



Beth Haake
Senior Environmental Engineer

April 28, 2023

Re: Front Range Aggregates Parkdale Quarry Surface and Groundwater Monitoring 1st Quarter 2023, Permit M-1997-054

Surface and groundwater sampling for the 1st quarter of 2023 occurred on March 6, 2023. Samples were collected from CC-1, CC-2, MW-1, MW-3 and MW-10. TC-1 and TC-2 were not flowing on the sampling date.

Attached is a summary of the data for each of the required analytes at each sampling location. The lab reports and field data sheets are also provided.

Please note the exceedances of the applicable water quality standards:

Parameter	Standard (mg/L)	Sample Location	Result (mg/L)
Fluoride	2	CC-1	<2.5
Sulfide	0.002	CC-1	0.8
Sulfide	0.002	CC-2	1
Fluoride	2	MW-3	2.1
Uranium (U)	0.0168 (HHS)	MW-3	0.0247*
TDS	400	MW-10	439
Uranium (U)	0.0168 (HHS)	MW-10	0.0172*

*Please note that the unspicuated uranium results exceed the HHS established by the Colorado Water Quality Control Commission but do not exceed the MCL established by the EPA.

Should you have any questions or need additional information regarding this submittal please do not hesitate to contact me at (720) 249-7447 or beth.haake@martinmarietta.com.

Sincerely,

Beth Haake

Beth Haake
Environmental Engineer

Sampling Results for CC-1

Flow during Sampling event?	Yes/No		Q3 2022		Q4 2022		Q1 2023	
			Yes		Yes		Yes	
Parameter	Units	Standard(1)	Result	Calculated Standard	Result	Calculated Standard	Result	Calculated Standard
Field								
Dissolved Oxygen (DO)	mg/L	>6	8.27		10.61		9.26	
pH	std units	--	8.36		7.96		8.69	
Specific Conductivity (SC)	µS/Cm	--	970		974		NS	
Temperature (T)	Celsius	--	13.7		NS		7.7	
Turbidity	NTU	--	0.26		3.47		19.91	
Solution Paramters, Nonmetals, Major Ions								
Ammonia (NH3)	mg/L	TVS ch (2)	<0.05	1.379	<0.050	2.576	<0.050	0.791
Chloride	mg/L	250	69.5		70.2		68.3	
Fluoride	mg/L	2	0.84		0.79		2.5	
Sulfate	mg/L	250	96.9		97.2		94.1	
Sulfide	mg/L	0.002	0.5		<0.50		0.8	
Total Suspended Solids (TSS)	mg/L	--	8.9		<5.0		31.8	
Nutrients								
Nitrogen, Nitrate	mg/L	10	0.046		96		0.54	
Nitrogen, Nitrite	mg/L	0.05	<0.02		<0.10		<0.10	
Dissolved Metals								
Arsenic (As)	mg/L	0.34	<0.025		0.00099		0.00089	
Cadmium (Cd)	mg/L	0.005	<0.01		<0.0020		<0.0020	
Calcium	mg/L	--	78.9		86.7		75.1	
Chromium III (Cr 3)	mg/L	0.5	<0.02		<0.014		<0.014	
Chromium VI (Cr 6)	mg/L	0.5	<0.01		<0.010		<0.010	
Copper (Cu)	µg/L	ch(3)	<10	25.952	<4	27.815	<4	24.524
Iron (Fe)	mg/L	1	<0.02		<0.04		0.00459	
Lead (Pb)	mg/L	0.05	<0.05		<0.001		<0.001	
Magnesium	mg/L	--	36.5		38.9		33.4	
Manganese (Mn)	mg/L	--	<0.005	0.050	<0.0020	0.051	0.0163	0.049
Molybdenum (Mo)	mg/L	150	0.0037		0.0043		0.0037	
Nickel (Ni)	mg/L	0.1	<0.03		<0.004		<0.004	
Selenium (Se)	mg/L	4.6	<0.05		0.0053		0.005	
Silver (Ag)	mg/L	ch(5)	<0.03	0.639	<0.20	0.735	<0.20	0.570
Zinc (Zn)	mg/L	ch(6)	<0.03	376.010	NS	404.808	<0.02	354.035
Oil and Grease (visual)	Yes/No		No		No		No	
Oil and Grease	mg/L		N/A		N/A		N/A	

Notes:

< = Reported value less than Reporting Limit

NS= Not collected/measured

-- = No Applicable Standard

TVS = Table Value Standard. ☐

ac =acute

ch = chronic

(1) Standards from 5 CCR 1002-31 TABLE II and TABLE III: The referenced water quality standard is the lower of the drinking water standard, human health standard, agricultural standard, or TVS.

