Supplementary Information (SI) for Environmental Science: Advances.

Supplementary Information

Occurrence of PFAS in municipal drinking water: a participatory case study in London, UK

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Supplementary Methods

Supplementary Methods S1: Sample collection

The sampling kits were developed with input and guidance from members of the Public and Community Oversight Group of the MRC Centre for Environment & Health, and community representatives of the NERC West London Health Home and Environment Study.

Each kit contained a detailed set of instructions and all equipment necessary for sample collection (three 30 mL Nalgene bottles (labelled A, C1 (pre-filled with HPLC-grade bottled water) and C2), two plastic bags and return postage supplies, **Supplementary Figure S2**). Participants were instructed to run the tap for at least 60 seconds before sample collection to ensure fresh water was being pulled from the supply before rinsing bottle A three times and then collecting the final sample. Participants were then required to transfer the contents of bottle C1 to C2, which acted as a field blank for the sample collection. All bottles were then double-bagged and returned to the laboratory via the local postal service.

Supplementary Methods S2: Sample preparation

To avoid contamination often introduced through the sample preparation process, a direct injection protocol was used for the analysis of all samples. In summary, 900 µL of sample water (collected tap water and field blanks) were spiked with 100 µL of MeOH containing IS (to a final concentration of 25 ng L^{-1}). All samples were prepared and analysed in certified polypropylene PFAS-free HPLC vials with a polypropylene septum. Standards and methanol aliquots were added to the water samples using the Andrew+ robot system (Waters, Wilmslow, UK). Refer to **Supplementary Methods S3** for instrumental analysis parameters. Refer to **Supplementary Table S6** for a performance evaluation of the Andrew+.

For quantification purposes, an external calibration curve was prepared in HPLC-grade bottled water over the range of 0.5 ng L^{-1} to 100 ng L^{-1} as above, maintaining a SIL-IS concentration of 25 ng L^{-1} across all samples. Where possible, quantification was performed using the peak area ratio between the native PFAS compounds and corresponding SIL-IS. Quality control (QC) samples were prepared as above, spiked to 6, 18, and 60 ng/L with native PFAS compounds. Controls consisting of only MeOH and HPLC-grade bottled water (900 µL of each reagent, no additional SIL-IS added) were analysed to account for contamination from those reagents.

All test samples, field blanks, the 18 ng L^{-1} QC, and controls were randomised within the batch file with the total run time less than 48 hours per batch. The standard curve was evenly spaced throughout the batch file with the 6 and 60 ng L^{-1} QCs bracketing the whole run, in-line with the recommendations from the US EPA 533 method for PFAS analysis [1]. Refer to **Supplementary Table S7** and **Supplementary Table S8** for details of method performance assessment.

Supplementary Methods S3: Instrumental Analysis

All reagents used were at least HPLC-MS grade or higher unless stated otherwise and confirmed to be PFAS-free by in-house testing. Methanol (MeOH) and bottled water was obtained from VWR Scientific (Leicestershire, UK) and Fisher Scientific (Leicestershire, UK), respectively. For quantitative targeted analysis, a standard mix of 64 PFAS standards, including 19 stable isotopic-labelled internal standards (SIL-IS) with a purity of ≥ 97% was used. Refer to Table S1 for full details.

All water samples were analysed using a Shimadzu Nexera X2 LC and LCMS-8060 (Shimadzu Corporation, Kyoto, Japan) instrument with a PFAS delay column (50 x 2.1 mm, Thames Restek, High Wycombe, UK) fitted before the autosampler. Separations were performed over nine and a half minutes using a Force C18 column (50 x 2.1 mm, 3 um, Thames Restek, High Wycombe, UK) fitted with a complimentary guard column (Force C18, 5.0 x 2.1 mm, 5 um, Thames Restek, High Wycombe, UK) with 10 mM ammonium acetate (aq) as mobile phase A (MPA) and MeOH as mobile phase B (MPB). Both the delay and analytical columns were held at 40 ºC throughout the analysis, the flow rate was 0.5 mL min^{-1} and 50 mL of sample was injected onto the column. The gradient program consisted of an initial hold at 30% MPB for 0.51 min, then a linear ramp to 60% at 1.5 min, then a second ramp to 90% at 5 min, then an increase to 95% at 6 min, followed by a hold at 95% MPB for 1 min, the system was re-equilibrated at starting conditions for an additional 2 min.

During the multiple reaction monitoring, the interface temperature was maintained at 300°C, the desolvation line (DL) temperature at 150°C, and the heat block at 200°C. The gas flows were set at 3, 5, and 15 L min^{-1} for the nebulizing, drying, and heating gas, respectively.

Supplementary Methods S4: Testing of water filter jugs

All jugs were washed and the filters were conditioned with HPLC-grade water before use as per their respective instruction manuals. The removal of PFAS was assessed via recovery by spiking 500 mL of bottled HPLC-grade water to 50 ng/L for all native PFAS compounds, which was allowed to fully pass through the filter before analysis.

Unspiked bottled HPLC-grade water was used as a control. In addition, the best performing filter for PFAS removal, was subjected to a “real world use” scenario, whereby 100 L of tap water from two different sources (Site A and Site B) within London was passed through the filter (a new conditioned filter was used at each location) with samples collected every 20 L from the filtrate.

Filtrate samples were prepared for analysis by fully evaporating 5 mL of water at 40 ºC under a gentle stream of nitrogen. Samples were then reconstituted in 200 µL of starting mobile phase conditions (70:30 H2O:MeOH) and transferred to certified polypropylene PFAS-free HPLC insert vials. Refer to **Supplementary Table S9** for details of method performance assessment.

Supplementary Results

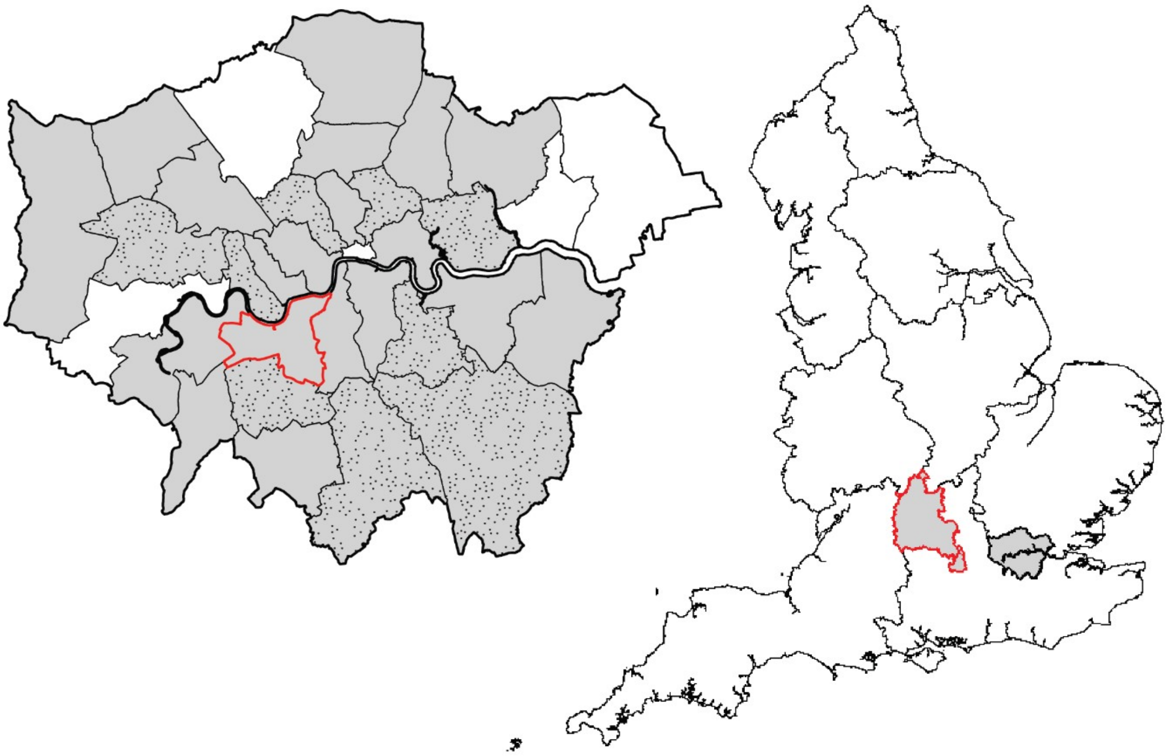
Supplementary Results S1: Detected PFAS

Across the whole study, 11 different PFAS compounds (PFBA, PFBS, PFecHS, PFHpA, PFHxA, PFHxS, PFNA, PFOA, PFOS, PFPeA, PFPeS) were present above the method's limit of detection (LOD). The limit of detection is defined as the lowest analyte concentration that can be detected by the analytical method with confidence [2.] To assign a reliable value to the concentration of PFAS in a sample, the concentration must first exceed the method's lower limit of quantification (LLOQ). This is the lowest value at which the instrument performance is acceptable for this application [2]. Refer to **Supplementary Table S7** and **Supplementary Table S8** for the LOD and LLOQ values used for each PFAS compound in this work.

Supplementary Figures

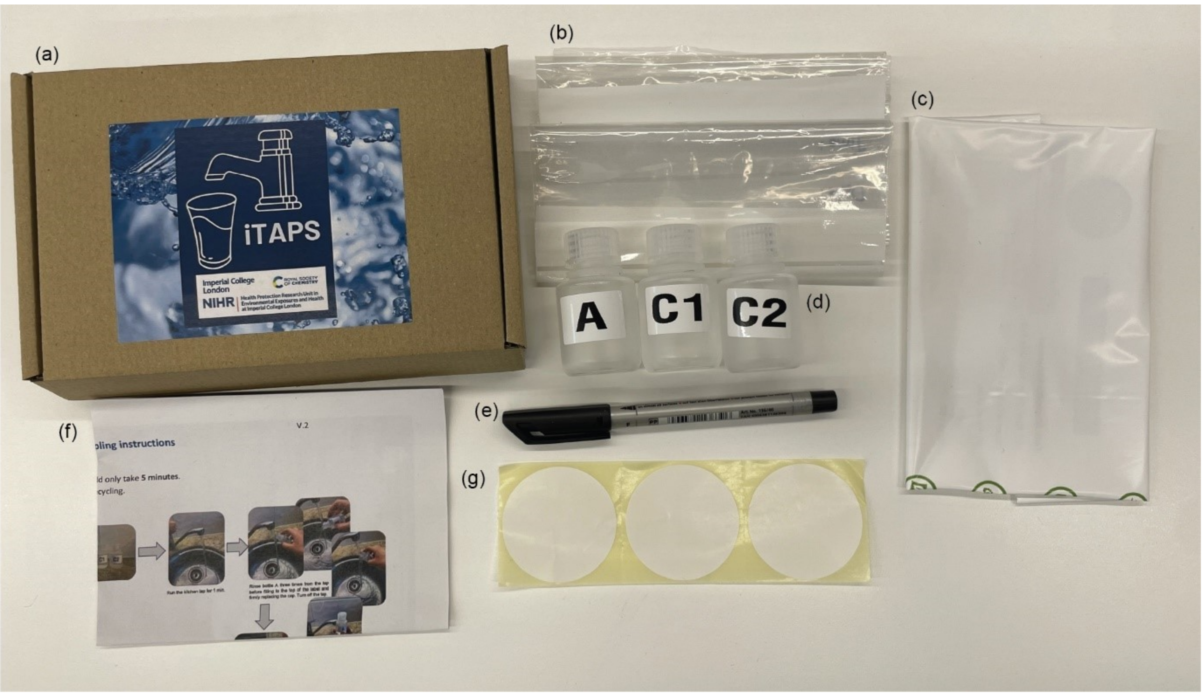
Supplementary Figure S1. Map of all sampling sites used in this study in England and London.

