

PFAS Color-Coding Legend and CAS Numbers
Minnesota Pollution Control Agency

Abbreviation		Acid Form	Acid Form CAS No.	Anion Form	Anion Form CAS No.
Short-chain PFCA's	PFBA	Perfluorobutyric acid	375-22-4	Perfluorobutanoate	45048-62-2
	PFPEA	Perfluoropentanoic acid	2706-90-3	Perfluoropentanoate	45167-47-3
	PFHXA	Perfluorohexanoic acid	307-24-4	Perfluorohexanoate	92612-52-7
	PFHPA	Perfluoroheptanoic acid	375-85-9	Perfluoroheptanoate	120885-29-2
Long-chain PFCA's	PFOA	Perfluorooctanoic acid	335-67-1	Perfluorooctanoate	45285-51-6
	PFNA	Perfluorononanoic acid	375-95-1	Perfluorononanoate	72007-68-2
	PFDA	Perfluorodecanoic acid	335-76-2	Perfluorodecanoate	73829-36-4
	PFUNA	Perfluoroundecanoic acid	2058-94-8	Perfluoroundecanoate	196859-54-8
	PFDOA	Perfluorododecanoic acid	307-55-1	Perfluorododecanoate	171978-95-3
	PFTDA	Perfluorotridecanoic acid	72629-94-8	Perfluorotridecanoate	862374-87-6
	PFTEDA	Perfluorotetradecanoic acid	376-06-7	Perfluorotetradecanoate	365971-87-5
Short-chain PFSA's	PFBS	Perfluorobutanesulfonic acid	375-73-5	Perfluorobutanesulfonate	45187-15-3
	PFPEs	Perfluoropentanesulfonic acid	2706-91-4	Perfluoropentanesulfonate	175905-36-9
Long-chain PFSA's	PFHXS	Perfluorohexanesulfonic acid	355-46-4	Perfluorohexanesulfonate	108427-53-8
	PFHPS	Perfluoroheptanesulfonic acid	375-92-8	Perfluoroheptanesulfonate	146689-46-5
	PFOS	Perfluorooctanesulfonic acid	1763-23-1	Perfluorooctanesulfonate	45298-90-6
	PFNS	Perfluorononanesulfonic acid	68259-12-1	Perfluorononanesulfonate	474511-07-4
	PFDS	Perfluorodecanesulfonic acid	335-77-3	Perfluorodecanesulfonate	126105-34-8
	PFDOS	Perfluorododecanesulfonic acid	79780-39-5	Perfluorododecanesulfonate	343629-43-6
Fluorotelomers	4:2 FTS	4:2 fluorotelomersulfonic acid	757124-72-4	4:2 fluorotelomersulfonate	414911-30-1
	6:2 FTS	6:2 fluorotelomersulfonic acid	27619-97-2	6:2 fluorotelomersulfonate	425670-75-3
	8:2 FTS	8:2 fluorotelomersulfonic acid	39108-34-4	8:2 fluorotelomersulfonate	481071-78-7
FOSA, FAISE, FASAMs	PFOSA	Perfluorooctanesulfonamide	754-91-6	NA	NA
	N-MEFOSA	N-Methylperfluorooctanesulfonamide	31506-32-8	NA	NA
	N-ETFOSA	N-Ethylperfluorooctanesulfonamide	4151-50-2	NA	NA
	MEFOSAA	N-Methylperfluorooctanesulfonamidoacetic acid	2355-31-9	N-Methylperfluorooctanesulfonamidoacetate	NA
	ETFOSAA	N-Ethylperfluorooctanesulfonamidoacetic acid	2991-50-6	N-Ethylperfluorooctanesulfonamidoacetate	NA
	N-MEFOSE	N-Methylperfluorooctanesulfonamidoethanol	24448-09-7	NA	NA
	N-ETFOSE	N-Ethylperfluorooctanesulfonamidoethanol	1691-99-2	NA	NA
Replacement Chemistries	HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)propanoic acid	13252-13-6	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)propanoate	122499-17-6
	ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid	919005-14-4	Dodecafluoro-3H-4,8-dioxanonanoate	2127366-90-7
	9CL-PF3ONS	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	756426-58-1	9-chlorohexadecafluoro-3-oxanonane-1-sulfonate	1621485-21-9
	11CL-PF3OUDS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9	11-chloroeicosafluoro-3-oxaundecane-1-sulfonate	2196242-82-5

Appendix F-3
West Lakeland Storage Sites Area
Surface Water PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1
MDH HBV (µg/L)			7.0	NS	NS	NS	0.035	NS	NS	NS	NS	NS	NS	2.0	NS	0.047	NS	0.015
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS
WL1	WL1-WAT-SUR-01-081519	8/15/2019	0.439 J	0.00993	0.011	0.00599	0.0583	0.000904 J	< 0.000734	< 0.000734	< 0.000734	< 0.000734	< 0.000734	0.00363	0.00189	0.00682	0.00122 J	0.157
WL2	WL2-WAT-SUR-01-081519	8/15/2019	0.331 J	0.00984	0.0106	0.00579	0.0581	< 0.000725	0.000789 J	< 0.000725	< 0.000725	< 0.000725	< 0.000725	0.00373	0.00215	0.00731	0.00109 J	0.167
WL2	WL2-WAT-18-21-01-081519	8/15/2019	0.29	< 0.0111	0.0103 J	0.00619 J	0.0517	< 0.00555	< 0.00555	< 0.00555	< 0.00555	< 0.00555	< 0.00555	< 0.00555	< 0.00555	0.00657 J	< 0.00555	0.148
WL3	WL3-WAT-SUR-01-081419	8/14/2019	0.267	< 0.0111	0.0104 J	0.0066 J	0.0586	< 0.00553	< 0.00553	< 0.00553	< 0.00553	< 0.00553	< 0.00553	< 0.00553	< 0.00553	0.00703 J	< 0.00553	0.148
WL3	WL3-WAT-18-21-01-081419	8/14/2019	0.227	< 0.0113	0.0106 J	0.00627 J	0.0543	< 0.00564	< 0.00564	< 0.00564	< 0.00564	< 0.00564	< 0.00564	< 0.00564	< 0.00564	0.00826 J	< 0.00564	0.163
WL5	WL5-WAT-SUR-01-081419	8/14/2019	0.257	< 0.0116	0.0099 J	0.00648 J	0.0579	< 0.00578	< 0.00578	< 0.00578	< 0.00578	< 0.00578	< 0.00578	< 0.00578	< 0.00578	0.00652 J	< 0.00578	0.146
WL6	WL6-WAT-SUR-01-081419	8/14/2019	0.218	< 0.0114	0.00793 J	< 0.00568	0.0565	< 0.00568	< 0.00568	< 0.00568	< 0.00568	< 0.00568	< 0.00568	< 0.00568	< 0.00568	0.0079 J	< 0.00568	0.149
WL6	WL6-WAT-BULK-01-022520	2/25/2020	0.455	0.0129	0.0127	0.00614	0.0513	< 0.00077	< 0.00077	< 0.00077	< 0.00077	< 0.00077	< 0.00077	0.0037	0.00216	0.0077	0.00102 J	0.0808
WL7	WL7-WAT-SUR-01-081419	8/14/2019	0.403 J	0.00886	0.00986	0.00649	0.0656	0.000954 J	< 0.000723	< 0.000723	< 0.000723	< 0.000723	< 0.000723	0.0033	0.00213	0.00988	0.00149	0.169
WL7	WL7-WAT-BULK-01-022520	2/25/2020	0.461	0.0129	0.0129	0.00575	0.0538	0.000837 J	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	0.00389	0.00214	0.00824	0.000961 J	0.081
WL8	WL8-WAT-SUR-01-081419	8/14/2019	0.275	< 0.0116	0.011 J	0.00656 J	0.058	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	0.00917 J	< 0.00579	0.151
WL9	WL9-WAT-SUR-01-081419	8/14/2019	0.433	0.0117	0.0122	0.00708	0.069	0.00112 J	< 0.00075	< 0.00075	< 0.00075	< 0.00075	< 0.00075	0.0038	0.00202	0.0101	0.00158	0.177
WL9	WL9-WAT-SUR-02-081419 (DUP)	8/14/2019	0.385	0.0111	0.0121	0.00629	0.0677	0.0011 J	< 0.000724	< 0.000724	< 0.000724	< 0.000724	< 0.000724	0.00366	0.00193	0.00923	0.000913 J	0.179
WL9	WL9-WAT-SUR-03-081419 (MS/MSD)	8/14/2019	0.173	< 0.0116	0.00908 J	< 0.00579	0.0551	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	0.00637 J	< 0.00579	0.149
WL9	WL9-WAT-BULK-01-022520	2/25/2020	0.422	0.0122	0.0126	0.00583	0.0542	0.000823 J	< 0.000738	< 0.000738	< 0.000738	< 0.000738	< 0.000738	0.00376	0.00235	0.00799	0.000899 J	0.0842
WL9	WL9-WAT-BULK-02-022520 (DUP)	2/25/2020	0.461	0.0128	0.0122	0.00615	0.0524	0.000819 J	< 0.000732	< 0.000732	< 0.000732	< 0.000732	< 0.000732	0.00374	0.00232	0.00884	0.000884 J	0.0807
WL9	WL9-WAT-BULK-03-022520 (MS/MSD)	2/25/2020	0.457	0.0129	0.0126	0.00604	0.0547	< 0.000734	< 0.000734	< 0.000734	< 0.000734	< 0.000734	< 0.000734	0.00403	0.0025	0.00842	0.00103 J	0.0853
WL9	WL9-WAT-SML-01-022520	2/25/2020	0.471	0.0135	0.0136	0.00635	0.053	< 0.00137	< 0.00137	< 0.00137	< 0.00137	< 0.00137	< 0.00137	0.00393	0.00215 J	0.00834	< 0.00137	0.0801
WL9	WL9-WAT-SML-02-022520 (DUP)	2/25/2020	0.428	0.134	0.0124 J	0.00536 J	0.043	< 0.00145	< 0.00145	< 0.00145	< 0.00145	< 0.00145	< 0.00145	0.00388	0.00187 J	0.00662	< 0.00145	0.0558
WL10	WL10-WAT-SUR-01-081319	8/13/2019	0.136	< 0.0115	0.00783 J	0.00614 J	0.0539	< 0.00577	< 0.00577	< 0.00577	< 0.00577	< 0.00577	< 0.00577	< 0.00577	< 0.00577	0.00712 J	< 0.00577	0.156
WL10	WL10-WAT-SUR-01-081419	8/14/2019	0.38	0.0114	0.0122	0.00669	0.0699	0.00121 J	< 0.000791	< 0.000791	< 0.000791	< 0.000791	< 0.000791	0.00407	0.00202	0.00995	0.00155	0.177
WL11	WL11-WAT-SUR-01-081319	8/13/2019	0.36	0.0112	0.0122	0.00729	0.0673	0.00101 J	0.00106 J	< 0.000766	< 0.000766	< 0.000766	< 0.000766	0.00438	0.00245	0.00941	0.00105 J	0.18
WL12	WL12-WAT-SUR-01-081419	8/14/2019	0.249	< 0.0116	0.00989 J	0.00637 J	0.0565	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	< 0.00579	0.00655 J	< 0.00579	0.185
WL12	WL12-WAT-BULK-01-022620	2/26/2020	0.463	0.0129	0.0126	0.00585	0.0549	< 0.000774	< 0.000774	< 0.000774	< 0.000774	< 0.000774	< 0.000774	0.00374	0.00231	0.00829	0.000935 J	0.0761
WL13	WL13-WAT-SUR-01-081419	8/14/2019	0.342 J	0.0101	0.00987	0.00596	0.0577	0.000796 J	< 0.000741	< 0.000741	< 0.000741	< 0.000741	< 0.000741	0.00335	0.00209	0.00851	0.0011 J	0.159
WL14	WL14-WAT-SUR-01-081419	8/14/2019	0.323 J	0.0114	0.0115	0.00702	0.0659	0.000963 J	0.00118 J	< 0.00076	< 0.00076	< 0.00076	< 0.00076	0.00351	0.00237	0.00986	0.00137 J	0.183
WL15	WL15-WAT-SUR-01-081419	8/14/2019	0.285	< 0.0111	0.0122 J	0.00752 J	0.0556	< 0.00554	< 0.00554	< 0.00554	< 0.00554	< 0.00554	< 0.00554	< 0.00554	< 0.00554	0.00844 J	< 0.00554	0.151
WL15	WL15-WAT-BULK-01-022620	2/26/2020	0.46	0.0131	0.0129	0.00638	0.0541	< 0.000983	< 0.000983	< 0.000983	< 0.000983	< 0.000983	< 0.000983	0.00402	0.00247	0.00831	0.00103 J	0.091
WL16	WL16-WAT-SUR-01-081419	8/14/2019	0.389 J	0.0131	0.013	0.00752	0.0739	0.00114 J	0.000963 J	< 0.000762	< 0.000762	< 0.000762	< 0.000762	0.0038	0.0021	0.0103	0.00179	0.169
WL17	WL17-WAT-SUR-01-081319	8/13/2019	0.42 J	0.0127	0.0128	0.00772	0.0758	0.000868 J	0.00114 J	< 0.00073	< 0.00073	< 0.00073	< 0.00073	0.00436	0.0022	0.0103	0.00163	0.185
WL18	WL18-WAT-SUR-01-081519	8/15/2019	0.43 J	0.0119	0.0123	0.00733	0.0697	0.00118 J	< 0.000719	< 0.000719	< 0.000719	< 0.000719	< 0.000719	0.0039	0.0026	0.0098	0.00136 J	0.17
WL18	WL18-WAT-BULK-01-022620	2/26/2020	0.449	0.0131	0.0125	0.00652	0.0559	0.000886 J	0.000874 J	< 0.00073	< 0.00073	< 0.00073	< 0.00073	0.00384	0.00233	0.00859	0.00114 J	0.11
WL19	WL19-WAT-SUR-01-081519	8/15/2019	0.303	0.0102	0.0114	0.00644	0.0566	0.000948 J	< 0.00076	< 0.00076	< 0.00076	< 0.00076	< 0.00076	0.00398	0.00196	0.00938	0.00128 J	0.142
WL20	WL20-WAT-SUR-01-081519	8/15/2019	0.203	< 0.0113	0.00851 J	0.00572 J	0.0495	< 0.00566	< 0.00566	< 0.00566	< 0.00566	< 0.00566	< 0.00566	< 0.00566	< 0.00566	0.0074 J	< 0.00566	0.166

