Gate three query process

Strategic solution(s)	London Water Recycling (LWR)
Query number	LWR005
Date sent to company	15/01/2025
Response due by	17/01/2025

Query

- Please provide a list of all parameters (not just the limiting hazards) as per A.2 in Annex B, split by sampling location.
- Annex B details that other limiting hazards have been assessed as a red or amber residual risk based on the information in the DWPSs and that these risks are being mitigated via the current Thames Water DWSP. Will the scheme either increase the flow above the current operational maximum or will any additional risks that the scheme may present be able to be treated within the post-mitigated operating envelope of the works, or will any further additional mitigations be required?
- How has the SWQRA considered the water quality in low river flow conditions (especially in consideration of the operation of the scheme in drought conditions and upstream wastewater inputs) and please provide a summary of the impact on the expected raw water quality at Teddington.
- How has the SWQRA considered any blending from other inputs into the chain of raw water reservoirs and any impact this may have on the limiting hazards and other WQ parameters.
- CECs, section 9.1.3 states that there will be advanced water treatment processes at Mogden and Beckton to mitigate the risk, what treatment is available at Coppermills and the other receiving works? Please provide details of what advanced treatment is being considered, should it be needed, and confirm that there is sufficient space to enable the construction at these sites.
- Please confirm the units for PFOS and PFOA in Annex B p30 & 31.

Solution owner response

This response has been written in line with the requirements of the RAPID Gate 3 Guidance and to comply with the regulatory process pursuant to Thames Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented be taken forward, Thames Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This response should be read with those duties in mind.

Q1: Please provide a list of all parameters (not just the limiting hazards) as per A.2 in Annex B, split by sampling location.

R1 – The table below sets out the parameters analysed at Teddington Weir and Hampton. The symbol 'Y' represents sampling for the parameter, symbol 'N' represents that a parameter is not sampled at that site.

Parameter	TWUL Hampton Intake	River Thames at Teddington Weir
2,4,4'-tribromodiphenyl ether (BDE-28)	Y	Y
2,2',4,4'-tetrabromodiphenyl ether (BDE-47)	Y	Y
2,2',4,4',5-pentabromodiphenyl ether (BDE-99)	Y	Y
2,2',4,4',6-pentabromodiphenyl ether (BDE-100)	Y	Y
1,1,1-trichloroethane	Y	Y
1,1,2-trichloroethane	Y	Y
1,2-dichloroethane	Y	Y
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)	Y	Y
2,2',4,4',5,6'-hexabromodiphenyl ether (BDE-154)	Y	Y
2,2',3,4,4',5',6-heptabromodiphenyl ether (BDE-183)	Y	Y
2,4,5-trichlorophenol	Y	Y
2,4,5-trichlorophenoxyacetic acid (2,4,5-T)	Y	Y
2,4,6-trichlorophenol	Y	Y
4-(2,4-dichlorophenoxy)butanoic acid (2,4-DB)	Y	Y
dichlorprop (2,4-DP)	Y	Y
2,4-dichlorophenoxyacetic acid (2,4-D)	Y	Y
2,4-dimethylphenol (2,4-xylenol)	Y	Y
2,5-dimethylphenol (2,5-xylenol)	Y	Y
2-chlorophenol	Y	Y
2-methylphenol (o-cresol)	Y	Y
3,5-dimethylphenol (3,5-xylenol)	Y	Y
3-methylphenol (m-cresol)	Y	Y

4-chlorophenol	Y	Y
4-methylphenol (p-cresol)	Y	Y
octylphenols (4-(1,1',3,3'-tetramethylbutyl)phenol)	Y	Y
acid neutralisation capacity (ANC, unfiltered)	Y	Y
abamectin	N	Y
aclonifen	Y	Y
acrylamide	Y	Y
silver, dissolved	N	Y
silver, total	N	Y
aluminium, dissolved	Y	Y
aluminium, total	Y	Y
alachlor	Y	Y
aldrin	Y	Y
alkalinity as CaCO3	Y	Y
alkalinity as HCO3	Y	Y
ammonia, unionised	Y	Y
ammonia, unionised	Y	Y
ametryn	Y	Y
total anions (sum of Cl, F, NO2, NO3, SO4)	Y	Y
arsenic, dissolved	Y	Y
arsenic, total	Y	Y
anthracene	Y	Y
atrazine	Y	Y
azinphos-methyl, dissolved	N	Y
benzyl butyl phthalate	Y	Y
boron, dissolved	Y	Y
biochemical oxygen demand (BOD, 5 day)	Y	Y
BTEX, total	Y	Y
boron, total	Y	Y
barium, dissolved	Y	Y
benzo[a]pyrene	Y	Y
barium, total	Y	Y
benzo[b]fluoranthene	Y	Y
bromodichloromethane	Y	Y
bifenox	Y	Y
benzo[ghi]perylene	Y	Y
benzo[k]fluoranthene	Y	Y
bromoxynil	Y	Y
benzene	Y	Y
benzene	Y	Y
biphenyl	N	Y
bromate	Y	Y
bromine - total residual oxidant	N	Y
bromoform	Y	Y
bentazone	Y	Y

