	sulphide	18496-25-8	0.01	mg/l as S
	cyanide, total	57-12-5	0.04	mg/l
	sodium, total	7440-23-5	0.00007	mg/l
	magnesium, total	7439-95-4	0.00002	mg/l
	potassium, total	7440-09-7	0.00008	mg/l
	calcium, total	7440-70-2	0.00009	mg/l
	manganese, total	7439-96-5	0.00022	mg/l
	iron, total	7439-89-6	0.0055	mg/l
	Toxic Metals:			
	chromium(III), total	7440-47-3	0.25	µg/l
	chromium(VI), total	7440-47-3	7	µg/l
	nickel, total	7439-92-1	0.5	µg/l
	copper, total	7440-50-8	0.4	µg/l
	zinc, total	7440-66-6	0.5	µg/l
	cadmium, total	7440-43-9	0.02	µg/l

	lead, total	7439-92-1	0.09	µg/l
	mercury, total	7439-97-6	0.001	µg/l
	arsenic, total	7440-38-2	0.16	µg/l
	Adsorbable organically bound halogens (AOX)		0.1	mg/l
	Free cyanide (CN-)		0.01	mg/l
	Hydrocarbon oil index (HOI)		0.1	mg/l
	Total Suspended Solids (TSS)			
PFAS	Perfluorooctyl sulphonate (PFOS)	1763-23-1	0.000065	µg/l
	Perfluorooctanoic acid (PFOA)	335-67-1	0.000065	µg/l
	N-methylperfluorooctanesulfonamide (N-MeFOSA)	31506-32-8	0.005	µg/l
	N-Ethylperfluorooctanesulfonamide (EtFOSA)	4151-50-2	0.005	µg/l
	Hexafluoropropylene oxide trimer acid (HFPO-TA)		0.005	µg/l
	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	73606-19-6	0.0005	µg/l
	2-(N-Methylperfluorooctanesulfonamido)acetic acid (Linear) (MeFOSAA-L)	2355-31-9	0.002	µg/l
	2-(N-Methylperfluorooctanesulfonamido)acetic acid (Branched) (MeFOSSA-B)		0.002	µg/l
	2-(N-Ethylperfluorooctanesulfonamido)acetic acid (Linear) (EtFOSAA-L)	2991-50-6	0.005	µg/l
	2-(N-Ethylperfluorooctanesulfonamido)acetic acid (Bbranched) (EtFOSAA-B)		0.005	µg/l
	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)		0.002	µg/l
	5:3 fluorotelomer carboxylic acid (5:3 FTCA)	914637-49-3	0.001	µg/l
	6:2 fluorotelomer sulphonate (6:2 FTSA)	27619-97-2	0.001	µg/l
	8:2 fluorotelomer alcohol (8:2 FTOH)	678-39-7	0.001	µg/l
	4:2 Fluorotelomer sulfonic acid (4:2 FTSA)	757124-72-4	0.0005	µg/l
	Perfluoropentyl Sulphonate (PFPeS)	2706-91-4	0.001	µg/l
	Perfluoroheptyl Sulphonate (PFHpS)	375-92-8	0.001	µg/l
	Perfluoropentanoic Acid (PFPA)	2706-90-3	0.001	µg/l
	Perfluoroheptanoic Acid (PFHpA)	375-85-9	0.001	µg/l
	Hexafluoropropylene oxide-dimer acid (HFPO-DA) (Gen-X)	62037-80-3	0.001	µg/l
	F53B (two components)	73606-19-6	0.001	µg/l
	Perfluorobutyl Sulphonate (PFBS)	29420-49-3	0.001	µg/l

	Perfluorobutanoic Acid (PFBA)	375-22-4	0.001	µg/l
	Perfluorononanoic Acid (PFNA)	375-95-1	0.001	µg/l
	Perfluorodecanoic acid (PFDA)	336-76-2	0.0005	µg/l
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	0.002	µg/l
	Perfluorohexanoic Acid (PFHxA)	307-24-4	0.001	µg/l
	Perfluorohexanesulfonamide (PFHxSA)	41997-13-1	0.0005	µg/l
	Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.0005	µg/l
	Perfluorohexyl sulphonate (PFHxS)	3871-99-6	0.001	µg/l
	Perfluorohexanesulfonic acid (L) (PFHxS-L)	355-46-4	0.0005	µg/l
	Perfluoroheptanesulfonic acid(PFHpS)	375-92-8	0.0005	µg/l
	Perfluoroethylcyclohexane Sulphonate (PFECHS)	80988-54-1	0.001	µg/l
	Perfluorononanesulfonic acid (PFNS)	474511-07-4	0.002	µg/l
	Perfluorododecane sulfonic acid (PFDoS)	79780-39-5	0.005	µg/l
	Perfluorobutylsulfonamide (perfluorobutane sulfonamide) (FBSA)	30334-69-1	0.0005	µg/l
	Perfluorooctanesulfonamide (FOSA or PFOSAm)	754-91-6	0.001	µg/l
	Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/l
	Perfluorotridecane sulfonic acid (PFTrDS)	335-77-3	0.0005	µg/l
	Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	0.0005	µg/l
	Perfluoroundecanoic acid (PFUnA)	2058-96-8	0.005	µg/l
	Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/l
	Perfluorotetradecanoic acid (PFTeA)	376-06-7	0.01	µg/l
	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	0.0005	µg/l
	PFAS total	na	sum of above	µg/l
BROMINATED FLAME RETARDANTS	***Brominated Diphenyl Ethers:***			
	2,4,4'-tribromodiphenyl ether (BDE-28)	41318-75-6	0.0001	µg/l
	2,2',4,4'-tetrabromodiphenyl ether (BDE-47)	5436-43-1	0.0001	µg/l
	2,2',4,4',5-pentabromodiphenyl ether (BDE-99)	60348-60-9	0.0001	µg/l
	2,2',4,4',6 pentabromodiphenyl ether (BDE-100)	189084-64-8	0.0001	µg/l
	2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)	68631-49-2	0.0001	µg/l
	2,2',4,4',5,6'-hexabromodiphenyl ether (BDE-154)	207122-15-4	0.0001	µg/l
	Sum of identified BDE congeners (28,47,99,100,153,154)		0.0005	µg/l
	Tetrabromodiphenyl ethers		0.004	µg/l

	Pentabromodiphenyl ethers		0.004	µg/l
	Hexabromodiphenyl ethers		0.004	µg/l
	Heptabromodiphenyl ethers		0.004	µg/l
	Octabromodiphenyl ethers		0.004	µg/l
	Decabromodiphenyl ether (BDE 209)	1163-19-5	0.004	µg/l
	Sum of BDEs			µg/l
	Other flame retardants			
	Hexabromocyclododecane (HBCDD) total and isomers	3194-55-6	0.0023	µg/l
VOCs AND BTEX	***VOC, aliphatic and aromatic halogenated compounds:***			
	1,1,2,2-Tetrachloroethane	79-34-5	0.01	µg/l
	Carbon-tetrachloride	56-23-5	0.01	µg/l
	1.2-Dichloroethane	107-06-2	0.01	µg/l
	Dichloromethane (methylene dichloride, DCM)	75-09-2	0.01	µg/l
	Tetrachloroethylene (tetrachloroethene)	79-01-6	0.01	µg/l
	Trichloroethylene (trichloroethene)	127-18-4	0.01	µg/l
	1,1,1,2-tetrachloroethane	630-20-6	0.01	µg/l
	1,2,3-trichlorobenzene	87-61-6	0.01	µg/l
	1,2,4-trichlorobenzene	120-82-1	0.01	µg/l
	Polychlorinated Naphthalenes		0.03	µg/l
	Trichloromethane (chloroform)	67-66-3	0.01	µg/l
	1,4-dioxane	123-91-1	0.01	µg/l
	Chlorinated Paraffins (SCCPs and MCCPs):			
	Short-chain chlorinated paraffins (SCCPs)		0.01	µg/l
	Medium-chain chlorinated paraffins (MCCPs)		0.01	µg/l
	BTEX			
	Benzene	71-43-2	0.01	µg/l
	Toluene	108-88-3	0.01	µg/l
	Ethylbenzene	100-41-4	0.01	µg/l
	m-xylene & p-xylene	co-elute	0.01	µg/l
	o-xylene	95-47-6	0.01	µg/l
	Sum of BTEX			µg/l
HERBICIDES AND PESTICIDES	***Acid Herbicides:***			
	2, 4-Dichlorophenoxyacetic acid (2, 4 D)	94-75-7	0.02	µg/l
	Mecoprop	93-65-2	0.02	µg/l
	4-chloro-2-methylphenol (4Cl2M)	1570-64-5	0.1	µg/l
	Pentachlorophenol (PCP)	87-86-5	0.02	µg/l
	Bentazone	25057-89-0	0.02	µg/l
	Dichlorprop (2,4-DP)	120-36-5	0.02	µg/l
	Sum of acid herbicides			µg/l
	Carbamate Pesticide:			
	Carbendazim	10605-21-7	0.05	µg/l

Fungicide:			
Methiocarb	2032-65-7	0.05	µg/l
Uron Herbicide:			
Linuron	330-55-2	0.03	µg/l
Diuron	330-54-1	0.05	µg/l
Isoproturon	34123-59-6	0.05	µg/l
Triazines:			
Atrazine	1912-24-9	0.02	µg/l
Simazine	122-34-9	0.02	µg/l
Terbutryn	886-50-0	0.02	µg/l
Other Herbicides:			
Cybutryne (irgarol)	28159-98-0	0.0025	µg/l
Dicamba	1918-00-9	0.02	µg/l
Bifenox	42576-02-3	0.001	µg/l
Chlorothalonil	1897-45-6	0.001	µg/l
Aclonifen	74070-46-5	0.001	µg/l
Toxaphene	8001-35-2	2	µg/l
Pendimethalin	40487-42-1	0.02	µg/l
Triclosan:			
Triclosan:	3380-34-5	0.01	µg/l
Glyphosate:			
Glyphosate	1071-83-6	0.1	µg/l
Aminomethylphosphonic Acid (AMPA)	1066-51-9	0.1	µg/l
OCL Insecticides:			
Alachor	15972-60-8	0.001	µg/l
Aldrin	309-00-2	0.001	µg/l
Dieldrin	60-57-1	0.001	µg/l
Endrin	72-20-8	0.001	µg/l
Isodrin	465-73-6	0.001	µg/l
DDT total		0.002	µg/l
para-para-DDT	50-29-3	0.001	µg/l
ortho-para-DDT	789-02-6	0.001	µg/l
Endosulfan A & B	115-29-7	0.001	µg/l
Hexachloro-benzene (HCB)	118-74-1	0.001	µg/l
Hexachloro-butadiene (HCBD)	87-68-3	0.001	µg/l
Pentachlorobenzene	608-93-5	0.001	µg/l
Dicofol	115-32-2	0.001	µg/l
Heptachlor	76-44-8	0.001	µg/l