(2) TVS (chronic elsp) from 5 CCR 1002-31 TABLE II

(3) Cu chronic standard from 5 CCR 1002-31 TABLE III = $\exp(0.8545 \cdot [\ln(\text{hardness})] - 1.7428)$

(4) Mg chronic standard from 5 CCR 1002-31 TABLE III = $\exp(0.3331 \cdot [\ln(\text{hardness})] + 5.8743)$

(5) Ag chronic trout standard from 5 CCR 1002-31 TABLE III = $\exp(1.72 \cdot [\ln(\text{hardness})] - 10.51)$

(6) Zn chronic standard from 5 CCR 1002-31 TABLE III = $0.986 \cdot \exp((0.9094 \cdot [\ln(\text{hardness})] + 0.6235))$

Hardness = $(\text{Ca} \cdot 2.497) + (\text{Mg} \cdot 4.118)$

Sampling Results for CC-2

Flow during Sampling event? Yes/No			Q3 2022		Q4 2022		Q1 2023	
			Yes		Yes		Yes	
Parameter	Units	Standard(1)	Result	Calculated Standard	Result	Calculated Standard	Result	Calculated Standard
Field								
Dissolved Oxygen (DO)	mg/L	>6	6.39		11		9.53	
pH	std units	--	8.07		7.84		8.25	
Specific Conductivity (SC)	µS/Cm	--	988		981		NS	
Temperature (T)	Celsius	--	15.2		NS		9.45	
Turbidity	NTU	--	1740		10.15		9.22	
Solution Paramters, Nonmetals, Major Ions								
Ammonia (NH3)	mg/L	TVS ch (2)	<0.05	2.195	0.05	3.027	<0.05	1.654
Chloride	mg/L	250	66.3		71		71	
Fluoride	mg/L	2	0.8		0.73		0.74	
Sulfate	mg/L	250	95.5		97.2		97.7	
Sulfide	mg/L	0.002	<0.5		<0.50		1	
Total Suspended Solids (TSS)	mg/L	--	7.3		13.2		<5	
Nutrients								
Nitrogen, Nitrate	mg/L	10	0.63		0.25		0.11	
Nitrogen, Nitrite	mg/L	0.05	<0.02		<0.020		<0.020	
Dissolved Metals								
Arsenic (As)	mg/L	0.34	<0.025		0.0009		0.00065	
Cadmium (Cd)	mg/L	0.005	<0.01		<0.002		<0.002	
Calcuim	mg/L	--	82.6		80.5		67.4	
Chromium III (Cr 3)	mg/L	0.5	<0.02		<0.014		<0.014	
Chromium VI (Cr 6)	mg/L	0.5	<0.01		<0.010		<0.010	
Copper (Cu)	µg/L	ch(3)	<10	26.226	<4	27.096	<4	23.065
Iron (Fe)	mg/L	1	<0.02		0.197		<0.04	
Lead (Pb)	mg/L	0.05	<0.05		<0.001		<0.001	
Magnesium	mg/L	--	35.3		39.9		32.6	
Manganese (Mn)	mg/L	--	<0.005	0.050	11.7	0.051	0.0081	0.047
Molybdenum (Mo)	mg/L	150	0.0042		3.9		0.0038	
Nickel (Ni)	mg/L	0.1	<0.03		<0.004		<0.004	
Selenium (Se)	mg/L	4.6	<0.05		0.0037		0.0038	
Silver (Ag)	mg/L	ch(5)	<0.03	0.653	<0.0000	0.697	<0.00002	0.504
Zinc (Zn)	mg/L	ch(6)	<0.03	380.239	NS	393.687	<0.002	331.657
Oil and Grease (visual)	Yes/No		No		No		No	
Oil and Grease	mg/L		N/A		N/A		N/A	

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(4) Mg chronic standard from 5 CCR 1002-31 TABLE III = $\exp(0.3331 \cdot [\ln(\text{hardness})] + 5.8743)$

(5) Ag chronic trout standard from 5 CCR 1002-31 TABLE III = $\exp(1.72 \cdot [\ln(\text{hardness})] - 10.51)$