benazolin	Y	Y
number of Crypto-like bodies 3-4um	Y	Y
number of Crypto-like bodies 4-6 µm	Y	Y
4-chloro-3-methyl phenol	Y	Y
chloronitrotoluenes	N	Y
cyanide, total	Y	Y
cyanide, free (easily liberable)	Y	Y
chloroalkanes (C10-C13)	Y	Y
calcium, dissolved	Y	Y
calcium, total	Y	Y
carbetamide	Y	Y
carbendazim	Y	Y
cadmium, dissolved	Y	Y
cadmium, total	Y	Y
chlorfenvinphos	Y	Y
chloride	Y	Y
chlorine, free	Y	Y
chlorine, total	Y	Y
trichloromethane (chloroform)	Y	Y
Coliforms, total	Y	Y
C. perfringens veg & spores, confirmed	Y	Y
chlorophyll	Y	Y
cobalt, dissolved	Y	Y
cobalt, total	Y	Y
colour	Y	Y
E. coli	Y	Y
conductivity @ 20øC	Y	Y
coumaphos	N	Y
clopyralid	Y	Y
chlorpyrifos (chlorpyrifos-ethyl)	Y	Y
chlorpropham	N	Y
chromium (III), dissolved	Y	Y
chromium (VI), dissolved	Y	Y
chromium, dissolved	Y	Y
chromium, total	Y	Y
Cryptosporidium	Y	Y
chlorothalonil	Y	Y
carbon tetrachloride (tetrachloromethane)	Y	Y
chlorotoluron	Y	Y
copper, dissolved	Y	Y
copper, total	Y	Y
DHC isopropylbenzene (cumene)	Y	Y
cybutryne (Irgarol)	Y	Y
cyfluthrin	N	Y
cypermethrin	Y	Y

dichloromethane (DCM)	Y	Y
DDT, total	Y	Y
di(2-ethylhexyl) phthalate (DEHP)	Y	Y
dissolved organic carbon (DOC)	Y	Y
dibromochloromethane	Y	Y
dibutyl phthalate	N	Y
3,4-dichloroaniline	Y	Y
dicamba	Y	Y
dicofol	Y	Y
2,4-dichlorophenol	Y	Y
dichlorvos	Y	Y
dichlorobenzene, total isomers	N	Y
DHC decane	Y	Y
demeton (-O & -S)	N	Y
diethyl phthalate	N	Y
diflubenzuron	N	Y
1,2-dichloroethane	Y	Y
diuron	Y	Y
dieldrin	Y	Y
dimethyl phthalate	N	Y
dimethoate	Y	Y
dioctyl phthalate	N	Y
doramectin	N	Y
desethyl atrazine	Y	Y
diazinon	Y	Y
Isue tih c	Y	Y
ethylenediaminetetraacetic acid (EDTA)	N	Y
2-ethyl-4-methyl-1,3-dioxolane (2-EMD)	Y	Y
endrin	Y	Y
Enterococci, confirmed	Y	Y
alpha-endosulfan (endosulfan)	Y	Y
BTEX, total	Y	Y
DHC ethylbenzene	Y	Y
fluoride	Y	Y
flucofuron	N	Y
iron, dissolved	Y	Y
iron, total	Y	Y
2,4,5-TP (Fenoprop)	Y	Y
flufenacet	Y	Y
fluoranthene	Y	Y
formaldehyde	N	Y
fenchlorphos	N	Y
fenitrothion	N	Y
fluroxypyr	Y	Y
glyphosate	Y	Y