Grey shaded regions indicate counties where tap water samples were collected across the whole study. Areas with a red border contain the households used to assess daily variability. Dotted regions contain the public water drinking fountains that were sampled.

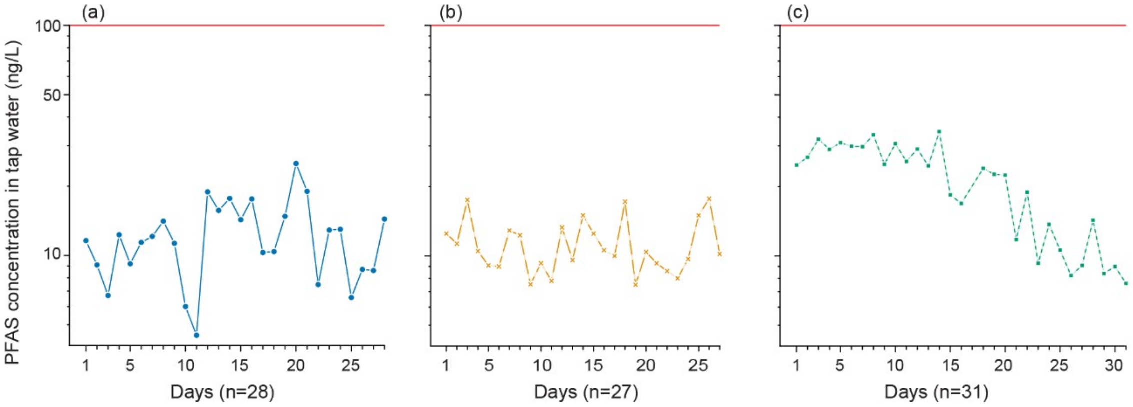


Supplementary Figure S2. Contents of home sampling kits that were sent to participants.

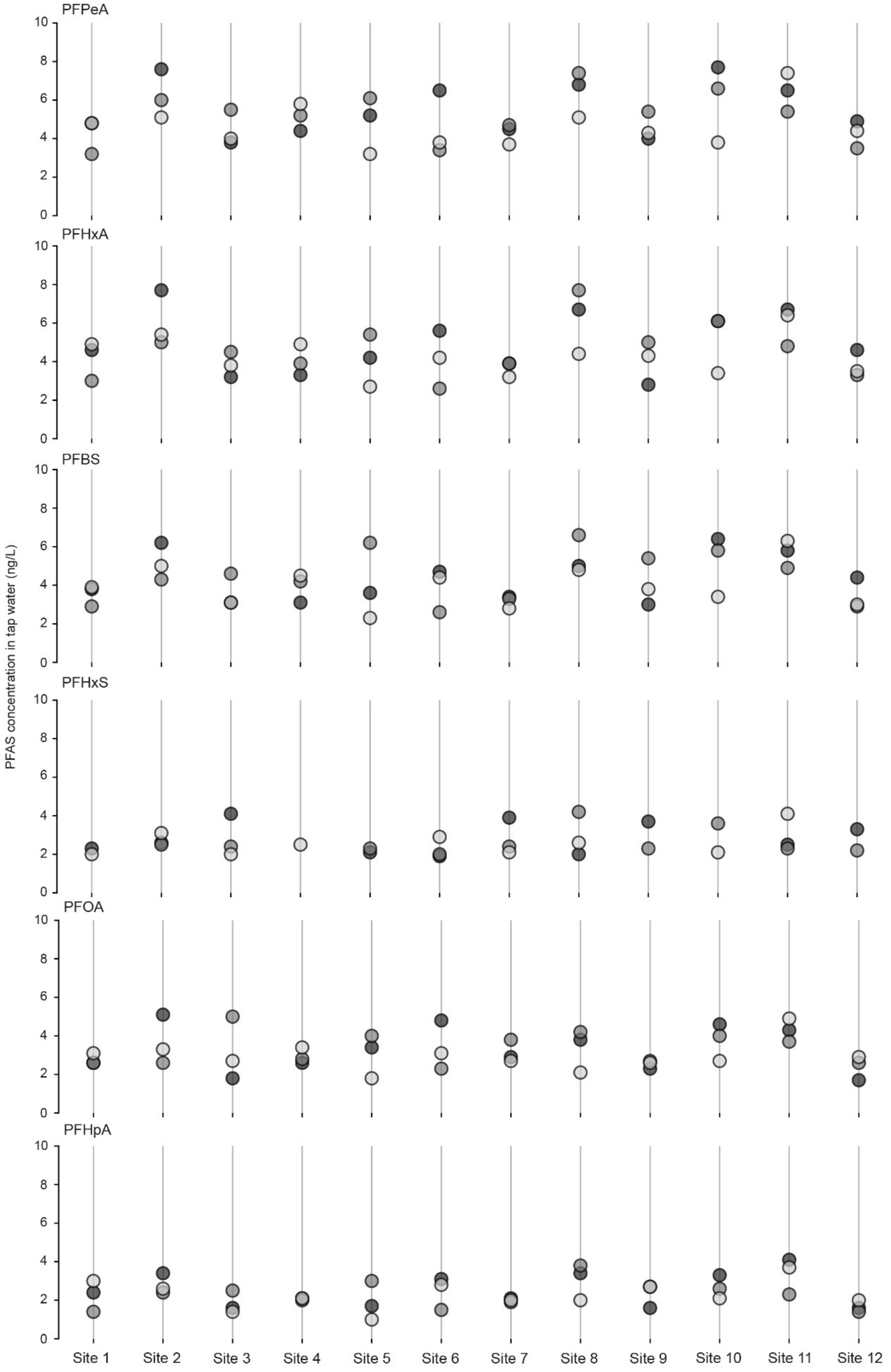
(a) Letter-sized cardboard box that contained all components, (b) plastic bags for double bagging water samples, (c) pre-labelled return envelope, (d) 30 mL polypropylene Nalgene bottles for sample collection (A) and field blanks (C1 and C2), (e) permanent marker for labelling, (f) sample collection instructions, and (g) box closure stickers.

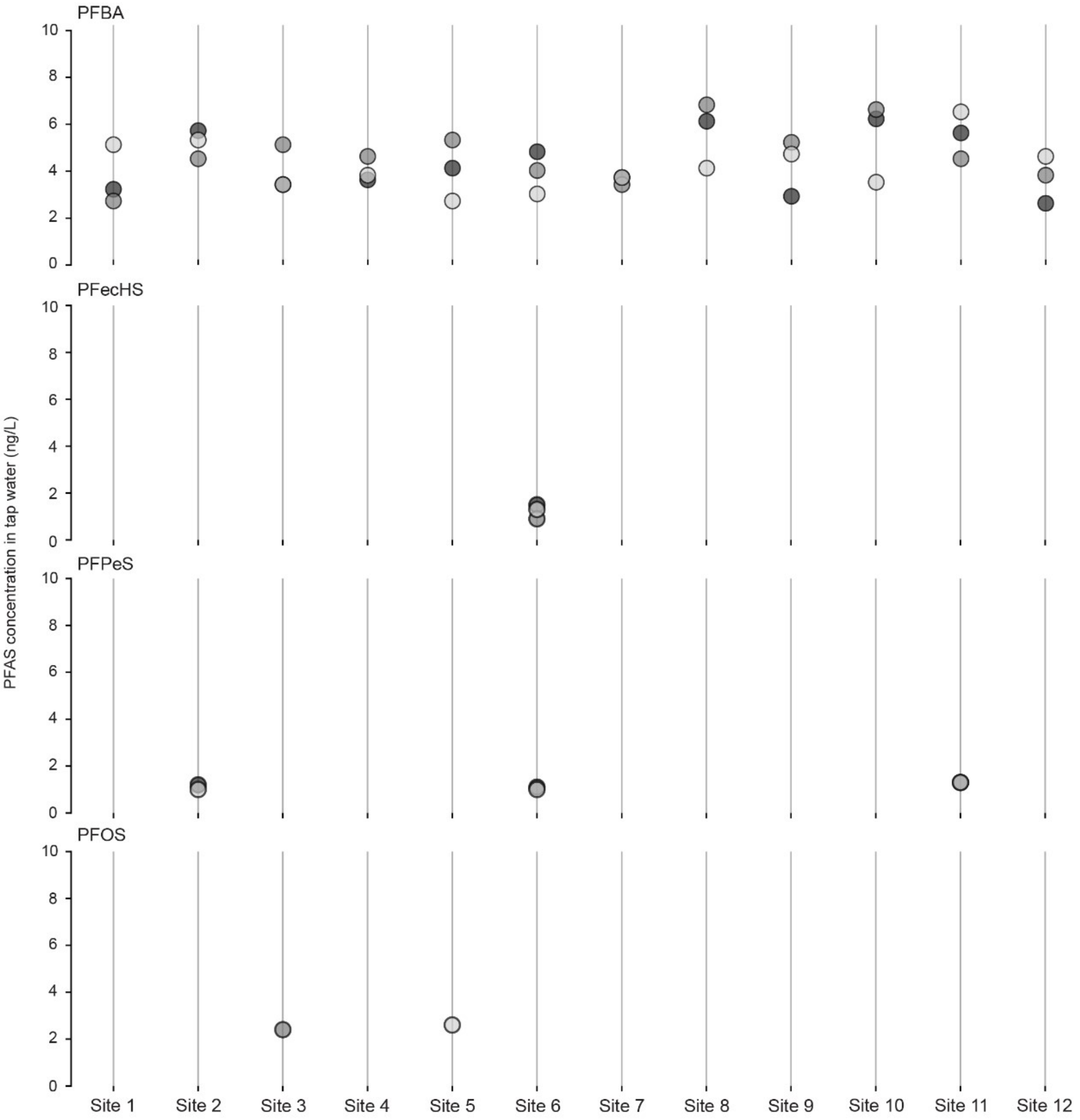


Supplementary Figure S3. Daily cumulative concentrations of PFAS in tap water. The successive daily cumulative PFAS concentration in tap water from each household, (a) to (c). The red line indicates the 100 ng/L cumulative limit for PFAS in drinking water.



Supplementary Figure S4. Average PFAS concentrations at each public water fountain site over the three-sample collection timepoints. Light grey = 7th of March 2022, grey = 22nd of March 2022, dark grey = 7th of April 2022.




PFBA
PFecHS
PFPeS
PFOS
PFAS concentration in tap water (ng/L)
0
2
4
6
8
10
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Site 9
Site 10
Site 11
Site 12

Supplementary Tables

Supplementary Table S1. List of PFAS analytical standards, Chemical Abstract Service (CAS) number, retention time (t_R), and MRM transitions used for targeted analysis per compound.