	Heptachlor Epoxide	1024-57-3	0.001	µg/l
	Chlordane	57-74-9	0.001	µg/l
	Chlordecone	143-50-0	0.001	µg/l
	HCH - alpha isomer	319-84-6	0.001	µg/l
	HCH - beta isomer	319-85-7	0.001	µg/l
	HCH - delta isomer	319-86-8	0.001	µg/l
	HCH - gamma isomer (Lindane)	58-89-9	0.001	µg/l
	Mirex	2385-85-5	0.001	µg/l
	Insecticides:			
	Permethrin	52645-53-1	0.01	µg/l
	Cypermethrin	52315-07-8	0.00008	µg/l
	Other Pesticides:			
	Metaldehyde	9002-91-9	0.02	µg/l
	Organo Phosphorus Pesticides + 3,4-Dichloroaniline:			
	Diazinon	333-41-5	0.01	µg/l
	Dimethoate	60-51-5	0.01	µg/l
	Dichlorvos	62-73-7	0.01	µg/l
	Chlorfenvinphos	470-90-6	0.01	µg/l
	Chlorpyrifos (chlorpyrifos-ethyl)	2921-88-2	0.01	µg/l
	3,4-Dichloroaniline	95-76-1	0.01	µg/l
DIOXINS, FURANS AND PCBs	***Dioxins and Furans:***			
	2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF)	51207-31-9	<0.0003	ng/l
	2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD)	1746-01-6	<0.0005	ng/l
	1,2,3,7,8-pentachlorodibenzofuran (1,2,3,7,8-PeCDF)	57117-41-6	<0.0008	ng/l
	2,3,4,7,8-pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	57117-31-4	<0.0008	ng/l
	1,2,3,7,8-pentachlorodibenzodioxin (1,2,3,7,8-PeCDD)	40321-76-4	<0.0008	ng/l
	1,2,3,4,7,8-hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	70648-26-9	<0.0013	ng/l
	1,2,3,6,7,8-hexachlorodibenzofuran (1,2,3,6,7,8-HxCDF)	57117-44-9	<0.0013	ng/l
	2,3,4,6,7,8-hexachlorodibenzofuran (2,3,4,6,7,8-HxCDF)	60851-34-5	<0.0008	ng/l
	1,2,3,7,8,9-hexachlorodibenzofuran (1,2,3,7,8,9-HxCDF)	72918-21-9	<0.0008	ng/l
	1,2,3,4,7,8-hexachlorodibenzodioxin (1,2,3,4,7,8-HxCDD)	39227-28-6	<0.0015	ng/l
	1,2,3,6,7,8-hexachlorodibenzodioxin (1,2,3,6,7,8-HxCDD)	57653-85-7	<0.0018	ng/l

	1,2,3,7,8,9-hexachlorodibenzodioxin1,2,3,7,8,9-HxCDD	19408-74-3	<0.0015	ng/l
	1,2,3,4,6,7,8-heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	67562-39-4	<0.0008	ng/l
	1,2,3,4,7,8,9-heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	55673-89-7	<0.0010	ng/l
	1,2,3,4,6,7,8-heptachlorodibenzodioxin (1,2,3,4,6,7,8-HpCDD)	35822-46-9	<0.0009	ng/l
	Octachlorodibenzofuran (OCDF)	39001-02-0	<0.0018	ng/l
	Octachlorodibenzodioxin (OCDD)	3268-87-9	<0.0020	ng/l
	Sum of reported dioxins and furans			ng/l
PCBs + Hexabromobiphenyl	PCB congener 18	37680-65-2	0.01	µg/l
	PCB congener 28	7012-37-5	0.01	µg/l
	PCB congener 31	16606-02-3	0.01	µg/l
	PCB congener 44	41464-39-5	0.01	µg/l
	PCB congener 47	2437-79-8	0.01	µg/l
	PCB congener 49	41464-40-8	0.01	µg/l
	PCB congener 52	35693-99-3	0.01	µg/l
	PCB congener 66	32598-10-0	0.01	µg/l
	PCB congener 101	37680-73-2	0.01	µg/l
	PCB congener 105	32598-14-4	0.01	µg/l
	PCB congener 110	38380-03-9	0.01	µg/l
	PCB congener 118	31508-00-6	0.01	µg/l
	PCB congener 128	38380-07-3	0.01	µg/l
	PCB congener 138	35065-28-2	0.01	µg/l
	PCB congener 141	52712-04-6	0.01	µg/l
	PCB congener 149	38380-04-0	0.01	µg/l

	PCB congener 151	52663-63-5	0.01	µg/l
	PCB congener 153	35065-27-1	0.01	µg/l
	PCB congener 156	38380-08-4	0.01	µg/l
	PCB congener 158	74472-42-7	0.01	µg/l
	PCB congener 170	35065-30-6	0.01	µg/l
	PCB congener 180	35065-29-3	0.01	µg/l
	PCB congener 183	52663-69-1	0.01	µg/l
	PCB congener 187	52663-68-0	0.01	µg/l
	PCB congener 194	35694-08-7	0.01	µg/l
	Sum of PCBs			µg/l
	Hexabromobiphenyl (HBB)	36355-01-8		µg/l
POLYAROMATIC	Fluoranthene	206-44-0	0.0063	µg/l
	Anthracene	120-12-7	0.0003	µg/l
	Benzo(a)pyrene	50-32-8	0.00017	µg/l
	Benzo(b)fluoranthene	205-99-2	0.0001	µg/l
	Benzo(k)fluoranthene	207-08-9	0.0001	µg/l
	Benzo(g,h,i)-perylene	191-24-2	0.0003	µg/l
	Indeno(1,2,3-cd)-pyrene	193-39-5	0.0003	µg/l
	Naphthalene	91-20-3	0.01	µg/l
	Sum of PAH			µg/l
PHENOLS AND PHTHALATES	***Phenols:***			
	Dichlorophenols (Sum of 2,3-2,4-2,5 and 2,6)		0.1	µg/l
	2,3-Dichlorophenol	576-24-9	0.1	µg/l
	2,4-Dichlorophenol	120-83-2	0.1	µg/l
	2,5-Dichlorophenol	583-78-8	0.1	µg/l
	2,6-Dichlorophenol	87-65-0	0.1	µg/l
	Phenol (total)	108-95-2	1	µg/l
	Phthalates:			
	Di(2-ethylhexyl)-phthalate (DEHP)	117-81-7	0.15	µg/l
	Benzyl butyl phthalate	85-68-7	0.2	µg/l
	Nonyl Phenols:			
	Nonylphenols. (4-Nonylphenol Technical Mix)		0.04	µg/l
	Nonylphenol monoethoxylate NPO1		0.04	µg/l
	Nonylphenol diethoxylate NPO2		0.04	µg/l

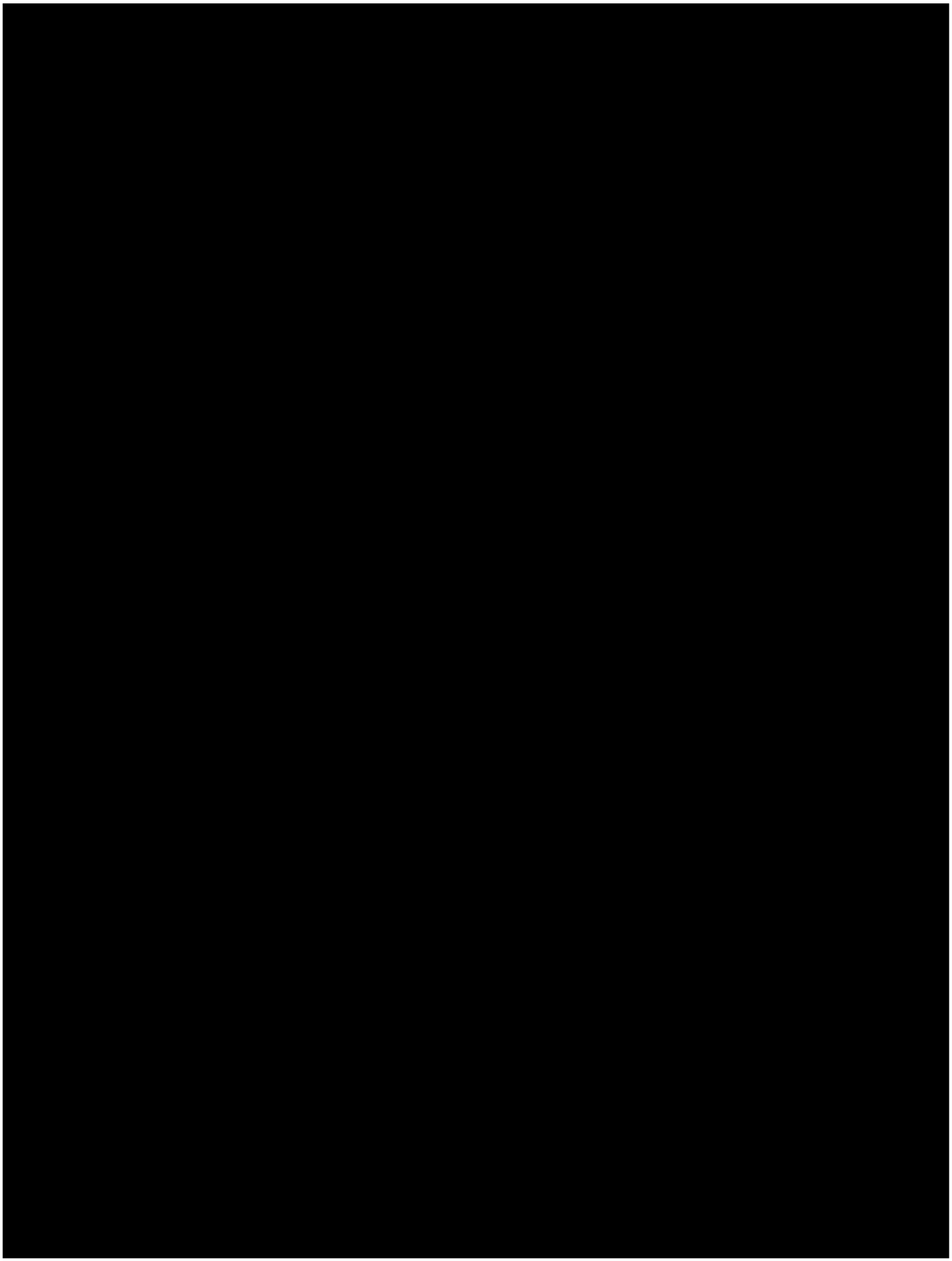
	Nonylphenol triethoxylate NPO3		0.04	µg/l
	Octyl Phenols:			
	Octylphenols ((4-(1,1', 3,3'-tetramethylbutyl)-phenol))		0.01	µg/l

