

Appendix V6-5H

Predicted Metal Concentrations in Soil from
Dust Deposition during the Construction Phase



Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D06 (0-10)			D06 (10-20)			D10 (0-10)			D10 (10-20)			D20 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	15200	3.27E+01	15232.71372	14300	3.27E+01	14332.71372	7230	1.53E+01	7245.32218	7250	1.53E+01	7265.32218	10300	1.16E+01	10311.62485
Antimony	0.1 - 10	5	1.13E-04	5.000112806	5	1.13E-04	5.000112806	5	5.28E-05	5.000052835	5	5.28E-05	5.000052835	5	4.01E-05	5.000040086
Arsenic	0.05 - 5	2.5	5.64E-04	2.50056403	2.5	5.64E-04	2.50056403	2.5	2.64E-04	2.500264176	5.6	2.64E-04	5.600264176	2.5	2.00E-04	2.500200428
Barium	0.5 - 1	82.7	3.38E-03	82.70338418	76.2	3.38E-03	76.20338418	21.8	1.59E-03	21.80158505	29.2	1.59E-03	29.20158505	81.4	1.20E-03	81.40120257
Beryllium	0.2 - 0.5	0.25	3.72E-04	0.25037226	0.25	3.72E-04	0.25037226	0.25	1.74E-04	0.250174356	0.25	1.74E-04	0.250174356	0.25	1.32E-04	0.250132283
Bismuth	0.2 - 20	10	1.13E-04	10.00011281	10	1.13E-04	10.00011281	10	5.28E-05	10.00005284	10	5.28E-05	10.00005284	10	4.01E-05	10.00004009
Cadmium	0.05 - 0.5	0.25	1.13E-04	0.250112806	0.25	1.13E-04	0.250112806	0.25	5.28E-05	0.250052835	0.25	5.28E-05	0.250052835	0.25	4.01E-05	0.250040086
Calcium	50	3040	3.61E+01	3076.097902	3170	3.61E+01	3206.097902	1780	1.69E+01	1796.907233	2120	1.69E+01	2136.907233	11100	1.28E+01	11112.82742
Chromium	0.5 - 2	47.6	1.69E-01	47.76920891	48.1	1.69E-01	48.26920891	23.8	7.93E-02	23.87925266	22.1	7.93E-02	22.17925266	81.8	6.01E-02	81.86012853
Cobalt	0.1 - 2	9.8	3.95E-02	9.83948208	11.9	3.95E-02	11.93948208	7.9	1.85E-02	7.918492286	8.3	1.85E-02	8.318492286	16.7	1.40E-02	16.71402999
Copper	0.5 - 1	20.1	1.24E-01	20.22408654	16.9	1.24E-01	17.02408654	21.3	5.81E-02	21.35811861	31.4	5.81E-02	31.45811861	38.2	4.41E-02	38.24409425
Iron	50	23200	5.53E+01	23255.27491	23800	5.53E+01	23855.27491	15100	2.59E+01	15125.8892	15100	2.59E+01	15125.8892	23600	1.96E+01	23619.64199
Lead	0.5 - 30	15	6.77E-04	15.00067684	15	6.77E-04	15.00067684	15	3.17E-04	15.00031701	15	3.17E-04	15.00031701	15	2.41E-04	15.00024051
Magnesium	20 - 50	8480	2.59E+01	8505.945367	7980	2.59E+01	8005.945367	4710	1.22E+01	4722.152074	4790	1.22E+01	4802.152074	7790	9.22E+00	7799.219707
Manganese	1	243	1.05E+00	244.0490953	340	1.05E+00	341.0490953	212	4.91E-01	212.4913665	192	4.91E-01	192.4913665	790	3.73E-01	790.3727969
Mercury	0.005 - 0.005	0.0094	1.13E-05	0.009411281	0.0025	1.13E-05	0.002511281	0.0069	5.28E-06	0.006905284	0.0025	5.28E-06	0.002505284	0.0543	4.01E-06	0.054304009
Molybdenum	0.5 - 4	2	5.64E-04	2.00056403	2	5.64E-04	2.00056403	2	2.64E-04	2.000264176	2	2.64E-04	2.000264176	2	2.00E-04	2.000200428
Nickel	0.5 - 5	24.7	8.12E-02	24.78122028	25.2	8.12E-02	25.28122028	15.2	3.80E-02	15.23804127	16	3.80E-02	16.03804127	53.5	2.89E-02	53.52886169
Phosphorus	50	395	2.48E-01	395.2481731	413	2.48E-01	413.2481731	235	1.16E-01	235.1162372	269	1.16E-01	269.1162372	715	8.82E-02	715.0881885
Potassium	100 - 200	2950	1.13E-01	2950.112806	2520	1.13E-01	2520.112806	550	5.28E-02	550.0528351	820	5.28E-02	820.0528351	1110	4.01E-02	1110.040086
Selenium	0.2 - 0.5	0.25	5.64E-04	0.25056403	0.25	5.64E-04	0.25056403	0.25	2.64E-04	0.250264176	0.25	2.64E-04	0.250264176	0.25	2.00E-04	0.250200428
Silver	0.1 - 2	1	1.13E-04	1.000112806	1	1.13E-04	1.000112806	1	5.28E-05	1.000052835	1	5.28E-05	1.000052835	1	4.01E-05	1.000040086
Sodium	100 - 200	480	2.82E-01	480.2820149	310	2.82E-01	310.2820149	100	1.32E-01	100.1320878	100	1.32E-01	100.1320878	100	1.00E-01	100.1002142
Strontium	0.5	21.3	1.58E-02	21.31579283	19.5	1.58E-02	19.51579283	8.21	7.40E-03	8.217396914	9.02	7.40E-03	9.027396914	33.3	5.61E-03	33.305612
Thallium	0.05 - 1	0.5	1.13E-04	0.500112806	0.5	1.13E-04	0.500112806	0.5	5.28E-05	0.500052835	0.5	5.28E-05	0.500052835	0.5	4.01E-05	0.500040086
Tin	42771	2.5	2.26E-03	2.502256119	2.5	2.26E-03	2.502256119	2.5	1.06E-03	2.501056702	2.5	1.06E-03	2.501056702	2.5	8.02E-04	2.500801714
Titanium	1	1180	2.48E+00	1182.481731	1060	2.48E+00	1062.481731	509	1.16E+00	510.1623723	527	1.16E+00	528.1623723	351	8.82E-01	351.8818851
Uranium	0.05	1.37	1.13E-04	1.370112806	1.32	1.13E-04	1.320112806	0.297	5.28E-05	0.297052835	0.37	5.28E-05	0.370052835	0.378	4.01E-05	0.378040086
Vanadium	0.2 - 2	51.2	1.13E-01	51.31280594	50.9	1.13E-01	51.01280594	32	5.28E-02	32.0528351	32.8	5.28E-02	32.8528351	46.3	4.01E-02	46.34008568
Zinc	1	44.7	6.66E-02	44.76655551	39.7	6.66E-02	39.76655551	25.3	3.12E-02	25.33117271	30.1	3.12E-02	30.13117271	47.1	2.37E-02	47.12365055