(6) Zn chronic standard from 5 CCR 1002-31 TABLE III = $0.986 \cdot \exp((0.9094 \cdot [\ln(\text{hardness})] + 0.6235))$

Hardness = $(\text{Ca} \cdot 2.497) + (\text{Mg} \cdot 4.118)$

Sampling Results for TC-1

Flow during Sampling event? Yes/No			Q3 2022		Q4 2022		Q1 2023	
			No		No		No	
Parameter	Units	Standard(1)	Result	Calculated Standard	Result	Calculated Standard	Result	Calculated Standard
Field								
Dissolved Oxygen (DO)	mg/L	>6						
pH	std units	--						
Specific Conductivity (SC)	µS/Cm	--						
Temperature (T)	Celsius	--						
Turbidity	NTU	--						
Solution Paramters, Nonmetals, Major Ions								
Ammonia (NH3)	mg/L	TVS ch (2)		7.088		7.088		7.088
Chloride	mg/L	250						
Fluoride	mg/L	2						
Sulfate	mg/L	250						
Sulfide	mg/L	0.002						
Total Suspended Solids (TSS)	mg/L	--						
Nutrients								
Nitrogen, Nitrate	mg/L	10						
Nitrogen, Nitrite	mg/L	0.05						
Dissolved Metals								
Arsenic (As)	mg/L	0.34						
Cadmium (Cd)	mg/L	0.005						
Calcuim	mg/L	--						
Chromium III (Cr 3)	mg/L	0.5						
Chromium VI (Cr 6)	mg/L	0.5						
Copper (Cu)	µg/L	ch(3)		#NUM!		#NUM!		#NUM!
Iron (Fe)	mg/L	1						
Lead (Pb)	mg/L	0.05						
Magnesium	mg/L	--						
Manganese (Mn)	mg/L	--		#NUM!		#NUM!		#NUM!
Molybdenum (Mo)	mg/L	150						
Nickel (Ni)	mg/L	0.1						
Selenium (Se)	mg/L	4.6						
Silver (Ag)	mg/L	ch(5)		#NUM!		#NUM!		#NUM!
Zinc (Zn)	mg/L	ch(6)		#NUM!		#NUM!		#NUM!
Oil and Grease (visual)	Yes/No							
Oil and Grease	mg/L							

Notes:

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(5) Ag chronic trout standard from 5 CCR 1002-31 TABLE III = $\exp(1.72 \cdot [\ln(\text{hardness})] - 10.51)$

(6) Zn chronic standard from 5 CCR 1002-31 TABLE III = $0.986 \cdot \exp((0.9094 \cdot [\ln(\text{hardness})] + 0.6235))$

Hardness = $(\text{Ca} \cdot 2.497) + (\text{Mg} \cdot 4.118)$

Sampling Results for TC-2

Flow during Sampling event? Yes/No			Q3 2022		Q4 2022		Q1 2023	
			No		No		No	
Parameter	Units	Standard(1)	Result	Calculated Standard	Result	Calculated Standard	Result	Calculated Standard
Field								
Dissolved Oxygen (DO)	mg/L	>6						
pH	std units	--						
Specific Conductivity (SC)	µS/Cm	--						
Temperature (T)	Celsius	--						
Turbidity	NTU	--						
Solution Paramters, Nonmetals, Major Ions								
Ammonia (NH3)	mg/L	TVS ch (2)		7.088		7.088		7.088
Chloride	mg/L	250						
Fluoride	mg/L	2						
Sulfate	mg/L	250						
Sulfide	mg/L	0.002						
Total Suspended Solids (TSS)	mg/L	--						
Nutrients								
Nitrogen, Nitrate	mg/L	10						
Nitrogen, Nitrite	mg/L	0.05						
Dissolved Metals								
Arsenic (As)	mg/L	0.34						
Cadmium (Cd)	mg/L	0.005						
Calcium	mg/L	--						
Chromium III (Cr 3)	mg/L	0.5						
Chromium VI (Cr 6)	mg/L	0.5						
Copper (Cu)	µg/L	ch(3)		#NUM!		#NUM!		#NUM!
Iron (Fe)	mg/L	1						
Lead (Pb)	mg/L	0.05						
Magnesium	mg/L	--						
Manganese (Mn)	mg/L	--		#NUM!		#NUM!		#NUM!
Molybdenum (Mo)	mg/L	150						
Nickel (Ni)	mg/L	0.1						
Selenium (Se)	mg/L	4.6						
Silver (Ag)	mg/L	ch(5)		#NUM!		#NUM!		#NUM!
Zinc (Zn)	mg/L	ch(6)		#NUM!		#NUM!		#NUM!
Oil and Grease (visual)	Yes/No							
Oil and Grease	mg/L							