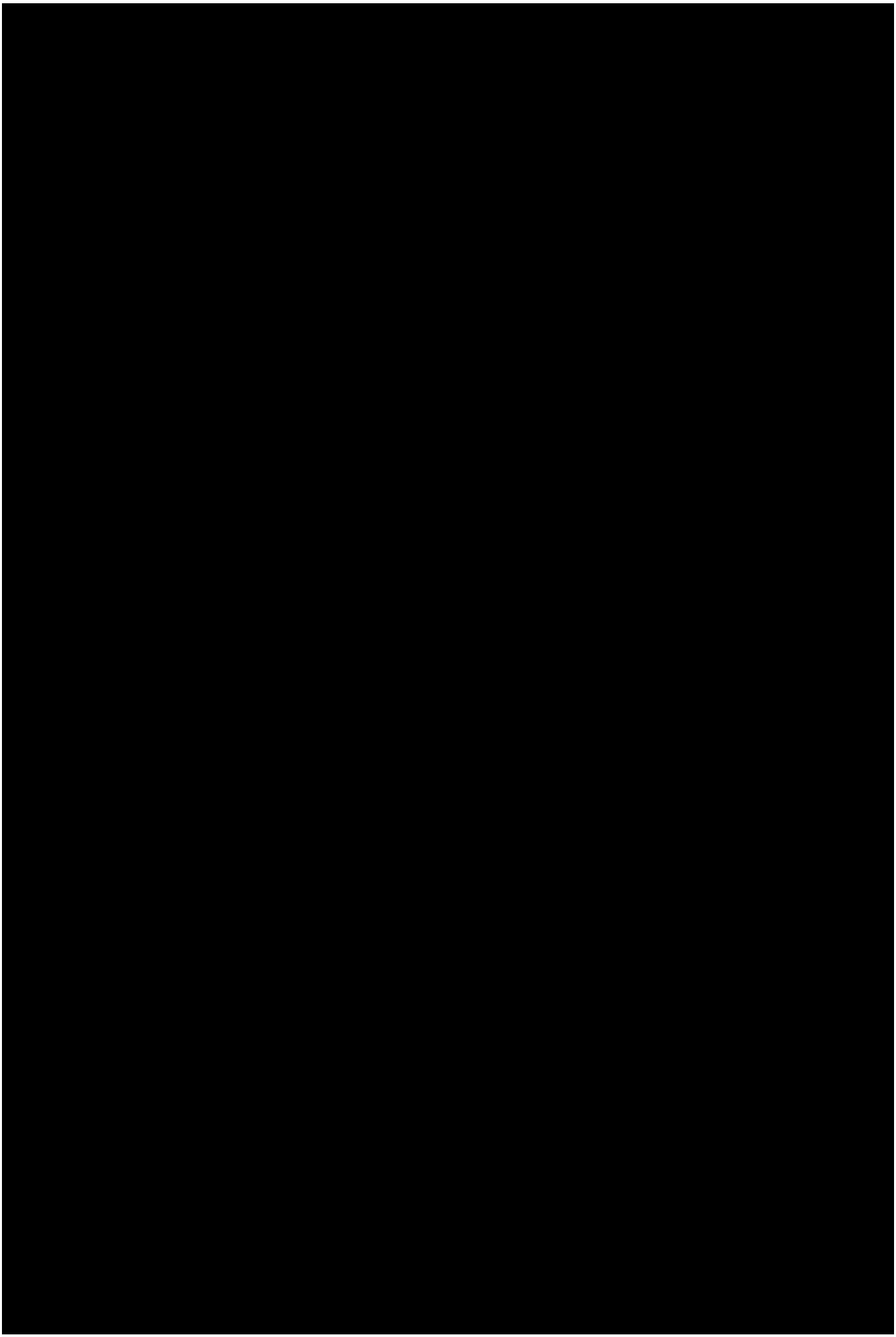
Note: See also spreadsheet titled,
'2022 EA Chemical determinants List_methods_LOD_example data'
This spreadsheet will be useful to send to laboratories for costing purposes.

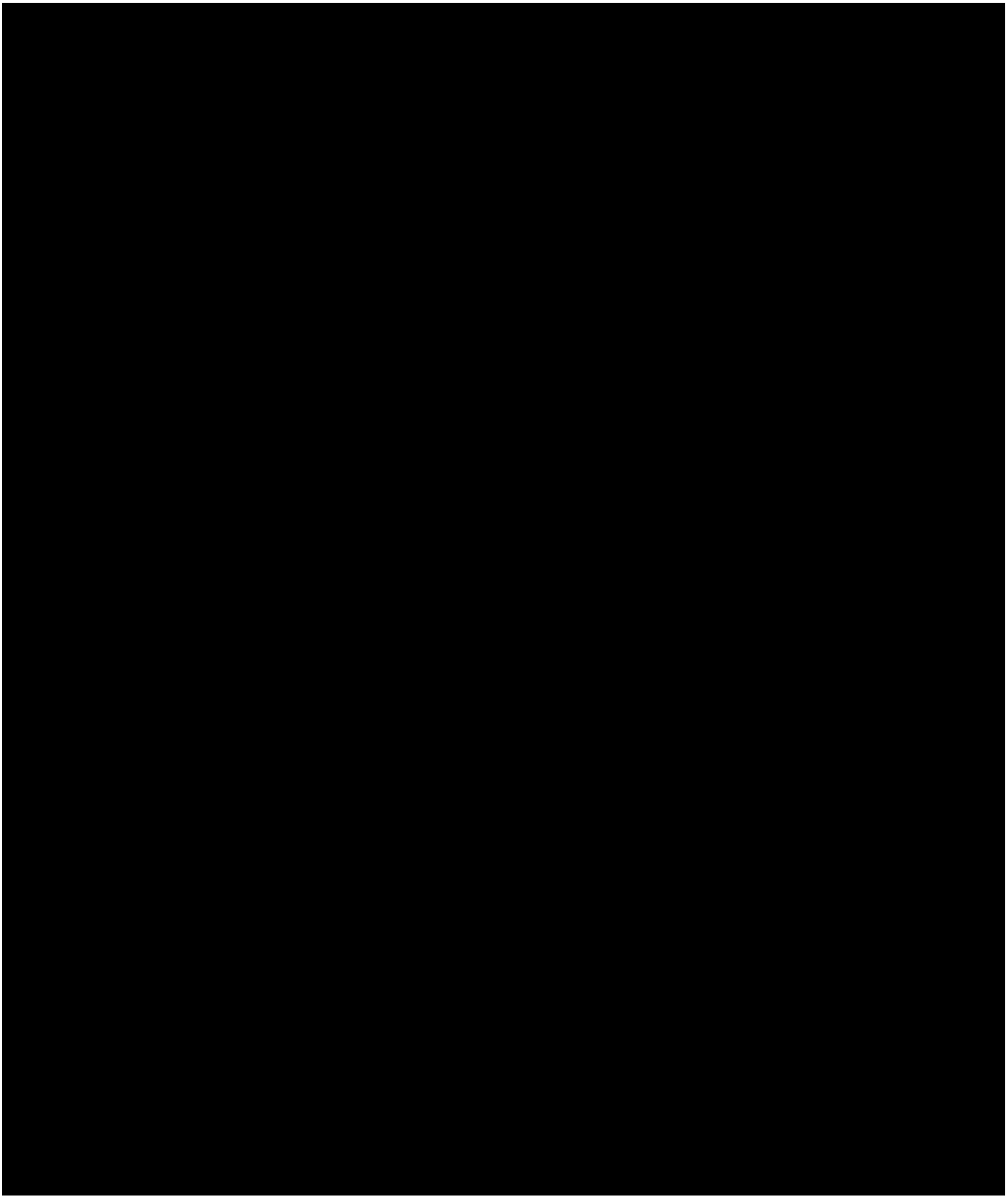
SCHEDULE 2 – PRICING SCHEDULE

The total Contract Price due to the Contractor in consideration of the Services for Lot 1, 2, 3 and 4 is £1,955,829 ex VAT.