hexabromocyclododecane (HBCDD), total	Y	Y
hexachlorobutadiene (HCBD)	Y	Y
hexachlorobenzene (HCB)	Y	Y
gamma-hexachlorocyclohexane (g-HCH, lindane)	Y	Y
heptachlor and heptachlor epoxide	Y	Y
DHC heptane	Y	Y
mercury, dissolved	Y	Y
mercury, total	Y	Y
hardness as CaCO3	Y	Y
hardness as Ca	Y	Y
indeno[1,2,3-cd]pyrene	Y	Y
ioxynil	N	Y
isoproturon	Y	Y
isodrin	Y	Y
ivermectin	N	Y
potassium, dissolved	Y	Y
Kjeldahl nitrogen, total	Y	Y
potassium, total	Y	Y
linuron	Y	Y
MCPA	Y	Y
MCPB	Y	Y
malathion	N	Y
methiocarb	Y	Y
mecoprop (MCPP)	Y	Y
mevinphos (mixture of isomers)	N	Y
magnesium, dissolved	Y	Y
magnesium, total	Y	Y
metaldehyde	Y	Y
malachite green oxalate	N	Y
manganese, dissolved	Y	Y
manganese, total	Y	Y
maneb (as carbon disulfide)	N	Y
monuron	Y	Y
mancozeb (as carbon disulfide)	N	Y
metazachlor	Y	Y
ammoniacal nitrogen	Y	Y
nitrite	Y	Y
nitrite	Y	Y
nitrate	Y	Y
nitrate	Y	Y
nonylphenols (4-nonylphenol technical mix)	Y	Y
nitrilotriacetic acid (NTA)	N	Y
sodium, dissolved	Y	Y
sodium, total	Y	Y
DHC naphthalene	Y	Y

DHC naphthalene	Y	Y
nickel, dissolved	Y	Y
nickel, total	Y	Y
nitrite & nitrate calculation	Y	Y
organic nitrogen	Y	Y
oxidation reduction potential (ORP)	Y	Y
DHC octane	Y	Y
odour	Y	Y
omethoate	N	Y
polycyclic aromatic hydrocarbons (PAH) sum	Y	Y
22°C plate count, neat	Y	Y
37°C plate count, neat	Y	Y
pentachlorophenol (PCP)	Y	Y
polychloro-2-(chloromethyl sulphonamido) diphenyl ethers (PCSD)	N	Y
perfluoro-1-octane sulfonate and its derivatives	Y	Y
lead, dissolved	Y	Y
lead, total	Y	Y
pirimicarb	N	Y
pentachlorobenzene	Y	Y
prochloraz	N	Y
phenol	Y	Y
pirimiphos-methyl	N	Y
picloram	Y	Y
prometryn	Y	Y
pendimethalin	Y	Y
DHC phenanthrene	Y	Y
propetamphos	N	Y
propyzamide	Y	Y
permethrin	Y	Y
propazine	Y	Y
quinmerac	Y	Y
quinoxyfen	Y	Y
radon	Y	Y
sulphide or hydrogen sulphide	Y	Y
sulphate	Y	Y
soluble reactive phosphorus (SRP)	Y	Y
salinity @ 20øC	Y	Y
antimony, dissolved	Y	Y
antimony, total	Y	Y
sulcofuron	N	Y
selenium, dissolved	Y	Y
selenium, total	Y	Y
simazine	Y	Y
tin, dissolved	N	Y

tin, total	N	Y
strontium, dissolved	Y	Y
strontium, total	Y	Y
styrene	N	Y
tributyltin compounds (as tributyltin cation)	Y	Y
1,1,2,2-tetrachloroethane	Y	Y
tetrachloroethene	Y	Y
THMs, sum	Y	Y
total organic carbon (TOC)	Y	Y
total oxidised nitrogen	Y	Y
triphenyltin compounds (as triphenyltin cation)	N	Y
phosphorus, total	Y	Y
tritium	Y	Y
triallate	N	Y
taste, quantitative	Y	Y
triazophos	N	Y
tributyl phosphate	N	Y
terbutryn	Y	Y
tri & tetrachloroethane, total	Y	Y
tecnazene	N	Y
tebuthiuron	Y	Y
trifluralin	Y	Y
thiabendazole	N	Y
trichlorobenzenes	Y	Y
trichloroethene	Y	Y
trichloromethane (chloroform)	Y	Y
DHC toluene	Y	Y
DHC toluene	Y	Y
triclopyr	Y	Y
triclosan	Y	Y
DHC tetradecane	Y	Y
turbidity (21°C)	Y	Y
vanadium, dissolved	N	Y
vanadium, total	N	Y
tungsten, dissolved	Y	Y
tungsten, total	Y	Y
zinc, dissolved	Y	Y
zinc, total	Y	Y
alpha activity, total	Y	Y
beta activity, total	Y	Y
gamma-hexachlorocyclohexane (g-HCH, lindane)	Y	Y
BTEX, total	Y	Y
BTEX, total	Y	Y
o,p'-DDD (o,p'-TDE)	Y	Y
o,p'-DDE	Y	Y