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D20 (10-20)			D21 (0-10)			D21 (10-20)			D29 (0-10)			D29 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	12200	1.16E+01	12211.62485	21100	5.96E+00	21105.95582	19500	5.96E+00	19505.95582	18600	4.18E+00	18604.1761	20900	4.18E+00	20904.1761
Antimony	0.1 - 10	5	4.01E-05	5.000040086	5	2.05E-05	5.000020537	5	2.05E-05	5.000020537	5	1.44E-05	5.0000144	5	1.44E-05	5.0000144
Arsenic	0.05 - 5	2.5	2.00E-04	2.500200428	2.5	1.03E-04	2.500102686	2.5	1.03E-04	2.500102686	2.5	7.20E-05	2.500072002	5.2	7.20E-05	5.200072002
Barium	0.5 - 1	39.7	1.20E-03	39.70120257	112	6.16E-04	112.0006161	107	6.16E-04	107.0006161	100	4.32E-04	100.000432	121	4.32E-04	121.000432
Beryllium	0.2 - 0.5	0.25	1.32E-04	0.250132283	0.64	6.78E-05	0.640067773	0.59	6.78E-05	0.590067773	0.53	4.75E-05	0.530047521	0.58	4.75E-05	0.580047521
Bismuth	0.2 - 20	10	4.01E-05	10.00004009	10	2.05E-05	10.00002054	10	2.05E-05	10.00002054	10	1.44E-05	10.0000144	10	1.44E-05	10.0000144
Cadmium	0.05 - 0.5	0.25	4.01E-05	0.250040086	0.25	2.05E-05	0.250020537	0.25	2.05E-05	0.250020537	0.25	1.44E-05	0.2500144	0.25	1.44E-05	0.2500144
Calcium	50	7590	1.28E+01	7602.827419	3760	6.57E+00	3766.571934	3630	6.57E+00	3636.571934	9020	4.61E+00	9024.608111	7320	4.61E+00	7324.608111
Chromium	0.5 - 2	74.5	6.01E-02	74.56012853	62.8	3.08E-02	62.83080594	58.6	3.08E-02	58.63080594	51.8	2.16E-02	51.82160052	60.6	2.16E-02	60.62160052
Cobalt	0.1 - 2	17.1	1.40E-02	17.11402999	11.4	7.19E-03	11.40718805	10.1	7.19E-03	10.10718805	10.3	5.04E-03	10.30504012	12.9	5.04E-03	12.90504012
Copper	0.5 - 1	67.7	4.41E-02	67.74409425	25.4	2.26E-02	25.42259102	24.4	2.26E-02	24.42259102	28.4	1.58E-02	28.41584038	31	1.58E-02	31.01584038
Iron	50	26700	1.96E+01	26719.64199	29000	1.01E+01	29010.06327	27400	1.01E+01	27410.06327	25500	7.06E+00	25507.05617	30500	7.06E+00	30507.05617
Lead	0.5 - 30	15	2.41E-04	15.00024051	15	1.23E-04	15.00012322	15	1.23E-04	15.00012322	15	8.64E-05	15.0000864	15	8.64E-05	15.0000864
Magnesium	20 - 50	10700	9.22E+00	10709.21971	10900	4.72E+00	10904.72358	10200	4.72E+00	10204.72358	10000	3.31E+00	10003.31208	11700	3.31E+00	11703.31208
Manganese	1	619	3.73E-01	619.3727969	255	1.91E-01	255.1909968	225	1.91E-01	225.1909968	358	1.34E-01	358.1339232	368	1.34E-01	368.1339232
Mercury	0.005 - 0.005	0.0155	4.01E-06	0.015504009	0.0159	2.05E-06	0.015902054	0.01	2.05E-06	0.010002054	0.0263	1.44E-06	0.02630144	0.0141	1.44E-06	0.01410144
Molybdenum	0.5 - 4	2	2.00E-04	2.000200428	2	1.03E-04	2.000102686	2	1.03E-04	2.000102686	2	7.20E-05	2.000072002	2	7.20E-05	2.000072002
Nickel	0.5 - 5	48.3	2.89E-02	48.32886169	31.1	1.48E-02	31.11478685	28.6	1.48E-02	28.61478685	26.2	1.04E-02	26.21036825	32.5	1.04E-02	32.51036825
Phosphorus	50	321	8.82E-02	321.0881885	602	4.52E-02	602.045182	552	4.52E-02	552.045182	536	3.17E-02	536.0316808	516	3.17E-02	516.0316808
Potassium	100 - 200	1160	4.01E-02	1160.040086	4390	2.05E-02	4390.020537	3930	2.05E-02	3930.020537	3330	1.44E-02	3330.0144	3790	1.44E-02	3790.0144
Selenium	0.2 - 0.5	0.25	2.00E-04	0.250200428	0.25	1.03E-04	0.250102686	0.25	1.03E-04	0.250102686	0.25	7.20E-05	0.250072002	0.25	7.20E-05	0.250072002
Silver	0.1 - 2	1	4.01E-05	1.000040086	1	2.05E-05	1.000020537	1	2.05E-05	1.000020537	1	1.44E-05	1.0000144	1	1.44E-05	1.0000144
Sodium	100 - 200	100	1.00E-01	100.1002142	510	5.13E-02	510.0513432	480	5.13E-02	480.0513432	1030	3.60E-02	1030.036001	730	3.60E-02	730.0360009
Strontium	0.5	23.4	5.61E-03	23.405612	30	2.88E-03	30.00287522	28	2.88E-03	28.00287522	36.4	2.02E-03	36.40201605	29.8	2.02E-03	29.80201605
Thallium	0.05 - 1	0.5	4.01E-05	0.500040086	0.5	2.05E-05	0.500020537	0.5	2.05E-05	0.500020537	0.5	1.44E-05	0.5000144	0.5	1.44E-05	0.5000144
Tin	42771	2.5	8.02E-04	2.500801714	2.5	4.11E-04	2.500410746	2.5	4.11E-04	2.500410746	2.5	2.88E-04	2.500288007	2.5	2.88E-04	2.500288007
Titanium	1	746	8.82E-01	746.8818851	1440	4.52E-01	1440.45182	1340	4.52E-01	1340.45182	1210	3.17E-01	1210.316808	1400	3.17E-01	1400.316808
Uranium	0.05	0.774	4.01E-05	0.774040086	1.63	2.05E-05	1.630020537	1.62	2.05E-05	1.620020537	1.03	1.44E-05	1.0300144	1.47	1.44E-05	1.4700144
Vanadium	0.2 - 2	50.3	4.01E-02	50.34008568	64.3	2.05E-02	64.32053729	60.2	2.05E-02	60.22053729	53.8	1.44E-02	53.81440035	64.6	1.44E-02	64.61440035
Zinc	1	46.5	2.37E-02	46.52365055	54.2	1.21E-02	54.212117	50.4	1.21E-02	50.412117	55.8	8.50E-03	55.80849621	60.9	8.50E-03	60.90849621

Notes:

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³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

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DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

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Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D32 (0-10)			D32 (10-20)			D38 (0-10)			D38 (10-20)			D43 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	8640	3.75E+00	8643.747749	8250	3.75E+00	8253.747749	3380	3.08E+00	3383.081379	3630	3.08E+00	3633.081379	16400	2.41E+01	16424.07385
Antimony	0.1 - 10	5	1.29E-05	5.000012923	5	1.29E-05	5.000012923	5	1.06E-05	5.000010625	5	1.06E-05	5.000010625	5	8.30E-05	5.000083013
Arsenic	0.05 - 5	2.5	6.46E-05	2.500064616	2.5	6.46E-05	2.500064616	2.5	5.31E-05	2.500053127	2.5	5.31E-05	2.500053127	2.5	4.15E-04	2.500415066
Barium	0.5 - 1	39.7	3.88E-04	39.7003877	44	3.88E-04	44.0003877	12.8	3.19E-04	12.80031876	15.4	3.19E-04	15.40031876	93	2.49E-03	93.0024904
Beryllium	0.2 - 0.5	0.25	4.26E-05	0.250042647	0.25	4.26E-05	0.250042647	0.25	3.51E-05	0.250035064	0.25	3.51E-05	0.250035064	0.56	2.74E-04	0.560273944
Bismuth	0.2 - 20	10	1.29E-05	10.00001292	10	1.29E-05	10.00001292	10	1.06E-05	10.00001063	10	1.06E-05	10.00001063	10	8.30E-05	10.00008301
Cadmium	0.05 - 0.5	0.25	1.29E-05	0.250012923	0.25	1.29E-05	0.250012923	0.25	1.06E-05	0.250010625	0.25	1.06E-05	0.250010625	0.25	8.30E-05	0.250083013
Calcium	50	2270	4.14E+00	2274.135448	2120	4.14E+00	2124.135448	984	3.40E+00	987.4001426	1270	3.40E+00	1273.400143	9410	2.66E+01	9436.564248
Chromium	0.5 - 2	26.2	1.94E-02	26.21938491	25.7	1.94E-02	25.71938491	8.2	1.59E-02	8.215938168	9.6	1.59E-02	9.615938168	45.7	1.25E-01	45.82451991
Cobalt	0.1 - 2	6.1	4.52E-03	6.104523146	5.2	4.52E-03	5.204523146	2.7	3.72E-03	2.703718906	3.6	3.72E-03	3.603718906	9.4	2.91E-02	9.429054646
Copper	0.5 - 1	12.1	1.42E-02	12.1142156	13.8	1.42E-02	13.8142156	2.5	1.17E-02	2.51168799	3.7	1.17E-02	3.71168799	16.5	9.13E-02	16.5913146
Iron	50	15300	6.33E+00	15306.3324	13100	6.33E+00	13106.3324	7800	5.21E+00	7805.206468	8610	5.21E+00	8615.206468	22800	4.07E+01	22840.6765
Lead	0.5 - 30	15	7.75E-05	15.00007754	15	7.75E-05	15.00007754	15	6.38E-05	15.00006375	15	6.38E-05	15.00006375	15	4.98E-04	15.00049808
Magnesium	20 - 50	5280	2.97E+00	5282.972353	4810	2.97E+00	4812.972353	2040	2.44E+00	2042.443852	2320	2.44E+00	2322.443852	9550	1.91E+01	9569.093053
Manganese	1	132	1.20E-01	132.1201864	116	1.20E-01	116.1201864	68.3	9.88E-02	68.39881664	84.3	9.88E-02	84.39881664	248	7.72E-01	248.7720235
Mercury	0.005 - 0.005	0.0056	1.29E-06	0.005601292	0.0082	1.29E-06	0.008201292	0.0025	1.06E-06	0.002501063	0.0025	1.06E-06	0.002501063	0.0175	8.30E-06	0.017508301
Molybdenum	0.5 - 4	2	6.46E-05	2.000064616	2	6.46E-05	2.000064616	2	5.31E-05	2.000053127	2	5.31E-05	2.000053127	2	4.15E-04	2.000415066
Nickel	0.5 - 5	14.6	9.30E-03	14.60930476	14.1	9.30E-03	14.10930476	2.5	7.65E-03	2.507650321	5.3	7.65E-03	5.307650321	24.3	5.98E-02	24.35976956
Phosphorus	50	478	2.84E-02	478.0284312	456	2.84E-02	456.0284312	125	2.34E-02	125.023376	211	2.34E-02	211.023376	406	1.83E-01	406.1826292
Potassium	100 - 200	1220	1.29E-02	1220.012923	1280	1.29E-02	1280.012923	380	1.06E-02	380.0106254	410	1.06E-02	410.0106254	3960	8.30E-02	3960.083013
Selenium	0.2 - 0.5	0.25	6.46E-05	0.250064616	0.25	6.46E-05	0.250064616	0.25	5.31E-05	0.250053127	0.25	5.31E-05	0.250053127	0.25	4.15E-04	0.250415066
Silver	0.1 - 2	1	1.29E-05	1.000012923	1	1.29E-05	1.000012923	1	1.06E-05	1.000010625	1	1.06E-05	1.000010625	1	8.30E-05	1.000083013
Sodium	100 - 200	240	3.23E-02	240.0323082	250	3.23E-02	250.0323082	100	2.66E-02	100.0265636	100	2.66E-02	100.0265636	630	2.08E-01	630.2075332
Strontium	0.5	13	1.81E-03	13.00180926	12.5	1.81E-03	12.50180926	5.88	1.49E-03	5.881487562	6.67	1.49E-03	6.671487562	79.9	1.16E-02	79.91162186
Thallium	0.05 - 1	0.5	1.29E-05	0.500012923	0.5	1.29E-05	0.500012923	0.5	1.06E-05	0.500010625	0.5	1.06E-05	0.500010625	0.5	8.30E-05	0.500083013
Tin	42771	2.5	2.58E-04	2.500258465	2.5	2.58E-04	2.500258465	2.5	2.13E-04	2.500212509	2.5	2.13E-04	2.500212509	2.5	1.66E-03	2.501660265
Titanium	1	584	2.84E-01	584.284312	527	2.84E-01	527.284312	335	2.34E-01	335.2337598	344	2.34E-01	344.2337598	996	1.83E+00	997.826292
Uranium	0.05	0.748	1.29E-05	0.748012923	0.735	1.29E-05	0.735012923	0.249	1.06E-05	0.249010625	0.332	1.06E-05	0.332010625	0.837	8.30E-05	0.837083013
Vanadium	0.2 - 2	31.8	1.29E-02	31.81292327	29.2	1.29E-02	29.21292327	19.1	1.06E-02	19.11062545	20.9	1.06E-02	20.91062545	47.2	8.30E-02	47.28301327
Zinc	1	28.9	7.62E-03	28.90762473	30.6	7.62E-03	30.60762473	10.7	6.27E-03	10.70626901	11.6	6.27E-03	11.60626901	51	4.90E-02	51.04897783