#	**Abbreviation**	**Name**	**CAS**	**MRM transition**	**t_R (min)**
Native standards					
1	4:2 FTS	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate	3871-99-6	326.75 > 307.05* 326.75 > 81.05	2.46
2	5:3 FTCA	2H,2H,3H,3H-Perfluorooctanoic Acid	914637-49-3	341.00 > 217.20* 341.00 > 237.20	2.94
3	6:2 Cl-PFESA	9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	73606-19-6	531.05 > 351.15* 531.05 > 34.90	3.88
4	6:2 FTS	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate	375-95-1	426.75 > 407.00* 426.75 > 81.10	3.24
5	7:3 FTCA	2H,2H,3H,3H-Perfluorodecanoic Acid	72629-94-8	440.90 > 317.15* 440.90 > 337.20	3.79
6	8:2 Cl-PFESA	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	83329-89-9	631.10 > 450.95*	4.56
7	8:2 FTS	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate	98789-57-2	527.05 > 506.95* 527.05 > 81.00	4.06
8	DONA	4,8-dioxa-3H-Perfluorononanoic Acid	919005-14-4	376.95 > 251.15* 376.95 > 85.10	2.90
9	HFPO-TA	Hexafluoropropylene oxide trimer acid	13252-14-7	495.55 > 398.15*	3.50
10	L-PFDoS	Sodium perfluoro-1-dodecanesulfonate	2795-39-3	699.00 > 80.05* 699.00 > 99.00	4.99
11	L-PFUdS	Sodium perfluoro-1-undecanesulfonate	376-06-7	649.00 > 80.00* 649.00 > 99.05	4.72
12	MeFOSA	N-Methyl-perfluorooctanesulfonamide	16517-11-6	511.85 > 219.20* 511.85 > 269.05	5.03
13	N-EtFOSAA	2-(N-ethylperfluorooctanesulfonamido) acetic acid	375-22-4	583.70 > 419.00* 583.70 > 526.00	4.42
14	N-MeFOSAA	2-(N-methylperfluorooctanesulfonamido) acetic acid	29420-49-3	570.05 > 418.95* 570.05 > 482.95	4.24
15	PFBA	Perfluorobutanoic acid	27619-93-8	212.80 > 169.15*	1.19
16	PFBS	Perfluorobutyl sulfonate	335-76-2	298.75 > 80.10* 298.75 > 99.00	2.21
17	PFDA	Perfluorodecanoic acid	1260224-54-1	512.65 > 468.95* 512.65 > 219.05	4.06
18	PFDoA	Perfluorododecanoic acid	441296-91-9	612.65 > 569.00* 612.65 > 169.15	4.74
19	PFDS	Perfluorodecane sulfonate	67905-19-5	598.80 > 80.10* 598.80 > 99.10	4.40

20	PFecHS	Perfluoroethylcyclohexane sulphonate	335-24-0	460.80 > 381.10* 460.80 > 99.05	3.20
21	PFEESA	Perfluoro(2-ethoxyethane)sulphonic acid	113507-82-7	314.90 > 135.15*	2.35
22	PFHpA	Perfluoroheptanoic acid	27619-96-1	362.75 > 319.05* 362.75 > 169.15	2.85
23	PFHpS	Perfluoroheptane sulfonate	375-85-9	448.85 > 80.15* 448.85 > 99.00	3.27
24	PFHxA	Perfluorohexanoic acid	812-70-4	312.95 > 269.05* 312.95 > 119.10	2.50
25	PFHxDA	Perfluoro-n-hexadecanoic acid	2706-90-3	813.00 > 768.85* 813.00 > 169.20	5.67
26	PFHxS[a]	Perfluorohexane sulfonate	2806-15-7	398.85 > 99.05* 398.85 > 80.00	2.87
27	PFMOBA	Perfluoro-4-methoxybutanic acid	863090-89-5	278.85 > 85.05*	2.25
28	PFMOPrA	Perfluoro-3-methoxypropanoic acid	377-73-1	228.95 > 85.10*	1.66
29	PFNA	Perfluorononanoic acid	13252-13-6	463.05 > 419.00* 463.05 > 219.25	3.67
30	PFNS	Perfluorononane sulfonate	21934-50-9	548.85 > 80.05* 548.85 > 99.10	4.05
31	PFOA	Perfluorooctanoic acid	754-91-6	412.85 > 369.10* 412.85 > 169.15	3.26
32	PFODA	Perfluoro-n-octadecanoic acid	630402-22-1	913.00 > 869.00* 913.00 > 169.20	5.98
33	PFOS[b]	Perfluorooctyl sulfonate	307-24-4	498.95 > 80.00* 498.65 > 99.00	3.67
34	PFPeA	Perfluoropentanoic acid	27619-94-9	263.00 > 219.25* 263.00 > 69.10	2.14
35	PFPeS	Perfluoropentane sulfonate	307-55-1	349.05 > 80.10* 349.05 > 99.00	2.53
36	PFTeDA	Perfluorotetradecanoic acid	151772-58-6	712.65 > 668.95* 712.65 > 169.20	5.26
37	PFTrDA	Perfluorotridecanoic acid	2991-50-6	662.85 > 619.00* 662.85 > 169.10	5.01
38	PFUdA	Perfluoroundecanoic acid	24448-09-7	562.65 > 519.15* 562.65 > 269.20	4.42
Internal standards					
1	d3-N-MeFOSAA	d3-N-methyl perfluorooctanesulfonamidoacetic acid	-	572.50 > 419.10* 572.50 > 515.15	4.24
2	d5-N-EtFOSAA	d5-N-ethyl perfluorooctane sulfonamido acetic acid	-	588.95 > 419.00* 588.95 > 531.15	4.41

3	M2-4:2 FTS	M2-Sodium 1H,1H,2H,2H-perfluorohexane sulfonate	-	328.90 > 308.95* 328.90 > 80.95	2.47
4	M2-6:2 FTS	M2-Sodium 1H,1H,2H,2H-perfluorooctane sulfonate	-	428.50 > 409.00* 428.50 > 81.05	3.24
5	M2-8:2 FTS	M2-Sodium 1H,1H,2H,2H-perfluorodecane sulfonate	-	528.50 > 509.10* 528.50 > 81.15	4.06
6	M2-PFHxDA	M2-Perfluoro-n-hexadecanoic acid	-	815.00 > 770.00* 815.00 > 169.05	5.66
7	M2-PFTeDA	M2-Perfluorotetradecanoic acid	-	714.90 > 670.10* 714.90 > 169.10	5.26
8	M3-PFBS	M3-Perfluorobutyl sulfonate	-	301.50 > 80.00* 301.50 > 99.05	2.22
9	M3-PFHxS	M3-Perfluorohexane sulfonate	-	401.50 > 80.05* 401.50 > 98.95	2.87
10	M4-PFHpA	M4-Perfluoroheptanoic acid	-	366.90 > 322.10* 366.90 > 172.10	2.85
11	M6-PFDA	M6-Perfluorodecanoic acid	-	518.50 > 474.05*	4.06
12	M7-PFUdA	M7-Perfluoroundecanoic acid	-	569.90 > 525.00* 569.90 > 274.00	4.42
13	M8-PFOA	M8-Perfluorooctanoic acid	-	420.50 > 376.05* 420.50 > 172.15	3.25
14	M8-PFOS	M8-Perfluorooctyl sulfonate	-	506.50 > 80.00* 506.50 > 98.95	3.67
15	M9-PFNA	M9-Perfluorononanoic acid	-	472.00 > 427.15* 472.00 > 223.1	3.66
16	M-PFDoA	M-Perfluorododecanoic acid	-	614.50 > 570.05* 614.50 > 169.20	4.74

* Quantifier ion

[a] Linear and branched isomers are present in the mix. Purity of linear form = 81 %

[b] Linear and branched isomers are present in the mix. Purity of linear form = 79 %

Supplementary Table S2. Mean ± standard deviation and median of the maximum PFAS concentrations (ng/L) reported in the literature from municipal drinking water samples taken directly from taps.

Country		PFOS	PFOA	PFNA	PFHxS	Others[‡]	References
Australia	Mean ± SD	1.5 ± 4	1.0 ± 3	0.03 ± 0.006	8.8 ± 6	0.4 ± 1	3–5
	Median	0.04	0.1	0.03	8.8	0.03	
	Maximum	15.6	9.7	0.03	14..4	6.8	
Belgium	Mean ± SD	1.5 ± 1	-	0.3 ± 0.07	0.7 ± 0.3	3.3 ± 3	6–8
	Median	1.5	-	0.3	0.7	2.9	
	Maximum	2.7	2.7	0.3	0.9	12.0	
Brazil	Mean ± SD	-	-	-	-	22.2 ± 14	9
	Median	-	-	-	-	18	
	Maximum	44	46	47	-	42	
Burkina Faso	Mean ± SD	-	-	-	-	5.9 ± 14	10
	Median	-	-	-	-	0.9	
	Maximum	3.9	1.9	0.4	1	39.3	
Canada	Mean ± SD	10.4 ± 7	41.3 ± 63	1.8 ± 1	25 ± 18	3.3 ± 12	10–13
	Median	9	6.5	1.1	31.0	0.2	
	Maximum	20.2	150.1	3.8	43.2	104.6	
China	Mean ± SD	4.7 ± 5	31.3 ± 36	1.7 ± 2	18.3 ± 36	12.8 ± 29	10,14–27
	Median	2.3	15.5	1.1	5.1	1.9	
	Maximum	14.8	115.4	7.0	139.7	175.3	
Czechia	Mean ± SD	8.8 ± 3	65.4 ± 43	6.9 ± 6	1.3 ± 0.5	12.6 ± 24	28,29
	Median	8.8	65.4	6.9	1.3	0.5	
	Maximum	11.8	108.0	13.3	1.8	97.7	
England	Mean ± SD	3.3 ± 1	2.4 ± 0.6	0.5 ± 0.3	2.3 ± 1	0.8 ± 1	13,19
	Median	3.3	2.4	0.5	2.3	0.1	
	Maximum	4.4	2.9	0.8	3.5	5.1	
France	Mean ± SD	5.6 ± 4	17.5 ± 10	2.2 ± 1	7.2 ± 5	3.1 ± 10	6,9,13,30
	Median	4.4	19.8	2.4	7.3	0.2	
	Maximum	12.6	29.0	3.8	12.8	72.2	
Germany	Mean ± SD	6.3 ± 8	88.5 ± 193	0.9 ± 0.6	9.5 ± 3	8.3 ± 14	6,8,31–34
	Median	2.8	2.5	0.9	9.5	4.4	
	Maximum	22.0	519.0	1.4	12.1	77.0	
Ghana	Mean ± SD	-	-	-	-	0.1 ± 0.01	35
	Median	-	-	-	-	0.1	
	Maximum	168	190	-	-	0.1	
Greece	Mean ± SD	-	1.9 ± 2	-	-	0.4 ± 1	13,36
	Median	-	1.9	-	-	0.1	
	Maximum	0.4	3.6	0.04	0.9	15.1	
Hong Kong	Mean ± SD	-	-	-	-	2.8 ± 3	37
	Median	-	-	-	-	1.5	
	Maximum	8.6	39.7	1	-	7.6	
India	Mean ± SD	-	-	-	-	-	11
	Median	-	-	-	-	-	
	Maximum	8.4	2.0	-	-	-	

Iran	Mean ± SD	-	-	-	-	-	38
	Median	-	-	-	-	-	
	Maximum	99.2	105.6	-	-	-	
Ireland	Mean ± SD	-	-	-	-	-	39
	Median	-	-	-	-	-	
	Maximum	0.8	1.8	0.4	-	15.1	
Italy	Mean ± SD	2.9 ± 3	3.5 ± 2	0.3 ± 0.2	0.8 ± 0.5	0.7 ± 1	6,8,13
	Median	1.5	4.9	0.2	1.1	0.1	
	Maximum	6.9	5.1	0.5	1.2	4.5	
Ivory Coast	Mean ± SD	-	-	-	-	0.5 ± 0.3	10
	Median	-	-	-	-	0.4	
	Maximum	1.3	0.3	-	0.8	0.9	
Japan	Mean ± SD	1.4 ± 0.2	11 ± 7	-	-	2 ± 2	10,11
	Median	1.4	11	-	-	1.9	
	Maximum	1.6	18.0	4.5	0.7	4.6	
Malaysia	Mean ± SD	-	-	-	-	9.7 ± 6	40
	Median	-	-	-	-	9.1	
	Maximum	19	171.3	48.5	1.4	17.2	
Mexico	Mean ± SD	-	-	-	-	1.2 ± 3	6,13
	Median	-	-	-	-	0.1	
	Maximum	1.4	1.5	0.3	2.1	11.7	
Netherlands	Mean ± SD	2.8 ± 2	8.9 ± 2	-	1.6 ± 0.5	7.5 ± 6	36,41
	Median	2.6	8.6	-	1.3	5.2	
	Maximum	5.0	11.1	-	2.3	19.8	
Norway	Mean ± SD	0.4 ± 0.2	1.8 ± 0.4	-	-	0.5 ± 0.2	8,42
	Median	0.4	1.8	-	-	0.4	
	Maximum	0.6	2.2	-	0.1	0.8	
Portugal	Mean ± SD	-	-	-	-	1.3 ± 1	6
	Median	-	-	-	-	0.6	
	Maximum	0.3	0.4	-	0.2	3.2	
Singapore	Mean ± SD	-	-	-	-	2 ± 2	43
	Median	-	-	-	-	1.5	
	Maximum	2.2	1.8	1.3	1.0	4.6	
South Korea	Mean ± SD	2.4 ± 0.9	15 ± 10	2.5 ± 1	64.6 ± 88	17.7 ± 54	44–46
	Median	1.8	14	3	2.4	1.3	
	Maximum	3.6	27.7	3.6	189.6	224.0	
Spain	Mean ± SD	62 ± 93	13.1 ± 14	17.2 ± 16	10.6 ± 12	9.1 ± 12	6,9,13,32,47–49
	Median	6.2	6.6	9.6	3.0	3.2	
	Maximum	258.0	35.0	46.0	28.0	58.0	
Sweden	Mean ± SD	-	-	-	-	1.4 ± 1	8
	Median	-	-	-	-	1	
	Maximum	8.8	6.2	0.4	2.5	2.9	
Thailand	Mean ± SD	37.9 ± 16	-	-	-	-	50
	Median	37.9	-	-	-	-	
	Maximum	54.2	-	-	-	-	

