

## **Appendix C – Derivation of Screening Criteria**

## Derivation of Residential Soil Screening Criteria

In the absence of screening levels for PFOS, PFOA and PFHxS in soil and sediment for a residential settings, site specific criteria were derived. Given the toxicity reference value (TRV) has only been developed for ingestion pathway (refer to section 7 of the IHHRA report), inhalation of particulates and dermal contact pathways were considered via the adjustment of the TRV to assume up to 80% of exposure is assumed to come from other pathways. This adjustment is likely to be a very conservative approach given ingestion pathway is considered to be the major exposure route for PFAS therefore the potential contribution of particulate and dermal contact exposures would not be expected to have a significant effect on the derived screening criteria. The exposure equations and assumptions were consistent with NEPM (2013).

On the basis that home grown fruit and vegetables were sampled in the urban residential setting, the ingestion of these products will be evaluated directly therefore this pathway was not included in the derivation of soil screening levels. Likewise, the accounting for leaching of PFAS from soil to groundwater and subsequent ecosystem bioaccumulation was not incorporated in either the residential or recreational screening criteria on the basis; groundwater monitoring within the Investigation Area is ongoing, and potential exposures to residents via direct contact pathways of surface waters and ingestion of aquatic biota are also evaluated.

The exposure calculation for the incidental ingestion of soil is presented

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**Equation C1: Ingestion of soil** 
$$Soil_{HSLIngestion} = \frac{TRV_{oral} \times TRQ \times CC \times BW \times AT \times 365}{CF_1 \times IR_{Ing} \times BA_o \times ED \times EF}$$

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**Where:**

<b>SOIL<sub>HSLIng</sub></b>	=	Health screening level	[mg/kg]
<b>TRV<sub>oral</sub></b>	=	Toxicity reference value	[mg/kg/day]
<b>TRQ</b>	=	Target risk quotient	[unitless]
<b>B<sub>o</sub></b>	=	Bioavailability (oral) (expressed as a fraction of 1)	[unitless]
<b>EF</b>	=	Exposure frequency	[days/year]
<b>ED</b>	=	Exposure duration	[years]
<b>IR<sub>Ing</sub></b>	=	Ingestion rate	[mg/day]
<b>CF<sub>1</sub></b>	=	Conversion factor	[kg/mg]
<b>CC</b>	=	Contribution to background exposure	[unitless]
<b>AT</b>	=	Averaging time = ED for COPCs with a threshold health effect	[years]
<b>BW</b>	=	Body weight	[kg]

The exposure assumptions and calculated soil and sediment screening levels are presented in the Table C-1.

Table C-1: Soil screening criteria - Residential setting

	Symbol	Units	Young Child	Adult	Notes
<b>Exposure Parameters</b>					
Body Weight	BW	kg	15	70	NEPM Schedule B7, Table 5
Exposure Duration	ED	years	6	29	
Exposure Frequency	EF	days/year	365	365	
Soil/dust ingestion rate	IR <sub>ing</sub>	mg/day	100	50	
Averaging Time	AT	years	6	29	
Target Risk Quotient	TRQ	-	0.2	0.2	OEH (2017)
<b>Chemical Specific Parameters</b>					
Contribution to contamination	CC	-			Background assumed to be <1% as other exposures via other media will be evaluated separately
PFOS + PFHxS			1	1	
PFOA			1	1	
Toxicity Reference Value	TRV	mg/kg/d			
PFOS + PFHxS			2.0E-05	2.0E-05	DoH (2017)
PFOA			1.6E-04	1.6E-04	
Oral bioavailability	B <sub>o</sub>	-			
PFOS + PFHxS			1	1	Maximum assumed
PFOA			1	1	
Health Screening Level	HSL	mg/kg			
PFOS + PFHxS			<b>0.6</b>	<b>1.2</b>	
PFOA			<b>4.8</b>	<b>9.6</b>	