Notes:

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(6) Zn chronic standard from 5 CCR 1002-31 TABLE III = $0.986 \cdot \exp(0.9094 \cdot \ln(\text{hardness})) + 0.6235$

Hardness = $(\text{Ca} \cdot 2.497) + (\text{Mg} \cdot 4.118)$

Sampling Results for MW-1

Parameter	Units	Standard(1)	Note	Q3 2022			Q4 2022			Q1 2023		
				Result	Precision	MDC	Result		Calculated Standard	Result		Calculated Standard
Field												
pH	std units	6.5-8.5	DWS	7.7			7.02			7.64		
Specific Conductivity (SC)	mS/Cm	-	-	575			560.19			569.34		
Temperature (T)	Celsius	-	-	15.8			15.6			15.88		
Turbidity	NTU	-	-	NS			67.21			14.32		
Solution Paramters, Nonmetals, Major Ions												
Chloride	mg/L	250	-	6.2			6.4			6.4		
Fluoride	mg/L	2	A	1.8			1.9			2.0		
Sulfate	mg/L	250	DWS	85.4			86.7			84.7		
Total Dissolved Solids (TDS)	mg/L	400	Note 2	454			306			365.0		
Total Suspended Solids (TSS)	mg/L	-	-	1080			103			14.8		
Nutrients												
Nitrogen, Nitrate	mg/L	10	HHS	6.6			7.2			6.7		
Nitrogen, Nitrite	mg/L	1	HHS	<0.004			<0.004			<0.004		
Dissolved Metals												
Aluminum (Al)	mg/L	5	A	0.471			<0.1			<0.1		
Antimony (Sb)	mg/L	0.006	HHS	<0.0008			<0.0008			<0.0008		
Arsenic (As)	mg/L	0.01	HHS	<0.0004			<0.0004			<0.0004		
Barium (Ba)	mg/L	2	HHS	0.017			0.013			0.013		
Beryllium (Be)	mg/L	0.004	HHS	<0.0004			<0.0004			<0.0004		
Boron (B)	mg/L	0.75	A	<0.08			<0.08			<0.08		
Cadmium (Cd)	mg/L	0.005	HHS	<0.0002			<0.0002			<0.0002		
Chromium (Cr)	mg/L	0.1	HHS	<0.004			<0.004			<0.004		
Chromium III (Cr 3)	mg/L			NS			<0.00001			<0.00001		
Chromium VI (Cr 6)	mg/L			NS			<0.000014			<0.000014		
Cobalt (Co)	mg/L	0.05	A	<0.0004			<0.0004			<0.0004		
Copper (Cu)	mg/L	0.2	A	<0.004			0.0192			<0.004		
Iron (Fe)	mg/L	0.3	DWS	0.229			<0.04			<0.04		
Lead (Pb)	mg/L	0.05	HHS	<0.001			<0.001			<0.001		
Lithium (Li)	mg/L	2.5	A	0.0213			0.0201			0.0189		
Manganese (Mn)	mg/L	0.05	DWS	0.0037			<0.002			<0.002		
Molybdenum (Mo)	mg/L	0.21	HHS	0.018			0.0206			0.0157		
Nickel (Ni)	mg/L	0.1	HHS	<0.004			<0.004			<0.004		
Selenium (Se)	mg/L	0.02	A	0.0046			0.0044			0.0041		
Silver (Ag)	mg/L	0.05	HHS	<0.0002			<0.0002			<0.0002		
Thallium (Tl)	mg/L	0.002	HHS	<0.0004			<0.0004			<0.0004		
Uranium (U), unspeciated	mg/L	0.0168 to 0.03	HHS	0.0163			0.0165			0.0156		
Vanadium (V)	mg/L	0.1	A	<0.002			0.002			<0.002		
Zinc (Zn)	mg/L	2	A	<0.02			<0.02			<0.02		
Radionuclides												
Gross Alpha	pCi/L	-		8.8	3.8	3.9	23.6	56	2.8	17.3	4.8	3.9
Adjusted Gross Alpha (calculated)	pCi/L	15	Note 3	-12.5	-	-	2.7	-	-	-6.1	-	-
Gross Beta	pCi/L	50	Scrn Lev	4	2	3.9	16.1	2.7	3.5	5.2	1.8	3.6
Radium 226	pCi/L	-	-	2.4	0.5	0.2	0.6	0.2	0.2	0.3	0.2	0.3
Radium 228	pCi/L	-	-	7	1.6	1.1	-0.7	0.6	1.1	0.9	0.6	0.9
Radon 222	pCi/L	-	-	1740	73.8	91.6	1760	78.8	99.3	2430.0	74.0	81.0
Uranium 234	pCi/L	-	-	15.3	3	0.2	14.6	2.8	0.5	18.4	3.6	1.1
Uranium 235	pCi/L	-	-	0.8	0.2	0.1	0.3	0.3	0.5	1.7	0.3	1.0
Uranium 238	pCi/L	-	-	6	1.2	0.2	6.3	1.2	0.6	5.0	1.0	1.0