Turkey	Mean ± SD	-	-	-	-	2.9 ± 4	51
	Median	-	-	-	-	1.7	
	Maximum	2.0	2.4	0.4	2.2	11.3	
United States of America	Mean ± SD	27.2 ± 33	22.3 ± 29	2.4 ± 2	10.7 ± 11	18.3 ± 45	6,10,11,13,52–61
	Median	14.5	8.3	2.3	4.7	0.8	
	Maximum	98.6	108.0	7.9	34.3	295.0	
Vietnam	Mean ± SD	-	-	-	-	1 ± 0.2	62
	Median	-	-	-	-	1	
	Maximum	-	0.5	0.2	0.1	1.2	

[‡] 268 unique PFAS compounds reported across all studies; refer to individual references for specific compounds.

Supplementary Table S3. Summary statistics for the nine PFAS quantified in tap water (ng/L) for each borough within Greater London.

		PFBA	**PFBS**	**PFecHS**	**PFHpA**	**PFHxA**	**PFHxS**	**PFOA**	**PFOS**	**PFPeA**
Greater London										
	DR% (> LOD)	99	99	49	98	99	94	99	82	98
	DR% (> LLOQ)	99	99	10	94	98	72	96	13	98
	Mean ± SD	3.1 ± 1.0	2.7 ± 0.8	1.3 ± 0.3	1.8 ± 0.5	1.8 ± 0.5	2.7 ± 0.7	2.2 ± 0.7	3.3 ± 0.9	3.3 ± 1.0
	Median	3.2	2.7	1.2	1.8	3.0	2.6	2.2	3.0	3.3
	Range	< LOD – 5.0	< LOD – 4.7	< LOD – 1.8	< LOD – 3.1	< LOD – 4.4	< LOD – 5.4	< LOD – 4.2	< LOD – 5.2	< LOD – 6.0
West London										
Brent	DR% (> LLOQ)	100	100	-	100	100	100	100	33	100
(3)	Mean ± SD	3.6 ± 1.6	2.8 ± 0.7	< LLOQ	1.7 ± 0.5	3.0 ± 0.6	3.1 ± 1.0	3.1 ± 0.8	4.6 ± 0.2	3.5 ± 1.3
	Median	4.0	2.7	-	1.9	3.0	2.7	3.0	-	3.7
	Range	1.8 – 4.9	2.1 – 3.6	-	1.1 – 2.1	2.3 – 3.6	2.4 – 4.2	2.3 – 4.0	< LLOQ – 4.6	2.1 – 4.7
Ealing	DR% (> LLOQ)	100	100	-	100	100	62	100	-	92
(13)	Mean ± SD	3.0 ± 0.9	2.7 ± 0.6	< LLOQ	1.8 ± 0.3	2.9 ± 0.5	1.6 ± 1.4	2.1 ± 0.7	< LLOQ	3.1 ± 0.5
	Median	3.1	2.8	-	1.8	3.1	2.7	1.9	-	3.2
	Range	1.3 – 4.4	1.4 – 3.6	-	1.2 – 2.3	1.7 – 3.4	< LLOQ – 4.2	1.1 – 3.6	-	< LOD – 3.7
Hammersmith & Fulham	DR% (> LLOQ)	100	100	-	100	100	72	94	6	100
(18)	Mean ± SD	3.4 ± 0.9	2.9 ± 0.5	< LLOQ	1.7 ± 0.3	3.0 ± 0.5	2.1 ± 1.0	2.1 ± 0.5	2.7 ± 0.5	3.2 ± 0.7
	Median	3.5	3.0	-	1.7	3.1	2.3	2.1	-	3.1
	Range	1.9 – 4.7	2.0 – 3.7	-	1.3 – 2.2	1.9 – 4.0	< LLOQ – 3.3	< LLOQ – 3.3	< LLOQ – 2.7	2.3 – 4.7
Harrow	DR% (> LLOQ)	100	100	-	100	100	100	100	50	100
(2)	Mean ± SD	3.2 ± 2.2	2.4 ± 1.5	< LLOQ	1.7 ± 0.8	2.7 ± 1.2	3.7 ± 2.3	3.0 ± 1.5	5.2 ± 0.3	3.3 ± 1.5
	Median	3.2	2.4	-	1.7	2.7	3.7	3.0	-	3.3
	Range	1.7 – 4.8	1.3 – 3.5	-	1.1 – 2.2	1.8 – 3.5	2.1 – 5.4	1.9 – 4.1	< LOD – 5.2	2.3 – 4.3
Hillingdon	DR% (> LLOQ)	100	100	-	100	100	-	100	-	100
(1)	Mean ± SD	1.6 ± 0.2	2.0 ± 0.6	-	1.1 ± 0.5	2.3 ± 0.3	-	1.5 ± 0.6	< LLOQ	1.9 ± 0.1
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Richmond upon Thames	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
(3)	Mean ± SD	3.5 ± 0.4	2.8 ± 0.2	< LLOQ	1.8 ± 0.2	2.9 ± 0.2	2.8 ± 0.4	2.2 ± 0.6	< LLOQ	4.0 ± 0.7
	Median	3.6	2.9	-	1.7	2.8	2.8	2.1	-	3.9
	Range	3.1 – 3.9	2.6 – 3.0	-	1.6 – 1.9	2.6 – 3.1	2.4 – 3.1	1.6 – 2.9	-	3.4 – 4.7

Central London										
Camden (1)	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
	Mean ± SD	4.0 ± 0.9	3.5 ± 0.6	< LLOQ	2.6 ± 0.4	4.0 ± 0.7	3.4 ± 0.2	3.2 ± 1.1	< LLOQ	3.7 ± 0.6
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Islington (1)	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
	Mean ± SD	4.0 ± 0.1	3.3 ± 0.2	< LLOQ	2.3 ± 0.2	3.2 ± 0.1	2.6 ± 1.0	2.4 ± 0.8	< LLOQ	3.8 ± 0.2
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Kensington and Chelsea (10)	DR% (> LLOQ)	100	100	-	100	100	60	100	-	100
	Mean ± SD	3.4 ± 0.7	2.7 ± 0.3	< LLOQ	1.7 ± 0.3	3.2 ± 0.4	1.9 ± 1.2	1.8 ± 0.4	< LLOQ	3.4 ± 0.6
	Median	3.3	2.7	-	1.8	3.2	2.3	1.7	-	3.6
	Range	2.2 – 4.3	2.4 – 3.3	-	1.3 – 2.2	2.5 – 3.8	< LLOQ – 3.1	1.4 – 2.5	< LOD – < LLOQ	2.3 – 4.1
Lambeth (3)	DR% (> LLOQ))	100	100	-	100	100	100	100	-	100
	Mean ± SD	2.8 ± 0.5	2.6 ± 0.2	< LLOQ	1.7 ± 0.4	2.3 ± 0.2	2.3 ± 0.7	2.1 ± 0.8	< LLOQ	3.6 ± 0.6
	Median	3.1	2.7	-	1.5	2.4	1.9	2.4	-	4.0
	Range	2.3 – 3.1	2.4 – 2.8	-	1.4 – 2.2	2.1 – 2.5	1.8 – 3.1	1.2 – 2.6	< LOD – < LLOQ	2.9 – 4.0
Southwark (1)	DR% (> LLOQ)	100	100	-	100	100	-	100	-	100
	Mean ± SD	2.3 ± 0.7	2.3 ± 0.2	-	1.6 ± 0.3	2.0 ± 0.5	< LLOQ	1.7 ± 0.1	-	2.5 ± 0.5
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Westminster (7)	DR% (> LLOQ)	100	100	-	100	100	71	86	17	100
	Mean ± SD	2.8 ± 0.7	2.6 ± 0.6	< LLOQ	1.6 ± 0.3	2.5 ± 0.7	2.2 ± 1.1	2.0 ± 0.6	2.5 ± 0.5	3.0 ± 0.7
	Median	3.2	2.6	-	1.6	2.4	2.4	2.0	-	3.3
	Range	1.6 – 3.8	1.6 – 3.5	-	1.1 – 2.1	1.3 – 3.3	< LLOQ – 3.1	< LLOQ – 2.7	< LOD – 2.5	1.8 – 3.5
East London										
Bexley (2)	DR% (> LLOQ)	100	100	-	-	50	-	50	-	50
	Mean ± SD	1.6 ± 0.2	0.9 ± 0.3	-	-	1.0 ± 0.3	-	1.2 ± 0.3	-	1.1 ± 0.3
	Median	1.6	0.9	-	-	-	-	-	-	-
	Range	1.4 – 1.7	0.6 – 1.1	-	-	< LLOQ – 1.0	-	< LOD – 1.2	-	< LOD – 1.1
Greenwich (1)	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
	Mean ± SD	2.6 ± 0.2	2.7 ± 0.3	< LLOQ	1.4 ± 0.1	1.8 ± 0.2	2.0 ± 1.0	2.1 ± 1.0	< LLOQ	2.9 ± 0.3
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-