Notes:
MDH - Minnesota Department of Health
HBV - Health-Based Values
NS - No standard
All results are shown in parts per billion (ppb) or µg/L
Result is in exceedance of MDH HBV
Bold - Result is above the laboratory minimum reporting limit.
J - estimated concentration
< 0.0002 - Concentration is less than laboratory reportable limit
DUP - duplicate sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate
SML - Surface Microlayer

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFASs
Long-chain PFASs
Fluorotelomers
FOSA, FASE, FASAAAs
Replacement Chemistries

**Appendix F-4
Valley Branch and Afton Area
Surface Water PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1
MDH HBV (µg/L)			7.0	NS	NS	NS	0.035	NS	NS	NS	NS	NS	NS	2.0	NS	0.047	NS	0.015
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS
VB2	VB2-WAT-BULK-01-022620	2/26/2020	0.229	0.00776	0.00382 J	0.00163 J	0.0123	< 0.000754	< 0.000754	< 0.000754	< 0.000754	< 0.000754	< 0.000754	0.00249	0.000935 J	0.00369	< 0.000754	0.0134

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Yellow Result is in exceedance of MDH HBV

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Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluorotelomers
FOSA, FASE, FASAAs
Replacement Chemistrie

Appendix F-4
Valley Branch and Afton Area
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CAS Number			68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MDH HBV (µg/L)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
VB2	VB2-WAT-BULK-01-022620	2/26/2020	< 0.000754	< 0.000754	< 0.000754	< 0.00302	< 0.00272	< 0.00302	< 0.000754	< 0.000867	< 0.00189	< 0.000754	< 0.000754	< 0.00754	< 0.00566	< 0.00302	< 0.00302	< 0.00302	< 0.00302

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Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSAAs
Long-chain PFSAAs
Fluortelomers
FOSA, FASE, FASAAAs
Replacement Chemistries

**Appendix F-5
Other Locations
Surface Water PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1
MDH HBV (µg/L)			7.0	NS	NS	NS	0.035	NS	NS	NS	NS	NS	NS	2.0	NS	0.047	NS	0.015
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS
GL1	GL1-WAT-BULK-01-051220	5/12/2020	0.0306	0.00265 J	0.00183 J	0.00128 J	< 0.00471	< 0.00073	< 0.00073	< 0.00073	< 0.00073	< 0.00073	< 0.00073	< 0.00073	< 0.00073	< 0.00073	0.00073	0.00302

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Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluortelomers
FOA, FASE, FASAA
Replacement Chemistries

**Appendix F-5
Other Locations
Surface Water PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MDH HBV (µg/L)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
GL1	GL1-WAT-BULK-01-051220	5/12/2020	< 0.00073	< 0.00073	< 0.00073	< 0.00292	< 0.00263	< 0.00292	< 0.00073	< 0.000839	< 0.00182	< 0.00073	< 0.00073	< 0.0073	< 0.00547	< 0.00277	< 0.00292	< 0.00292	< 0.00292

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Long-chain PFASs
Fluorotelomers
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Appendix G-3
West Lakeland Storage Sites Area
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1	
MPCA SDCV - 5 days/week (µg/kg)			87,000	NS	NS	NS	540	NS	NS	NS	NS	NS	NS	13,000	NS	290	NS	93	
MPCA SDCV - 2 days/week (µg/kg)			310,000	NS	NS	NS	1,900	NS	NS	NS	NS	NS	NS	46,000	NS	1,000	NS	330	
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS	
WL2	WL2-SED-0-6-01-081519	8/15/2019	< 0.286	< 0.143	< 0.0714	< 0.0714	< 0.0714	0.11 J	< 0.0714	0.074 J	< 0.0714	< 0.0714	< 0.0714	< 0.0714	< 0.0714	< 0.0714	< 0.0714	< 0.0714	0.83
WL3	WL3-SED-0-6-01-082719	8/27/2019	< 0.298	< 0.149	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	< 0.0746	2.86
WL5	WL5-SED-0-6-01-081419	8/14/2019	< 0.304	< 0.152	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	< 0.0759	1.05
WL6	WL6-SED-0-6-01-081419	8/14/2019	0.361 J	< 0.152	< 0.0762	< 0.0762	0.221	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	< 0.0762	4.81
WL7	WL7-SED-0-6-01-081419	8/14/2019	< 0.276	< 0.138	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	< 0.0689	1.1
WL9	WL9-SED-0-6-01-081419	8/14/2019	< 0.296	< 0.148	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	0.917
WL9	WL9-SED-0-6-02-081419 (DUP)	8/14/2019	< 0.296	< 0.148	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	< 0.0741	0.66
WL9	WL9-SED-0-6-03-081419 (MS/MSD)	8/14/2019	< 0.313	< 0.156	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	< 0.0783	0.61
WL10	WL10-SED-0-6-01-081319	8/13/2019	< 0.266	< 0.133	< 0.0665	< 0.0665	0.125 J	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	< 0.0665	3.18
WL11	WL11-SED-0-6-01-081319	8/13/2019	< 0.31	< 0.155	< 0.0775	< 0.0775	0.092 J	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	< 0.0775	1.14
WL12	WL12-SED-0-6-01-081419	8/14/2019	< 0.295	< 0.148	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	< 0.0739	0.939
WL13	WL13-SED-0-6-01-081419	8/14/2019	< 0.312	< 0.156	< 0.0781	< 0.0781	0.106 J	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	< 0.0781	2.04
WL14	WL14-SED-0-6-01-081419	8/14/2019	< 0.3	< 0.15	< 0.075	< 0.075	0.203	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	3.82
WL15	WL15-SED-0-6-01-081419	8/14/2019	< 0.317	< 0.159	< 0.0793	< 0.0793	0.137 J	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	< 0.0793	3.17
WL17	WL17-SED-0-6-01-081319	8/13/2019	< 0.295	< 0.148	< 0.0738	< 0.0738	0.081 J	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	< 0.0738	1.7

Notes:
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Bold - Result is above the laboratory minimum reporting limit.
J - estimated concentration
< 0.0002 - Concentration is less than laboratory reportable limit
DUP - duplicate sample
MS/MSD - Matrix Spike and Spike Duplicate

Short-chain PFCA's
Long-chain PFCA's
Short-chain PFSA's
Long-chain PFSA's
Fluorotelomers
FOSA, FASE, FASAA's
Replacement Chemistries

Appendix G-3
West Lakeland Storage Sites Area
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number			68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MPCA SDCV - 5 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MPCA SDCV - 2 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
WL2	WL2-SED-0-6-01-081519	8/15/2019	< 0.0714	< 0.0714	< 0.0714	< 0.286	< 0.257	< 0.286	< 0.0714	< 0.0822	< 0.179	< 0.0714	< 0.0714	< 0.714	< 0.536	< 0.286	< 0.286	< 0.286	< 0.286
WL3	WL3-SED-0-6-01-082719	8/27/2019	< 0.0746	< 0.0746	< 0.0746	< 0.298	< 0.269	< 0.298	< 0.0746	< 0.0858	< 0.187	< 0.0746	0.081 J	< 0.746	< 0.56	< 0.298	< 0.298	< 0.298	< 0.298
WL5	WL5-SED-0-6-01-081419	8/14/2019	< 0.0759	< 0.0759	< 0.0759	< 0.304	< 0.273	< 0.304	< 0.0759	< 0.0873	< 0.19	< 0.0759	< 0.0759	< 0.759	< 0.569	< 0.304	< 0.304	< 0.304	< 0.304
WL6	WL6-SED-0-6-01-081419	8/14/2019	< 0.0762	< 0.0762	< 0.0762	< 0.305	< 0.274	< 0.305	< 0.0762	< 0.0877	< 0.191	< 0.0762	< 0.0762	< 0.762	< 0.572	< 0.305	< 0.305	< 0.305	< 0.305
WL7	WL7-SED-0-6-01-081419	8/14/2019	< 0.0689	< 0.0689	< 0.0689	< 0.276	< 0.248	< 0.276	< 0.0689	< 0.0792	< 0.172	< 0.0689	< 0.0689	< 0.689	< 0.517	< 0.276	< 0.276	< 0.276	< 0.276
WL9	WL9-SED-0-6-01-081419	8/14/2019	< 0.074	< 0.074	< 0.074	< 0.296	< 0.266	< 0.296	< 0.074	< 0.0851	< 0.185	< 0.074	< 0.074	< 0.74	< 0.555	< 0.296	< 0.296	< 0.296	< 0.296
WL9	WL9-SED-0-6-02-081419 (DUP)	8/14/2019	< 0.0741	< 0.0741	< 0.0741	< 0.296	< 0.267	< 0.296	< 0.0741	< 0.0852	< 0.185	< 0.0741	< 0.0741	< 0.741	< 0.556	< 0.296	< 0.296	< 0.296	< 0.296
WL9	WL9-SED-0-6-03-081419 (MS/MSD)	8/14/2019	< 0.0783	< 0.0783	< 0.313	< 0.282	< 0.313	< 0.0783	< 0.09	< 0.196	< 0.0783	< 0.0783	< 0.782	< 0.587	< 0.313	< 0.313	< 0.313	< 0.313	< 0.313
WL10	WL10-SED-0-6-01-081319	8/13/2019	< 0.0665	< 0.0665	< 0.0665	< 0.266	< 0.239	< 0.266	< 0.0665	< 0.0765	< 0.166	< 0.0665	< 0.0665	< 0.665	< 0.499	< 0.266	< 0.266	< 0.266	< 0.266
WL11	WL11-SED-0-6-01-081319	8/13/2019	< 0.0775	< 0.0775	< 0.0775	< 0.31	< 0.558	< 0.31	< 0.0775	< 0.0892	< 0.194	< 0.0775	< 0.155	< 0.775	< 0.582	< 0.31	< 0.31	< 0.31	< 0.31
WL12	WL12-SED-0-6-01-081419	8/14/2019	< 0.0739	< 0.0739	< 0.0739	< 0.295	< 0.266	< 0.295	< 0.0739	< 0.085	< 0.185	< 0.0739	< 0.0739	< 0.739	< 0.554	< 0.295	< 0.295	< 0.295	< 0.295
WL13	WL13-SED-0-6-01-081419	8/14/2019	< 0.0781	< 0.0781	< 0.0781	< 0.312	< 0.281	< 0.312	< 0.0781	< 0.0898	< 0.195	< 0.0781	< 0.0781	< 0.781	< 0.586	< 0.312	< 0.312	< 0.312	< 0.312
WL14	WL14-SED-0-6-01-081419	8/14/2019	< 0.075	< 0.075	< 0.075	< 0.3	< 0.27	< 0.3	< 0.075	< 0.0862	< 0.187	< 0.075	< 0.075	< 0.75	< 0.562	< 0.3	< 0.3	< 0.3	< 0.3
WL15	WL15-SED-0-6-01-081419	8/14/2019	< 0.0793	< 0.0793	< 0.0793	< 0.317	< 0.286	< 0.317	< 0.0793	< 0.0912	< 0.198	< 0.0793	< 0.0793	< 0.793	< 0.595	< 0.317	< 0.317	< 0.317	< 0.317
WL17	WL17-SED-0-6-01-081319	8/13/2019	< 0.0738	< 0.0738	< 0.0738	< 0.295	< 0.266	< 0.295	< 0.0738	< 0.0849	< 0.185	< 0.0738	< 0.0738	< 0.738	< 0.554	< 0.295	< 0.295	< 0.295	< 0.295