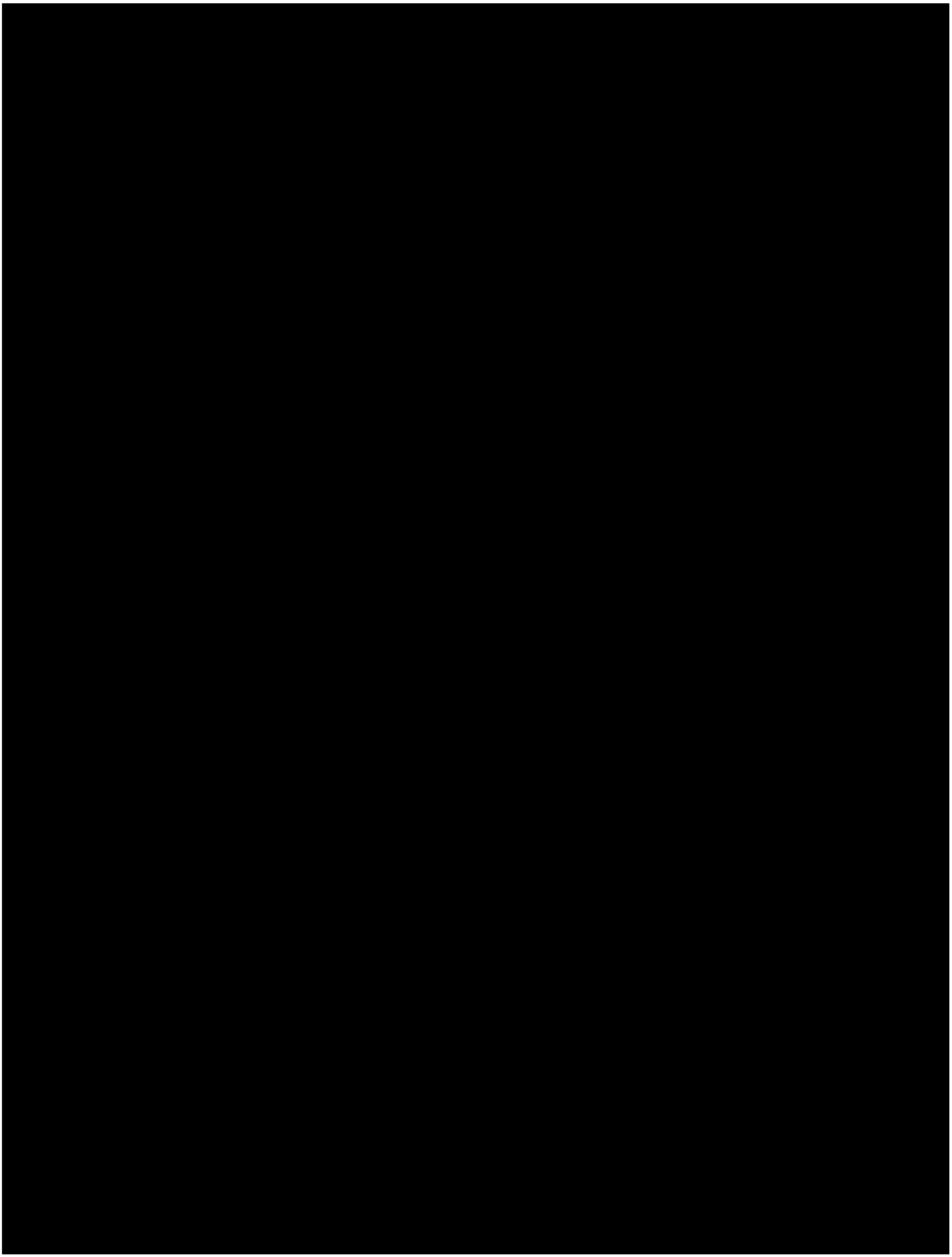
The breakdown of each Lot by value and by contract period is as follows:

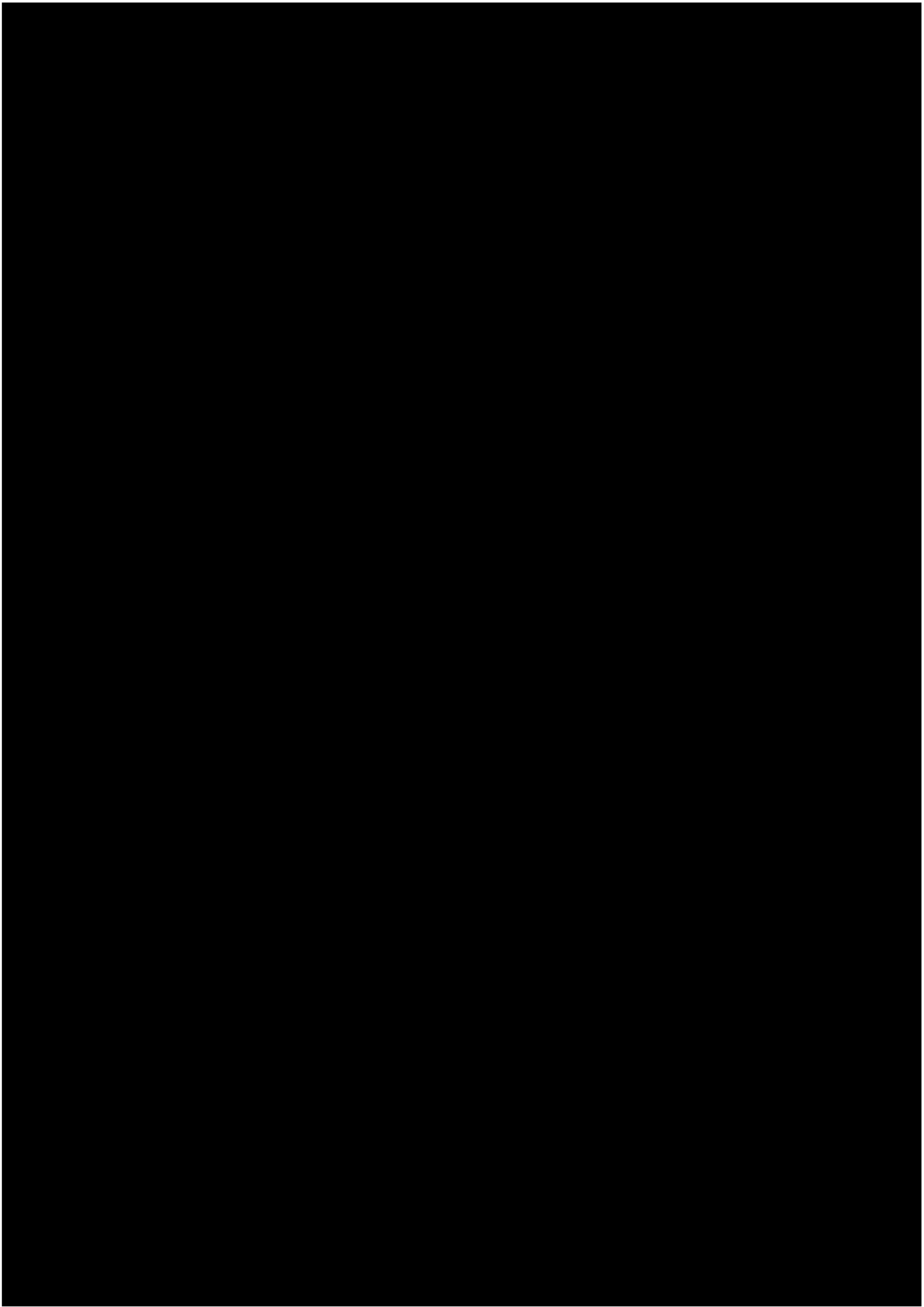




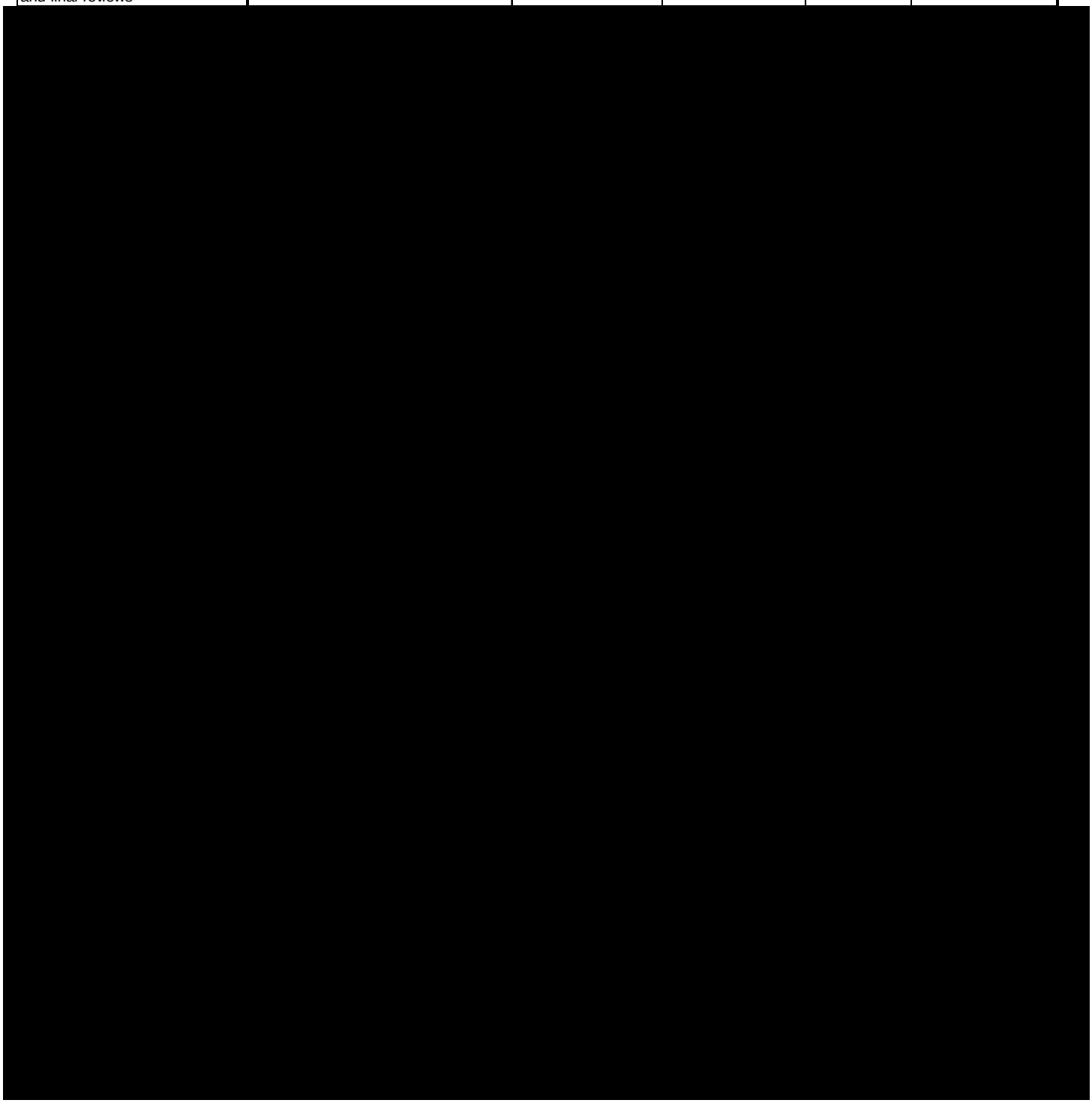


Lot 2 - Assessment of PFAS and POPs in non-hazardous landfill leachate compared to other sources within domestic and industrial wastewaters.