Hackney (2)	DR% (> LLOQ)	100	100	100	100	100	100	100	50	100
	Mean ± SD	3.2 ± 0.9	2.7 ± 0.6	1.2 ± 0.01	2.4 ± 0.1	3.3 ± 0.3	2.7 ± 0.8	2.8 ± 0.1	2.8 ± 0.1	4.0 ± 1.0
	Median	3.2	2.7	1.2	2.4	3.3	2.7	2.8	-	4.0
	Range	2.6 – 3.8	2.3 – 3.2	1.22 –1.23	2.3 – 2.4	3.1 – 3.5	2.1 – 3.2	2.7 – 2.9	< LOD – 2.8	3.3 – 4.7
Lewisham (2)	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
	Mean ± SD	2.8 ± 1.3	2.5 ± 1.2	< LLOQ	1.7 ± 0.9	2.7 ± 1.7	3.3 ± 1.8	2.5 ± 0.01	< LLOQ	3.6 ± 1.9
	Median	2.8	2.5	-	1.7	2.7	3.3	2.5	-	3.6
	Range	1.9 – 3.7	1.6 – 3.3	-	1.1 – 2.4	1.5 – 3.9	2.1 – 4.5	2.47 – 2.48	< LOD – < LLOQ	2.3 – 4.9
Newham (2)	DR% (> LLOQ)	100	100	100	100	100	100	100	50	100
	Mean ± SD	3.6 ± 0.2	3.3 ± 0.9	1.2 ± 0.3	2.1 ± 0.2	3.5 ± 0.6	3.0 ± 0.01	2.6 ± 0.2	2.9 ± 0.4	4.6 ± 0.7
	Median	3.6	3.3	1.2	2.2	3.5	3.0	2.6	-	4.6
	Range	3.5 – 3.7	2.6 – 3.9	1.0 – 1.4	2.0 – 2.3	3.1 – 3.9	3.0 – 3.01	2.5 – 2.7	< LLOQ – 2.9	4.1 – 5.1
Redbridge (1)	DR% (> LLOQ)	100	100	100	100	100	100	100	100	100
	Mean ± SD	5.0 ± 0.2	4.7 ± 0.3	1.8 ± 0.4	2.5 ± 0.3	4.1 ± 0.4	3.4 ± 0.7	3.6 ± 0.8	3.2 ± 0.5	4.5 ± 0.6
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Tower Hamlets (2)	DR% (> LLOQ)	100	100	100	100	100	50	100	100	100
	Mean ± SD	3.5 ± 0.5	4.0 ± 0.8	1.1 ± 0.02	2.4 ± 0.1	3.1 ± 0.03	3.9 ± 0.6	2.9 ± 0.9	3.4 ± 0.9	3.7 ± 0.5
	Median	3.5	4.0	1.1	2.3	3.1	-	2.9	3.4	3.7
	Range	3.2 – 3.9	3.4 – 4.5	1.1 – 1.14	2.3 – 2.4	3.06 – 3.1	< LOD – 3.9	2.2 – 3.5	2.8 – 4.0	3.4 – 4.1
Waltham Forest (2)	DR% (> LLOQ)	100	100	100	100	100	100	100	100	100
	Mean ± SD	4.4 ± 0.4	4.4 ± 0.1	1.3 ± 0.1	3.0 ± 0.1	4.0 ± 0.5	3.3 ± 0.1	3.9 ± 0.4	3.2 ± 1.1	5.4 ± 0.8
	Median	4.4	4.4	1.3	3.0	4.0	3.3	3.9	3.2	5.4
	Range	4.1 – 4.7	4.3 – 4.4	1.2 – 1.4	2.9 – 3.1	3.6 – 4.4	3.2 – 3.4	3.6 – 4.2	2.4 – 4.0	4.9 – 6.0
South London										
Bromley (2)	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
	Mean ± SD	2.5 ± 1.6	2.4 ± 1.4	< LLOQ	1.5 ± 1.0	2.4 ± 1.5	2.9 ± 1.2	2.2 ± 0.1	-	2.9 ± 1.5
	Median	2.4	2.4	-	1.5	2.4	2.9	2.3	-	2.9
	Range	1.3 – 3.6	1.4 – 3.4	-	0.8 – 2.2	1.3 – 3.5	2.1 – 3.8	2.2 – 2.4	-	1.9 – 4.0
Croydon (1)	DR% (> LLOQ)	100	100	-	-	100	-	-	100	100
	Mean ± SD	1.1 ± 0.2	0.9 ± 0.2	-	< LLOQ	1.3 ± 0.2	< LLOQ	< LLOQ	3.0 ± 1.2	3.3 ± 0.9
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-

Kingston upon Thames	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
(1)	Mean ± SD	2.4 ± 0.1	1.5 ± 0.2	< LLOQ	1.2 ± 0.2	2.1 ± 0.1	1.9 ± 0.2	1.4 ± 0.6	-	2.4 ± 0.8
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Merton	DR% (> LLOQ)	100	100	-	50	100	50	100	-	100
(2)	Mean ± SD	2.2 ± 2.0	1.8 ± 1.5	< LLOQ	2.0 ± 0.6	2.1 ± 1.2	2.3 ± 0.6	2.4 ± 0.6	< LLOQ	2.6 ± 2.3
	Median	2.2	1.8	-	-	2.0	-	2.4	-	2.6
	Range	0.8 – 3.6	0.7 – 2.9	-	< LLOQ – 2.0	1.2 – 2.9	< LLOQ – 2.3	2.0 – 2.8	< LOD – < LLOQ	0.9 – 4.2
Sutton	DR% (> LLOQ)	-	-	-	-	-	-	100	-	100
(1)	Mean ± SD	-	-	-	< LLOQ	-	< LLOQ	1.1 ± 0.6	< LLOQ	1.5 ± 0.8
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Wandsworth	DR% (> LLOQ)	100	100	-	100	100	67	100	-	100
(3)	Mean ± SD	2.2 ± 1.5	1.8 ± 0.9	< LLOQ	1.3 ± 0.8	2.1 ± 1.4	2.5 ± 0.6	2.4 ± 0.03	-	2.6 ± 1.9
	Median	1.4	1.4	-	0.9	1.3	2.5	2.4	-	1.6
	Range	1.4 – 3.9	1.2 – 2.9	-	0.8 – 2.3	1.3 – 3.8	< LOD – 2.9	2.3 – 2.4	-	1.4 – 4.8
North London										
Enfield	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
(1)	Mean ± SD	2.9 ± 0.2	2.0 ± 0.2	-	1.6 ± 0.1	2.3 ± 0.7	3.0 ± 0.8	2.2 ± 0.5	-	2.3 ± 0.5
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-
Haringey	DR% (> LLOQ)	100	100	-	100	100	100	100	-	100
(1)	Mean ± SD	1.9 ± 0.2	1.3 ± 0.1	-	1.9 ± 0.5	2.3 ± 0.3	2.5 ± 0.3	2.3 ± 0.8	-	2.5 ± 0.9
	Median	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-

DR% (> LOD) – Detection rate above the limit of detection
DR% (> LLOQ) – Detection rate above the lower limit of detection

Supplementary Table S4. Average removal efficiencies (n = 3) ± standard deviation of PFAS compounds for all filter jugs tested. The PFAS removal score is indicated in parenthesis.

PFAS Compound	Jug A	Jug B	Jug C	Jug D	Jug E
4:2 FTS	99 ± 2 (1)	100 ± 0 (1)	93 ± 5 (2)	100 ± 0.1 (1)	98 ± 0.1 (1)
5:3 FTCA	-	-	-	-	-
6:2 Cl-PFESA	99 ± 1 (1)	100 ± 0 (1)	94 ± 6 (2)	100 ± 0.1 (1)	98 ± 0.1 (1)
6:2 FTS	99 ± 2 (1)	100 ± 0 (1)	94 ± 5 (2)	100 ± 0.1 (1)	99 ± 0.2 (1)
7:3 FTCA	-	-	-	-	-
8:2 Cl-PFESA	100 ± 0.7 (1)	100 ± 0.1 (1)	93 ± 8 (2)	100 ± 0.1 (1)	99 ± 0.1 (1)
8:2 FTS	100 ± 0.8 (1)	100 ± 0 (1)	96 ± 5 (1)	100 ± 0.1 (1)	99 ± 0.2 (1)
DONA/ADONA	99 ± 2 (1)	100 ± 0 (1)	89 ± 10 (2)	100 ± 0 (1)	98 ± 0.1 (1)
HFPO-TA	-	-	-	-	-
L-PFDoS	100 ± 0.3 (1)	99 ± 0.8 (1)	94 ± 6 (2)	100 ± 0.5 (1)	99 ± 0.3 (1)
L-PFUdS	100 ± 0.6 (1)	100 ± 0.3 (1)	94 ± 7 (2)	100 ± 0.4 (1)	99 ± 0.2 (1)
MeFOSA	-	-	-	-	-
N-EtFOSAA	99 ± 1.3 (1)	100 ± 0.1 (1)	89 ± 12 (2)	100 ± 0 (1)	97 ± 0.1 (1)
N-MeFOSAA	99 ± 1 (1)	100 ± 0 (1)	93 ± 8 (2)	100 ± 0 (1)	98 ± 0.1 (1)
PFBA	99 ± 0.7 (1)	100 ± 0.2 (1)	89 ± 6 (2)	99 ± 0.7 (1)	98 ± 0.4 (1)
PFBS	99 ± 1 (1)	100 ± 0 (1)	92 ± 6 (2)	100 ± 0.3 (1)	99 ± 0 (1)
PFDA	99 ± 1 (1)	100 ± 0 (1)	94 ± 6 (2)	99 ± 0.8 (1)	98 ± 0.1 (1)
PFDoA	99 ± 1 (1)	100 ± 0.1 (1)	92 ± 9 (2)	100 ± 0.3 (1)	99 ± 0.4 (1)
PFDS	100 ± 0.7 (1)	100 ± 0.1 (1)	94 ± 6 (2)	100 ± 0.1 (1)	99 ± 0.1 (1)
PFecHS	99 ± 1 (1)	100 ± 0 (1)	89 ± 9 (2)	100 ± 0 (1)	99 ± 0.2 (1)
PFEESA	99 ± 1 (1)	100 ± 0 (1)	90 ± 8 (2)	100 ± 0.1 (1)	99 ± 0 (1)
PFHpA	99 ± 1 (1)	100 ± 0 (1)	89 ± 9 (2)	99 ± 2 (1)	98 ± 0.1 (1)
PFHpS	98 ± 1 (1)	99 ± 0.1 (1)	91 ± 7 (2)	98 ± 3 (1)	98 ± 0.4 (1)
PFHxA	99 ± 1 (1)	100 ± 0.1 (1)	91 ± 8 (2)	98 ± 2 (1)	98 ± 0.1 (1)
PFHxDA	97 ± 2 (1)	92 ± 7 (2)	88 ± 5 (3)	92 ± 8 (2)	78 ± 11 (4)
PFHxS	99 ± 1 (1)	100 ± 0 (1)	90 ± 10 (2)	99 ± 1 (1)	99 ± 0.1 (1)
PFMOBA	100 ± 0.8 (1)	100 ± 0 (1)	95 ± 4 (1)	100 ± 0.2 (1)	98 ± 0.1 (1)
PFMOPrA	100 ± 0.6 (1)	100 ± 0 (1)	92 ± 5 (2)	100 ± 0 (1)	98 ± 0.1 (1)
PFNA	99 ± 2 (1)	100 ± 0.1 (1)	93 ± 6 (2)	100 ± 0.6 (1)	98 ± 0.3 (1)
PFNS	99 ± 0.8 (1)	100 ± 0 (1)	95 ± 5 (1)	100 ± 0.1 (1)	99 ± 0.1 (1)
PFOA	99 ± 2 (1)	100 ± 0 (1)	90 ± 8 (2)	99 ± 1 (1)	98 ± 0.3 (1)
PFODA	97 ± 3 (1)	93 ± 6 (2)	87 ± 4 (3)	74 ± 35 (5)	58 ± 20.9 (8)
PFOS	99 ± 1 (1)	100 ± 0 (1)	93 ± 6 (2)	100 ± 0.2 (1)	99 ± 0.1 (1)
PFPeA	99 ± 0.9 (1)	100 ± 0.1 (1)	95 ± 3 (1)	100 ± 0.4 (1)	98 ± 0.1 (1)
PFPeS	9 9 ± 1 (1)	100 ± 0 (1)	91 ± 7 (2)	100 ± 0.2 (1)	99 ± 0.1 (1)
PFTeDA	99 ± 0.5 (1)	98 ± 2 (1)	94 ± 5 (2)	99 ± 0.8 (1)	96 ± 0.7 (1)
PFTrDA	99 ± 1 (1)	99 ± 0.5 (1)	92 ± 9 (2)	99 ± 0.7 (1)	98 ± 0.2 (1)
PFUdA	99 ± 1 (1)	100 ± 0 (1)	94 ± 7 (2)	99 ± 0.7 (1)	98 ± 0.2 (1)

- unable to assess recovery

Supplementary Table S5. Average PFAS concentration in London tap water and average concentration in tap water after filtration.