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Short-chain PFCAs
Long-chain PFCAs
Short-chain PFASs
Long-chain PFASs
Fluorotelomers
FOSA, FASE, FASAAs
Replacement Chemistries

**Appendix G-4
Valley Branch Creek and Afton Area
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1
MPCA SDCV - 5 days/week (µg/kg)			87,000	NS	NS	NS	540	NS	NS	NS	NS	NS	NS	13,000	NS	290	NS	93
MPCA SDCV - 2 days/week (µg/kg)			310,000	NS	NS	NS	1,900	NS	NS	NS	NS	NS	NS	46,000	NS	1,000	NS	330
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS
VB1	VB1-SED-COMP-0-6-01-042720	4/27/2020	<0.32	<0.16	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
VB3	VB3-SED-COMP-0-6-01-042720	4/27/2020	1.49	0.191 J	0.117 J	<0.0787	0.781	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	<0.0787	1.37
VB3	VB3-SED-COMP-0-6-02-042720 (DUP)	4/27/2020	0.74	<0.142	<0.0711	<0.0711	0.408	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	<0.0711	0.862
VB3	VB3-SED-COMP-0-6-03-042720 (MS/MSD)	4/27/2020	0.787	<0.152	<0.0762	<0.0762	0.329	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762	0.852

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< 0.0002 - Concentration is less than laboratory reportable limit
DUP - duplicate sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSAs
Long-chain PFSAs
Fluorotelomers
FOSA, FASE, FASAAs
Replacement Chemistries

Appendix G-4
Valley Branch Creek and Afton Area
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number			68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MPCA SDCV - 5 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MPCA SDCV - 2 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
VB1	VB1-SED-COMP-0-6-01-042720	4/27/2020	<0.08	<0.08	<0.08	<0.32	<0.288	<0.32	<0.08	<0.092	<0.2	0.081 J	<0.08	<0.8	<0.6	<0.304	<0.32	<0.32	<0.32
VB3	VB3-SED-COMP-0-6-01-042720	4/27/2020	<0.0787	<0.0787	<0.0787	<0.315	<0.325	<0.315	<0.0787	<0.0905	<0.197	<0.0787	<0.0787	<0.787	<0.59	<0.299	<0.315	<0.315	<0.315
VB3	VB3-SED-COMP-0-6-02-042720 (DUP)	4/27/2020	<0.0711	<0.0711	<0.0711	<0.285	<0.288	<0.285	<0.0711	<0.0818	<0.178	<0.0711	<0.0711	<0.711	<0.534	<0.27	<0.285	<0.285	<0.285
VB3	VB3-SED-COMP-0-6-03-042720 (MS/MSD)	4/27/2020	<0.0762	<0.0762	<0.0762	<0.305	<0.274	<0.305	<0.0762	<0.0876	<0.19	<0.0762	<0.0762	<0.762	<0.571	<0.289	<0.305	<0.305	<0.305

Notes:
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J - estimated concentration
< 0.0002 - Concentration is less than laboratory reportable limit
DUP - duplicate sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFASs
Long-chain PFASs
Fluorotelomers
FOSA, FASE, FASAs
Replacement Chemistries

**Appendix G-5
Other Locations
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

MPCA SDCV - 5 days/week (µg/kg)			87,000	NS	NS	NS	540	NS	NS	NS	NS	NS	NS	13,000	NS	290	NS	93	
MPCA SDCV - 2 days/week (µg/kg)			310,000	NS	NS	NS	1,900	NS	NS	NS	NS	NS	NS	46,000	NS	1,000	NS	330	
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS	
GL1	GL1-SED-0-6-01-051220	5/12/2020	<0.321	<0.16	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	<0.0802	0.121 J
BP1	BP1-SED-0-6-01-042720	4/27/2020	<0.318	<0.159	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	<0.0796	0.18
FC1	FC1-SED-0-3-01-042320	4/23/2020	0.463 J	<0.162	<0.0812	<0.0812	0.145 J	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	<0.0812	0.854

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Short-chain PFCAs
Long-chain PFCAs
Short-chain PFASs
Long-chain PFASs
Fluorotelomers
FOSA, FASE, FASAAs
Replacement Chemistries

**Appendix G-5
Other Locations
Sediment PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

MPCA SDCV - 5 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
MPCA SDCV - 2 days/week (µg/kg)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
GL1	GL1-SED-0-6-01-051220	5/12/2020	<0.0802	<0.0802	<0.0802	<0.321	<0.289	<0.321	<0.0802	<0.0922	<0.2	<0.0802	<0.0802	<0.802	<0.601	<0.305	<0.321	<0.321	<0.321
BP1	BP1-SED-0-6-01-042720	4/27/2020	<0.0796	<0.0796	<0.0796	<0.318	<0.335	<0.318	<0.0796	<0.0916	<0.199	<0.0796	<0.0796	<0.796	<0.597	<0.303	<0.318	<0.318	<0.318
FC1	FC1-SED-0-3-01-042320	4/23/2020	<0.0812	<0.0812	<0.0812	<0.325	<0.292	<0.325	<0.0812	<0.0934	<0.203	<0.0812	<0.0812	<0.812	<0.609	<0.309	<0.325	<0.325	<0.325

Notes:
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Short-chain PFCAs
Long-chain PFCAs
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Replacement Chemistries

Appendix H
Historic Raleigh Creek Surface Water PFAS Analytical Results (2006 - 2020)
Project 1007
Minnesota Pollution Control Agency

MDH Location ID	Weston Location ID (1)	AECOM Location ID	Sample Date	PFBA (µg/L)	PFOA (µg/L)	PFBS (µg/L)	PFOS (µg/L)	PFPeA (µg/L)	PFHxA (µg/L)	PFHxS (µg/L)
CAS Number				375-22-4	335-67-1	375-73-5	1763-23-1	2706-90-3	307-24-4	355-46-4
MDH HBV (µg/L)				7.000	0.035	2.0	0.015	NS	NS	0.047
SW-1			6/1/2006	5.900	8.00	0.2	8.00	0.50	1.10	0.60
SW-1			6/20/2006	3.900	4.10	0.2	8.00	< 1	0.80	0.30
	SW01		11/17/2010	0.782	1.43	NA	4.00	NA	NA	NA
	SW01		3/13/2012	0.860	0.847	0.029	3.92	NA	NA	NA
	SW01		6/13/2013	0.630	1.97	0.056	6.63	NA	NA	NA
	SW01		6/14/2014	0.586	2.00	0.048	6.39	NA	NA	NA
	SW01		8/22/2014	0.437	0.425	0.027	1.71	NA	NA	NA
	SW01		3/23/2015	NS	NS	NS	NS	NA	NA	NA
	SW01		6/16/2015	0.549	1.21	0.031	4.43	NA	NA	NA
	SW01		9/1/2015	0.414	1.01	< 0.025	4.99	NA	NA	NA
	SW01		11/20/2015	0.727	1.90	0.048	4.54	NA	NA	NA
	SW01		11/3/2016	0.798	1.55	0.063	3.47	NA	NA	NA
SW-1			7/28/2017	0.210	0.37	0.020	1.40	0.02	0.037	0.035
	SW01		11/2/2017	0.700	0.967	0.036	3.04	0.053	0.093	0.093
	SW01		10/22/2018	0.774	1.220	0.044	3.16	0.055	0.146	0.124
		RC3	8/12/2019	0.412	0.832	0.025	3.9	0.041	0.077	0.087
		RC3	8/14/2019	0.300	0.548	0.016	2.466	0.027	0.052	0.059
	SW01		10/17/2019	0.439	0.921	0.033	2.63	NA	NA	0.086
		RC3	2/24/2020	0.904	1.68	0.0614	2.94	0.105	0.225	0.171
SW-3			6/20/2006	2.800	2.30	< 0.5	2.80	< 1	0.500	0.20
	SW12		11/17/2010	0.805	1.17	NA	2.35	NA	NA	NA
	SW12		3/13/2012	0.435	0.361	< 0.025	1.17	NA	NA	NA
	SW12		6/13/2013	0.545	1.16	0.036	3.38	NA	NA	NA
	SW12		6/14/2014	0.726	1.69	0.047	5.44	NA	NA	NA
	SW12		8/22/2014	0.868	0.791	0.033	3.10	NA	NA	NA
	SW12		3/23/2015	0.806	0.572	< 0.025	1.47	NA	NA	NA
	SW12		6/16/2015	0.650	1.02	< 0.025	3.52	NA	NA	NA
	SW12		9/1/2015	0.658	0.866	< 0.025	3.02	NA	NA	NA
	SW12		11/20/2015	0.709	1.75	0.046	3.52	NA	NA	NA
	SW12		11/3/2016	0.684	0.992	0.037	2.4	NA	NA	NA
SW-3			7/28/2017	0.800	0.650	0.028	2.4	0.049	0.11	0.067
	SW12		11/2/2017	0.601	0.593	< 0.025	1.69	0.034	0.085	0.067
	SW12		10/22/2018	0.675	0.878	0.03	2.12	< 0.05	0.119	0.085
		RC5	8/12/2019	0.404	0.395	0.015	1.992	0.026	0.061	0.043
	SW12		10/17/2019	0.396	0.650	0.028	1.910	NA	NA	0.053
		RC5	2/24/2020	0.764	0.949	0.034	1.400	0.066	0.141	0.093
SW-4			6/20/2006	2.200	2.300	< 0.5	5.00	< 1	0.50	0.20
	SW13		11/17/2010	0.761	1.00	NA	2.00	NA	NA	NA
	SW13		3/13/2012	0.323	0.257	< 0.025	0.933	NA	NA	NA
	SW13		6/13/2013	0.434	0.821	< 0.025	2.88	NA	NA	NA
	SW13		6/14/2014	0.666	1.53	0.041	4.76	NA	NA	NA
	SW13		8/22/2014	0.684	0.728	0.030	2.81	NA	NA	NA
	SW13		3/23/2015	NS	NS	NS	NS	NA	NA	NA
	SW13		6/16/2015	0.562	0.974	< 0.025	3.92	NA	NA	NA
	SW13		9/1/2015	0.580	0.817	< 0.025	3.11	NA	NA	NA
	SW13		11/20/2015	0.597	1.36	0.037	2.72	NA	NA	NA
	SW13		11/3/2016	0.569	0.820	0.033	2.35	NA	NA	NA
SW-4			7/28/2017	0.450	0.620	0.027	3.40	0.037	0.082	0.065
	SW13		11/2/2017	0.571	0.641	0.025	2.13	< 0.025	0.062	0.070
	SW13		10/22/2018	0.537	0.679	0.027	1.86	< 0.05	0.101	0.070
		RC7	8/12/2019	0.350	0.347	0.015	1.91	0.022	0.046	0.037
		RC7	8/14/2019	0.158	0.184	0.006	1.538	0.012	0.022	0.018
	SW13		10/17/2019	0.296	0.486	< 0.0250	1.680	NA	NA	0.039
		RC7A	2/24/2020	0.659	0.880	0.033	1.370	0.058	0.135	0.085
SW-6			8/29/2006	1.400	1.900	< 0.5	5.20	< 1	0.20	< 0.5
	SW14		11/17/2010	0.644	0.779	NA	1.54	NA	NA	NA
	SW14		3/13/2012	0.166	0.012	< 0.025	0.965	NA	NA	NA
	SW14		6/13/2013	0.294	0.341	< 0.025	1.16	NA	NA	NA
	SW14		6/14/2014	0.540	1.17	0.037	3.91	NA	NA	NA
	SW14		8/22/2014	NS	NS	NS	NS	NA	NA	NA
	SW14		3/23/2015	NS	NS	NS	NS	NA	NA	NA

