Understanding PFAS

What is PFAS?

PFAS (per-and poly-fluoroalkyl substances) are a group of manufactured chemicals that have been used since the 1950s in lots of common products like: non-stick cookware; fabric, furniture and carpet stain protection applications; and food packaging.

Why are these chemicals being phased out?

The manufacture and use of some PFAS are being discontinued or limited through international agreements and voluntary actions primarily because of their persistence in the environment, rather than because of any established health effects. PFAS break down very slowly in the environment under naturally occurring conditions.

Because of this, they tend to accumulate in the food chain and in human tissue. The international scientific community has identified this characteristic as undesirable because of the potential for unforeseen effects resulting from accumulating levels, and the difficulty in removing these chemicals from the environment.

Are there any health affects?

Health experts are still working to fully understand PFAS. There is currently no consistent evidence that PFAS exposure causes adverse human health effects. However, because there is uncertainty and PFAS can accumulate in the body with continued exposure, it is prudent to reduce exposure to PFAS as far as is practicable.

PFAS are found at very low levels in the blood of the general population around the world. The general public is exposed to small amounts of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in everyday life. Levels of PFAS in the blood will decrease over time if exposure is minimised.

Does PFAS affect pregnant women or babies who are being breastfed?

Queensland Health advises there currently no consistent evidence that exposure to PFAS causes poor outcomes in pregnant women or their babies.

If you're concerned please talk to your GP or call Queensland Health on 13 Health (13 43 25 84).

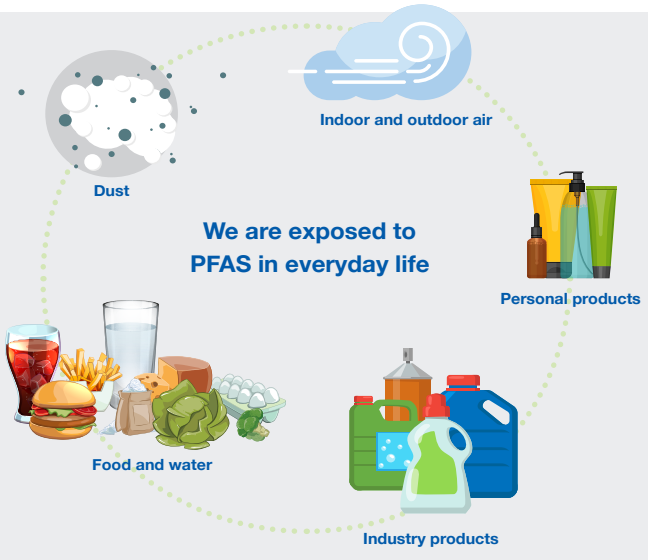
How long does it take for PFAS to leave my system?

The time it takes for PFAS to be excreted from the body is the same for adults and children. In humans, studies suggest that the half-life of PFAS could range from two to nine years.

How are people exposed to PFAS?

The general public are exposed to small amounts of PFAS in everyday life through exposure to dust, indoor and outdoor air, food, water and contact with consumer products that contain these chemicals.

For most people, food is thought to be the major source of exposure. People who work in industries that use PFAS, or use products containing these chemicals, may be exposed to higher levels than the general public.



Timeline of activities

NOV 2020 - JAN 2021

On-site and public land investigations (sampling)

FEB 2021

Public and landholder notification of sampling results

FEB 2021

Start zone 1 sampling

MARCH 2021

Zone 1, 2 and 3 sampling

Notification of zone 1 sampling results

APRIL 2021

Complete zone 2 and 3 sampling, ongoing landholder notification of results

Start sampling in zone 4 and 5

Results analysis (ongoing)

MAY 2021

Ongoing public and landholder notification of all sampling results

Undertake any other sampling needed

Desktop study - further define source areas, flow paths, remediation options

MID 2021 - We are here

Develop ongoing long-term, offsite monitoring program

Evaluate remediation and operational options

Hydrogeological review

LATE 2021

Aquatic biota sampling

Commence onsite remediation

EARLY 2022

Human Health and Ecological Risk Assessment

2022 ONWARDS

Ongoing monitoring and remediation

Ongoing landholder and community engagement

*Anticipated timeline subject to change

What is CS Energy doing?

Testing

CS Energy is conducting a voluntary investigation to understand the potential impacts associated with our historical use of PFAS at Callide Power Station.

Callide's use of firefighting foams containing PFAS was infrequent and in small quantities for training, testing and emergency response purposes. CS Energy removed firefighting foams containing non-compliant levels of PFAS in 2019 as part of a Queensland Government policy to phase out their use.