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D43 (10-20)			D54 (0-10)			D54 (10-20)			D57 (0-10)			D57 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	16000	2.41E+01	16024.07385	626	3.93E+00	629.9265945	2390	3.93E+00	2393.926595	17400	3.78E+01	17437.78991	19700	3.78E+01	19737.78991
Antimony	0.1 - 10	5	8.30E-05	5.000083013	5	1.35E-05	5.00001354	5	1.35E-05	5.00001354	5	1.30E-04	5.00013031	5	1.30E-04	5.00013031
Arsenic	0.05 - 5	2.5	4.15E-04	2.500415066	2.5	6.77E-05	2.5000677	2.5	6.77E-05	2.5000677	2.5	6.52E-04	2.50065155	2.5	6.52E-04	2.50065155
Barium	0.5 - 1	102	2.49E-03	102.0024904	36	4.06E-04	36.0004062	48.4	4.06E-04	48.4004062	116	3.91E-03	116.0039093	136	3.91E-03	136.0039093
Beryllium	0.2 - 0.5	0.53	2.74E-04	0.530273944	0.25	4.47E-05	0.250044682	0.25	4.47E-05	0.250044682	0.56	4.30E-04	0.560430023	0.63	4.30E-04	0.630430023
Bismuth	0.2 - 20	10	8.30E-05	10.00008301	10	1.35E-05	10.00001354	10	1.35E-05	10.00001354	10	1.30E-04	10.00013031	10	1.30E-04	10.00013031
Cadmium	0.05 - 0.5	0.25	8.30E-05	0.250083013	0.25	1.35E-05	0.25001354	0.25	1.35E-05	0.25001354	0.25	1.30E-04	0.25013031	0.25	1.30E-04	0.25013031
Calcium	50	9000	2.66E+01	9026.564248	11700	4.33E+00	11704.33279	14000	4.33E+00	14004.33279	4610	4.17E+01	4651.699214	4580	4.17E+01	4621.699214
Chromium	0.5 - 2	43.6	1.25E-01	43.72451991	1	2.03E-02	1.020309972	5.8	2.03E-02	5.820309972	53	1.95E-01	53.19546506	62.4	1.95E-01	62.59546506
Cobalt	0.1 - 2	8.9	2.91E-02	8.929054646	3.6	4.74E-03	3.604738993	5.8	4.74E-03	5.804738993	11.5	4.56E-02	11.54560851	13.2	4.56E-02	13.24560851
Copper	0.5 - 1	21.8	9.13E-02	21.8913146	5.6	1.49E-02	5.614893979	9.1	1.49E-02	9.114893979	23.8	1.43E-01	23.94334105	26.5	1.43E-01	26.64334105
Iron	50	21900	4.07E+01	21940.6765	4080	6.63E+00	4086.634591	25200	6.63E+00	25206.63459	25500	6.39E+01	25563.85192	30300	6.39E+01	30363.85192
Lead	0.5 - 30	15	4.98E-04	15.00049808	15	8.12E-05	15.00008124	15	8.12E-05	15.00008124	15	7.82E-04	15.00078186	15	7.82E-04	15.00078186
Magnesium	20 - 50	9200	1.91E+01	9219.093053	2530	3.11E+00	2533.114196	2100	3.11E+00	2103.114196	10100	3.00E+01	10129.97131	11500	3.00E+01	11529.97131
Manganese	1	246	7.72E-01	246.7720235	226	1.26E-01	226.1259218	112	1.26E-01	112.1259218	308	1.21E+00	309.2118834	337	1.21E+00	338.2118834
Mercury	0.005 - 0.005	0.0108	8.30E-06	0.010808301	0.158	1.35E-06	0.158001354	0.0695	1.35E-06	0.069501354	0.0165	1.30E-05	0.016513031	0.0091	1.30E-05	0.009113031
Molybdenum	0.5 - 4	2	4.15E-04	2.000415066	2	6.77E-05	2.0000677	2	6.77E-05	2.0000677	2	6.52E-04	2.00065155	2	6.52E-04	2.00065155
Nickel	0.5 - 5	23.5	5.98E-02	23.55976956	2.5	9.75E-03	2.509748786	15.1	9.75E-03	15.10974879	28.1	9.38E-02	28.19382323	34.4	9.38E-02	34.49382323
Phosphorus	50	356	1.83E-01	356.1826292	674	2.98E-02	674.029788	943	2.98E-02	943.029788	591	2.87E-01	591.2866821	607	2.87E-01	607.2866821
Potassium	100 - 200	3140	8.30E-02	3140.083013	830	1.35E-02	830.01354	100	1.35E-02	100.01354	4370	1.30E-01	4370.13031	4840	1.30E-01	4840.13031
Selenium	0.2 - 0.5	0.25	4.15E-04	0.250415066	0.25	6.77E-05	0.2500677	0.25	6.77E-05	0.2500677	0.25	6.52E-04	0.25065155	0.25	6.52E-04	0.25065155
Silver	0.1 - 2	1	8.30E-05	1.000083013	1	1.35E-05	1.00001354	1	1.35E-05	1.00001354	1	1.30E-04	1.00013031	1	1.30E-04	1.00013031
Sodium	100 - 200	640	2.08E-01	640.2075332	540	3.38E-02	540.03385	380	3.38E-02	380.03385	530	3.26E-01	530.3257751	450	3.26E-01	450.3257751
Strontium	0.5	77.3	1.16E-02	77.31162186	54.3	1.90E-03	54.3018956	61.9	1.90E-03	61.9018956	31.4	1.82E-02	31.41824341	31.5	1.82E-02	31.51824341
Thallium	0.05 - 1	0.5	8.30E-05	0.500083013	0.5	1.35E-05	0.50001354	0.5	1.35E-05	0.50001354	0.5	1.30E-04	0.50013031	0.5	1.30E-04	0.50013031
Tin	42771	2.5	1.66E-03	2.501660265	2.5	2.71E-04	2.5002708	2.5	2.71E-04	2.5002708	2.5	2.61E-03	2.502606201	2.5	2.61E-03	2.502606201
Titanium	1	945	1.83E+00	946.826292	18.7	2.98E-01	18.99787958	64.4	2.98E-01	64.69787958	1200	2.87E+00	1202.866821	1250	2.87E+00	1252.866821
Uranium	0.05	0.988	8.30E-05	0.988083013	0.025	1.35E-05	0.02501354	0.219	1.35E-05	0.21901354	1.88	1.30E-04	1.88013031	1.97	1.30E-04	1.97013031
Vanadium	0.2 - 2	47.2	8.30E-02	47.28301327	1	1.35E-02	1.013539981	9.4	1.35E-02	9.413539981	57.3	1.30E-01	57.43031004	64.9	1.30E-01	65.03031004
Zinc	1	48.6	4.90E-02	48.64897783	26.5	7.99E-03	26.50798859	9	7.99E-03	9.007988589	50.9	7.69E-02	50.97688293	59.1	7.69E-02	59.17688293