**Appendix H
Historic Raleigh Creek Surface Water PFAS Analytical Results (2006 - 2020)
Project 1007
Minnesota Pollution Control Agency**

MDH Location ID	Weston Location ID (1)	AECOM Location ID	Sample Date	PFBA (µg/L)	PFOA (µg/L)	PFBS (µg/L)	PFOS (µg/L)	PFPeA (µg/L)	PFHxA (µg/L)	PFHxS (µg/L)
CAS Number				375-22-4	335-67-1	375-73-5	1763-23-1	2706-90-3	307-24-4	355-46-4
MDH HBV (µg/L)				7.000	0.035	2.0	0.015	NS	NS	0.047
	SW14		6/16/2015	NS	NS	NS	NS	NA	NA	NA
	SW14		9/1/2015	NS	NS	NS	NS	NA	NA	NA
	SW14		11/20/2015	0.569	1.31	0.038	2.56	NA	NA	NA
	SW14		11/3/2016	NS	NS	NS	NS	NA	NA	NA
	SW14		11/2/2017	0.202	< 0.048	< 0.025	< 0.0928	< 0.025	< 0.025	< 0.025
	SW14		10/22/2018	0.460	0.664	0.028	1.82	< 0.05	0.091	0.069
		RC10	8/12/2019	0.175	0.1371	0.01144	1.07	0.012	0.023	0.025
	SW14		10/17/2019	0.266	0.345	<0.025	1.34	NA	NA	0.027
SW-7			9/25/2006	0.200	< 1	< 0.5	0.20	< 1	< 1	< 0.5
	SW15		11/17/2010	0.570	0.686	NA	1.33	NA	NA	NA
	SW15		3/13/2012	0.132	0.079	< 0.025	0.591	NA	NA	NA
	SW15		6/13/2013	0.309	0.586	< 0.025	2.18	NA	NA	NA
	SW15		6/14/2014	NS	NS	NS	NS	NA	NA	NA
	SW15		8/22/2014	NS	NS	NS	NS	NA	NA	NA
	SW15		3/23/2015	NS	NS	NS	NS	NA	NA	NA
	SW15		6/16/2015	NS	NS	NS	NS	NA	NA	NA
	SW15		9/1/2015	NS	NS	NS	NS	NA	NA	NA
	SW15		11/20/2015	0.524	1.20	0.032	2.04	NA	NA	NA
	SW15		11/3/2016	NS	NS	NS	NS	NA	NA	NA
SW-7			7/23/2017	0.092	0	0	0.027	0.011	0	0
	SW15		11/2/2017	NS	NS	NS	NS	NS	NS	NS
	SW15		10/22/2018	NS	NS	NS	NS	NS	NS	NS
		RC13	8/12/2019	0.189	0.103	0.011	0.964	0.009	0.016	0.023
	SW15		10/17/2019	0.319	0.345	<0.025	1.240	NA	NA	0.027
	SW-8		9/25/2006	0.2	< 1	< 0.5	< 1	< 1	< 1	< 0.5
		RC14	8/12/2019	0.11	0.00807	0.00194	0.00187	0.00522	0.00449	0.00333
		RC14	2/24/2020	0.09	0.00732	0.00262	0.00203	0.00632	0.00427	0.00315
SW-2			6/1/2006	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
SW-2			9/25/2006	< 1	< 1	< 0.5	0.2	< 1	< 1	< 0.5
	SW16		11/17/2010	0.553	0.626	NA	1.22	NA	NA	NA
	SW16		3/13/2012	0.098	0.041	< 0.025	0.388	NA	NA	NA
	SW16		6/13/2013	0.197	0.261	< 0.025	0.950	NA	NA	NA
	SW16		6/14/2014	0.085	< 0.024	< 0.025	< 0.0232	NA	NA	NA
	SW16		8/22/2014	0.076	< 0.024	< 0.025	< 0.0232	NA	NA	NA
	SW16		3/23/2015	NS	NS	NS	NS	NA	NA	NA
	SW16		6/16/2015	NS	NS	NS	NS	NA	NA	NA
	SW16		9/1/2015	< 0.1	< 0.024	< 0.025	< 0.0232	NA	NA	NA
	SW16		11/20/2015	0.261	0.370	< 0.025	0.722	NA	NA	NA
	SW16		11/3/2016	0.076	< 0.024	< 0.025	< 0.0232	NA	NA	NA
	SW16		11/2/2017	0.109	< 0.048	< 0.025	< 0.0928	< 0.025	< 0.025	< 0.025
	SW16		10/22/2018	0.109	< 0.024	< 0.025	< 0.0464	< 0.05	< 0.025	< 0.025
		RC17	8/12/2019	0.0879	0.0080	0.0021	0.0020	0.0053	0.0040	0.0029
		RC17 (DUP)	8/12/2019	0.0974	0.0082	0.0020	0.0016	0.0054	0.0038	0.0030
		RC17	8/14/2019	0.1941	0.09502	0.005237	0.7019	0.009877	0.01416	0.01211
	SW16		10/17/2019	0.083	<0.048	<0.025	0.0538	NA	NA	<0.025
		RC17A	2/24/2020	0.0878	0.00746	0.00263	0.00191	0.00633	0.00443	0.00306
		RC17A (DUP)	2/24/2020	0.089	0.00771	0.00267	0.00236	0.00633	0.00455	0.00325

Notes:

Bold = Result is above the laboratory minimum reporting limit
 DUP = duplicate sample
 µg/L = micrograms per liter or parts per billion (ppb)
 < 0.0002 = Concentration is less than laboratory reportable limit
 NA = Data not available
 NS = Not sampled
 D = dilution data
 J = estimated concentration less than laboratory reportable limit
 MDH = Minnesota Department of Health
 HBV = Health-Based Values
 (1) Weston 3M PFAS values shown are the arithmetic mean (average) of the primary and duplicate sample collected at each location.
 (2) MDH HBVs are not established for PFPeA or PFHxA
 (3) Samples collected prior to 2019 were collected either by MDH or Weston.

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSAs
Long-chain PFSAs
Fluortelomers
FOSA, FASE, FASAAAs
Replacement Chemistries

AECOM Location ID	Weston Location ID
RC3	SW01
RC5	SW12
RC7/RC7A	SW13
RC10	SW14
RC13	SW15
RC17	SW16

Appendix I
 Surface Water, Water Quality Analytical Results
 Six-Month Investigation Progress Report (November 11, 2019 - May 15, 2020)
 Project 1007
 Minnesota Pollution Control Agency

Location ID	Sample ID	Sample Date	Alkalinity (1)	BOD	Chloride	Bromide	Phosphorous	Fluoride	Nitrate as N	pH	Sulfate	Total Dissolved Solids	Total Organic Carbon	Total Suspended Solids	Turbidity (2)	Iron	Magnesium	Potassium	Calcium	Zinc	Sodium
EP11	EP11-WAT-BULK-02-022520 (DUP)	2/25/2020	NA	NA	42.5	NA	NA	NA	NA	NA	NA	262	4.2	NA	NA	NA	NA	NA	NA	NA	NA
EP11	EP11-WAT-BULK-01-022520	2/25/2020	NA	NA	42.3	NA	NA	NA	NA	NA	NA	259	4.4	NA	NA	NA	NA	NA	NA	NA	NA
EP16	EP16-WAT-BULK-01-022520	2/25/2020	NA	NA	69.2	NA	NA	NA	NA	NA	NA	292	5.2	NA	NA	NA	NA	NA	NA	NA	NA
EP19	EP19-WAT-BULK-01-022520	2/25/2020	NA	NA	108	NA	NA	NA	NA	NA	NA	345	7.5	NA	NA	NA	NA	NA	NA	NA	NA
EP20	EP20-WAT-BULK-01-022520	2/25/2020	NA	NA	99.4	NA	NA	NA	NA	NA	NA	397	4.8	NA	NA	NA	NA	NA	NA	NA	NA
WL6	WL6-WAT-BULK-01-022520	2/25/2020	NA	NA	68.5	NA	NA	NA	NA	NA	NA	312	5	NA	NA	NA	NA	NA	NA	NA	NA
WL7	WL7-WAT-BULK-01-022520	2/25/2020	NA	NA	69	NA	NA	NA	NA	NA	NA	303	5	NA	NA	NA	NA	NA	NA	NA	NA
WL9	WL9-WAT-BULK-02-022520 (DUP)	2/25/2020	NA	NA	71.3	NA	NA	NA	NA	NA	NA	313	5.0	NA	NA	NA	NA	NA	NA	NA	NA
WL9	WL9-WAT-BULK-01-022520	2/25/2020	NA	NA	55.3	NA	NA	NA	NA	NA	NA	312	4.9	NA	NA	NA	NA	NA	NA	NA	NA
WL9	WL9-WAT-BULK-03-022520 (MS/MSD)	2/25/2020	NA	NA	70.5	NA	NA	NA	NA	NA	NA	299	5.0	NA	NA	NA	NA	NA	NA	NA	NA
WL12	WL12-WAT-BULK-01-022620	2/26/2020	NA	NA	69.8	NA	NA	NA	NA	NA	NA	304	4.9	NA	NA	NA	NA	NA	NA	NA	NA
WL15	WL15-WAT-BULK-01-022620	2/26/2020	NA	NA	73.8	NA	NA	NA	NA	NA	NA	297	4.9	NA	NA	NA	NA	NA	NA	NA	NA
WL18	WL18-WAT-BULK-01-022620	2/26/2020	NA	NA	86.0	NA	NA	NA	NA	NA	NA	316	5.2	NA	NA	NA	NA	NA	NA	NA	NA
VB2	VB2-WAT-BULK-01-022620	2/26/2020	NA	NA	46.3	NA	NA	NA	NA	NA	NA	344	1.3	NA	NA	NA	NA	NA	NA	NA	NA
EP21B	EP21-WAT-BULK-01-050520	5/5/2020	161	NA	38.0	<0.090	<0.10	<0.10	<0.020	8.0	5.3	239	4.4	<10.0	1.8	<0.05	17.9	1.78	44.3	<0.0050	18.3
EP18	EP18-WAT-BULK-01-051220	5/12/2020	95.4	NA	91.6	<0.090	<0.10	<0.10	<0.020	7.8	2.5	275	7.6	<10.0	2.1	0.196	11.2	2.15	32.9	<0.0050	53.1
GL1	GL1-WAT-BULK-01-051220	5/12/2020	32.6	NA	35.3	<0.090	<0.10	<0.10	<0.020	7.2	<2.0	122	10.6	22	10.5	0.162	3.11	3.7	6.67	<0.0050	27.4
RC22	RC22-WAT-BULK-01-051420	5/14/2020	166.0	NA	NA	NA	NA	NA	NA	7.8	NA	648	6.4	<10.0	2	NA	NA	NA	NA	NA	NA
RC23	RC23-WAT-BULK-01-051420	5/14/2020	132.0	NA	NA	NA	NA	NA	NA	7.7	NA	606	7.1	<10.0	2.2	NA	NA	NA	NA	NA	NA

Notes:

All results are shown in mg/L except pH which is unitless.