CS Energy has divided the sampling area near Callide Power Station into geographic zones so that the testing on private landholder property can be carried out efficiently. Results to date are showing a mix of PFAS levels above and below drinking water guidelines. Testing is still under way.

Remediation and monitoring

We are developing an ongoing monitoring program and remediation plan with the Department of Environment and Science (DES). As part of this, we will continue to monitor for PFAS in Callide Creek a number of times a year and report the results to the community.

Communication

We strive for transparency and clear communication with the community. We are speaking directly with affected landholders and proactively updating the broader Biloela community and our employees. We are engaging with the community as a whole and are continuously updating our website with new information as test results come through.

What are the Australian drinking water guidelines?

The Australian drinking water guidelines for the total PFOS plus PFHxS are 0.07 µg per litre and 0.56 µg per litre for PFOA. PFOS, PFHxS and PFOA are different types of PFAS. The measure µg = micrograms. That is a unit of mass equal to one millionth of a gram.

What are the recreational water guidelines?

The National Health and Medical Research Council also has recreational water guidelines in place for activities like swimming and sprinkler play. These are: the total concentration of PFOS plus PFHxS should not exceed 2 ug/L, and 10ug/L for PFOA. This is calculated on an estimated accidental ingestion of 30 litres per year.

How will the water level readings affect me?

PHOS + PFHxS above drinking water guidelines of 0.07 ug/L

For landholders with levels of PFAS above the drinking water guidelines on their property, how will it impact their daily activity?

To minimise exposure, Queensland Health advises these landowners to stop using the water from the sample point/s that exceed the guideline on their property for the following:

- Drinking the water
- Using for cooking
- Personal hygiene (includes activities such as brushing teeth and showering)
- Eating produce like meat, veggies or eggs that use water from this sample point on your property.

The Queensland Health advice **only applies to the locations that are non-compliant with the guideline**. They also advise activities such as swimming and sprinkler play are safe if the detection is above the drinking water guideline, but below the recreational water guideline.

Some levels of PFAS found

What about landholders whose results showed some levels of PFAS but they were below the drinking water and recreation guidelines?

The advice from Queensland Health is that you can continue to drink the water. The Department of Agriculture and Fisheries advises you can continue to use the water for irrigating crops and for livestock whether they are above or below drinking water guidelines.

However, we recognise that you may feel uncertain, and may want to limit exposure.

Queensland Health advises you may wish to follow the advice for minimising exposure as a precautionary measure.

- Avoid drinking the water
- Avoid using for cooking
- Avoid using the water for personal hygiene (includes activities such as brushing teeth and showering, but not swimming or sprinkler play)
- Avoid eating produce like meat, veggies or eggs from your property.

For more information on PFAS visit pfas.gov.au or health.qld.gov.au or call 13 HEALTH (13 43 25 84).

To speak with a Callide Power Station representative contact Brett Smith on 0419 726 550 or bsmith@csenergy.com.au or learn more on our website csenergy.com.au.

Does PFAS affect animals?

For domestic pets like dogs and cats, Department of Agriculture and Fisheries (DAF) says there's no evidence that suggests that PFAS have a detrimental effect on animal or plant health at levels likely to be found in contaminated areas. If you are concerned about your pet, you can choose to give them the same alternative water source as yourself.

Can I still use the water for livestock and crops?

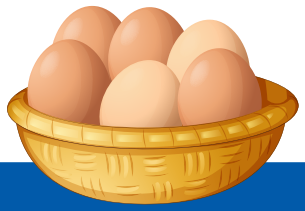
DAF advises you can continue to use the water for irrigating crops and for livestock.

Will PFAS affect the breeding value (genetics) of stud animals or international trade?

The advice from DAF is no. Toxicology data suggests that PFAS are not genotoxic and therefore genetic traits will not be affected. There are currently no standards set for PFAS in agricultural products or food in Australia. Food Standards Australia and New Zealand (FSANZ), the agency responsible for food standards in Australia, has recently completed a review of risks associated with PFAS in human diets and has not recommended any food regulatory measures at this stage.

Are there standards for PFAS levels in agricultural products in Australia?

There are currently no standards set for PFAS in agricultural products or food in Australia. Food Standards Australia and New Zealand (FSANZ), the agency responsible for food standards in Australia, has recently completed a review of risks associated with PFAS in human diets and has not recommended any food regulatory measures at this stage.



I've changed my chickens' drinking water to an alternative supply. When can I start eating their eggs again?