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	D59 (0-10)			D59 (10-20)			D61 (0-10)			D61 (10-20)			D70 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	5000	5.22E+00	5005.218416	3680	5.22E+00	3685.218416	14200	3.11E+00	14203.11475	11200	3.11E+00	11203.11475	3580	3.88E+00	3583.883288
Antimony	0.1 - 10	5	1.80E-05	5.000017995	5	1.80E-05	5.000017995	5	1.07E-05	5.000010741	5	1.07E-05	5.000010741	5	1.34E-05	5.000013391
Arsenic	0.05 - 5	2.5	9.00E-05	2.500089973	2.5	9.00E-05	2.500089973	2.5	5.37E-05	2.500053703	2.5	5.37E-05	2.500053703	2.5	6.70E-05	2.500066953
Barium	0.5 - 1	22.4	5.40E-04	22.40053984	21.7	5.40E-04	21.70053984	77.1	3.22E-04	77.10032222	60	3.22E-04	60.00032222	21.3	4.02E-04	21.30040172
Beryllium	0.2 - 0.5	0.25	5.94E-05	0.250059382	0.25	5.94E-05	0.250059382	0.25	3.54E-05	0.250035444	0.25	3.54E-05	0.250035444	0.25	4.42E-05	0.250044189
Bismuth	0.2 - 20	10	1.80E-05	10.00001799	10	1.80E-05	10.00001799	10	1.07E-05	10.00001074	10	1.07E-05	10.00001074	10	1.34E-05	10.00001339
Cadmium	0.05 - 0.5	0.25	1.80E-05	0.250017995	0.25	1.80E-05	0.250017995	0.25	1.07E-05	0.250010741	0.25	1.07E-05	0.250010741	0.25	1.34E-05	0.250013391
Calcium	50	2470	5.76E+00	2475.758252	2410	5.76E+00	2415.758252	6190	3.44E+00	6193.43697	4210	3.44E+00	4213.43697	1800	4.29E+00	1804.285007
Chromium	0.5 - 2	17.5	2.70E-02	17.52699181	13.8	2.70E-02	13.82699181	41.3	1.61E-02	41.3161108	34.7	1.61E-02	34.7161108	9	2.01E-02	9.020085972
Cobalt	0.1 - 2	6.2	6.30E-03	6.206298088	4.9	6.30E-03	4.906298088	7.2	3.76E-03	7.203759186	6.6	3.76E-03	6.603759186	1	4.69E-03	1.004686727
Copper	0.5 - 1	22.1	1.98E-02	22.11979399	16.2	1.98E-02	16.21979399	13	1.18E-02	13.01181458	12.6	1.18E-02	12.61181458	5.9	1.47E-02	5.914729713
Iron	50	10700	8.82E+00	10708.81732	8910	8.82E+00	8918.817323	19700	5.26E+00	19705.26286	17300	5.26E+00	17305.26286	6690	6.56E+00	6696.561417
Lead	0.5 - 30	15	1.08E-04	15.00010797	15	1.08E-04	15.00010797	15	6.44E-05	15.00006444	15	6.44E-05	15.00006444	15	8.03E-05	15.00008034
Magnesium	20 - 50	3740	4.14E+00	3744.138744	2370	4.14E+00	2374.138744	7990	2.47E+00	7992.470322	6340	2.47E+00	6342.470322	1650	3.08E+00	1653.079849
Manganese	1	108	1.67E-01	108.1673492	83.8	1.67E-01	83.9673492	240	9.99E-02	240.0998869	182	9.99E-02	182.0998869	41.5	1.25E-01	41.62453302
Mercury	0.005 - 0.005	0.0025	1.80E-06	0.002501799	0.0025	1.80E-06	0.002501799	0.0201	1.07E-06	0.020101074	0.0059	1.07E-06	0.005901074	0.0099	1.34E-06	0.009901339
Molybdenum	0.5 - 4	2	9.00E-05	2.000089973	2	9.00E-05	2.000089973	2	5.37E-05	2.000053703	2	5.37E-05	2.000053703	2	6.70E-05	2.000066953
Nickel	0.5 - 5	15.2	1.30E-02	15.21295607	10.5	1.30E-02	10.51295607	20	7.73E-03	20.00773318	16	7.73E-03	16.00773318	2.5	9.64E-03	2.509641266
Phosphorus	50	325	3.96E-02	325.039588	363	3.96E-02	363.039588	490	2.36E-02	490.0236292	579	2.36E-02	579.0236292	326	2.95E-02	326.0294594
Potassium	100 - 200	540	1.80E-02	540.0179945	490	1.80E-02	490.0179945	2890	1.07E-02	2890.010741	2640	1.07E-02	2640.010741	230	1.34E-02	230.0133906
Selenium	0.2 - 0.5	0.25	9.00E-05	0.250089973	0.25	9.00E-05	0.250089973	0.25	5.37E-05	0.250053703	0.25	5.37E-05	0.250053703	0.25	6.70E-05	0.250066953
Silver	0.1 - 2	1	1.80E-05	1.000017995	1	1.80E-05	1.000017995	1	1.07E-05	1.000010741	1	1.07E-05	1.000010741	1	1.34E-05	1.000013391
Sodium	100 - 200	100	4.50E-02	100.0449863	100	4.50E-02	100.0449863	510	2.69E-02	510.0268513	380	2.69E-02	380.0268513	210	3.35E-02	210.0334766
Strontium	0.5	8.52	2.52E-03	8.522519235	8.67	2.52E-03	8.672519235	32	1.50E-03	32.00150367	24.8	1.50E-03	24.80150367	8.51	1.87E-03	8.511874691
Thallium	0.05 - 1	0.5	1.80E-05	0.500017995	0.5	1.80E-05	0.500017995	0.5	1.07E-05	0.500010741	0.5	1.07E-05	0.500010741	0.5	1.34E-05	0.500013391
Tin	42771	2.5	3.60E-04	2.500359891	2.5	3.60E-04	2.500359891	2.5	2.15E-04	2.500214811	2.5	2.15E-04	2.500214811	2.5	2.68E-04	2.500267813
Titanium	1	381	3.96E-01	381.3958798	357	3.96E-01	357.3958798	815	2.36E-01	815.2362917	740	2.36E-01	740.2362917	235	2.95E-01	235.2945943
Uranium	0.05	0.345	1.80E-05	0.345017995	0.38	1.80E-05	0.380017995	1.1	1.07E-05	1.100010741	1.27	1.07E-05	1.270010741	0.344	1.34E-05	0.344013391
Vanadium	0.2 - 2	23.7	1.80E-02	23.71799454	20.9	1.80E-02	20.91799454	43.3	1.07E-02	43.31074053	40.3	1.07E-02	40.31074053	15.1	1.34E-02	15.11339065
Zinc	1	18.4	1.06E-02	18.41061678	15.5	1.06E-02	15.51061678	57.3	6.34E-03	57.30633691	33.7	6.34E-03	33.70633691	9.6	7.90E-03	9.607900482