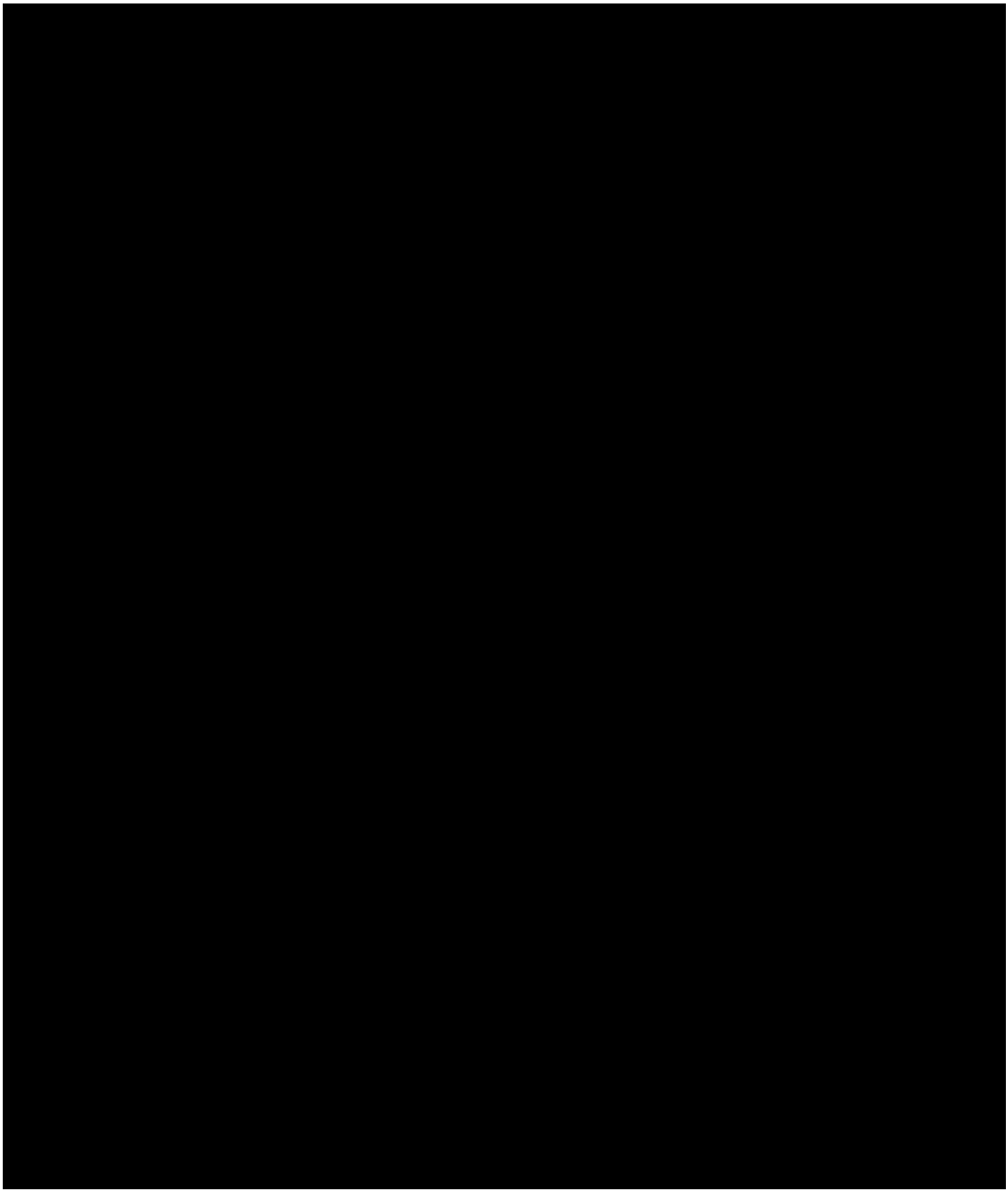


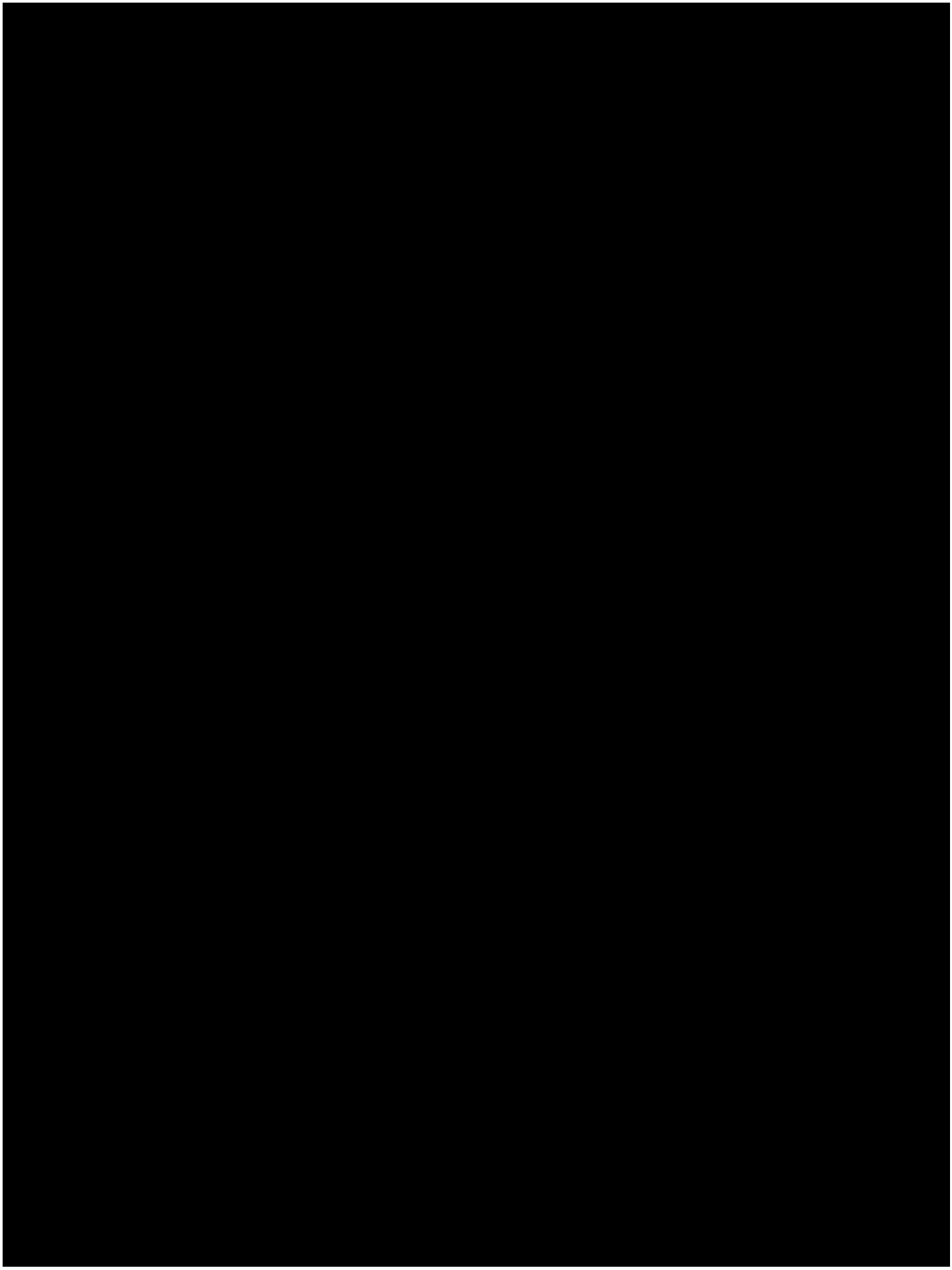


Task 6 - Close-out workshop and final reviews					