Queensland Health advises that previous studies have shown that PFAS was eliminated from eggs 30 days after changing PFAS-free water. Based on this study, Queensland Health advises people to wait one month before consuming eggs.

Source: Queensland Health and Department of Agriculture and Fisheries (DAF).

For more information on PFAS for primary producers visit daf.qld.gov.au or call 13 25 23.

To speak with a Callide Power Station representative contact Brett Smith on 0419 726 550 or bsmith@csenergy.com.au or learn more on our website csenergy.com.au.

Map showing results of PFAS testing in zones 1 to 5 as at May 2021

18 June 2021

Understanding the map

- The map shows the results for PFAS concentrations (as PFOS + PFHxS) measured against drinking water guidelines. For clarity, this map does not show any ecological or species protection triggers.
- The map takes the results from each sample point (dots on the map) to **infer or estimate PFAS concentration** levels across all sampling zones. This is displayed in shades of purple to indicate levels of PFAS and whether they are under or over the drinking water guidelines.
- This method of spatial interpolation is called **Natural Neighbour interpolation** and is useful for areas that have limited data, or data points at some distance from each other.
- What this means is that our data model looked at the values at each groundwater sample point. The model then applied a weight to each value, based on adjacent sample points to estimate a total value for the area as a whole.
- We have coloured each sample point in the shade of purple that represents if they are over or under drinking water guidelines to assist in interpreting the data presented on the map.
- The map also includes results from the earlier sampling that CS Energy conducted on public land in January 2021.
- It's important to note this map is a snapshot that represents the testing we've done to date (at 11 May 2021). If more testing is undertaken to add more data points to add to the map, the inferred PFAS concentration levels will change too – which means the purple shading is likely to change over time.

Australian drinking water guidelines

- The Australian drinking water guidelines measure in **µg = micrograms.** That is a unit of mass equal to one millionth of a gram.
- In the notes of the map you will see that the Australian drinking water guideline for the total PFOS plus PFHxS (which are types of PFAS) is 0.07 **µg** per litre.
- The Australian drinking water guidelines provide an authoritative reference on what defines safe, good quality drinking water. Where health guidelines values exist, they tend to be conservative in nature, ensuring that public health is protected.

More information

If you have any questions about the map or the testing data please contact **Brett Smith from Callide Power Station**. He can be contacted on **0419 726 550** or **bsmith@csenergy.com.au**

Anyone concerned about their health or that of family members should talk to their GP, the Central Queensland Public Health Unit (**Ph 07 4920 6989**) or call 13HEALTH (**13 43 25 84**).

CS Energy
Callide Power Station

Inferred Groundwater PFOS + PFHxS Concentration Zones 1 to 5 (May 2021)

Legend

Callide Power Station site boundary

Offsite Investigation Areas

Zone 1 (Power Station to Linkes Road)

Zone 2 (Linkes Road to Dawson Highway, north of Callide Creek)

Zone 3 (Baileys Lane to Dawson Highway, south of Callide Creek)

Zone 4 (Eastern Site Boundary to Lake Callide)

Zone 5 (Dawson Highway west to Jambin Dakenba Road)

Inferred Aquifer Extent (DES Groundwater Dependent Ecosystem – Unconsolidated Sedimentary Aquifer)

Groundwater Monitoring Location

Limit of Reporting to 0.007 ug/L (Under drinking water guideline)

0.007 to 0.07 ug/L (Under drinking water guideline)

0.07 to 0.7 ug/L (Above drinking water guideline)

0.7 to 7 ug/L (Above drinking water guideline)