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D70 (10-20)			D72 (0-10)			D72 (10-20)			D76 (0-10)			D76 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	3810	3.88E+00	3813.883288	16600	4.78E+01	16647.80499	16600	4.78E+01	16647.80499	16700	1.50E+01	16714.95142	8450	1.50E+01	8464.951417
Antimony	0.1 - 10	5	1.34E-05	5.000013391	5	1.65E-04	5.000164845	5	1.65E-04	5.000164845	5	5.16E-05	5.000051557	5	5.16E-05	5.000051557
Arsenic	0.05 - 5	2.5	6.70E-05	2.500066953	2.5	8.24E-04	2.500824224	2.5	8.24E-04	2.500824224	2.5	2.58E-04	2.500257783	2.5	2.58E-04	2.500257783
Barium	0.5 - 1	20.5	4.02E-04	20.50040172	73.1	4.95E-03	73.10494534	81.9	4.95E-03	81.90494534	102	1.55E-03	102.0015467	52.6	1.55E-03	52.6015467
Beryllium	0.2 - 0.5	0.25	4.42E-05	0.250044189	0.25	5.44E-04	0.250543988	0.51	5.44E-04	0.510543988	0.25	1.70E-04	0.250170137	0.25	1.70E-04	0.250170137
Bismuth	0.2 - 20	10	1.34E-05	10.00001339	10	1.65E-04	10.00016484	10	1.65E-04	10.00016484	10	5.16E-05	10.00005156	10	5.16E-05	10.00005156
Cadmium	0.05 - 0.5	0.25	1.34E-05	0.250013391	0.25	1.65E-04	0.250164845	0.25	1.65E-04	0.250164845	0.25	5.16E-05	0.250051557	0.25	5.16E-05	0.250051557
Calcium	50	1740	4.29E+00	1744.285007	3280	5.28E+01	3332.750331	3150	5.28E+01	3202.750331	2550	1.65E+01	2566.498115	2260	1.65E+01	2276.498115
Chromium	0.5 - 2	9	2.01E-02	9.020085972	47.1	2.47E-01	47.34726718	47.9	2.47E-01	48.14726718	39.9	7.73E-02	39.97733491	22.8	7.73E-02	22.87733491
Cobalt	0.1 - 2	1	4.69E-03	1.004686727	6.4	5.77E-02	6.457695675	6.6	5.77E-02	6.657695675	8.4	1.80E-02	8.418044813	5	1.80E-02	5.018044813
Copper	0.5 - 1	4.7	1.47E-02	4.714729713	28.6	1.81E-01	28.78132926	30.4	1.81E-01	30.58132926	26.2	5.67E-02	26.25671227	12.7	5.67E-02	12.75671227
Iron	50	5160	6.56E+00	5166.561417	19400	8.08E+01	19480.77395	19200	8.08E+01	19280.77395	22900	2.53E+01	22925.26274	13800	2.53E+01	13825.26274
Lead	0.5 - 30	15	8.03E-05	15.00008034	15	9.89E-04	15.00098907	15	9.89E-04	15.00098907	15	3.09E-04	15.00030934	15	3.09E-04	15.00030934
Magnesium	20 - 50	1810	3.08E+00	1813.079849	6430	3.79E+01	6467.914301	6590	3.79E+01	6627.914301	7200	1.19E+01	7211.85802	4210	1.19E+01	4221.85802
Manganese	1	44.8	1.25E-01	44.92453302	135	1.53E+00	136.5330565	130	1.53E+00	131.5330565	147	4.79E-01	147.4794765	108	4.79E-01	108.4794765
Mercury	0.005 - 0.005	0.0025	1.34E-06	0.002501339	0.0193	1.65E-05	0.019316484	0.0116	1.65E-05	0.011616484	0.0206	5.16E-06	0.020605156	0.0065	5.16E-06	0.006505156
Molybdenum	0.5 - 4	2	6.70E-05	2.000066953	2	8.24E-04	2.000824224	2	8.24E-04	2.000824224	2	2.58E-04	2.000257783	2	2.58E-04	2.000257783
Nickel	0.5 - 5	2.5	9.64E-03	2.509641266	17.4	1.19E-01	17.51868825	18	1.19E-01	18.11868825	20.8	3.71E-02	20.83712076	10.9	3.71E-02	10.93712076
Phosphorus	50	386	2.95E-02	386.0294594	531	3.63E-01	531.3626585	473	3.63E-01	473.3626585	412	1.13E-01	412.1134245	405	1.13E-01	405.1134245
Potassium	100 - 200	230	1.34E-02	230.0133906	1810	1.65E-01	1810.164845	1680	1.65E-01	1680.164845	3110	5.16E-02	3110.051557	1710	5.16E-02	1710.051557
Selenium	0.2 - 0.5	0.25	6.70E-05	0.250066953	0.25	8.24E-04	0.250824224	0.25	8.24E-04	0.250824224	0.25	2.58E-04	0.250257783	0.25	2.58E-04	0.250257783
Silver	0.1 - 2	1	1.34E-05	1.000013391	1	1.65E-04	1.000164845	1	1.65E-04	1.000164845	1	5.16E-05	1.000051557	1	5.16E-05	1.000051557
Sodium	100 - 200	100	3.35E-02	100.0334766	290	4.12E-01	290.412112	250	4.12E-01	250.412112	290	1.29E-01	290.1288915	220	1.29E-01	220.1288915
Strontium	0.5	7.89	1.87E-03	7.891874691	27.4	2.31E-02	27.42307827	23.8	2.31E-02	23.82307827	21.5	7.22E-03	21.50721793	15.1	7.22E-03	15.10721793
Thallium	0.05 - 1	0.5	1.34E-05	0.500013391	0.5	1.65E-04	0.500164845	0.5	1.65E-04	0.500164845	0.5	5.16E-05	0.500051557	0.5	5.16E-05	0.500051557
Tin	42771	2.5	2.68E-04	2.500267813	2.5	3.30E-03	2.503296896	2.5	3.30E-03	2.503296896	2.5	1.03E-03	2.501031132	2.5	1.03E-03	2.501031132
Titanium	1	283	2.95E-01	283.2945943	1080	3.63E+00	1083.626585	992	3.63E+00	995.6265853	977	1.13E+00	978.1342454	646	1.13E+00	647.1342454
Uranium	0.05	0.393	1.34E-05	0.393013391	1.63	1.65E-04	1.630164845	1.71	1.65E-04	1.710164845	1.12	5.16E-05	1.120051557	0.79	5.16E-05	0.790051557
Vanadium	0.2 - 2	13.3	1.34E-02	13.31339065	50.6	1.65E-01	50.76484479	50.3	1.65E-01	50.46484479	46	5.16E-02	46.05155661	30.1	5.16E-02	30.15155661
Zinc	1	8.9	7.90E-03	8.907900482	34.6	9.73E-02	34.69725842	35.4	9.73E-02	35.49725842	46.3	3.04E-02	46.3304184	22.9	3.04E-02	22.9304184