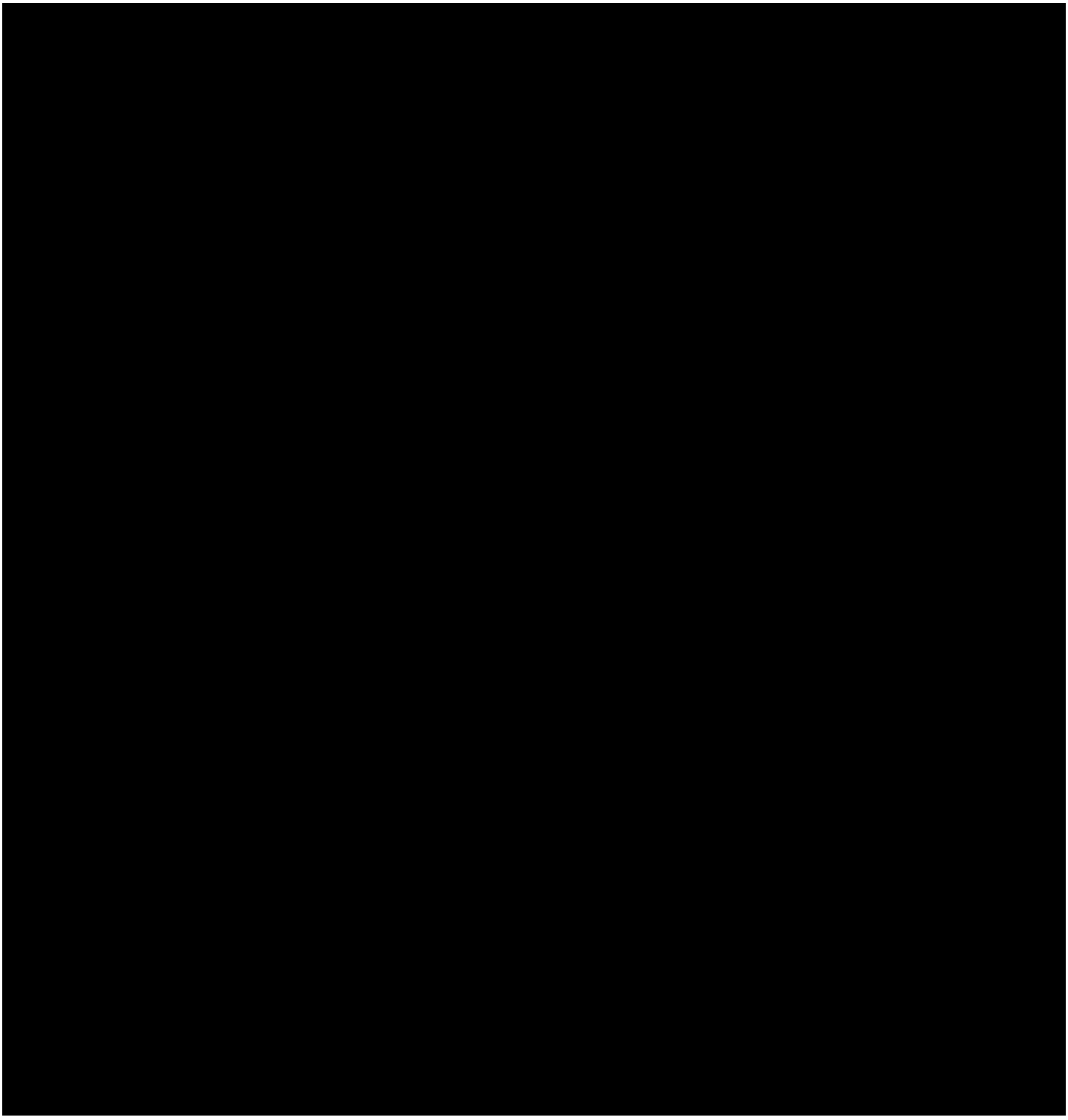


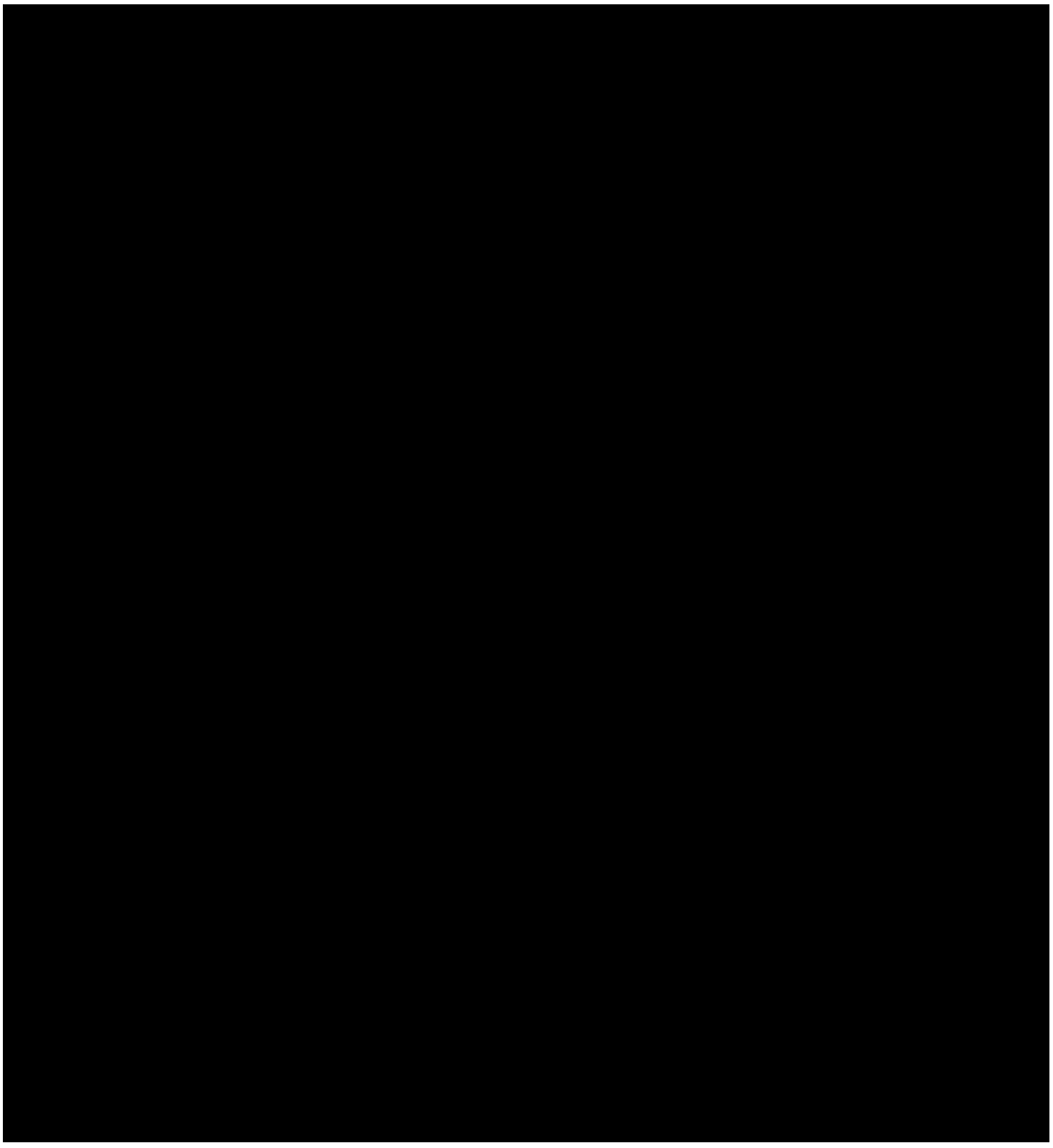
leachates to surface and groundwaters from unlined and lined non-hazardous landfills.