(1) Alkalinity is reported as total CaCO3

(2) Turbidity is reported in Nephelometric Turbidity Units (NTU)

* = Duplicate sample labeled as primary sample on separate Chain of Custody

** = Sample not analyzed

mg/L - milligrams per liter or parts per million (ppm)

NA - Parameter not analyzed

ND - Concentration is not detected above the laboratory limit

NS - No standard

BOD - Biological Oxygen Demand

DUP - duplicate sample

**Appendix J
Foam PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1	
MDH HBV (µg/L)			7.0	NS	NS	NS	0.035	NS	NS	NS	NS	NS	NS	2.0	NS	0.047	NS	0.015	
Location ID	Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS	
RC5	RC5-FOAM-01-022420	2/24/2020	0.51	0.0438 J	0.0924 J	0.0905	1.24	0.0394	0.378	0.0217 J	< 0.0108	< 0.0108	< 0.0108	0.0205 J	0.0233	0.0752	0.0788	30.7 D	
RC7	RC7-FOAM-081219	8/12/2019	< 0.311	< 0.155	< 0.0777	< 0.0777	0.658	< 0.0777	1.62	1.93	1.17	< 0.0777	< 0.0777	< 0.0777	< 0.0777	< 0.0777	< 0.0777	40.1	
RC7	RC7-FOAM-081419	8/14/2019	< 32	< 16	< 8	< 8	175	14.7 J	96.5	< 8	< 8	< 8	< 8	< 8	< 8	< 8	24.9	13,800	
RC7A	RC7A-FOAM-01-022420	2/24/2020	< 3.180	< 1.590	< 0.796	< 0.796	5.21	< 0.796	8.2	1.8	< 0.796	< 0.796	< 0.796	< 0.796	< 0.796	< 0.796	< 0.796	531	
RC12	RC12-FOAM-081419	8/14/2019	< 32	< 16	< 8	< 8	16.2 J	11.1 J	72.8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	10,500	
RC17	RC17-FOAM-081419	8/14/2019	< 8	< 4	< 2	< 2	3.75 J	< 2	31.5	3.63 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2,750	
RC17A	RC17A-FOAM-081419	8/14/2019	< 0.316	< 0.158	< 0.0791	< 0.0791	0.504	0.332	5.26	0.401	< 0.0791	< 0.0791	< 0.0791	< 0.0791	< 0.0791	< 0.0791	< 0.0791	0.243	595 D
RC21	RC21-FOAM-01-022420	2/24/2020	0.103	< 0.00872	0.0174 J	0.0599	6.79	7.31	2.88	0.196	0.0237	0.00653 J	< 0.00436	0.00471 J	< 0.00436	1.13	0.642	56.4 D	
RC21	RC21-FOAM-01-042320	4/23/2020	0.0793	< 0.0115	0.00651 J	0.00617 J	0.212	0.184	0.139	0.03	0.00968 J	< 0.00576	< 0.00576	< 0.00576	< 0.00576	0.0353	0.00909 J	1.57	
EP21A	EP21-FOAM-01-042320	4/23/2020	0.897 J	< 0.223	< 0.111	< 0.111	0.521	0.26	2.11	0.331	< 0.111	< 0.111	< 0.111	< 0.111	< 0.111	< 0.111	0.15 J	216 D	
EP21B	EP21-FOAM-01-050520	5/5/2020	0.839 J	< 0.22	< 0.11	< 0.11	1.05	0.999	10.8	0.952	0.125 J	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	0.503	904 D	
EP21B	EP21-FOAM-02-050520 (DUP)	5/5/2020	0.83	< 0.199	< 0.0995	< 0.0995	1.07	1	10.4	1.1	0.144 J	< 0.0995	< 0.0995	< 0.0995	< 0.0995	< 0.0995	0.498	862 D	
WL6	WL6-FOAM-01-022520	2/25/2020	< 3.170	< 1.580	< 0.792	< 0.792	1.54 J	2.73	15.3	0.846 J	< 0.792	< 0.792	< 0.792	< 0.792	< 0.792	< 0.792	1.65	1630 D	

Notes:
MDH - Minnesota Department of Health
HBV - Health-Based Values
NS - No standard
All results are shown in parts per billion (ppb) or µg/L
Result is in exceedance of MDH HBV for drinking water
Bold - Result is above the laboratory minimum reporting limit.
< 0.0002 - Concentration is less than laboratory reportable limit
J - Estimated concentration
D - Dilution data
DUP - duplicate sample
R - peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluorotelomers
FOSA, FASE, FASAA
Replacement Chemistries

**Appendix J
Foam PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency**

CAS Number			68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MDH HBV (µg/L)			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
RC5	RC5-FOAM-01-022420	2/24/2020	0.0416 R	0.0155 J	< 0.0108	< 0.0432	< 0.0389	< 0.0432	2.96	0.0131 J	0.204	0.0274	4.01	< 0.108	< 0.0811	< 0.0411	< 0.0432	< 0.0432	< 0.0432
RC7	RC7-FOAM-081219	8/12/2019	1.1	3.1	< 0.0777	< 0.311	< 0.28	< 0.311	18.8	2.12	5.5	1.18	94.5	< 0.777	< 0.583	< 0.311	< 0.311	< 0.311	< 0.311
RC7	RC7-FOAM-081419	8/14/2019	12.6 J	< 8	< 8	< 32	592	< 32	270	< 9.2	< 20	< 8	263	< 80	< 60	< 32	< 32	< 32	< 32
RC7A	RC7A-FOAM-01-022420	2/24/2020	2.950 R	3.16	< 0.796	< 3.180	< 2.870	< 3.180	103	5.31	54.1	1.320 J	96.4	< 7.960	< 5.970	< 3.020	< 3.180	< 3.180	< 3.180
RC12	RC12-FOAM-081419	8/14/2019	< 8	< 8	< 8	< 32	361 J	< 32	71.1	< 9.2	< 20	< 8	168	< 80	< 60	< 32	< 32	< 32	< 32
RC17	RC17-FOAM-081419	8/14/2019	3.17 J	< 2	< 2	< 8	< 7.2	< 8	51	< 2.3	< 5	2.1 J	92.5	< 20	< 15	< 8	< 8	< 8	< 8
RC17A	RC17A-FOAM-081419	8/14/2019	0.582	0.147 J	< 0.0791	< 0.316	< 0.285	< 0.316	8.78	< 0.0909	0.211 J	0.216	10.6	< 0.791	< 0.593	< 0.316	< 0.316	< 0.316	< 0.316
RC21	RC21-FOAM-01-022420	2/24/2020	< 0.00436	< 0.00436	< 0.00436	< 0.0174	< 0.0157	< 0.0174	0.214	< 0.00501	< 0.0109	0.0315	0.136	< 0.0436	< 0.0327	< 0.0166	< 0.0174	< 0.0174	< 0.0174
RC21	RC21-FOAM-01-042320	4/23/2020	< 0.00576	< 0.00576	< 0.00576	< 0.0231	0.0561 J	< 0.0231	0.0143	< 0.00663	< 0.0144	0.0147	0.0259	< 0.0576	< 0.0432	< 0.0219	< 0.0231	< 0.0231	< 0.0231
EP21A	EP21-FOAM-01-042320	4/23/2020	< 0.111	< 0.111	< 0.111	< 0.445	< 0.401	< 0.445	0.463	< 0.128	< 0.278	< 0.111	1.3	< 1.11	< 0.835	< 0.423	< 0.445	< 0.445	< 0.445
EP21B	EP21-FOAM-01-050520	5/5/2020	< 0.11	< 0.11	< 0.11	< 0.44	< 0.396	< 0.44	0.737	< 0.127	< 0.275	0.365	3.12	< 1.1	< 0.825	< 0.418	< 0.44	< 0.44	< 0.44
EP21B	EP21-FOAM-02-050520 (DUP)	5/5/2020	< 0.0995	< 0.0995	< 0.0995	< 0.398	< 0.358	< 0.398	0.692	< 0.114	< 0.249	0.358	2.81 D	< 0.995	< 0.747	< 0.378	< 0.398	< 0.398	< 0.398
WL6	WL6-FOAM-01-022520	2/25/2020	< 0.792	< 0.792	< 0.792	< 3.170	< 2.850	< 3.170	8.57	< 0.911	< 1.980	< 0.792	8.4	< 7.920	< 5.940	< 3.010	< 3.170	< 3.170	< 3.170

Notes:
MDH - Minnesota Department of Health
HBV - Health-Based Values
NS - No standard
All results are shown in parts per billion (ppb) or µg/L
Result is in exceedance of MDH HBV for drinking water
Bold - Result is above the laboratory minimum reporting limit.
< 0.0002 - Concentration is less than laboratory reportable limit
J - Estimated concentration
D - Dilution data
DUP - duplicate sample
R - peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluorotelomers
FOSA, FASE, FASAA
Replacement Chemistries

Appendix K
Sediment Sampling Event, Cations and CEC Sediment Analytical Results
Project 1007
Minnesota Pollution Control Agency