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	D108 (0-10)			D108 (10-20)			D109 (0-10)			D109 (10-20)			D96 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	10200	6.21E+00	10206.21386	9060	6.21E+00	9066.213864	907	4.11E+00	911.1084423	6910	4.11E+00	6914.108442	2390	4.21E+01	2432.101803
Antimony	0.1 - 10	5	2.14E-05	5.000021427	5	2.14E-05	5.000021427	5	1.42E-05	5.000014167	5	1.42E-05	5.000014167	5	1.45E-04	5.000145179
Arsenic	0.05 - 5	2.5	1.07E-04	2.500107136	2.5	1.07E-04	2.500107136	2.5	7.08E-05	2.500070835	2.5	7.08E-05	2.500070835	2.5	7.26E-04	2.500725893
Barium	0.5 - 1	30.2	6.43E-04	30.20064281	30.3	6.43E-04	30.30064281	24	4.25E-04	24.00042501	33.7	4.25E-04	33.70042501	9.3	4.36E-03	9.304355359
Beryllium	0.2 - 0.5	0.25	7.07E-05	0.250070709	0.25	7.07E-05	0.250070709	0.25	4.68E-05	0.250046751	0.25	4.68E-05	0.250046751	0.25	4.79E-04	0.250479089
Bismuth	0.2 - 20	10	2.14E-05	10.00002143	10	2.14E-05	10.00002143	10	1.42E-05	10.00001417	10	1.42E-05	10.00001417	10	1.45E-04	10.00014518
Cadmium	0.05 - 0.5	0.25	2.14E-05	0.250021427	0.25	2.14E-05	0.250021427	0.25	1.42E-05	0.250014167	0.25	1.42E-05	0.250014167	0.25	1.45E-04	0.250145179
Calcium	50	3560	6.86E+00	3566.856678	4940	6.86E+00	4946.856678	4630	4.53E+00	4634.533454	2760	4.53E+00	2764.533454	1110	4.65E+01	1156.457162
Chromium	0.5 - 2	24.3	3.21E-02	24.33214068	23.7	3.21E-02	23.73214068	1	2.13E-02	1.021250564	14.5	2.13E-02	14.52125056	6.5	2.18E-01	6.717767949
Cobalt	0.1 - 2	9	7.50E-03	9.007499491	6.4	7.50E-03	6.407499491	1	4.96E-03	1.004958465	2.3	4.96E-03	2.304958465	1	5.08E-02	1.050812521
Copper	0.5 - 1	20.9	2.36E-02	20.92356983	23.7	2.36E-02	23.72356983	4.3	1.56E-02	4.315583747	4.9	1.56E-02	4.915583747	1.6	1.60E-01	1.759696496
Iron	50	18400	1.05E+01	18410.49929	17100	1.05E+01	17110.49929	1200	6.94E+00	1206.941851	9750	6.94E+00	9756.941851	4620	7.11E+01	4691.13753
Lead	0.5 - 30	15	1.29E-04	15.00012856	15	1.29E-04	15.00012856	15	8.50E-05	15.000085	15	8.50E-05	15.000085	15	8.71E-04	15.00087107
Magnesium	20 - 50	5460	4.93E+00	5464.928237	3400	4.93E+00	3404.928237	1100	3.26E+00	1103.25842	1390	3.26E+00	1393.25842	1380	3.34E+01	1413.391086
Manganese	1	327	1.99E-01	327.1992722	201	1.99E-01	201.1992722	10.4	1.32E-01	10.5317535	24.9	1.32E-01	25.0317535	59.7	1.35E+00	61.05016128
Mercury	0.005 - 0.005	0.0504	2.14E-06	0.050402143	0.062	2.14E-06	0.062002143	0.104	1.42E-06	0.104001417	0.0442	1.42E-06	0.044201417	0.0025	1.45E-05	0.002514518
Molybdenum	0.5 - 4	2	1.07E-04	2.000107136	2	1.07E-04	2.000107136	2	7.08E-05	2.000070835	2	7.08E-05	2.000070835	2	7.26E-04	2.000725893
Nickel	0.5 - 5	15.9	1.54E-02	15.91542752	12.8	1.54E-02	12.81542752	2.5	1.02E-02	2.510200271	8.1	1.02E-02	8.110200271	2.5	1.05E-01	2.604528616
Phosphorus	50	425	4.71E-02	425.0471397	770	4.71E-02	770.0471397	530	3.12E-02	530.0311675	735	3.12E-02	735.0311675	193	3.19E-01	193.319393
Potassium	100 - 200	410	2.14E-02	410.0214271	370	2.14E-02	370.0214271	440	1.42E-02	440.014167	590	1.42E-02	590.014167	270	1.45E-01	270.1451786
Selenium	0.2 - 0.5	0.25	1.07E-04	0.250107136	0.25	1.07E-04	0.250107136	0.25	7.08E-05	0.250070835	0.25	7.08E-05	0.250070835	0.25	7.26E-04	0.250725893
Silver	0.1 - 2	1	2.14E-05	1.000021427	1	2.14E-05	1.000021427	1	1.42E-05	1.000014167	1	1.42E-05	1.000014167	1	1.45E-04	1.000145179
Sodium	100 - 200	100	5.36E-02	100.0535678	100	5.36E-02	100.0535678	100	3.54E-02	100.0354176	100	3.54E-02	100.0354176	100	3.63E-01	100.3629466
Strontium	0.5	16.2	3.00E-03	16.2029998	19.3	3.00E-03	19.3029998	29.3	1.98E-03	29.30198339	23.5	1.98E-03	23.50198339	5.01	2.03E-02	5.030325009
Thallium	0.05 - 1	0.5	2.14E-05	0.500021427	0.5	2.14E-05	0.500021427	0.5	1.42E-05	0.500014167	0.5	1.42E-05	0.500014167	0.5	1.45E-04	0.500145179
Tin	42771	2.5	4.29E-04	2.500428542	2.5	4.29E-04	2.500428542	2.5	2.83E-04	2.500283341	2.5	2.83E-04	2.500283341	2.5	2.90E-03	2.502903573
Titanium	1	719	4.71E-01	719.4713966	454	4.71E-01	454.4713966	36.4	3.12E-01	36.71167493	260	3.12E-01	260.3116749	165	3.19E+00	168.1939299
Uranium	0.05	0.428	2.14E-05	0.428021427	0.798	2.14E-05	0.798021427	0.062	1.42E-05	0.062014167	0.609	1.42E-05	0.609014167	0.219	1.45E-04	0.219145179
Vanadium	0.2 - 2	36	2.14E-02	36.02142712	30.7	2.14E-02	30.72142712	2.5	1.42E-02	2.514167042	14.6	1.42E-02	14.61416704	9.9	1.45E-01	10.04517863
Zinc	1	38.6	1.26E-02	38.612642	26.7	1.26E-02	26.712642	17.3	8.36E-03	17.30835856	10.6	8.36E-03	10.60835856	9.7	8.57E-02	9.785655393

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	D96 (10-20)			D99 (0-10)			D99 (10-20)			D82 (0-10)			D82 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	2300	4.21E+01	2342.101803	16300	1.45E+01	16314.47416	16600	1.45E+01	16614.47416	3030	1.50E+01	3044.951417	3480	1.50E+01	3494.951417
Antimony	0.1 - 10	5	1.45E-04	5.000145179	5	4.99E-05	5.000049911	5	4.99E-05	5.000049911	5	5.16E-05	5.000051557	5	5.16E-05	5.000051557
Arsenic	0.05 - 5	2.5	7.26E-04	2.500725893	2.5	2.50E-04	2.500249554	2.5	2.50E-04	2.500249554	2.5	2.58E-04	2.500257783	2.5	2.58E-04	2.500257783
Barium	0.5 - 1	9.5	4.36E-03	9.504355359	104	1.50E-03	104.0014973	105	1.50E-03	105.0014973	17.8	1.55E-03	17.8015467	23.1	1.55E-03	23.1015467
Beryllium	0.2 - 0.5	0.25	4.79E-04	0.250479089	0.25	1.65E-04	0.250164706	0.25	1.65E-04	0.250164706	0.25	1.70E-04	0.250170137	0.25	1.70E-04	0.250170137
Bismuth	0.2 - 20	10	1.45E-04	10.00014518	10	4.99E-05	10.00004991	10	4.99E-05	10.00004991	10	5.16E-05	10.00005156	10	5.16E-05	10.00005156
Cadmium	0.05 - 0.5	0.25	1.45E-04	0.250145179	0.25	4.99E-05	0.250049911	0.25	4.99E-05	0.250049911	0.25	5.16E-05	0.250051557	0.25	5.16E-05	0.250051557
Calcium	50	1200	4.65E+01	1246.457162	4250	1.60E+01	4265.971482	4470	1.60E+01	4485.971482	1620	1.65E+01	1636.498115	1930	1.65E+01	1946.498115
Chromium	0.5 - 2	6.5	2.18E-01	6.717767949	46.3	7.49E-02	46.37486632	47.3	7.49E-02	47.37486632	11.1	7.73E-02	11.17733491	10.6	7.73E-02	10.67733491
Cobalt	0.1 - 2	1	5.08E-02	1.050812521	8.8	1.75E-02	8.817468809	10.2	1.75E-02	10.21746881	2.2	1.80E-02	2.218044813	2.6	1.80E-02	2.618044813
Copper	0.5 - 1	1.3	1.60E-01	1.459696496	18.8	5.49E-02	18.85490197	17.7	5.49E-02	17.75490197	4.4	5.67E-02	4.45671227	7	5.67E-02	7.05671227
Iron	50	4700	7.11E+01	4771.13753	23100	2.45E+01	23124.45633	22800	2.45E+01	22824.45633	7960	2.53E+01	7985.262738	8310	2.53E+01	8335.262738
Lead	0.5 - 30	15	8.71E-04	15.00087107	15	2.99E-04	15.00029947	15	2.99E-04	15.00029947	15	3.09E-04	15.00030934	15	3.09E-04	15.00030934
Magnesium	20 - 50	1400	3.34E+01	1433.391086	7720	1.15E+01	7731.479503	8000	1.15E+01	8011.479503	1760	1.19E+01	1771.85802	1920	1.19E+01	1931.85802
Manganese	1	47.1	1.35E+00	48.45016128	202	4.64E-01	202.4641712	249	4.64E-01	249.4641712	56.4	4.79E-01	56.87947646	63.8	4.79E-01	64.27947646
Mercury	0.005 - 0.005	0.0025	1.45E-05	0.002514518	0.0079	4.99E-06	0.007904991	0.009	4.99E-06	0.009004991	0.0025	5.16E-06	0.002505156	0.0071	5.16E-06	0.007105156
Molybdenum	0.5 - 4	2	7.26E-04	2.000725893	2	2.50E-04	2.000249554	2	2.50E-04	2.000249554	2	2.58E-04	2.000257783	2	2.58E-04	2.000257783
Nickel	0.5 - 5	2.5	1.05E-01	2.604528616	21.6	3.59E-02	21.63593584	21.7	3.59E-02	21.73593584	2.5	3.71E-02	2.537120758	2.5	3.71E-02	2.537120758
Phosphorus	50	216	3.19E-01	216.319393	523	1.10E-01	523.1098039	559	1.10E-01	559.1098039	292	1.13E-01	292.1134245	280	1.13E-01	280.1134245
Potassium	100 - 200	250	1.45E-01	250.1451786	3850	4.99E-02	3850.049911	3970	4.99E-02	3970.049911	510	5.16E-02	510.0515566	420	5.16E-02	420.0515566
Selenium	0.2 - 0.5	0.25	7.26E-04	0.250725893	0.25	2.50E-04	0.250249554	0.25	2.50E-04	0.250249554	0.25	2.58E-04	0.250257783	0.25	2.58E-04	0.250257783
Silver	0.1 - 2	1	1.45E-04	1.000145179	1	4.99E-05	1.000049911	1	4.99E-05	1.000049911	1	5.16E-05	1.000051557	1	5.16E-05	1.000051557
Sodium	100 - 200	100	3.63E-01	100.3629466	370	1.25E-01	370.1247772	380	1.25E-01	380.1247772	100	1.29E-01	100.1288915	100	1.29E-01	100.1288915
Strontium	0.5	5.08	2.03E-02	5.100325009	25.2	6.99E-03	25.20698752	26.4	6.99E-03	26.40698752	7.27	7.22E-03	7.277217925	8.89	7.22E-03	8.897217925
Thallium	0.05 - 1	0.5	1.45E-04	0.500145179	0.5	4.99E-05	0.500049911	0.5	4.99E-05	0.500049911	0.5	5.16E-05	0.500051557	0.5	5.16E-05	0.500051557
Tin	42771	2.5	2.90E-03	2.502903573	2.5	9.98E-04	2.500998218	2.5	9.98E-04	2.500998218	2.5	1.03E-03	2.501031132	2.5	1.03E-03	2.501031132
Titanium	1	187	3.19E+00	190.1939299	1210	1.10E+00	1211.098039	1230	1.10E+00	1231.098039	348	1.13E+00	349.1342454	357	1.13E+00	358.1342454
Uranium	0.05	0.218	1.45E-04	0.218145179	1.22	4.99E-05	1.220049911	1.21	4.99E-05	1.210049911	0.397	5.16E-05	0.397051557	0.453	5.16E-05	0.453051557
Vanadium	0.2 - 2	10.2	1.45E-01	10.34517863	53.2	4.99E-02	53.24991088	54.2	4.99E-02	54.24991088	19.4	5.16E-02	19.45155661	20	5.16E-02	20.05155661
Zinc	1	7.3	8.57E-02	7.385655393	46.2	2.94E-02	46.22944742	48.4	2.94E-02	48.42944742	8.8	3.04E-02	8.830418399	9.8	3.04E-02	9.830418399