		PFBA	PFBS	PFecHS	PFHpA	PFHxA	PFHxS	PFOA	PFOS	PFPeA
[PFAS London]		3.1 ± 1.0	2.7 ± 0.8	1.3 ± 0.3	1.8 ± 0.5	2.8 ± 0.8	2.7 ± 0.7	2.2 ± 0.7	3.3 ± 0.9	3.3 ± 1.0
Site 1	20 L	-	-	-	-	-	-	< LLOQ	-	< LLOQ
	40 L	-	-	-	-	-	-	< LLOQ	-	-
	60 L	-	< LLOQ	-	< LLOQ	-	-	0.3 ± 0.1	-	< LLOQ
	80 L	-	-	-	-	-	-	< LLOQ	-	-
	100 L	< LLOQ	-	-	-	-	-	< LLOQ	-	-
Site 2	20 L	-	-	-	-	-	-	< LLOQ	-	-
	40 L	-	-	-	< LLOQ	< LLOQ	-	0.2 ± 0.02	-	-
	60 L	-	-	-	-	-	-	0.2 ± 0.1	-	-
	80 L	-	-	-	-	-	-	< LLOQ	-	-
	100 L	-	-	-	-	-	-	< LLOQ	-	-

- not detected,

< LLOQ: below limit if quantification, refer to **Supplementary Table S9** for individual values

Supplementary Table S6. Comparison between calibration lines and the quantification results of QCs (average ± standard deviation) prepared using the Andrew+ robot and the laboratory user for all PFAS compounds. The mean absolute error (MAE) between the slope, intercept and QC quantification values is presented.

Compound	Andrew+						Laboratory user						MAE			
	Range ($n \geq 5$)	Linearity (R^2)	Slope	Intercept	10 ng/L[a,c] ($n = 7$)	10 ng/L[b,c] ($n = 7$)	Range ($n \geq 5$)	Linearity (R^2)	Slope	Intercept	10 ng/L[a,d] ($n = 7$)	10 ng/L[b,d] ($n = 7$)	Slope	Intercept	10 ng/L[a]	10 ng/L[b]
4-2FTS*	0.5 - 100	1.00	0.99	-1.29	11 ± 0.3	10 ± 0.4	0.5 - 100	1.00	1.05	-1.39	12 ± 0.5	13 ± 0.4	0.06	0.1	0.7	0.9
5:3 FTCA	0.5 - 100	1.00	1.04	2.91	11 ± 0.5	10 ± 0.4	0.5 - 100	1.00	1.07	2.83	12 ± 0.5	13 ± 0.6	0.03	0.08	0.9	1.0
6:2 Cl-PFESA	0.5 - 100	1.00	1.04	3.65	11 ± 0.4	9 ± 0.7	0.5 - 100	1.00	1.01	3.67	9 ± 0.7	11 ± 0.4	0.03	0.02	1.4	1.4
6-2FTS*	0.5 - 100	0.99	1.04	-0.47	11 ± 1.3	9 ± 0.7	0.5 - 100	0.99	0.98	-0.42	9 ± 0.7	11 ± 1	0.06	0.05	1.7	1.6
7:3 FTCA	0.5 - 100	0.99	0.99	2.93	8 ± 0.6	8 ± 0.6	0.5 - 100	0.97	1.22	2.52	17 ± 1	16 ± 1	0.23	0.41	0.2	0.4
8:2Cl-PFESA	0.5 - 100	0.99	1.31	2.43	23 ± 4	14 ± 2	1 - 75	0.97	1.20	2.55	12 ± 2	19 ± 3	0.11	0.12	8.9	7.5
8-2FTS*	0.5 - 100	0.98	1.05	-0.68	11 ± 3	9 ± 2	0.5 - 75	0.98	1.06	-0.78	11 ± 2	13 ± 4	0.01	0.1	1.8	2.2
DONA	0.5 - 100	1.00	1.00	4.03	10 ± 0.4	9 ± 0.4	0.5 - 100	1.00	1.00	4.00	10 ± 0.5	10 ± 0.4	0	0.03	0.4	0.5
HFPO-TA	5 - 100	0.99	1.22	1.33	19 ± 4	18 ± 3	2.5 - 100	0.96	1.04	1.61	11 ± 2	11 ± 3	0.18	0.28	1.0	0.6
L-PFDoS	5 - 75	0.92	1.00	1.78	6 ± 3	5 ± 3	2.5 - 75	0.93	1.05	1.52	9 ± 6	11 ± 6	0.05	0.26	0.9	1.6
L-PFUdS	2.5 - 100	0.98	1.31	1.42	16 ± 6	11 ± 3	0.5 - 75	0.98	1.39	1.12	22 ± 5	31 ± 11	0.08	0.3	4.8	9.1
MeFOSA	2.5 - 75	0.62	0.82	1.75	10 ± 3	10 ± 2	2.5 - 75	0.66	0.71	1.94	8 ± 1	7 ± 3	0.11	0.19	0.6	0.5
N-EtFOSAA*	2.5 - 100	0.97	1.24	-1.72	22 ± 3	17 ± 2	1 - 100	0.95	1.15	-1.62	15 ± 2	18 ± 3	0.09	0.1	4.5	3.7
N-MeFOSAA*	1 - 100	0.98	1.07	-0.54	10 ± 3	8 ± 2	1 - 100	0.98	1.23	-0.87	14 ± 4	19 ± 5	0.16	0.33	2.4	4.4
PFBA	0.5 – 100	0.99	1.29	2.86	19 ± 3	19 ± 3	0.5 – 100	1.00	1.09	3.14	12 ± 2	12 ± 2	0.20	0.28	0.3	0.2
PFBS*	0.5 - 100	0.98	1.18	-0.83	15 ± 1	14 ± 2	0.5 - 100	1.00	1.05	-0.67	11 ± 2	12 ± 0.9	0.13	0.16	0.8	0.6
PFDA*	1 - 100	0.99	0.96	-0.47	10 ± 1	9 ± 0.6	0.5 - 75	0.96	1.17	-0.76	14 ± 1	15 ± 2	0.21	0.29	1.0	1.6
PFDoA*	5 - 100	0.95	1.14	-0.94	23 ± 4	20 ± 5	1 - 75	0.96	0.99	-0.71	14 ± 4	16 ± 3	0.15	0.23	3.1	2.1
PFDS	1 - 100	0.93	1.19	2.00	13 ± 3	10 ± 2	0.5 - 100	0.98	1.17	1.95	12 ± 3	15 ± 4	0.02	0.05	2.8	3.2
PFecHS	0.5 - 100	1.00	1.02	3.66	10 ± 0.3	10 ± 0.5	0.5 - 100	1.00	1.02	3.62	10 ± 0.5	11 ± 0.4	0	0.04	0.4	0.4
PFEESA	0.5 - 100	1.00	1.01	3.85	10 ± 0.4	10 ± 0.6	0.5 - 100	1.00	1.00	3.83	10 ± 0.6	10 ± 0.5	0.01	0.02	0.2	0.2
PFHpA*	1 - 100	1.00	1.04	-1.38	11 ± 0.3	10 ± 0.8	0.5 - 100	0.99	1.08	-1.47	12 ± 1	13 ± 0.4	0.04	0.09	1.0	1.2
PFHpS	0.5 - 100	0.99	1.16	2.64	14 ± 2	13 ± 0.7	1 - 100	0.99	1.15	2.62	14 ± 0.7	15 ± 2	0.01	0.02	0.7	0.8
PFHxA	0.5 - 100	1.00	1.00	3.40	10 ± 0.5	10 ± 0.8	0.5 - 100	0.99	0.99	3.38	10 ± 0.8	11 ± 0.6	0.01	0.02	0.4	0.5
PFHxDA*	10 - 100	0.99	1.07	-1.47	15 ± 3	14 ± 2	0.5 - 75	0.99	0.99	-1.45	14 ± 2	16 ± 3	0.08	0.02	1.8	1.8
PFHxS*	5 – 100	0.99	0.96	-0.72	9 ± 2	7 ± 0.9	1 -100	0.99	1.05	-0.86	9 ± 1	11 ± 2	0.09	0.14	0.5	3.5
PFMOBA	0.5 - 100	1.00	1.01	3.29	10 ± 0.2	10 ± 0.6	0.5 - 100	1.00	1.03	3.24	11 ± 0.7	11 ± 0.2	0.02	0.05	0.4	0.4
PFMOPrA	0.5 - 100	1.00	1.05	2.90	11 ± 0.6	10 ± 0.6	0.5 - 100	1.00	1.04	2.88	11 ± 0.6	11 ± 0.6	0.01	0.02	0.4	0.4
PFNA*	2.5 - 100	1.00	1.00	-1.35	11 ± 0.6	10 ± 0.9	1 - 100	0.99	1.01	-1.40	11 ± 1	12 ± 0.6	0.01	0.05	1.0	1.2
PFNS	0.5 - 100	0.99	1.27	2.27	17 ± 3	15 ± 2	0.5 - 100	0.97	1.08	2.52	10 ± 1	12 ± 2	0.19	0.25	2.1	1.4
PFOA*	5 - 100	0.99	1.00	-0.62	12 ± 0.9	10 ± 0.9	0.5 - 100	0.99	0.87	-0.47	9 ± 0.8	10 ± 0.7	0.13	0.15	1.8	1.5
PFODA	1 - 100	0.97	1.20	2.65	12 ± 1	16 ± 2	1 - 75	0.97	0.85	3.10	8 ± 0.7	6 ± 0.5	0.35	0.45	4.1	2.0
PFOS*	2.5 – 100	0.98	1.03	-0.62	8 ± 1	7 ± 1	1 – 100	0.97	1.15	-0.81	9 ± 2	12 ± 2	0.12	0.19	0.9	4.8
PFPeA	0.5 - 100	1.00	1.10	3.13	14 ± 0.9	13 ± 0.9	0.5 - 100	0.99	0.99	3.27	10 ± 0.7	11 ± 0.7	0.11	0.14	1.0	0.8
PFPeS	0.5 - 100	0.99	1.07	2.94	11 ± 0.8	11 ± 1	0.5 - 100	1.00	1.03	2.97	11 ± 0.9	11 ± 0.8	0.04	0.03	0.3	0.3

PFTeDA*	5 - 100	0.66	0.73	-0.90	13 ± 6	14 ± 7	10 - 75	0.30	0.38	-0.48	10 ± 5	10 ± 5	0.35	0.42	1.1	0.8
PFTrDA	1 - 75	0.81	0.71	3.10	7 ± 1	8 ± 2	0.5 - 75	0.91	0.82	2.94	10 ± 3	8 ± 2	0.11	0.16	1.5	1.9
PFUdA*	0.5 - 100	0.96	0.94	-1.41	10 ± 0.7	10 ± 1	1 - 100	0.96	1.03	-1.63	15 ± 2	15 ± 1	0.09	0.22	0.3	0.5

* Corresponding SIL-IS analogue used for peak area ratio-based assessment.

[a]: 10 ng/L QC prepared by the Andrew + robot.

[b]: 10 ng/L QC prepared by the Laboratory user.

[c]: Quantified using the calibration prepared by the Andrew+ robot.

[d]: Quantified using the calibration prepared by the Laboratory user.

Supplementary Table S7. Method performance characteristics for samples prepared in laboratory tap water, analysed via direct injection. LOD: limit of detection; LLOQ: Lower limit of quantification.