Location ID	Sample ID	Sample Date	pH	Buffer Index	Organic Matter (OM%)	Soluble Salts	Bray-I Phosphorus	Olsen Phosphorus	Potassium	Calcium	Magnesium	Sodium	Zinc	CEC Summation
RC3	RC3-SED-WET-0-6-01-042520	4/25/2020	7.1	7.4	6.9	0.2	55	14	46	1234	198	139	8	8.5
RC3	RC3-SED-WET-12-18-01-042520	4/25/2020	8	7.4	3.3	0.2	16	6	49	1122	190	541	5.2	9.6
RC3A	RC3A-SED-WET-0-6-01-042520	4/25/2020	6.6	6.8	11.2	0.6	28	24	22	1980	293	431	9.6	16.3
RC5	RC5-SED-0-4-01-042420	4/24/2020	6.4	7	3.1	0.2	22	30	39	1203	178	163	4	8.3
RC5	RC5-SED-4-6-01-042420	4/24/2020	7	7.2	1.8	0.1	26	16	39	1265	189	162	3.2	8.7
RC5	RC5-SED-22-26-01-042420	4/24/2020	7.6	7.4	0.8	0.2	22	12	30	748	125	158	0.6	5.5
RC5	RC5-SED-WET-3-12-01-042420	4/24/2020	7	7.1	11.5	0.2	5	38	40	1983	291	137	11.3	13
RC5	RC5-SED-WET-12-18-01-042420	4/24/2020	7	7.2	1.4	0.2	10	13	57	1490	308	111	2.2	10.6
RC6	RC6-SED-WET-0-6-01-042420	4/24/2020	6.3	6.8	19.7	0.5	13	11	79	1869	329	272	9.6	15.4
RC6	RC6-SED-WET-6-12-01-042420	4/24/2020	7	7.1	4.2	0.3	28	22	80	2262	408	279	11.6	16.1
RC12	RC12-SED-12-18-01-042420	4/24/2020	7.8	7.5	0.9	0.2	4	5	81	1486	343	188	0.2	11.3
RC12	RC12-SED-30-36-01-042420	4/24/2020	7.8	7.3	1	0.2	3	4	102	1942	477	203	0.2	14.8
RC12	RC12-SED-0-6-01-042520	4/25/2020	7.8	7.6	0.9	0.2	26	12	36	903	156	128	2.4	6.4
RC16A	RC16A-SED-WET-0-6-01-043020	4/30/2020	6.3	6.6	5.5	0.2	13	34	76	1288	191	94	1.5	12.6
RC16A	RC16A-SED-WET-6-12-01-043020	4/30/2020	6.4	6.5	5.4	0.2	136	74	97	1530	222	136	1.3	15.4
RC17	RC17-SED-BANK-EAST-0-3-01-042320	4/23/2020	7.7	7.4	3.0	0.1	11	6	107	1278	264	150	1.6	9.5
RC17	RC17-SED-BANK-EAST-3-6-01-042320	4/23/2020	7.4	7.5	2.9	0.1	16	10	65	1410	262	115	2.6	9.9
RC17	RC17-SED-BANK-WEST-0-3-01-042320	4/23/2020	7.5	7.4	2.4	0.1	16	8	63	1320	256	120	1.9	9.4
RC17	RC17-SED-BANK-WEST-3-6-01-042320	4/23/2020	7.3	7.5	2.0	0.1	20	12	62	1248	248	102	1.7	8.9
RC18	RC18-SED-COMP-0-3-01-042320	4/23/2020	7.1	7.5	3.1	0.2	22	11	54	969	176	105	2.1	6.9
RC21	RC21-SED-COMP-0-3-01-042320	4/23/2020	7.8	7.6	0.8	0.1	15	8	55	1006	214	94	0.9	7.3
RC22	RC22-SED-0-6-01-051420	5/14/2020	6.7	6.8	6.7	0.5	3	33	73	2175	368	209	6.2	17
RC22	RC22-SED-6-12-01-051420	5/14/2020	7	7	4.7	0.3	10	34	76	2198	398	209	6.6	15.4
RC23	RC23-SED-0-6-01-051420	5/14/2020	7.4	7	5.8	0.5	14	21	168	3663	348	239	2.4	22.6
RC23	RC23-SED-6-12-01-051420	5/14/2020	6.7	6.9	4.3	0.4	27	25	134	2404	255	173	3.7	16.2
EP16	EP16-SED-0-6-01-042720	4/27/2020	7.4	7.6	0.9	0.2	12	6	27	549	120	53	0.7	4
EP17	EP17-SED-WET-0-6-01-042520	4/25/2020	6	6.8	12.4	0.2	14	7	34	1154	208	139	1.9	10.2
EP17	EP17-SED-WET-6-12-01-042520	4/25/2020	6.2	6.7	6.8	0.1	18	7	36	1441	263	133	2.1	13
EP17	EP17-SED-0-6-01-042520	4/25/2020	6.1	6.5	9.6	0.2	24	12	28	1308	246	139	2.2	14.2
EP17	EP16-SED-6-18-01-042720	4/27/2020	7.7	7.6	0.4	0.1	12	6	40	470	118	67	0.4	3.7
EP18	EP18-SED-0-6-01-051220	5/12/2020	6.2	6.7	15.2	0.4	22	6	86	1383	241	107	2	12.6
EP18	EP16-SED-30-36-01-042720	4/27/2020	7.6	7.6	0.3	0.1	13	6	29	386	95	56	0.4	3
EP19	EP19-SED-WET-0-6-01-042520	4/25/2020	6.9	7.5	0.8	0.1	14	6	18	399	76	51	0.5	2.9
EP19	EP19-SED-WET-6-12-042520	4/25/2020	6.7	7.4	0.6	0.1	16	5	19	334	65	62	0.3	2.5
EP19	EP19-SED-24-30-01-042520	4/25/2020	6.5	7.5	0.7	0.2	10	4	18	313	63	68	0.3	2.4
EP19	EP19-SED-36-40-01-042520	4/25/2020	7	7.6	0.3	0.2	12	5	22	300	64	50	0.2	2.3
EP20	EP20-SED-WET-0-6-01-042720	4/27/2020	7.8	7.6	1.2	0.3	10	5	28	1590	113	61	1.1	9.2
EP21A	EP21-SED-FOAM-0-6-01-042320	4/23/2020	8.4	7.6	0.7	0.2	6	4	58	1752	249	37	0.1	11.1
EP21A	EP21-SED-0-6-01-042520	4/25/2020	8.2	7.6	0.5	0.1	5	3	25	958	135	54	0.3	6.2
EP21B	EP21-SED-BEACH-FOAM-01-050520	5/5/2020	7.7	7.5	0.2	0.1	10	4	15	337	60	13	3.2	2.3
EP21A	EP21-SED-WET-6-12-01-042720	4/27/2020	7.7	7.6	1.1	0.2	16	6	26	1490	100	56	1.1	8.6
EP22	EP22-SED-24-30-01-042720	4/27/2020	7.8	7.6	0.7	0.1	21	7	29	1346	99	62	0.5	7.9
EP23	EP23-SED-36-42-01-042720	4/27/2020	7.8	7.5	0.9	0.2	19	8	25	1182	86	53	0.6	6.9
EP23	EP23-SED-0-6-01-042720	4/27/2020	8	7.6	0.2	0.1	14	6	24	584	69	101	1	4
EP24	EP24-SED-0-6-01-042720	4/27/2020	7.3	7.4	5.8	0.1	10	6	32	2422	280	100	1	14.9
BP1	BP1-SED-0-6-01-042720	4/27/2020	6.8	7.4	1.4	0.1	17	7	44	646	98	36	1.6	4.3
GL1	GL1-SED-0-6-01-051220	5/12/2020	5.7	6.6	2.2	0.1	21	13	99	630	114	46	1.8	8.5
FC1	FC1-SED-0-3-01-042320	4/23/2020	6.5	7	4.4	0.2	18	17	72	1639	286	113	1.8	11.2
VB1	VB1-SED-COMP-0-6-01-042720	4/27/2020	6.7	7.3	1.4	0.3	63	23	39	758	147	73	6	5.4
VB3	VB3-SED-COMP-0-6-01-042720	4/27/2020	7.8	7.5	1.6	0.2	20	11	38	1323	214	45	0.8	8.7

Notes:

All results are shown in milligrams per kilogram (mg/kg) or parts per million (ppm) except pH and Buffer Index.

Soluble Salts are shown in millimhos per centimeter (mmhos/cm).

CEC Summation is shown in milliequivalents/100 grams (me/100 g).

Appendix L
Anions and TOC Sediment Analytical Results
Project 1007
Minnesota Pollution Control Agency

Location ID	Sample ID	Sample Date	Percent Moisture	Chloride	Phosphorous	Bromide	Fluoride	Nitrate as N	Nitrite as N	Sulfate	Total Organic Carbon (1)
RC3	RC3-SED-WET-0-6-01-042520	4/25/2020	58.6	200	476	<2.0	<1.5	<2.0	<2.0	495	42600
RC3	RC3-SED-WET-12-18-01-042520	4/25/2020	35.6	NA	NA	NA	NA	NA	NA	NA	30600
RC3A	RC3A-SED-WET-0-6-01-042520	4/25/2020	49.8	NA	NA	NA	NA	NA	NA	NA	77700
RC5	RC5-SED-0-4-01-042420	4/24/2020	47.3	NA	NA	NA	NA	NA	NA	NA	27700
RC5	RC5-SED-22-26-01-042420	4/24/2020	12.7	NA	NA	NA	NA	NA	NA	NA	5120
RC5	RC5-SED-4-6-01-042420	4/24/2020	22.7	NA	NA	NA	NA	NA	NA	NA	18200
RC5	RC5-SED-WET-12-18-01-042420	4/24/2020	20.3	NA	NA	NA	NA	NA	NA	NA	6030
RC5	RC5-SED-WET-3-12-01-042420	4/24/2020	51.7	NA	NA	NA	NA	NA	NA	NA	64400
RC6	RC6-SED-WET-0-6-01-042420	4/24/2020	71.6	NA	NA	NA	NA	NA	NA	NA	64600
RC6	RC6-SED-WET-12-18-01-042420	4/24/2020	38.5	NA	NA	NA	NA	NA	NA	NA	21400
RC12	RC12-SED-12-18-01-042420	4/24/2020	18.3	NA	NA	NA	NA	NA	NA	NA	1890
RC12	RC12-SED-30-36-01-042420	4/24/2020	19.3	NA	NA	NA	NA	NA	NA	NA	1410
RC12	RC12-SED-0-6-01-042520	4/25/2020	4.0	32.9	119	<2.0	<1.5	5.1	<2.0	<2.0	6370
RC16A	RC16A-SED-WET-0-6-01-043020	4/30/2020	42.4	NA	502	NA	NA	NA	<2.0	NA	22200
RC16A	RC16A-SED-WET-6-12-01-043020	4/30/2020	36.2	NA	NA	NA	NA	NA	NA	NA	27300
RC17	RC17-BANK-EAST-3-6-01-042320	4/23/2020	28.2	NA	NA	NA	NA	NA	NA	NA	19500
RC17	RC17-BANK-WEST-3-6-01-042320	4/23/2020	27.8	NA	NA	NA	NA	NA	NA	NA	12900
RC17	RC17-SED-BANK-EAST-0-3-01-042320	4/23/2020	36.7	56.7	204	2.2	<1.5	<2.0	<2.0	127	19100
RC17	RC17-SED-BANK-WEST-0-3-01-042320	4/23/2020	30.6	NA	NA	NA	NA	NA	NA	NA	17500
RC18	RC18-SED-COMP-0-3-01-042320	4/23/2020	36.5	NA	NA	NA	NA	NA	NA	NA	32400
RC21	RC21-SED-COMP-0-3-01-042320	4/23/2020	14.8	NA	NA	NA	NA	NA	NA	NA	4920
RC22	RC22-SED-WET-0-6-01-051420	5/14/2020	50.9	266	NA	<1.9	<1.4	<1.9	<1.9	68.7	38100
RC22	RC22-SED-WET-6-12-01-051420	5/14/2020	37.3	NA	NA	NA	NA	NA	NA	NA	22300
RC23	RC23-SED-WET-0-6-01-051420	5/14/2020	53.5	NA	NA	NA	NA	NA	NA	NA	30400
RC23	RC23-SED-WET-6-12-01-051420	5/14/2020	32.3	NA	NA	NA	NA	NA	NA	NA	26200
EP16	EP16-SED-0-6-01-042720	4/27/2020	24.6	25.3	65.7	<2.0	<1.5	<2.0	<2.0	155	6470
EP16	EP16-SED-30-36-01-042720	4/27/2020	17.7	NA	NA	NA	NA	NA	NA	NA	1560
EP16	EP16-SED-6-18-01-042720	4/27/2020	18.6	NA	NA	NA	NA	NA	NA	NA	1230
EP17	EP17-SED-0-6-01-042520	4/25/2020	47.7	145	317	<1.9	<1.4	<1.9	<1.9	216	33000
EP17	EP17-SED-WET-0-6-01-042520	4/25/2020	68.8	NA	NA	NA	NA	NA	NA	NA	20600
EP17	EP17-SED-WET-6-12-01-042520	4/25/2020	42.3	NA	NA	NA	NA	NA	NA	NA	50000
EP18	EP18-SED-0-6-01-051220	5/12/2020	76.7	109	NA	<2.1	<1.6	<2.1	<2.1	29.2	88600
EP19	EP19-SED-24-30-01-042520	4/25/2020	25.8	NA	NA	NA	NA	NA	NA	NA	9710
EP19	EP19-SED-36-42-01-042520	4/25/2020	19.3	NA	NA	NA	NA	NA	NA	NA	4540
EP19	EP19-SED-WET-0-6-01-042520	4/25/2020	19.7	NA	NA	NA	NA	NA	NA	NA	9730
EP19	EP19-SED-WET-6-12-01-042520	4/25/2020	23.1	NA	NA	NA	NA	NA	NA	NA	6670
EP20	EP20-SED-24-30-01-042720	4/27/2020	17.1	NA	NA	NA	NA	NA	NA	NA	9150
EP20	EP20-SED-36-42-01-042720	4/27/2020	20.4	NA	NA	NA	NA	NA	NA	NA	2430
EP20	EP20-SED-WET-0-6-01-042720	4/27/2020	23.2	33.8	105	<2.0	<1.5	<2.0	<2.0	247	16700
EP20	EP20-SED-WET-6-12-01-042720	4/27/2020	18.6	NA	NA	NA	NA	NA	NA	NA	8660
EP21A	EP21-SED-FOAM-0-6-01-042320	4/23/2020	18.1	35.9	209	<1.9	<1.4	<1.9	<1.9	104	2690
EP21A	EP21-SED-0-6-01-042520	4/25/2020	14.7	NA	NA	NA	NA	NA	NA	NA	3390
EP21B	EP21-SED-BEACH-FOAM-01-050520	5/5/2020	18.4	NA	NA	NA	NA	NA	NA	NA	6900
EP23	EP23-SED-0-6-01-042720	4/27/2020	11.2	NA	NA	NA	NA	NA	NA	NA	716
EP24	EP24-SED-0-6-01-042720	4/27/2020	43.0	12.9	323	<1.9	<1.4	<1.9	<1.9	250	11900
BP1	BP1-SED-0-6-01-042720	4/27/2020	23.7	<11.7	106	<1.9	<1.5	<1.9	<1.9	71.5	18700
FC1	FC1-SED-0-3-01-042320	4/23/2020	37.5	69.4	NA	NA	NA	NA	NA	8.1	28700
GL1	GL1-SED-0-6-01-051220	5/12/2020	40.4	22.6	NA	<2.0	<1.5	<2.0	<2.0	59.0	18000
VB1	VB1-SED-COMP-0-6-01-042720	4/27/2020	29.0	27.1	543	<2.0	<1.5	<2.0	<2.0	805	15400
VB3	VB3-SED-COMP-0-6-01-042720	4/27/2020	24.6	13.9	164	<2.0	<1.5	<2.0	<2.0	61.6	11900

Notes:

All results are shown in milligrams per kilogram (mg/kg) or parts per million (ppm) except for percent moisture.