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	D88 (0-10)			D88 (10-20)			D65 (0-10)			D65 (10-20)			D119 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	3280	4.21E+01	3322.101803	2910	4.21E+01	2952.101803	2650	3.88E+00	2653.883288	3670	3.88E+00	3673.883288	2960	6.21E+00	2966.213864
Antimony	0.1 - 10	5	1.45E-04	5.000145179	5	1.45E-04	5.000145179	5	1.34E-05	5.000013391	5	1.34E-05	5.000013391	5	2.14E-05	5.000021427
Arsenic	0.05 - 5	2.5	7.26E-04	2.500725893	2.5	7.26E-04	2.500725893	2.5	6.70E-05	2.500066953	2.5	6.70E-05	2.500066953	2.5	1.07E-04	2.500107136
Barium	0.5 - 1	18.3	4.36E-03	18.30435536	19.1	4.36E-03	19.10435536	16.6	4.02E-04	16.60040172	18.1	4.02E-04	18.10040172	21.3	6.43E-04	21.30064281
Beryllium	0.2 - 0.5	0.25	4.79E-04	0.250479089	0.25	4.79E-04	0.250479089	0.25	4.42E-05	0.250044189	0.25	4.42E-05	0.250044189	0.25	7.07E-05	0.250070709
Bismuth	0.2 - 20	10	1.45E-04	10.00014518	10	1.45E-04	10.00014518	10	1.34E-05	10.00001339	10	1.34E-05	10.00001339	10	2.14E-05	10.00002143
Cadmium	0.05 - 0.5	0.25	1.45E-04	0.250145179	0.25	1.45E-04	0.250145179	0.25	1.34E-05	0.250013391	0.25	1.34E-05	0.250013391	0.25	2.14E-05	0.250021427
Calcium	50	1270	4.65E+01	1316.457162	1310	4.65E+01	1356.457162	1440	4.29E+00	1444.285007	1340	4.29E+00	1344.285007	1230	6.86E+00	1236.856678
Chromium	0.5 - 2	8.5	2.18E-01	8.717767949	8.2	2.18E-01	8.417767949	8.8	2.01E-02	8.820085972	12	2.01E-02	12.02008597	10.3	3.21E-02	10.33214068
Cobalt	0.1 - 2	2.7	5.08E-02	2.750812521	3	5.08E-02	3.050812521	1	4.69E-03	1.004686727	2.6	4.69E-03	2.604686727	1	7.50E-03	1.007499491
Copper	0.5 - 1	5.7	1.60E-01	5.859696496	18.4	1.60E-01	18.5596965	5.2	1.47E-02	5.214729713	4.8	1.47E-02	4.814729713	2.3	2.36E-02	2.32356983
Iron	50	7500	7.11E+01	7571.13753	7100	7.11E+01	7171.13753	6310	6.56E+00	6316.561417	7460	6.56E+00	7466.561417	7600	1.05E+01	7610.499288
Lead	0.5 - 30	15	8.71E-04	15.00087107	15	8.71E-04	15.00087107	15	8.03E-05	15.00008034	15	8.03E-05	15.00008034	15	1.29E-04	15.00012856
Magnesium	20 - 50	2000	3.34E+01	2033.391086	1740	3.34E+01	1773.391086	1620	3.08E+00	1623.079849	2450	3.08E+00	2453.079849	1960	4.93E+00	1964.928237
Manganese	1	59.5	1.35E+00	60.85016128	62.3	1.35E+00	63.65016128	48.8	1.25E-01	48.92453302	57.9	1.25E-01	58.02453302	54.8	1.99E-01	54.9992722
Mercury	0.005 - 0.005	0.0025	1.45E-05	0.002514518	0.0025	1.45E-05	0.002514518	0.0025	1.34E-06	0.002501339	0.0129	1.34E-06	0.012901339	0.0025	2.14E-06	0.002502143
Molybdenum	0.5 - 4	2	7.26E-04	2.000725893	2	7.26E-04	2.000725893	2	6.70E-05	2.000066953	2	6.70E-05	2.000066953	2	1.07E-04	2.000107136
Nickel	0.5 - 5	2.5	1.05E-01	2.604528616	2.5	1.05E-01	2.604528616	2.5	9.64E-03	2.509641266	5.4	9.64E-03	5.409641266	2.5	1.54E-02	2.515427525
Phosphorus	50	203	3.19E-01	203.319393	259	3.19E-01	259.319393	360	2.95E-02	360.0294594	267	2.95E-02	267.0294594	214	4.71E-02	214.0471397
Potassium	100 - 200	520	1.45E-01	520.1451786	470	1.45E-01	470.1451786	420	1.34E-02	420.0133906	530	1.34E-02	530.0133906	700	2.14E-02	700.0214271
Selenium	0.2 - 0.5	0.25	7.26E-04	0.250725893	0.25	7.26E-04	0.250725893	0.25	6.70E-05	0.250066953	0.25	6.70E-05	0.250066953	0.25	1.07E-04	0.250107136
Silver	0.1 - 2	1	1.45E-04	1.000145179	1	1.45E-04	1.000145179	1	1.34E-05	1.000013391	1	1.34E-05	1.000013391	1	2.14E-05	1.000021427
Sodium	100 - 200	100	3.63E-01	100.3629466	100	3.63E-01	100.3629466	100	3.35E-02	100.0334766	100	3.35E-02	100.0334766	100	5.36E-02	100.0535678
Strontium	0.5	6.86	2.03E-02	6.880325009	6.12	2.03E-02	6.140325009	6.58	1.87E-03	6.581874691	8.22	1.87E-03	8.221874691	6.74	3.00E-03	6.742999796
Thallium	0.05 - 1	0.5	1.45E-04	0.500145179	0.5	1.45E-04	0.500145179	0.5	1.34E-05	0.500013391	0.5	1.34E-05	0.500013391	0.5	2.14E-05	0.500021427
Tin	42771	2.5	2.90E-03	2.502903573	2.5	2.90E-03	2.502903573	2.5	2.68E-04	2.500267813	2.5	2.68E-04	2.500267813	2.5	4.29E-04	2.500428542
Titanium	1	357	3.19E+00	360.1939299	279	3.19E+00	282.1939299	231	2.95E-01	231.2945943	377	2.95E-01	377.2945943	407	4.71E-01	407.4713966
Uranium	0.05	0.392	1.45E-04	0.392145179	0.324	1.45E-04	0.324145179	0.422	1.34E-05	0.422013391	0.344	1.34E-05	0.344013391	0.281	2.14E-05	0.281021427
Vanadium	0.2 - 2	16.4	1.45E-01	16.54517863	14.9	1.45E-01	15.04517863	14.3	1.34E-02	14.31339065	17.5	1.34E-02	17.51339065	19.8	2.14E-02	19.82142712
Zinc	1	9.9	8.57E-02	9.985655393	8.3	8.57E-02	8.385655393	7.8	7.90E-03	7.807900482	11.2	7.90E-03	11.20790048	9.9	1.26E-02	9.912641999