NS- Not collected/measured

< = Reported value less than Reporting Limit

A - Agricultural Standard

DWS - Drinking Water Standard

HHS - Human Health Standard

IDC - Minimal Detectable Concentration

TVS: Table value standard

WS: Water Supply Standard

(1) Standards from 5 CCR 1002-41: The referenced water quality standard is the lower of the drinking water standard, human health standard, agricultural standard, or TVS.

(2) 5 CCR 1002-41, Table 4

(3) Activity of Adjusted Gross Alpha calculated using: (Gross Alpha pCi- [U 234 pCi + U 238 pCi]). If Uranium is not speciated then activity of Uranium species estimated by: Uranium, Total ug/L * 0.67

(4) Not detected, value represents method detection limit

(5) Results not received from analytical laboratory as of 1/3/2023

(6) QA/QC sample (Field Blank and Equipment Blank) results will be provided with laboratory reports in final Q3 2022 report

Sampling Results for MW-3

				Q3 2022			Q4 2022			Q1 2023		
Parameter	Units	Standard(1)	Note	Result	Precision	MDC	Result		Calculated Standard	Result		Calculated Standard
Field												
pH	std units	6.5-8.5	DWS	7.64			7.26			7.54		
Specific Conductivity (SC)	mS/Cm	-	-	45.3		440.64	436.31					
Temperature (T)	Celsius	-	-	18.7		15.11	15.78					
Turbidity	NTU	-	-	14.85		11.37	6.18					
Solution Paramters, Nonmetals, Major Ions												
Chloride	mg/L	250	-	5.2			5.5			5.4		
Fluoride	mg/L	2	A	2		2	2.1					
Sulfate	mg/L	250	DWS	51		52.3	51.2					
Total Dissolved Solids (TDS)	mg/L	400	Note 2	278		213	266.0					
Total Suspended Solids (TSS)	mg/L	-	-	9.1			25.6			7.7		
Nutrients												
Nitrogen, Nitrate	mg/L	10	HHS	1.9			2			1.90		
Nitrogen, Nitrite	mg/L	1	HHS	<0.004		<0.004	<0.004					
Dissolved Metals												
Aluminum (Al)	mg/L	5	A	<0.1			<0.1			<0.1		
Antimony (Sb)	mg/L	0.006	HHS	<0.0008		<0.0008	<0.0008					
Arsenic (As)	mg/L	0.01	HHS	<0.007(4)		0.00071	0.00073					
Barium (Ba)	mg/L	2	HHS	<0.01		0.00081	0.0075					
Berylium (Be)	mg/L	0.004	HHS	<0.002(4)		<0.0004	<0.0004					
Boron (B)	mg/L	0.75	A	0.0518		<0.08	<0.08					
Cadmium (Cd)	mg/L	0.005	HHS	<0.01		<0.0002	<0.0002					
Chromium (Cr)	mg/L	0.1	HHS	<0.01		<0.004	<0.004					
Chromium III (Cr 3)	mg/L			NS		<0.00001	<0.00001					
Chromium VI (Cr 6)	mg/L			NS		<0.000014	<0.000014					
Cobalt (Co)	mg/L	0.05	A	<0.005		<0.0004	<0.0004					
Copper (Cu)	mg/L	0.2	A	<0.01		0.00096	<0.004					
Iron (Fe)	mg/L	0.3	DWS	<0.02		<0.04	<0.04					
Lead (Pb)	mg/L	0.05	HHS	<0.05		<0.001	<0.001					
Lithium (Li)	mg/L	2.5	A	0.0212		0.0195	0.0167					
Manganese (Mn)	mg/L	0.05	DWS	<0.005		<0.002	<0.002					
Molybdenum (Mo)	mg/L	0.21	HHS	0.022		0.0251	0.0209					
Nickel (Ni)	mg/L	0.1	HHS	<0.03		<0.004	<0.004					
Selenium (Se)	mg/L	0.02	A	<0.05		0.0033	0.0034					
Silver (Ag)	mg/L	0.05	HHS	<0.03		<0.0002	<0.0002					
Thalium (Tl)	mg/L	0.002	HHS	NS	<0.0004	<0.0004						
Uranium (U), unspeciated	mg/L	0.0168 to 0.03	HHS	<0.050	0.0237	0.0247						
Vanadium (V)	mg/L	0.1	A	<0.01	0.0025	<0.002						
Zinc (Zn)	mg/L	2	A	<0.03	<0.02	<0.02						
Radionuclides												
Gross Alpha	pCi/L	-		30.7	6.5	2.3	29.5	6.5	2.2	24.7	6.0	3.6
Adjusted Gross Alpha (calculated)	pCi/L	15	Note 3	2.2	-	-	1	-	-	-5.5	-	-
Gross Beta	pCi/L	50	Scrn Lev	11.5	1.9	2.8	19.8	3.1	3.8	8.0	1.9	3.6
Radium 226	pCi/L	-	-	0.2	0.1	0.2	0.3	0.2	0.2	0.3	.2	0.3
Radium 228	pCi/L	-	-	1.6	0.5	0.7	2.6	1.1	1.5	0.4	0.6	0.9
Radon 222	pCi/L	-	-	4230	118	123	1930	77.5	94.2	2370.0	71.3	77.8
Uranium 234	pCi/L	-	-	20.3	3.9	0.2	20.6	4	0.6	21.3	4.2	0.6
Uranium 235	pCi/L	-	-	0.9	0.2	0.1	1.4	0.3	0.6	0.8	0.6	0.6
Uranium 238	pCi/L	-	-	8.2	1.6	0.1	7.9	1.5	0.5	8.9	1.7	0.5