Compound	**Range ($n \geq 5$)**	**Linearity (R^2)**	**LOD (ng/L)**	**LLOQ (ng/L)**	**Peak Area precision (n = 7)**		**Matrix Effects**		**Inaccuracy (n = 7)**	
					5 ng/L	**10 ng/L**	**5 ng/L**	**10 ng/L**	**5 ng/L**	**10 ng/L**
4:2 FTS*	2.0 - 75	0.99	0.6	2.0	15	12	-2	23	16	11
5:3 FTCA	0.9 - 100	0.99	0.3	0.9	14	16	3	15	-6	-4
6:2 Cl-PFESA	1 - 50	0.97	0.3	1.0	25	25	-34	19	-4	25
6:2 FTS*	1.5 - 100	1.00	0.4	1.5	15	10	3	36	-5	-12
7:3 FTCA	1.2 - 100	0.99	0.4	1.2	29	14	-7	21	-10	4
8:2 Cl-PFESA	2.1 - 50	0.91	0.6	2.1	50	29	-58	20	-37	-31
8:2 FTS*	3.4 - 75	0.99	1.0	3.4	51	26	-37	22	29	43
DONA	0.4 - 100	1.00	0.1	0.4	10	11	4	16	1	14
HFPO-TA	1.2 - 75	0.97	0.4	1.2	35	23	-1	24	-7	14
L-PFDoS	3.6 - 50	0.24	1.1	3.6	40	71	80	97	-28	-61
L-PFUdS	2.0 - 50	0.78	0.6	2.0	41	46	-55	33	-28	-42
MeFOSA	2.1 - 75	0.99	0.6	2.1	65	22	178	108	22	4
N-EtFOSAA*	4.0 - 75	0.99	1.2	4.0	58	38	-52	19	82	46
N-MeFOSAA*	6.6 - 75	0.99	2.0	6.6	28	33	-46	24	103	109
PFBA	0.6 – 100	0.99	0.2	0.6	16	11	119	21	26	3
PFBS*	0.6 - 100	1.00	0.2	0.6	13	8	53	14	30	11
PFDA*	2.2 - 100	1.00	0.7	2.2	55	18	-30	20	2	-7
PFDoA*	3.4 - 75	0.88	1.0	3.4	61	38	-9	42	17	-21
PFDS	6.2 - 75	0.80	1.9	6.2	29	54	-46	34	33	68
PFecHS	0.7 - 100	0.99	0.2	0.7	10	14	1	13	21	33
PFEESA	0.3 - 100	1.00	0.1	0.3	13	7	1	11	-1	13
PFHpA*	0.8 - 100	1.00	0.2	0.8	13	9	29	29	23	1
PFHpS	1.0 - 75	0.97	0.3	1.0	38	18	-12	24	-27	2
PFHxA	0.8 - 100	0.99	0.3	0.8	20	14	60	21	39	17
PFHxDA*	2.0 - 75	1.00	0.6	2.0	0	0	21	57	36	-4
PFHxS*	1.8 - 100	1.00	0.6	1.8	18	9	54	26	137	81
PFMOBA	0.5 - 100	0.99	0.2	0.5	16	13	5	14	12	8
PFMOPrA	0.5 - 100	0.99	0.2	0.5	13	12	17	14	-3	-6
PFNA*	1.1 - 100	0.99	0.3	1.1	19	12	0	22	1	-17
PFNS	4.0 - 75	0.97	1.2	4.0	55	36	-33	36	-18	0
PFOA*	1.0 - 100	1.00	0.3	1.0	19	9	32	21	25	-17
PFODA	1.1 - 50	0.96	0.3	1.1	30	20	43	40	-24	-36
PFOS*	2.4 - 100	0.99	0.7	2.4	20	34	21	33	45	13
PFPeA	0.6 - 75	0.96	0.2	0.6	10	8	49	18	35	2
PFPeS	1.0 - 100	0.99	0.3	1.0	24	17	11	32	-17	-3
PFTeDA*	41 - 100	0.02	12.3	41.0	55	48	-16	49	844	585
PFTrDA	2.5 - 75	0.46	0.7	2.5	49	48	-3	31	14	-49
PFUdA*	2.1 - 75	0.98	0.6	2.1	36	36	-42	36	-0.1	-28

* Corresponding SIL-IS analogue used for peak area ratio-based assessment.

Supplementary Table S8. Method performance characteristics for samples prepared in laboratory HPLC-grade water, analysed via direct injection.

Compound	Range ($n \geq 5$)	Linearity (R^2)	LOD (ng/L)	LLOQ (ng/L)	Peak Area precision % ($n = 7$)		Inaccuracy % ($n = 7$)	
					5 ng/L	10 ng/L	5 ng/L	10 ng/L
4:2 FTS*	2.4 - 100	0.99	0.7	2.4	30	26	17	25
5:3 FTCA	0.7 - 100	0.99	0.2	0.7	28	10	-26	-23
6:2 Cl-PFESA	0.7 - 75	0.99	0.2	0.7	22	11	-25	-26
6:2 FTS*	0.8 - 100	0.99	0.2	0.8	23	15	-4	-1
7:3 FTCA	1.2 - 100	0.99	0.4	1.2	30	20	-36	-36
8:2 Cl-PFESA	1.0 - 75	0.91	0.3	1.0	50	26	-42	-49
8:2 FTS*	2.9 - 100	0.99	0.9	2.9	36	26	-2	5
DONA	0.3 - 100	0.99	0.1	0.3	20	9	-16	-23
HFPO-TA	10.4 - 75	0.99	3.1	10.4	49	30	412	426
L-PFDoS	4.7 – 75	0.74	1.4	4.7	46	61	-17	-27
L-PFUdS	2.3 - 75	0.91	0.7	2.3	48	60	-37	-98
MeFOSA	3.5 - 75	0.97	1.1	3.5	49	57	-1	-34
N-EtFOSAA*	1.7 - 100	0.99	0.5	1.7	33	23	-10	-20
N-MeFOSAA*	2.0 - 100	1.00	0.6	2.0	29	24	-6	0
PFBA	1.2 - 100	0.98	0.4	1.2	26	12	-17	-17
PFBS*	0.9 - 100	0.99	0.3	0.9	15	9	17	10
PFDA*	1.2 - 100	0.97	0.4	1.2	21	21	-12	-29
PFDoA*	1.8 - 100	0.93	0.5	1.8	47	32	-46	-40
PFDS	0.8 - 75	0.94	0.2	0.8	71	44	-79	-72
PFecHS	0.7 - 100	0.99	0.2	0.7	13	11	3	0
PFEESA	0.3 - 100	1.00	0.1	0.3	16	9	-17	-21
PFHpA*	0.7 - 100	0.99	0.2	0.7	17	17	-11	-30
PFHpS	1.1 - 100	0.99	0.3	1.1	37	20	-40	-41
PFHxA	0.9 – 100	0.98	0.3	0.9	25	15	-19	-28
PFHxDA*	2.5 - 75	0.94	0.7	2.5	49	54	-3	-22
PFHxS*	1.6 – 100	0.99	0.5	1.6	44	22	-13	-13
PFMOBA	0.6 - 100	0.99	0.2	0.6	18	14	-4	-7
PFMOPrA	0.8 - 100	1.00	0.2	0.8	29	29	-48	-50
PFNA*	1.4 - 100	0.99	0.4	1.4	28	20	-3	-24
PFNS	0.8 - 75	0.99	0.2	0.8	40	30	-58	-54
PFOA*	0.8 - 100	1.00	0.2	0.8	21	18	-24	-34
PFODA	1.7 – 75	0.93	0.5	1.7	41	19	8	-26
PFOS*	2.8 – 100	0.96	0.9	2.8	35	25	42	53
PFPeA	0.5 - 100	0.98	0.1	0.5	29	18	-35	-45
PFPeS	1.1 - 100	0.98	0.3	1.1	30	17	-22	-29
PFTeDA*	17.5 - 100	0.02	5.3	17.5	65	54	578	380
PFTrDA	0.9 - 75	0.86	0.3	0.9	43	31	-35	-51
PFUdA*	1.1 - 75	0.94	0.3	1.1	35	24	-27.6	-45

* Corresponding SIL-IS analogue used for peak area ratio-based assessment.

Supplementary Table S9. Method performance characteristics for samples prepared in HPLC-grade water using the evaporation concentration method.

Compound	**Range ($n \geq 5$)**	**Linearity (R^2)**	**LOD (ng/L)**	**LLOQ (ng/L)**	**Peak Area precision (n = 3)**		**Inaccuracy (n = 3)**	
					5 ng/L	**10 ng/L**	**5 ng/L**	**10 ng/L**
4-2FTS	0.4 - 100	0.99	0.1	0.4	12	11	18	6
5:3 FTCA	0.7 - 100	0.99	0.2	0.7	26	27	23	55
6:2 Cl-PFESA	0.7 - 100	1.00	0.2	0.7	45	6	47	2
6-2FTS	0.5 - 100	1.00	0.2	0.5	24	17	13	39
7:3 FTCA	3.6 - 100	0.90	1.1	3.6	75	52	88	-11
8:2Cl-PFESA	0.5 - 100	1.00	0.1	0.5	56	8	63	7
8-2FTS	0.3 - 100	1.00	0.1	0.3	18	9	24	3
DONA	0.7 - 100	0.99	0.2	0.7	34	17	22	46
HFPO-TA	1.2 - 100	0.76	0.4	1.2	27	41	-8	-10
L-PFDoS	0.5 - 100	1.00	0.2	0.5	40	7	45	15
L-PFUdS	0.7 - 100	1.00	0.2	0.7	39	13	38	9
MeFOSA	9.4 - 75	0.33	2.8	9.4	40	17	263	28
N-EtFOSAA	0.7 - 100	1.00	0.2	0.7	24	10	28	8
N-MeFOSAA	0.6 - 100	0.99	0.2	0.6	26	8	44	19
PFBA	1.2 - 50	0.99	0.4	1.2	15	7	69	62
PFBS	0.6 - 100	1.00	0.2	0.6	34	6	29	8
PFDA	0.8 - 100	1.00	0.2	0.8	17	6	26	-2
PFDoA	0.3 - 100	1.00	0.1	0.3	22	11	19	-8
PFDS	0.7 - 100	1.00	0.2	0.7	45	13	77	28
PFecHS	1.1 - 100	0.99	0.3	1.1	37	16	17	32
PFEESA	0.9 - 100	1.00	0.3	0.9	31	9	19	10
PFHpA	0.6 - 100	0.99	0.2	0.6	26	20	-7	8
PFHpS	1.0 - 100	0.99	0.3	1.0	45	17	47	46
PFHxA	0.9 - 100	1.00	0.3	0.9	20	9	5	-14
PFHxDA	0.4 - 100	0.99	0.1	0.4	35	16	11	-25
PFHxS	1.6 - 100	0.99	0.5	1.6	35	23	29	25
PFMOBA	0.9 - 100	1.00	0.3	0.9	17	7	14	10
PFMOPrA	0.4 - 100	1.00	0.1	0.4	20	0	0	1
PFNA	0.4 - 100	1.00	0.1	0.4	31	8	19	13
PFNS	0.5 - 100	0.99	0.2	0.5	40	11	63	23
PFOA	0.2 - 100	1.00	0.05	0.2	30	17	16	43
PFODA	0.8 - 100	0.99	0.3	0.8	25	30	68	-1
PFOS	0.7 - 100	0.99	0.2	0.7	36	21	47	38
PFPeA	0.4 - 100	1.00	0.1	0.4	27	6	13	1
PFPeS	1.0 - 100	0.99	0.3	1.0	40	12	40	13
PFTeDA	0.6 - 100	1.00	0.2	0.6	35	10	35	0
PFTrDA	0.5 - 100	0.99	0.2	0.5	40	20	3	-20
PFUdA	0.8 - 100	1.00	0.2	0.8	27	12	23	-6

Supplementary References

1 L. Rosenblum and S. C. Wendelken, *METHOD 533: DETERMINATION OF PER- AND POLYFLUOROALKYL SUBSTANCES IN DRINKING WATER BY ISOTOPE DILUTION ANION EXCHANGE SOLID PHASE EXTRACTION AND LIQUID CHROMATOGRAPHY/TANDEM MASS SPECTROMETRY*, 2019.

2 B. Magnusson and U. Örnemark, Eds., *Eurachem Guide: The Fitness for Purpose of Analytical Methods – A Laboratory Guide to Method Validation and Related Topics*, 2nd edn., 2014.