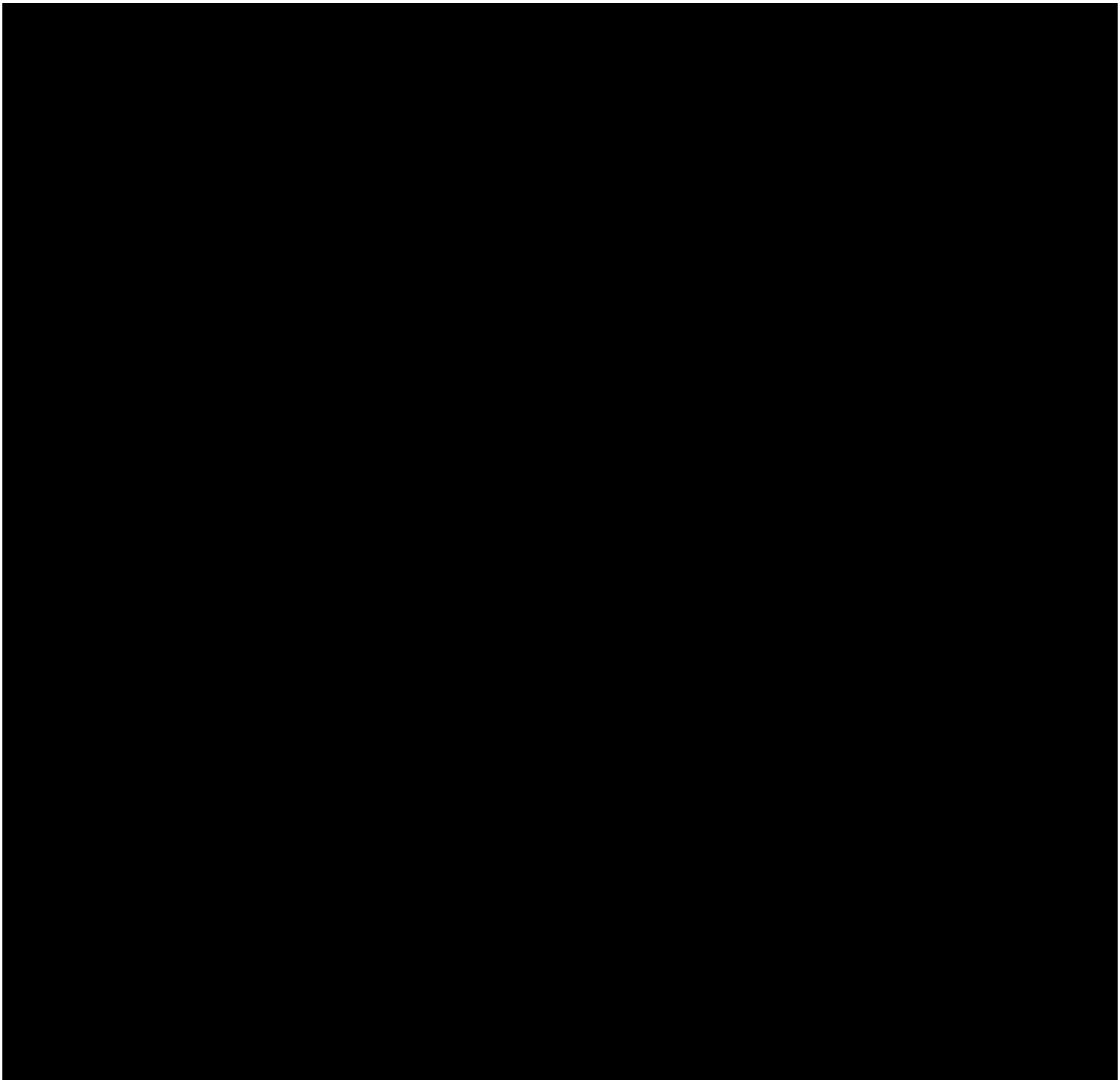


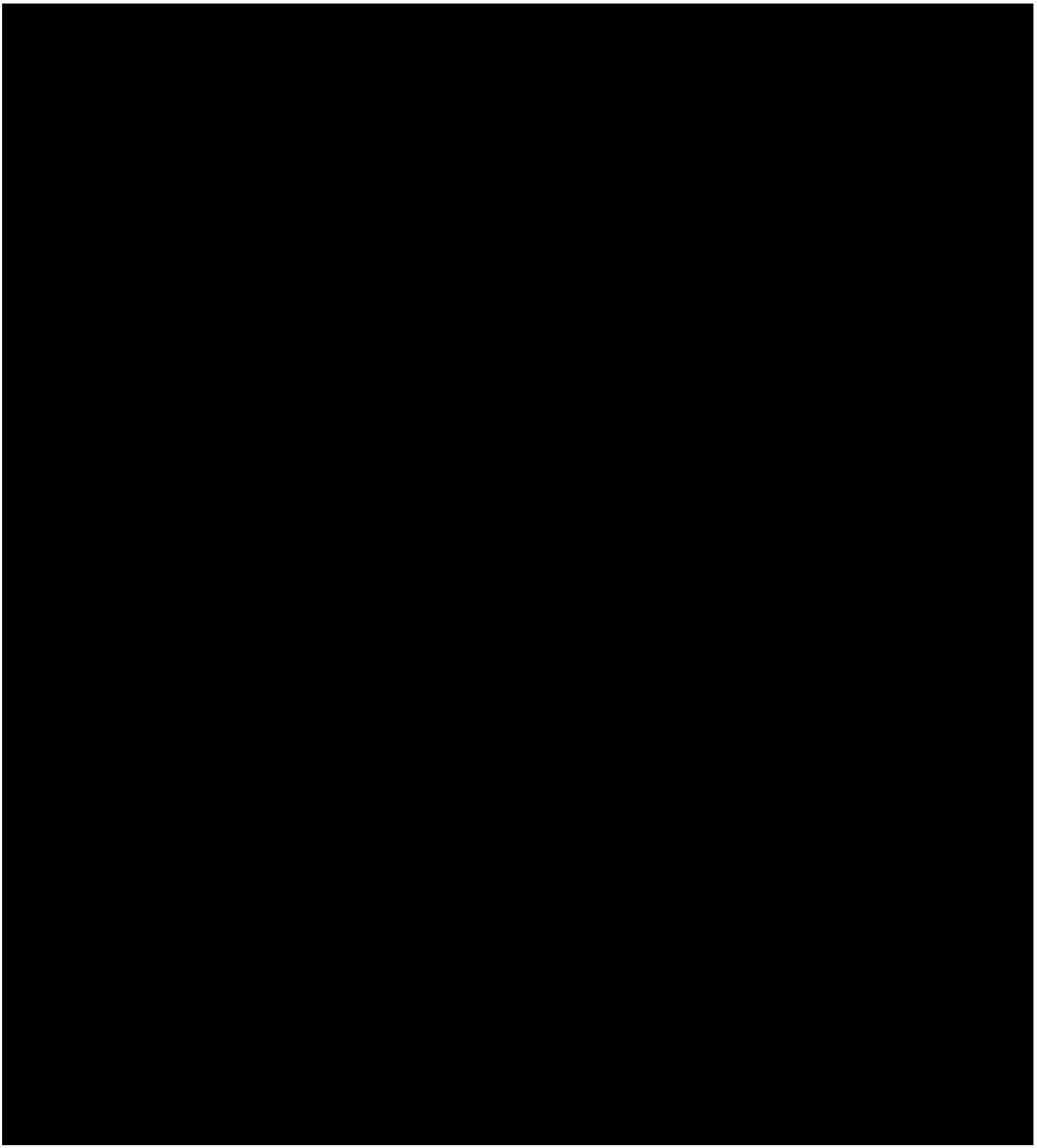


Lot 4 - Study of a PFAS suite and other trace gas emissions from non-hazardous landfills.









SCHEDULE 3 – DATA PROTECTION

Definitions – the definitions in this Schedule and the Contract shall apply:

Annex 1: the Schedule of Processing, Personal Data and Data Subjects attached to this Data Protection Schedule.

Annex 2: Joint Controller Agreement (where required).

Party: a Party to this Contract.

Data Protection Impact Assessment: an assessment by the Controller of the impact of the envisaged processing on the protection of Personal Data.

Controller, Processor, Data Subject, Personal Data, Personal Data Breach, Data Protection Officer: takes the meaning given in the UK GDPR.

Data Loss Event: any event that results, or may result, in unauthorised access to Personal Data held by the Processor under this Contract, and/or actual or potential loss and/or destruction of Personal Data in breach of this Contract, including any Personal Data Breach.

Data Subject Request: a request made by, or on behalf of, a Data Subject in accordance with rights granted pursuant to the Data Protection Legislation to access their Personal Data.

Joint Controllers: where two or more Controllers jointly determine the purposes and means of processing. **Protective Measures**: appropriate technical and organisational measures which may include: the use of pseudonyms and encrypting Personal Data, ensuring confidentiality, integrity, availability and resilience of systems and services, ensuring that availability of and access to Personal Data can be restored in a timely manner after an incident, and regularly assessing and evaluating the effectiveness of the such measures adopted by it including those outlined in Annex 1 (Security).

Sub-processor: any third Party appointed to process Personal Data on behalf of the Processor related to this Contract.

1. DATA PROTECTION

- The Parties acknowledge that for the purposes of the Data Protection Legislation, the Agency is the Controller and the Contractor is the Processor unless otherwise specified in Annex 1. The only processing that the Processor is authorised to do is listed in Annex 1 by the Controller and may not be determined by the Processor.

- The Processor shall notify the Controller immediately if it considers that any of the Controller's instructions infringe the Data Protection Legislation.

- The Processor shall provide all reasonable assistance to the Controller in the preparation of any Data Protection Impact Assessment prior to commencing any processing. Such assistance may, at the discretion of the Controller, include:

- a systematic description of the envisaged processing operations and the purpose of the processing;

- an assessment of the necessity and proportionality of the processing operations in relation to the Services;

- an assessment of the risks to the rights and freedoms of Data Subjects; and

- the measures envisaged to address the risks, including safeguards, security measures and mechanisms to ensure the protection of Personal Data.

o The Processor shall, in relation to any Personal Data processed in connection with its obligations under this Contract:

- process that Personal Data only in accordance with Annex 1, unless the Processor is required to do otherwise by Law. If it is so required the Processor shall promptly notify the Controller before processing the Personal Data unless prohibited by Law;

- ensure that it has in place Protective Measures, which are appropriate to protect against a Data Loss Event, which the Controller may reasonably reject (but failure to reject shall not amount to approval by the Controller of the adequacy of the Protective Measures), having taken account of the:
  - nature of the data to be protected;
  - harm that might result from a Data Loss Event;
  - state of technological development; and
  - cost of implementing any measures;

- ensure that :

  - the Contractor Personnel do not process Personal Data except in accordance with this Contract (and in particular Annex 1);

  - it takes all reasonable steps to ensure the reliability and integrity of any Contractor Personnel who have access to the Personal Data and[63] ensure that they:

    o are aware of and comply with the Processor's duties under this clause;

    o are subject to appropriate confidentiality undertakings with the Processor or any Sub-processor;

    o are informed of the confidential nature of the Personal Data and do not publish, disclose or divulge any of the Personal Data to any third Party unless directed in writing to do so by the Controller or as otherwise permitted by this Contract; and

    o have undergone adequate training in the use, care, protection and handling of Personal Data; and

- not transfer Personal Data outside of the EU unless the prior written consent of the Controller has been obtained and the following conditions are fulfilled:
    - the Controller or the Processor has provided appropriate safeguards in relation to the transfer (whether in accordance with GDPR Article 46 or LED Article 37) as determined by the Controller;
    - the Data Subject has enforceable rights and effective legal remedies;
    - the Processor complies with its obligations under the Data Protection Legislation by providing an adequate level of protection to any Personal Data that is transferred (or, if it is not so bound, uses its best endeavours to assist the Controller in meeting its obligations); and
    - the Processor complies with any reasonable instructions notified to it in advance by the Controller with respect to the processing of the Personal Data;
- at the written direction of the Controller, delete or return Personal Data (and any copies of it) to the Controller on termination of the Contract unless the Processor is required by Law to retain the Personal Data.

o Subject to clause 1.6, the Processor shall notify the Controller immediately if it:

- receives a Data Subject Request (or purported Data Subject Request);
- receives a request to rectify, block or erase any Personal Data;
- receives any other request, complaint or communication relating to either Party's obligations under the Data Protection Legislation;
- receives any communication from the Information Commissioner or any other regulatory authority in connection with Personal Data processed under this Contract;
- receives a request from any third Party for disclosure of Personal Data where compliance with such request is required or purported to be required by Law; or
- becomes aware of a Data Loss Event.

o The Processor's obligation to notify under clause 1.5 shall include the provision of further information to the Controller in phases, as details become available.

o Taking into account the nature of the processing, the Processor shall provide the Controller with full assistance in relation to either Party's obligations under Data Protection Legislation and any complaint, communication or request made under clause 1.5 (and insofar as possible within the timescales reasonably required by the Controller) including by promptly providing:

- the Controller with full details and copies of the complaint, communication or request;
- such assistance as is reasonably requested by the Controller to enable the Controller to comply with a Data Subject Request within the relevant timescales set out in the Data Protection Legislation;
- the Controller, at its request, with any Personal Data it holds in relation to a Data Subject;
- assistance as requested by the Controller following any Data Loss Event;
- assistance as requested by the Controller with respect to any request from the Information Commissioner's Office, or any consultation by the Controller with the Information Commissioner's Office.

o The Processor shall maintain complete and accurate records and information to demonstrate its compliance with this clause. This requirement does not apply where the Processor employs fewer than 250 staff, unless:

- the Controller determines that the processing is not occasional;
- the Controller determines the processing includes special categories of data as referred to in Article 9(1) of the GDPR or Personal Data relating to criminal convictions and offences referred to in Article 10 of the GDPR; or
- the Controller determines that the processing is likely to result in a risk to the rights and freedoms of Data Subjects.

o The Processor shall allow for audits of its Data Processing activity by the Controller or the Controller's designated auditor.

o Each Party shall designate its own data protection officer if required by the Data Protection Legislation.

o Before allowing any Sub-processor to process any Personal Data related to this Contract, the Processor must:

- notify the Controller in writing of the intended Sub-processor and processing;
- obtain the written consent of the Controller;
- enter into a written agreement with the Sub-processor which gives effect to the terms set out in this Schedule such that they apply to the Sub-processor; and
- provide the Controller with such information regarding the Sub-processor as the Controller may reasonably require.

o The Processor shall remain fully liable for all acts or omissions of any of its Sub-processors.