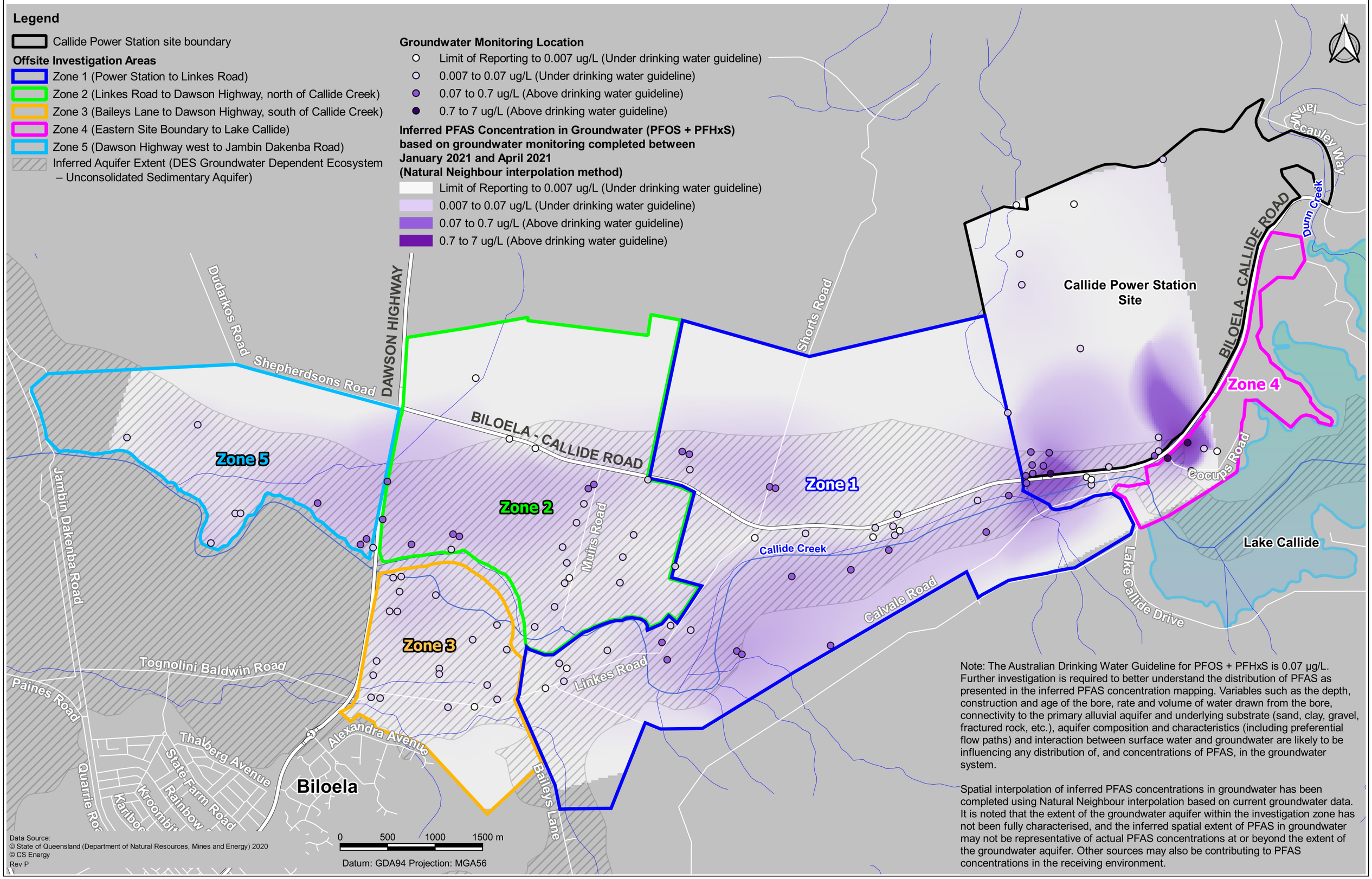
Inferred PFAS Concentration in Groundwater (PFOS + PFHxS) based on groundwater monitoring completed between January 2021 and April 2021 (Natural Neighbour interpolation method)

Limit of Reporting to 0.007 ug/L (Under drinking water guideline)

0.007 to 0.07 ug/L (Under drinking water guideline)

0.07 to 0.7 ug/L (Above drinking water guideline)

0.7 to 7 ug/L (Above drinking water guideline)



Data Source:
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Datum: GDA94 Projection: MGA56

Note: The Australian Drinking Water Guideline for PFOS + PFHxS is 0.07 µg/L. Further investigation is required to better understand the distribution of PFAS as presented in the inferred PFAS concentration mapping. Variables such as the depth, construction and age of the bore, rate and volume of water drawn from the bore, connectivity to the primary alluvial aquifer and underlying substrate (sand, clay, gravel, fractured rock, etc.), aquifer composition and characteristics (including preferential flow paths) and interaction between surface water and groundwater are likely to be influencing any distribution of, and concentrations of PFAS, in the groundwater system.

Spatial interpolation of inferred PFAS concentrations in groundwater has been completed using Natural Neighbour interpolation based on current groundwater data. It is noted that the extent of the groundwater aquifer within the investigation zone has not been fully characterised, and the inferred spatial extent of PFAS in groundwater may not be representative of actual PFAS concentrations at or beyond the extent of the groundwater aquifer. Other sources may also be contributing to PFAS concentrations in the receiving environment.