NS- Not collected/measured
 < = Reported value less than Reporting Limit
 A - Agricultural Standard
 DWS - Drinking Water Standard

HHS - Human Health Standard
 DC - Minimal Detectable Concentration
 TVS: Table value standard
 WS: Water Supply Standard

(1) Standards from 5 CCR 1002-41: The referenced water quality standard is the lower of the drinking water standard, human health standard, agricultural standard, or TVS.

(2) 5 CCR 1002-41, Table 4

(3) Activity of Adjusted Gross Alpha calculated using: (Gross Alpha pCi- [U 234 pCi + U 238 pCi]). If Uranium is not speciated then activity of Uranium species estimated by: Uranium, Total ug/L * 0.67

(4) Not detected, value represents method detection limit

(5) Results not received from analytical laboratory as of 1/3/2023

(6) QA/QC sample (Field Blank and Equipment Blank) results will be provided with laboratory reports in final Q3 2022 report

Sampling Results for MW-10

Parameter	Units	Standard(1)	Note	Q3 2022			Q4 2022			Q1 2023		
				Result	Precision	MDC	Result		Calculated Standard	Result		Calculated Standard
Field												
pH	std units	6.5-8.5	DWS	7.09			6.76			6.93		
Specific Conductivity (SC)	mS/Cm	-	-	684			672.56			663.41		
Temperature (T)	Celsius	-	-	26.5			13.37			14.44		
Turbidity	NTU	-	-	NS			219.05			42.52		
Solution Paramters, Nonmetals, Major Ions												
Chloride	mg/L	250	-	7.1			7.4			7		
Fluoride	mg/L	2	A	1.5			1.5			1.5		
Sulfate	mg/L	250	DWS	89.7			91.2			99.8		
Total Dissolved Solids (TDS)	mg/L	400	Note 2	458			401			439		
Total Suspended Solids (TSS)	mg/L	-	-	168			362			71.4		
Nutrients												
Nitrogen, Nitrate	mg/L	10	HHS	0.51			0.37			0.77		
Nitrogen, Nitrite	mg/L	1	HHS	<0.0080			<0.0080			<0.0080		
Dissolved Metals												
Aluminum (Al)	mg/L	5	A	<0.1			<0.1			<0.1		
Antimony (Sb)	mg/L	0.006	HHS	<0.0008			<0.0008			<0.0008		
Arsenic (As)	mg/L	0.01	HHS	0.00041			0.00043			0.00045		
Barium (Ba)	mg/L	2	HHS	0.0467			0.0405			0.0516		
Beryllium (Be)	mg/L	0.004	HHS	<0.0004			<0.0004			<0.0004		
Boron (B)	mg/L	0.75	A	<0.08			<0.08			<0.08		
Cadmium (Cd)	mg/L	0.005	HHS	<0.0002			<0.0002			<0.0002		
Chromium (Cr)	mg/L	0.1	HHS	<0.004			<0.004			<0.004		
Chromium III (Cr 3)	mg/L			NS			<0.00001			<0.00001		
Chromium VI (Cr 6)	mg/L			NS			<0.000014			<0.000014		
Cobalt (Co)	mg/L	0.05	A	<0.0004			<0.0004			<0.0004		