1,1,1-trichloro-2-(2-chlorophenyl)-2-(4-chlorphenyl)ethane (o,p'-DDT)	Y	Y
pH	Y	Y
1,1-dichloro-2,2-bis(4-chlorophenyl)ethane (p,p'-DDD)	Y	Y
1,1-dichloro-2,2-bis(4-chlorophenyl)ethene (p,p'-DDE)	Y	Y
p,p'-DDT	Y	Y

Q2: Annex B details that other limiting hazards have been assessed as a red or amber residual risk based on the information in the DWPSs and that these risks are being mitigated via the current Thames Water DWSP. Will the scheme either increase the flow above the current operational maximum or will any additional risks that the scheme may present be able to be treated within the post-mitigated operating envelope of the works, or will any further additional mitigations be required?

R2: The operation of the Teddington DRA will not impact on the flows or pose any additional risks at Coppermills WTW; consequently, no additional capacity or Project mitigation is required at Coppermills WTW due to the operation of Teddington DRA. As part of 'business as usual' activities ongoing investment at Coppermills WTW is planned over the coming AMP cycles.

Q3: How has the SWQRA considered the water quality in low river flow conditions (especially in consideration of the operation of the scheme in drought conditions and upstream wastewater inputs) and please provide a summary of the impact on the expected raw water quality at Teddington.

R3: The Gate 3 SWQRA utilises data collected through a monthly water quality programme which commenced in 2020 and now holds multiple years of data. These samples represent a variety of flow conditions and seasons, for example low flows during the drought in 2022 and high flows during winter periods. The SWQRA has therefore captured unique flow conditions. As we continue to collect data through Gate 4 so we will be able to isolate and statistical analyse specific flow patterns if required.

We intend to publish all water quality data collected as part of our investigations to date in our statutory consultation planned for 2025. A summary of the difference in raw water quality between Hampton (raw water that is currently abstracted into the TLT) and Teddington is provided in table A.1 and A.2 of Annex B. The only limiting hazards found to be statistically different between the two sites were for nitrates, alkalinity and E.Coli. The G3 SWQRA was based on data collected at Teddington.

Q4: How has the SWQRA considered any blending from other inputs into the chain of raw water reservoirs and any impact this may have on the limiting hazards and other WQ parameters

R4: The SWQRA utilised water quality data that represents the worst-case scenario of 'new' source water. For Teddington DRA this utilised data from the River Thames at Teddington Weir which includes the Hogsmill discharge upstream. Blending has not been considered to date in the worse-case scenario assessment.

For parameters that could not be assessed based on the developed methodology of PCV failures, such as corrosivity, a comparison approach between existing and new source water was applied.

Q5: CECs, section 9.1.3 states that there will be advanced water treatment processes at Mogden and Beckton to mitigate the risk, what treatment is available at Coppermills and the other receiving works? Please provide details of what advanced treatment is being considered, should it be needed, and confirm that there is sufficient space to enable the construction at these sites.

R5: The Mogden Water Recycling and Beckton Water Recycling schemes propose to utilise full Advanced Water Recycling Plants (AWRP) which use reverse osmosis technology to mitigate the risk of CECs. No additional treatment is therefore required at any receiving works to mitigate risks further from CECs from these schemes.

As set out in the concept design at Gate 2, the Mogden water recycling scheme[1] includes for AWRP development on land near Kempton, i.e. not at Mogden STW where space is limited. For Beckton water recycling scheme[2] AWRP

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[1] Annex A2 - Mogden Effluent Reuse Conceptual Design Report
[2] Annex A1 - Beckton Effluent Reuse Conceptual Design Report

development would be onsite at the STW. In both cases sufficient space has been identified for construction activities, the plants and any further expansion should it be required.

Q6: Please confirm the units for PFOS and PFOA in Annex B p30 & 31.

R6: Units for PFOS and PFOA are ng/l. Units within Annex B p30/31 should read ng/l.

If you require any further information, please contact the strategic solution contact below.

Date of response to RAPID	16/01/2025