3 J. Thompson, G. Eaglesham and J. Mueller, *Chemosphere*, 2011, **83**, 1320–1325.

4 L. Hua and W. A. Donald, *Chemosphere*, 2025, **385**, 144611.

5 J. López-Vázquez, R. Montes, R. Rodil, R. Cela, J. Á. Martínez-Pontevedra, M. T. Pena and J. B. Quintana, *Environmental Science and Pollution Research*, 2024, 1–12.

6 F. Cappelli, Y. Ait Bamai, K. Van Hoey, D. H. Kim and A. Covaci, *Environ. Res.*, 2024, **260**, 119753.

7 S. Ullah, T. Alsberg and U. Berger, *J. Chromatogr. A*, 2011, **1218**, 6388–6395.

8 T. G. Schwanz, M. Llorca, M. Farré and D. Barceló, *Science of The Total Environment*, 2016, **539**, 143–152.

9 H. A. Kaboré, S. Vo Duy, G. Munoz, L. Méité, M. Desrosiers, J. Liu, T. K. Sory and S. Sauvé, *Science of The Total Environment*, 2018, **616–617**, 1089–1100.

10 L. M. Yim, S. Taniyasu, L. W. Y. Yeung, G. Lu, L. Jin, Y. Yang, P. K. S. Lam, K. Kannan and N. Yamashita, *Environ. Sci. Technol.*, 2009, **43**, 4824–4829.

11 G. Munoz, M. Liu, S. Vo Duy, J. Liu and S. Sauvé, *Water Res.*, 2023, **233**, 119750.

12 T. Teymoorian, G. Munoz and S. Sauvé, *Environ. Int.*, 2025, **195**, 109250.

13 K. Y. Tan, G. H. Lu, H. T. Piao, S. Chen, X. C. Jiao, N. Gai, E. Yamazaki, N. Yamashita, J. Pan and Y. L. Yang, *Bull. Environ. Contam. Toxicol.*, 2017, **99**, 224–231.

14 R. Chen, G. Li, Y. Yu, X. Ma, Y. Zhuang, H. Tao and B. Shi, *Science of The Total Environment*, 2019, **697**, 134162.

15 J. Ao, T. Yuan, H. Xia, Y. Ma, Z. Shen, R. Shi, Y. Tian, J. Zhang, W. Ding, L. Gao, X. Zhao and X. Yu, *Environmental Pollution*, 2019, **254**, 112873.

16 L. N. Xie, X. C. Wang, X. J. Dong, L. Q. Su, H. J. Zhu, C. Wang, D. P. Zhang, F. Y. Liu, S. S. Hou, B. Dong, G. Q. Shan, X. Zhang and Y. Zhu, *Environ. Int.*, 2021, **146**, 106166.

17 A. He, Y. Lu, F. Chen, F. Li, K. Lv, H. Cao, Y. Sun, Y. Liang, J. Li, L. Zhao, X. Zhang, L. Li, Y. Wang and G. Jiang, *Science of The Total Environment*, 2022, **831**, 154988.

18 C. Gao, D. S. Drage, M. A. E. Abdallah, F. Quan, K. Zhang, S. Hu, X. Zhao, Y. Zheng, S. Harrad and W. Qiu, *ACS ES and T Water*, DOI:10.1021/ACSESTWATER.4C00533/ASSET/IMAGES/LARGE/EW4C00533_0004.JPEG.

19 Y. Q. Wang, L. X. Hu, T. Liu, J. H. Zhao, Y. Y. Yang, Y. S. Liu and G. G. Ying, *Environ. Int.*, 2022, **163**, 107219.

20 Y. Li, J. Li, L. Zhang, Z. Huang, Y. Liu, N. Wu, J. He, Z. Zhang, Y. Zhang and Z. Niu, *Environ. Int.*, 2019, **123**, 87–95.

21 G. Lu, P. Shao, Y. Zheng, Y. Yang and N. Gai, *Int. J. Environ. Res. Public Health*, 2022, **19**, 5722.

22 Y. Hong, Q. Ding, T. Yang, X. Li, N. Song and J. Zhang, *Environ. Geochem. Health*, DOI:10.1007/S10653-025-02506-9.

23 Y. H. Jin, W. Liu, I. Sato, S. F. Nakayama, K. Sasaki, N. Saito and S. Tsuda, *Chemosphere*, 2009, **77**, 605–611.

24 S. Zhang, Q. Kang, H. Peng, M. Ding, F. Zhao, Y. Zhou, Z. Dong, H. Zhang, M. Yang, S. Tao and J. Hu, *Environ. Int.*, 2019, **126**, 54–60.

25 Y. Zhang, J. Meng, Y. Zhou, N. Song, Y. Zhao, M. Hong, J. Yu, L. Cao, Y. Dou and D. Kong, *Science of The Total Environment*, 2024, **920**, 171010.

26 L. Ahrens, S. Taniyasu, L. W. Y. Yeung, N. Yamashita, P. K. S. Lam and R. Ebinghaus, *Water Res.*, 2021, **198**, 117162.

27 M. Jurikova, D. Dvorakova and J. Pulkrabova, *Environmental Science and Pollution Research*, 2022, **29**, 60341–60353.

28 F. Kozisek, D. Dvorakova, F. Kotal, H. Jeligova, L. Mayerova, V. Svobodova, M. Jurikova, V. Gomersall and J. Pulkrabova, *Chemosphere*, 2025, **370**, 143969.

29 T. Teymoorian, L. Delon, G. Munoz and S. Sauvé, *Environ. Sci. Technol. Lett.*, 2025, **12**, 327–333.

30 V. Gellrich, H. Brunn and T. Stahl, *J. Environ. Sci. Health A Tox. Hazard. Subst. Environ. Eng.*, 2013, **48**, 129–135.

31 M. Llorca, M. Farré, Y. Picó, J. Müller, T. P. Knepper and D. Barceló, *Science of The Total Environment*, 2012, **431**, 139–150.

32 D. Skutlarek, M. Exner and H. Färber, *Environmental Science and Pollution Research*, 2006, **13**, 299–307.

33 V. Ingold, A. Kämpfe and A. S. Ruhl, *Eco-Environment & Health*, 2023, **2**, 235–242.

34 D. K. Essumang, A. Eshun, J. N. Hogarh, J. K. Bentum, J. K. Adjei, J. Negishi, S. Nakamichi, M. Habibullah-Al-Mamun and S. Masunaga, *Science of The Total Environment*, 2017, **579**, 729–735.

35 E. Zafeiraki, D. Costopoulou, I. Vassiliadou, L. Leondiadis, E. Dassenakis, W. Traag, R. L. A. P. Hoogenboom and S. P. J. van Leeuwen, *Food Addit. Contam. Part A Chem. Anal. Control Expo. Risk Assess.*, 2015, **32**, 2048–2057.

36 N. Li, G. G. Ying, H. Hong and W. J. Deng, *Environmental Pollution*, 2021, **270**, 116219.

37 Z. Manoochehri, B. Shoshtari-Yeganeh, L. Gheisari and K. Ebrahimpour, *J. Environ. Health Sci. Eng.*, DOI:10.1007/S40201-024-00930-0.

38 S. Harrad, N. Wemken, D. S. Drage, M. A. E. Abdallah and A. M. Coggins, *Environ. Sci. Technol.*, DOI:10.1021/ACS.EST.9B04604/SUPPL_FILE/ES9B04604_SI_001.PDF.

39 D. E. M. Haron, M. Yoneda, R. Hod, M. R. Ramli and M. Y. Aziz, *Environmental Science and Pollution Research*, 2023, **30**, 111062–111075.

40 S. H. Brandsma, J. C. Koekkoek, M. J. M. van Velzen and J. de Boer, *Chemosphere*, 2019, **220**, 493–500.

41 L. S. Haug, S. Salihovic, I. E. Jogsten, C. Thomsen, B. van Bavel, G. Lindström and G. Becher, *Chemosphere*, 2010, **80**, 1137–1143.

42 K. T. Tan, P. Shen, W. M. Ang, I. R. L. Lim, W. Z. Yu, Y. Wu and S. H. Chan, *ACS ES&T Water*, 2025, **5**, 4403.

43 H. Park, G. Choo, H. Kim and J. E. Oh, *Science of The Total Environment*, 2018, **634**, 1505–1512.

44 D. H. Kim, J. H. Lee and J. E. Oh, *J. Hazard. Mater.*, 2019, **365**, 26–33.

45 S. K. Kim, Y. L. Kho, M. Shoeib, K. S. Kim, K. R. Kim, J. E. Park and Y. S. Shin, *Environmental Pollution*, 2011, **159**, 1167–1173.

46 D. Cserbik, M. Casas, C. Flores, A. Paraian, L. S. Haug, I. Rivas, M. Bustamante, P. Dadvand, J. Sunyer, M. Vrijheid and C. M. Villanueva, *Journal of Exposure Science & Environmental Epidemiology 2023 34:1*, 2023, **34**, 90–96.

47 J. L. Domingo, I. Ericson-Jogsten, G. Perelló, M. Nadal, B. Van Bavel and A. Kärrman, *J. Agric. Food Chem.*, 2012, **60**, 4408–4415.

48 I. Ericson, M. Nadal, B. Van Bavel, G. Lindström and J. L. Domingo, *Environ. Sci. Pollut. Res. Int.*, 2008, **15**, 614–619.

49 T. Lertassavakorn, N. Pholphana, N. Rangkadilok, T. Suriyo and J. Satayavivad, *Food Addit. Contam. Part A Chem. Anal. Control Expo. Risk Assess.*, 2021, **38**, 1400–1415.

50 B. Ünlü Endirlik, E. Bakır, İ. İ. Boşgelmez, A. Eken, İ. Narin and A. Gürbay, *Chemosphere*, 2019, **235**, 1162–1171.

51 X. Li, M. Fatowe, D. Cui and N. Quinete, *Science of The Total Environment*, 2022, **806**, 150393.

52 C. S. Skaggs and B. A. Logue, *J. Chromatogr. A*, 2021, **1659**, 462493.

53 K. Dasu, S. F. Nakayama, M. Yoshikane, M. A. Mills, J. M. Wright and S. Ehrlich, *J. Chromatogr. A*, 2017, **1494**, 46–54.

54 N. J. Herkert, J. Merrill, C. Peters, D. Bollinger, S. Zhang, K. Hoffman, P. L. Ferguson, D. R. U. Knappe and H. M. Stapleton, *Environ. Sci. Technol. Lett.*, 2020, **7**, 178–184.

55 T. D. Sinkway, Q. Mehdi, E. K. Griffin, K. Correia, C. G. Camacho, J. Aufmuth, C. Ilvento and J. A. Bowden, *Science of The Total Environment*, 2024, **926**, 171932.

56 K. Hohweiler, L. A. Krometis, E. J. Ling and K. Xia, *Science of The Total Environment*, 2024, **929**, 172539.

57 J. Von Behren, P. Reynolds, P. M. Bradley, J. L. Gray, D. W. Kolpin, K. M. Romanok, K. L. Smalling, C. Carpenter, W. Avila, A. Ventura, P. B. English, R. R. Jones and G. M. Solomon, *Science of The Total Environment*, 2024, **953**, 176067.

58 S. M. Hall, S. Zhang, G. H. Tait, K. Hoffman, D. N. Collier, J. A. Hoppin and H. M. Stapleton, *Science of The Total Environment*, 2023, **895**, 165091.

59 X. Li, M. Fatowe, L. Lemos and N. Quinete, *Environ. Sci. Pollut. Res. Int.*, 2022, **29**, 84383–84395.

60 M. S. Alam, A. Abbasi and G. Chen, *Environ. Res.*, 2026, **294**, 123822.

61 N. H. Lam, C. R. Cho, K. Kannan and H. S. Cho, *J. Hazard. Mater.*, 2017, **323**, 116–127.