(1) Stated value is a lab-determined mean of two TOC measurements

NA - Parameter not analyzed

TOC - Total Organic Carbon

Appendix M
Equipment Blank PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number		375-22-4	2706-90-3	307-24-4	375-85-9	335-67-1	375-95-1	335-76-2	2058-94-8	307-55-1	72629-94-8	376-06-7	375-73-5	2706-91-4	355-46-4	375-92-8	1763-23-1
MDH HBV (µg/L)		7.0	NS	NS	NS	0.035	NS	NS	NS	NS	NS	NS	2.0	NS	0.047	NS	0.015
Sample ID	Sample Date	PFBA	PFPEA	PFHXA	PFHPA	PFOA	PFNA	PFDA	PFUNA	PFDOA	PFTRDA	PFTEDA	PFBS	PFPEs	PFHxS	PFHPS	PFOS
EQ-CREW-A-081219	8/12/2019	< 0.003	< 0.0015	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749	< 0.000749
EQ-CREW-B-081219	8/12/2019	< 0.00295	< 0.00147	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737	< 0.000737
EQ-CREW-A-081319	8/13/2019	< 0.00296	< 0.00148	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074	< 0.00074
EQ-CREW-B-081319	8/13/2019	< 0.00304	< 0.00152	< 0.000759	< 0.000759	< 0.000759	< 0.000759	< 0.000759	< 0.000759	< 0.000759	< 0.000759	0.000809 J	< 0.000759	< 0.000759	< 0.000759	< 0.000759	0.00093 J
EQ-CREW-A-081419	8/14/2019	< 0.00318	< 0.00159	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794	< 0.000794
EQ-CREW-B-081419	8/14/2019	< 0.00319	< 0.0016	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798	< 0.000798
EQ-CREW-A-081519	8/15/2019	< 0.00296	< 0.00148	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739	< 0.000739
EQ-CREW-B-081519	8/15/2019	< 0.00306	< 0.00153	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765	< 0.000765
EQ-DRILLBIT-111919	11/19/2019	< 0.00316	< 0.00158	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079	< 0.00079
EQ-PUMP-111919	11/19/2019	< 0.00317	< 0.00158	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792	< 0.000792
EQ-LAKELANDWATER-120519	12/5/2019	< 0.00308	< 0.00154	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769	< 0.000769
EQ-MIXINGBOWL-011320	1/13/2020	< 0.00291	< 0.00146	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728	< 0.000728
EQ-SCISSORS-011420	1/14/2020	< 0.00307	< 0.00153	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767	< 0.000767
EQ-SQUEEGE-022620	2/26/2020	< 0.00301	< 0.00151	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753	< 0.000753
EQ-DIPPER-022620	2/26/2020	< 0.00305	< 0.00153	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763
EQ-ZIPBAG-022620	2/26/2020	< 0.00294	< 0.00147	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735	< 0.000735
EQ-CHEESE-022620	2/26/2020	< 0.00297	< 0.00148	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742	< 0.000742
GG-TEST-022620	2/26/2020	< 0.00305	< 0.00153	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763	< 0.000763

Notes:
MDH - Minnesota Department of Health
HBV - Health-Based Values
NS - No standard
All results are shown in parts per billion (ppb) or µg/L
Bold - Result is above the laboratory minimum reporting limit.
J - estimated concentration
< 0.0002 - Concentration is less than laboratory reportable limit

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluorotelomers
FOSA, FASE, FASAs
Replacement Chemistries

Appendix M
Equipment Blank PFAS Analytical Results
Project 1007
Minnesota Pollution Control Agency

CAS Number		68259-12-1	335-77-3	79780-39-5	757124-72-4	27619-97-2	39108-34-4	754-91-6	31506-32-8	4151-50-2	2355-31-9	2991-50-6	24448-09-7	1691-99-2	13252-13-6	919005-14-4	756426-58-1	763051-92-9
MDH HBV (µg/L)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sample ID	Sample Date	PFNS	PFDS	PFDOS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MEFOSA	N-ETFOSA	MEFOSAA	ETFOSAA	N-MEFOSE	N-ETFOSE	HFPO-DA	ADONA	9CL-PF3ONS	11CL-PF3OUDS
EQ-CREW-A-081219	8/12/2019	< 0.000749	< 0.000749	< 0.000749	< 0.003	< 0.0027	< 0.003	< 0.000749	< 0.000862	< 0.00187	< 0.000749	< 0.000749	< 0.00749	< 0.00562	< 0.003	< 0.003	< 0.003	< 0.003
EQ-CREW-B-081219	8/12/2019	< 0.000737	< 0.000737	< 0.000737	< 0.00295	< 0.00265	< 0.00295	< 0.000737	< 0.000847	< 0.00184	< 0.000737	< 0.000737	< 0.00737	< 0.00553	< 0.00295	< 0.00295	< 0.00295	< 0.00295
EQ-CREW-A-081319	8/13/2019	< 0.00074	< 0.00074	< 0.00074	< 0.00296	< 0.00266	< 0.00296	< 0.00074	< 0.000851	< 0.00185	< 0.00074	< 0.00074	< 0.0074	< 0.00555	< 0.00296	< 0.00296	< 0.00296	< 0.00296
EQ-CREW-B-081319	8/13/2019	< 0.000759	< 0.000759	< 0.000759	< 0.00304	0.015 J	< 0.00304	< 0.000759	< 0.000873	< 0.0019	< 0.000759	< 0.000759	< 0.00759	< 0.00569	< 0.00304	< 0.00304	< 0.00304	< 0.00304
EQ-CREW-A-081419	8/14/2019	< 0.000794	< 0.000794	< 0.000794	< 0.00318	< 0.00286	< 0.00318	< 0.000794	< 0.000913	< 0.00198	< 0.000794	< 0.000794	< 0.00794	< 0.00595	< 0.00318	< 0.00318	< 0.00318	< 0.00318
EQ-CREW-B-081419	8/14/2019	< 0.000798	< 0.000798	< 0.000798	< 0.00319	< 0.00287	< 0.00319	< 0.000798	< 0.000918	< 0.002	< 0.000798	< 0.000798	< 0.00798	< 0.00599	< 0.00319	< 0.00319	< 0.00319	< 0.00319
EQ-CREW-A-081519	8/15/2019	< 0.000739	< 0.000739	< 0.000739	< 0.00296	< 0.00266	< 0.00296	< 0.000739	< 0.00085	< 0.00185	< 0.000739	< 0.000739	< 0.00739	< 0.00554	< 0.00296	< 0.00296	< 0.00296	< 0.00296
EQ-CREW-B-081519	8/15/2019	< 0.000765	< 0.000765	< 0.000765	< 0.00306	< 0.00275	< 0.00306	< 0.000765	< 0.00088	< 0.00191	< 0.000765	< 0.000765	< 0.00765	< 0.00574	< 0.00306	< 0.00306	< 0.00306	< 0.00306
EQ-DRILLBIT-111919	11/19/2019	< 0.00079	< 0.00079	< 0.00079	< 0.00316	< 0.00569	< 0.00316	< 0.00079	< 0.000909	< 0.00198	< 0.00079	< 0.00158	< 0.0079	< 0.00593	< 0.00316	< 0.00316	< 0.00316	< 0.00316
EQ-PUMP-111919	11/19/2019	< 0.000792	< 0.000792	< 0.000792	< 0.00317	< 0.0057	< 0.00317	< 0.000792	< 0.000911	< 0.00198	< 0.000792	< 0.00158	< 0.00792	< 0.00594	< 0.00317	< 0.00317	< 0.00317	< 0.00317
EQ-LAKELANDWATER-120519	12/5/2019	< 0.000769	< 0.000769	< 0.000769	< 0.00308	0.00661 J	< 0.00308	< 0.000769	< 0.000884	< 0.00192	< 0.000769	< 0.000769	< 0.00769	< 0.00577	< 0.00308	< 0.00308	< 0.00308	< 0.00308
EQ-MIXINGBOWL-011320	1/13/2020	< 0.000728	< 0.000728	< 0.000728	< 0.00291	< 0.00262	< 0.00291	< 0.000728	< 0.000837	< 0.00182	< 0.000728	< 0.000728	< 0.00728	< 0.00546	< 0.00291	< 0.00291	< 0.00291	< 0.00291
EQ-SCISSORS-011420	1/14/2020	< 0.000767	< 0.000767	< 0.000767	< 0.00307	< 0.00276	< 0.00307	< 0.000767	< 0.000882	< 0.00192	< 0.000767	< 0.000767	< 0.00767	< 0.00575	< 0.00307	< 0.00307	< 0.00307	< 0.00307
EQ-SQUEEGE-022620	2/26/2020	< 0.000753	< 0.000753	< 0.000753	< 0.00301	< 0.00271	< 0.00301	< 0.000753	< 0.000866	< 0.00188	< 0.000753	< 0.000753	< 0.00753	< 0.00565	< 0.00301	< 0.00301	< 0.00301	< 0.00301
EQ-DIPPER-022620	2/26/2020	< 0.000763	< 0.000763	< 0.000763	< 0.00305	< 0.00275	< 0.00305	< 0.000763	< 0.000877	< 0.00191	< 0.000763	< 0.000763	< 0.00763	< 0.00572	< 0.00305	< 0.00305	< 0.00305	< 0.00305
EQ-ZIPBAG-022620	2/26/2020	< 0.000735	< 0.000735	< 0.000735	< 0.00294	< 0.00265	< 0.00294	< 0.000735	< 0.000845	< 0.00184	< 0.000735	< 0.000735	< 0.00735	< 0.00551	< 0.00294	< 0.00294	< 0.00294	< 0.00294
EQ-CHEESE-022620	2/26/2020	< 0.000742	< 0.000742	< 0.000742	< 0.00297	< 0.00267	< 0.00297	< 0.000742	< 0.000853	< 0.00185	< 0.000742	< 0.000742	< 0.00742	< 0.00556	< 0.00297	< 0.00297	< 0.00297	< 0.00297
GG-TEST-022620	2/26/2020	< 0.000763	< 0.000763	< 0.000763	< 0.00305	< 0.00275	< 0.00305	< 0.00763	< 0.000878	< 0.00191	< 0.000763	< 0.000763	< 0.00763	< 0.00573	< 0.00305	< 0.00305	< 0.00305	< 0.00305