Copper (Cu)	mg/L	0.2	A	<0.004			<0.004			<0.004		
Iron (Fe)	mg/L	0.3	DWS	<0.04			<0.04			<0.04		
Lead (Pb)	mg/L	0.05	HHS	<0.001			<0.001			<0.001		
Lithium (Li)	mg/L	2.5	A	0.0247			0.0249			0.0188		
Manganese (Mn)	mg/L	0.05	DWS	<0.002			<0.002			<0.002		
Molybdenum (Mo)	mg/L	0.21	HHS	0.0147			0.0161			0.0052		
Nickel (Ni)	mg/L	0.1	HHS	<0.004			<0.004			<0.004		
Selenium (Se)	mg/L	0.02	A	0.0029			0.003			0.0036		
Silver (Ag)	mg/L	0.05	HHS	<0.0002			<0.0002			<0.0002		
Thallium (Tl)	mg/L	0.002	HHS	<0.0004			<0.0004			<0.0004		
Uranium (U), unspeciated	mg/L	0.0168 to 0.03	HHS	0.0363			0.0498			0.0172		
Vanadium (V)	mg/L	0.1	A	0.0027			0.0029			0.0024		
Zinc (Zn)	mg/L	2	A	<0.02			<0.02			<0.02		
Radionuclides												
Gross Alpha	pCi/L	-		34.1	7.8	3.5	55.4	12	3.9	15.2	4.6	3.9
Adjusted Gross Alpha (calculated)	pCi/L	15	Note 3	9.779	-	-	13.3	-	-	-6.4	-	-
Gross Beta	pCi/L	50	Scrn Lev	3	1.1	3.6	38.9	4.7	3.5	8.8	2.4	4.1
Radium 226	pCi/L	-	-	1.2	0.3	1.1	1	0.3	0.3	1.7	0.4	0.3
Radium 228	pCi/L	-	-	2.1	0.8	1.1	2.2	1.2	1.6	2.9	0.9	1
Radon 222	pCi/L	-	-	1310	70.2	93.2	1720	76.9	96.8	1620	65.6	80.1
Uranium 234	pCi/L	-	-	LE	-	-	27.3	5.3	0.8	14.7	2.9	1.1
Uranium 235	pCi/L	-	-	LE	-	-	1.7	0.3	0.5	0.8	0.9	1.1
Uranium 238	pCi/L	-	-	LE	-	-	14.8	2.9	0.5	6.9	1.4	0.7

NS- Not collected/measured

< = Reported value less than Reporting Limit

A - Agricultural Standard

DWS - Drinking Water Standard

LE - Lab Error/Lab lost samples

HHS - Human Health Standard

IDC - Minimal Detectable Concentration

TVS: Table value standard

WS: Water Supply Standard

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STATE OF
COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

Parkdale Quarry - M1997054 - Q1 2023 GW Monitoring

1 message

Phillip Courtney <Phillip.Courtney@martinmarietta.com>

Tue, May 2, 2023 at 4:57 PM

To: "Cazier - DNR, Tim" <tim.cazier@state.co.us>

Cc: Beth Haake <Beth.Haake@martinmarietta.com>

Tim,

Attached is the report documenting the results of surface and groundwater monitoring at the Parkdale Quarry during Q1 2023.

Please advise if you have any questions.

Regards, Phil

Phillip Courtney

Land Manager | West Division

Martin Marietta

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Parkdale Quarry_M1997054_GWMonitoring_Q12023.pdf

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