- The Controller may, at any time on not less than 30 Working Days' notice, revise this clause by replacing it with any applicable controller to processor standard clauses or similar terms forming part of an applicable certification scheme (which shall apply when incorporated by attachment to this Contract).

- The Parties agree to take account of any guidance issued by the Information Commissioner's Office. The Controller may on not less than 30 Working Days' notice to the Processor amend this Contract to ensure that it complies with any guidance issued by the Information Commissioner's Office.

1.15 Where the Parties include two or more Joint Controllers as identified in Annex 1 in accordance with GDPR Article 26, those Parties shall enter into a Joint Controller Agreement based on the terms outlined in Annex 2 in replacement of Clauses 1.1-1.14 for the Personal Data under Joint Control.

Annex 1 - Schedule of Processing, Personal Data and Data Subjects Processing, Personal Data and Data Subjects

This Schedule shall be completed by the Controller, who may take account of the view of the Processor, however the final decision as to the content of this Schedule shall be with the Controller at its absolute discretion.

1. The contact details of the Controller's Data Protection Officer are:

[redacted]

2. The contact details of the Processor's Data Protection Officer are: [redacted]

3. The Processor shall comply with any further written instructions with respect to processing by the Controller.

4. Any such further instructions shall be incorporated into this Annex 1.

Description	Details
Identity of the Controller and Processor	The Parties acknowledge that for the purposes of the Data Protection Legislation, the Agency is the Controller and the Contractor is the Processor in accordance with Clause 1.1.
Subject matter of the processing	The processing is needed in order to ensure that the Processor can effectively deliver the contract to provide a service to the Environment Agency in relation to PFAS Risk Screening Project Phase 4, Work Package 5 - Landfill Emissions Assessment.
Duration of the processing	The data will be used during the contract period (November 2022 to July 2025.
Nature and purposes of the processing	The nature of processing will be utilising contact details to contact team members and site contacts (for environmental monitoring purposes). Site contact details will be passed to our sub-contractors for H&S and access arrangements to sites.
Type of Personal Data being Processed	Names, phone numbers, site addresses (not personal), and email addresses.
Categories of Data Subject	Staff, sub-contractors, and suppliers.

Plan for return and destruction of the data once the processing is complete UNLESS requirement under union or member state law to preserve that type of data	We retain personal information on the basis of necessity and to retain sufficient information in case of potential litigation.

SCHEDULE 4 – SUSTAINABILITY AND SOCIAL VALUE COMMITMENTS

This schedule outlines the sustainability and social value commitments made by the Contractor during the tendering period. The delivery of these commitments will be monitored through the agreed reporting mechanism and through the KPI's set out in Schedule 5.

SCHEDULE 5 – KEY PERFORMANCE INDICATORS

Key Performance Indicators (KPIs) shall be monitored on a regular basis and shall form part of the Contract performance review. Performance of KPIs will be reported by the contractor to the Authority on a monthly basis. The contractor shall detail performance against KPIs in Monthly Reports and at Contract meetings with the Authority; who will review this and make comments if any.

The contractor shall maintain their own management reports, including a Risk and Issues Log.

Any performance issues highlighted in these reports will be addressed by the contractor, who shall be required to provide an improvement plan ("Remediation Plan") to address all issues highlighted within a week of the Authority request.

Key Performance Indicators (KPIs) are essential in order to align the contractor's performance with the requirements of the Authority and to do so in a fair and practical way. KPIs have to be realistic and achievable; they also have to be met, otherwise indicating that the service is failing to deliver.

The Authority reserves the right to amend the existing KPIs detailed in this Section 3 or add any new KPIs. Any changes to the KPIs shall be confirmed by way of a Contract Change Note.

Key Performance Indicators

KPI Category	KPI ref	KPI criteria	KPI measure	KPI rating		
Project management	1	Deliverables	Deliverables are completed on time and all outputs are achieved. Contractors to report on agreed deliverables. These are delivered to a publishable standard.	Failure to deliver more than 5 outputs within 5 (five) Working Days after the agreed deadline. Progress is not communicated at fortnightly and monthly meetings with the Authority. A significant error or need for revision is identified that results in published documents being amended by the Authority. Or the quality of deliverables provided requires significant investment of time/effort by Authority staff to bring up to the require standard.	Failure to deliver more than three outputs within 5 (five) Working Days after the agreed deadline, objectives only partially met within time scales, progress not communicated at fortnightly meetings with the Authority. An error is identified that does not result in published documents being amended. However, the quality of deliverables provided requires investment of time/effort by Authority staff to bring up to the required standard	Delivery timescales and outputs achieved, milestones are met 90% of the time, and progress communicated at fortnightly meetings. Deliverables meet expectations and are delivered to a publishable standard.

	2	Responsiveness	The contractor is flexible and adapts work plans quickly in light of changing situations to ensure planned outcomes are achieved. The contractor supports data quality by proactive and collaborative working with key stakeholders and any sub-contractors.	Major concerns are not satisfactorily addressed by the contractor's project team; failure to adapt project approach has a significant impact on planned outcomes; the contractor's relationship with sub-contractors negatively impacts project delivery.	Some concerns are not satisfactorily addressed by the contractor's project team; failure to adapt project approach has a limited impact on planned outcomes; the contractor's relationship with sub-contractors inhibits the smooth running of the project.	Request/ concerns fully resolved; positive, constructive relationships maintained.
Risk management	3		Contractor is pro-active at identifying and dealing with risks and issues arising; appropriate mitigations are put in place.	Risk Assessment is not kept up to date and known risks are not communicated to project officer. Appropriate mitigation actions are not taken/ implemented, which effects delivery of key milestones or affects ability to meet project objectives.	Risk Assessment is kept up to date but communication of any risks is incomplete. Mitigation actions only partially address issue or are partially implemented.	Risk assessment is kept up to date and remains appropriate for use. Mitigation actions are taken in full and address risks.

Data management	4	Data quality and QA	Contractor maintains QA/QC standards. A credible QA development plan is in place with time-bound deliverables to implement Defra Quality Assurance Guidelines. QA logs are implemented. High QA standards are maintained for all data, analysis and data sets.	Lack of a QA development plan, a significant inaccuracy in the QA log or significant failure to maintain required standard in data and/or analysis.	Incomplete QA development plan, a significant inaccuracy in the QA log. Failure or only partial maintenance of the required standard in data and/or analysis	Meets expectations
	5	Data collection	Contractor collects appropriate data to address the evidence needs on time. QA/QC standards are maintained throughout data collection. Contractor ensures that data collection is conducted in accordance with GDPR, Data Protection Act and government ethical guidelines.	Deliverables around data collection are not delivered to the standard agreed or are more than two weeks late. Data protection is breached and/or ethical guidance is not followed	Deliverables around data collection are delivered less than two weeks late on more than one occasion or are not rigorous.	Deliverables around data collection are delivered on time. The standard of work is signed off by the Authority.

	6	Data analysis	Data collected should be of a high quality. The analysis is to enable the contractor to come to robust assessments as to the outcomes of the process and impact of the legislation. These conclusions are to be supported by suitable and robust data analysis.	Data is of poor quality. Data is not collected, processed or analysed using appropriate methods. Interpretation of data is incorrect and/or lacking and/or does not allow for conclusive assessments to be made as to the process or impact of the legislation.	Elements of data are of poor quality. Elements of data collection, processing or interpretation are incorrect, inappropriate and/or there is a lack of supporting data. Interpretation of data is incomplete and does not allow for conclusive assessments to be made as to the process or impact of the legislation.	Data is of high quality. Data are collected, processed and analysed correctly, using appropriate methods. Interpretation of data is correct and robust assessments can be made.

Continuous Improvement	7	Adaptability	Contractor is flexible and adapts work plans quickly in response to changing situations, ensuring that outcomes are achieved (e.g., revising recruitment approach or methodology). Contractor makes suggestions for improvements to quality of further elements of research/ analysis which supports the Authority's needs.	Contractor is not proactive in identifying issues/ areas for improvement. Areas for improvement are not satisfactorily addressed by the contractors' project team; failure to adapt the project approach has significant impact on the planned outcomes.	Contractor is proactive in identifying some issues/ areas for improvement. Some areas for improvement are not satisfactorily addressed by the contractor's project team; failure to adapt the project approach has a limited impact on planned outcomes.	Contractor is proactive in identifying issues/ areas for improvement. Concerns are fully resolved; positive and constructive relationships are maintained throughout the project.

Quality of service	8	Reports	Interim and final project reports received must demonstrate that research and analysis is rigorous, relevant and of value. Deliverables are quality assured, clear, accurate and of a publishable standard.	Reports and analysis do not meet requirements – they are not delivered in line with the date agreed on the deliverables table. The quality of deliverables provided require significant investment of time/ effort by Authority staff to bring up to required standard. Or an error is identified that results in Government incurring financial damages or	Reports and analysis partially meet requirements and they are not delivered in line with the date agreed on the deliverables table. The quality of deliverables provided require investment of time/ effort by Authority staff to bring up to required standard.	Meets expectations – Accurate and delivered to a publishable standard
Social Value	9	**Quarterly Social Value Report**	Quarterly reports delivered in the agreed format, on time and giving a qualitative description of the social value achieved to date. Reports should be clearly linked to the deliverables and the programme of work outlined in the contract.	Are later than 2 (two) weeks in delivery and or include significant errors	Are less than 2 (two) weeks in delivery and or include minor inaccuracies	Meets Expectations

End of document.