Notes:
MDH - Minnesota Department of Health
HBV - Health-Based Values
NS - No standard
All results are shown in parts per billion (ppb) or µg/L
Bold - Result is above the laboratory minimum reporting limit.
J - estimated concentration
< 0.0002 - Concentration is less than laboratory reportable limit

Short-chain PFCAs
Long-chain PFCAs
Short-chain PFSA
Long-chain PFSA
Fluorotelomers
FOSA, FASE, FASAs
Replacement Chemistries

Appendix N
IDW Soil Characterization Lab Analytical Results
Project 1007
Minnesota Pollution Control Agency

Parameter	Method	Units	Tier 1 Residential SRV	Tier 2 Industrial SRV	Screening SLV	20X TCLP Level	LAKEELMO-IDW-01-011420	LAKEELMO-IDW-02-011420
DRO and GRO								
Diesel Range Organics	WI MOD DRO	mg/kg	The MPCA Unregulated Fill Criterion is 100 mg/kg				ND	ND
Gasoline Range Organics	WI MOD GRO	mg/kg					NA	NA
TCLP RCRA Metals								
Arsenic	EPA 6010D	mg/kg	9	20	5.8	100	1.8	1.1
Barium	EPA 6010D	mg/kg	1,100	18,000	1,684	2,000	16.6	13.2
Cadmium	EPA 6010D	mg/kg	25	200	8.8	20	<0.031	<0.033
Chromium	EPA 6010D	mg/kg	87 ⁽¹⁾	650 ⁽¹⁾	36.2 ⁽¹⁾	100 ⁽¹⁾	13.7	10.9
Lead	EPA 6010D	mg/kg	300	700	2,700	100	2.8	1.7
Mercury	EPA 7471B	mg/kg	0.5	1.5	3.29	4	<0.0088	<0.010
Selenium	EPA 6010D	mg/kg	160	1300	2.64	20	<0.34	<0.36
Silver	EPA 6010D	mg/kg	160	1300	7.86	100	<0.037	<0.040
PAHs								
All PAHs	EPA 8270D SIM	mg/kg	Varies	Varies	Varies	Varies	ND	ND
BaP Equivalent Calculation								
Total BaP Eq. MN 2006sh. ND=0	EPA 8270D	mg/kg	2	3	1.4	NE	NA	NA
VOCs								
All VOCs	EPA 8260B	mg/kg	Varies	Varies	Varies	Varies	ND	ND
PCBs								
All PCBs	EPA 8082A	mg/kg	Varies	Varies	Varies	Varies	ND	ND

NOTES:

Only compounds detected are summarized on this table

(1) = Value is for Chromium VI

Values in **bold** were detected above laboratory reporting limits

mg/kg = milligrams per kilogram, equivalent to parts per million (ppm)

Values shaded green are above the corresponding Tier 1 SRV

Values shaded orange are above the corresponding Tier 2 SRV

Values shaded yellow are above the corresponding Screening SLV

Values shaded pink are above the 20X TCLP Level

Values shaded purple exceed the MPCA's Unregulated Fill Criterion of 100 mg/kg

Appendix O
Investigation-Derived Waste Water Characterization Lab Analytical Results
Project 1007
Minnesota Pollution Control Agency

Parameter	Method	Units	MDH HRL	MDH HBV	MDH RAA	EPA MCL	FRAC-WT1-052920	FRAC-WT2-052920	
Diesel Range Organics (DRO) and Gasoline Range Organics (GRO)									
Diesel Range Organics C10-C28	WI MOD DRO	µg/L	MPCA Surface Water Limit, 200 µg/L [†]					<32	130
Gasoline Range Organics	WIGRO GCV	µg/L						<35.3	<35.3
TCLP RCRA Metals									
All TCLP RCRA Metals	EPA 6010D EPA 7470A	µg/L	Varies by Compound				ND	ND	
Semi-Volatile Organic Compounds (SVOCs)									
All SVOCs	EPA 8270E	µg/L	Varies by Compound				ND	ND	
Volatile Organic Compounds (VOCs)									
1,1,1,2-Tetrachloroethane	EPA 8260B	µg/L	70	NE	NE	NE	<0.13	<0.13	
1,1,1-Trichloroethane	EPA 8260B	µg/L	5000	NE	NE	200	<0.17	<0.17	
1,1,2,2-Tetrachloroethane	EPA 8260B	µg/L	2	NE	NE	NE	<0.16	<0.16	
1,1,2-Trichloroethane	EPA 8260B	µg/L	3	NE	NE	5	<0.19	<0.19	
1,1,2-Trichlorotrifluoroethane	EPA 8260B	µg/L	200000	NE	NE	NE	<0.3	<0.3	
1,1-Dichloroethane	EPA 8260B	µg/L	NE	NE	80	NE	<0.17	<0.17	
1,1-Dichloroethene	EPA 8260B	µg/L	200	200	NE	7	<0.13	<0.13	
1,1-Dichloropropene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.22	<0.22	
1,2,3-Trichlorobenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.17	<0.17	
1,2,3-Trichloropropane	EPA 8260B	µg/L	.003	NE	NE	NE	<0.59	<0.59	
1,2,4-Trichlorobenzene	EPA 8260B	µg/L	4	NE	NE	70	<0.19	<0.19	
1,2,4-Trimethylbenzene	EPA 8260B	µg/L	NE	30	NE	NE	<0.17	<0.17	
1,2-Dibromo-3-chloropropane	EPA 8260B	µg/L	NE	NE	NE	0.2	<1.2	<1.2	
1,2-Dibromoethane (EDB)	EPA 8260B	µg/L	.004	NE	NE	0.05	<0.18	<0.18	
1,2-Dichlorobenzene	EPA 8260B	µg/L	600	NE	NE	600	<0.14	<0.14	
1,2-Dichloroethane	EPA 8260B	µg/L	1	NE	NE	5	<0.25	<0.25	
1,2-Dichloropropane	EPA 8260B	µg/L	5	NE	NE	5	<0.14	<0.14	
1,3,5-Trimethylbenzene	EPA 8260B	µg/L	100	30	NE	NE	<0.12	<0.12	
1,3-Dichlorobenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.12	<0.12	
1,3-Dichloropropane	EPA 8260B	µg/L	NE	NE	NE	NE	<0.13	<0.13	
1,4-Dichlorobenzene	EPA 8260B	µg/L	10	50	NE	75	<0.082	<0.082	
2,2-Dichloropropane	EPA 8260B	µg/L	NE	NE	NE	NE	<0.20	<0.20	
2-Butanone (MEK)	EPA 8260B	µg/L	4000	NE	NE	NE	<0.88	<0.88	
2-Chlorotoluene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.16	<0.16	
4-Chlorotoluene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.050	<0.050	
4-Methyl-2-pentanone (MIBK)	EPA 8260B	µg/L	300	NE	NE	NE	<0.54	<0.54	
Acetone	EPA 8260B	µg/L	4,000	3,000	NE	NE	<2.5	<2.5	
Allyl chloride	EPA 8260B	µg/L	30	NE	NE	NE	<0.27	<0.27	
Benzene	EPA 8260B	µg/L	2	NE	NE	5	<0.12	<0.12	
Bromobenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.13	<0.13	
Bromochloromethane	EPA 8260B	µg/L	NE	NE	NE	NE	<0.36	<0.36	
Bromodichloromethane	EPA 8260B	µg/L	6	3	NE	80	<0.11	<0.11	
Bromoform	EPA 8260B	µg/L	40	NE	NE	NE	<0.27	<0.27	
Bromomethane	EPA 8260B	µg/L	10	NE	NE	NE	<0.63	<0.63	
Carbon tetrachloride	EPA 8260B	µg/L	1	NE	NE	5	<0.17	<0.17	
Chlorobenzene	EPA 8260B	µg/L	100	NE	NE	100	<0.076	<0.076	
Chloroethane	EPA 8260B	µg/L	NE	NE	20	NE	<0.42	<0.42	
Chloroform	EPA 8260B	µg/L	20	NE	NE	80	<0.48	<0.48	
Chloromethane	EPA 8260B	µg/L	NE	NE	NE	NE	<0.15	<0.15	
Dibromochloromethane	EPA 8260B	µg/L	10	NE	NE	80	<0.20	<0.20	
Dibromomethane	EPA 8260B	µg/L	NE	NE	NE	NE	<0.15	<0.15	
Dichlorodifluoromethane	EPA 8260B	µg/L	700	NE	500	NE	<0.20	<0.20	
Dichlorofluoromethane	EPA 8260B	µg/L	NE	NE	20	NE	<0.19	<0.19	
Diethyl ether (Ethyl ether)	EPA 8260B	µg/L	NE	NE	200	NE	<0.18	<0.18	
Ethylbenzene	EPA 8260B	µg/L	50	40	NE	700	<0.075	<0.075	
Hexachloro-1,3-butadiene	EPA 8260B	µg/L	1	NE	NE	NE	<0.40	<0.40	
Isopropylbenzene (Cumene)	EPA 8260B	µg/L	300	NE	NE	NE	<0.13	<0.13	
Methyl-tert-butyl ether	EPA 8260B	µg/L	NE	NE	60	NE	<0.12	<0.12	
Methylene Chloride	EPA 8260B	µg/L	5	NE	NE	5	<1.1	<1.1	
Naphthalene	EPA 8260B	µg/L	70	NE	NE	NE	<0.68	<0.68	
Styrene	EPA 8260B	µg/L	NE	NE	NE	100	<0.11	<0.11	
Tetrachloroethene	EPA 8260B	µg/L	5	4	NE	5	<0.17	<0.17	
Tetrahydrofuran	EPA 8260B	µg/L	600	NE	NE	NE	<3.4	<3.4	
Toluene	EPA 8260B	µg/L	200	70	NE	1000	6.4	<0.12	
Trichloroethene	EPA 8260B	µg/L	.4	NE	NE	5	<0.15	<0.15	
Trichlorofluoromethane	EPA 8260B	µg/L	2000	NE	NE	NE	<0.12	<0.12	
Vinyl chloride	EPA 8260B	µg/L	.2	NE	NE	2	<0.099	<0.099	
Xylene (Total)	EPA 8260B	µg/L	NE	300	NE	10000	<0.29	<0.29	
cis-1,2-Dichloroethene	EPA 8260B	µg/L	6	NE	NE	70	<0.20	<0.20	
cis-1,3-Dichloropropene	EPA 8260B	µg/L	2	NE	NE	NE	<0.077	<0.077	
n-Butylbenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.16	<0.16	
n-Propylbenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.18	<0.18	
p-Isopropyltoluene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.18	<0.18	
sec-Butylbenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.15	<0.15	
tert-Butylbenzene	EPA 8260B	µg/L	NE	NE	NE	NE	<0.13	<0.13	
trans-1,2-Dichloroethene	EPA 8260B	µg/L	40	NE	NE	100	<0.19	<0.19	
trans-1,3-Dichloropropene	EPA 8260B	µg/L	2	NE	NE	NE	<0.32	<0.32	

NOTES:

Only compounds detected are summarized on this table
Values in **bold** were detected above laboratory method detection limits
µg/L = micrograms per Liter, equivalent to parts per billion (ppb)
ND = Not detected
NA = Not Analyzed
NE = Not established
MDH HRL = Minnesota Department of Health, Health Risk Limit
MDH HBV = Minnesota Department of Health, Health Based Value
MDH RAA = Minnesota Department of Health, Risk Assessment Advice
EPA MCL = Federal Environmental Protection Agency Maximum Contaminant Level
RCRA = Resource Conservation and Recovery Act

Values shaded teal are above one or more corresponding MDH criterion
Values shaded purple are above the corresponding EPA MCL
Values shaded light green exceed the MPCA's Surface Water Limit of 200 µg/L
[†]Minnesota Pollution Control Agency, 2016; National Pollutant Discharge Elimination System/State Disposal System Ground Water Pump-Out General Permit; Groundwater Surface Water Limit Reference Value Information.
*EPA MCLG value used for copper in lieu of MCL