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		D119 (10-20)			D122 (0-10)			D122 (10-20)			D132 (0-10)			D132 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	3480	6.21E+00	3486.213864	6280	7.40E+00	6287.404552	8800	7.40E+00	8807.404552	3470	3.46E+00	3473.456849	2850	3.46E+00	2853.456849
Antimony	0.1 - 10	5	2.14E-05	5.000021427	5	2.55E-05	5.000025533	5	2.55E-05	5.000025533	5	1.19E-05	5.00001192	5	1.19E-05	5.00001192
Arsenic	0.05 - 5	2.5	1.07E-04	2.500107136	2.5	1.28E-04	2.500127665	2.5	1.28E-04	2.500127665	2.5	5.96E-05	2.500059601	2.5	5.96E-05	2.500059601
Barium	0.5 - 1	28	6.43E-04	28.00064281	35	7.66E-04	35.00076599	46.1	7.66E-04	46.10076599	21.4	3.58E-04	21.40035761	15.1	3.58E-04	15.10035761
Beryllium	0.2 - 0.5	0.25	7.07E-05	0.250070709	0.25	8.43E-05	0.250084259	0.25	8.43E-05	0.250084259	0.25	3.93E-05	0.250039337	0.25	3.93E-05	0.250039337
Bismuth	0.2 - 20	10	2.14E-05	10.00002143	10	2.55E-05	10.00002553	10	2.55E-05	10.00002553	10	1.19E-05	10.00001192	10	1.19E-05	10.00001192
Cadmium	0.05 - 0.5	0.25	2.14E-05	0.250021427	0.25	2.55E-05	0.250025533	0.25	2.55E-05	0.250025533	0.25	1.19E-05	0.25001192	0.25	1.19E-05	0.25001192
Calcium	50	1350	6.86E+00	1356.856678	2070	8.17E+00	2078.170541	2550	8.17E+00	2558.170541	1710	3.81E+00	1713.814454	1340	3.81E+00	1343.814454
Chromium	0.5 - 2	13.1	3.21E-02	13.13214068	18.6	3.83E-02	18.63829941	24.9	3.83E-02	24.93829941	10.5	1.79E-02	10.51788025	9.2	1.79E-02	9.217880255
Cobalt	0.1 - 2	2.5	7.50E-03	2.507499491	3.2	8.94E-03	3.208936529	3.7	8.94E-03	3.708936529	3.4	4.17E-03	3.404172059	2.4	4.17E-03	2.404172059
Copper	0.5 - 1	5.7	2.36E-02	5.72356983	6.9	2.81E-02	6.928086233	8.8	2.81E-02	8.828086233	9.1	1.31E-02	9.113112187	7.1	1.31E-02	7.113112187
Iron	50	7890	1.05E+01	7900.499288	9940	1.25E+01	9952.51114	13000	1.25E+01	13012.51114	7340	5.84E+00	7345.840883	6590	5.84E+00	6595.840883
Lead	0.5 - 30	15	1.29E-04	15.00012856	15	1.53E-04	15.0001532	15	1.53E-04	15.0001532	15	7.15E-05	15.00007152	15	7.15E-05	15.00007152
Magnesium	20 - 50	2270	4.93E+00	2274.928237	3070	5.87E+00	3075.872576	3910	5.87E+00	3915.872576	1910	2.74E+00	1912.741639	1590	2.74E+00	1592.741639
Manganese	1	60.6	1.99E-01	60.7992722	70.9	2.37E-01	71.13745634	92	2.37E-01	92.23745634	64.8	1.11E-01	64.91085758	51.1	1.11E-01	51.21085758
Mercury	0.005 - 0.005	0.0025	2.14E-06	0.002502143	0.0099	2.55E-06	0.009902553	0.016	2.55E-06	0.016002553	0.0117	1.19E-06	0.011701192	0.0025	1.19E-06	0.002501192
Molybdenum	0.5 - 4	2	1.07E-04	2.000107136	2	1.28E-04	2.000127665	2	1.28E-04	2.000127665	2	5.96E-05	2.000059601	2	5.96E-05	2.000059601
Nickel	0.5 - 5	5	1.54E-02	5.015427525	8.3	1.84E-02	8.318383716	10.9	1.84E-02	10.91838372	5.6	8.58E-03	5.608582522	2.5	8.58E-03	2.508582522
Phosphorus	50	243	4.71E-02	243.0471397	489	5.62E-02	489.0561725	582	5.62E-02	582.0561725	295	2.62E-02	295.0262244	269	2.62E-02	269.0262244
Potassium	100 - 200	750	2.14E-02	750.0214271	890	2.55E-02	890.0255329	1130	2.55E-02	1130.025533	480	1.19E-02	480.0119202	360	1.19E-02	360.0119202
Selenium	0.2 - 0.5	0.25	1.07E-04	0.250107136	0.25	1.28E-04	0.250127665	0.25	1.28E-04	0.250127665	0.25	5.96E-05	0.250059601	0.25	5.96E-05	0.250059601
Silver	0.1 - 2	1	2.14E-05	1.000021427	1	2.55E-05	1.000025533	1	2.55E-05	1.000025533	1	1.19E-05	1.00001192	1	1.19E-05	1.00001192
Sodium	100 - 200	240	5.36E-02	240.0535678	100	6.38E-02	100.0638323	240	6.38E-02	240.0638323	100	2.98E-02	100.0298004	100	2.98E-02	100.0298004
Strontium	0.5	7.77	3.00E-03	7.772999796	14.7	3.57E-03	14.70357461	19.3	3.57E-03	19.30357461	7.84	1.67E-03	7.841668824	5.5	1.67E-03	5.501668824
Thallium	0.05 - 1	0.5	2.14E-05	0.500021427	0.5	2.55E-05	0.500025533	0.5	2.55E-05	0.500025533	0.5	1.19E-05	0.50001192	0.5	1.19E-05	0.50001192
Tin	42771	2.5	4.29E-04	2.500428542	2.5	5.11E-04	2.500510659	2.5	5.11E-04	2.500510659	2.5	2.38E-04	2.500238403	2.5	2.38E-04	2.500238403
Titanium	1	403	4.71E-01	403.4713966	415	5.62E-01	415.5617247	514	5.62E-01	514.5617247	280	2.62E-01	280.2622437	240	2.62E-01	240.2622437
Uranium	0.05	0.412	2.14E-05	0.412021427	0.807	2.55E-05	0.807025533	0.923	2.55E-05	0.923025533	0.482	1.19E-05	0.48201192	0.319	1.19E-05	0.31901192
Vanadium	0.2 - 2	20.7	2.14E-02	20.72142712	21.7	2.55E-02	21.72553294	27.3	2.55E-02	27.32553294	16.7	1.19E-02	16.71192017	15.3	1.19E-02	15.31192017
Zinc	1	12.2	1.26E-02	12.212642	23.3	1.51E-02	23.31506443	33.4	1.51E-02	33.41506443	9.6	7.03E-03	9.6070329	7.7	7.03E-03	7.7070329

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		8 (0-10)			8 (10-20)			13 (0-10)			13 (10-20)			14 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	17300	2.89E+01	17328.86505	19100	2.89E+01	19128.86505	2700	8.00E+00	2708.004727	3350	8.00E+00	3358.004727	18700	7.94E+00	18707.93905
Antimony	0.1 - 10	5	9.95E-05	5.000099535	5	9.95E-05	5.000099535	5	2.76E-05	5.000027603	5	2.76E-05	5.000027603	5	2.74E-05	5.000027376
Arsenic	0.05 - 5	2.5	4.98E-04	2.500497673	2.5	4.98E-04	2.500497673	2.5	1.38E-04	2.500138013	2.5	1.38E-04	2.500138013	2.5	1.37E-04	2.50013688
Barium	0.5 - 1	93.2	2.99E-03	93.20298604	106	2.99E-03	106.002986	15.3	8.28E-04	15.30082808	22.6	8.28E-04	22.60082808	117	8.21E-04	117.0008213
Beryllium	0.2 - 0.5	0.25	3.28E-04	0.250328464	0.52	3.28E-04	0.520328464	0.25	9.11E-05	0.250091088	0.25	9.11E-05	0.250091088	0.59	9.03E-05	0.590090341
Bismuth	0.2 - 20	10	9.95E-05	10.00009953	10	9.95E-05	10.00009953	10	2.76E-05	10.0000276	10	2.76E-05	10.0000276	10	2.74E-05	10.00002738
Cadmium	0.05 - 0.5	0.25	9.95E-05	0.250099535	0.25	9.95E-05	0.250099535	0.25	2.76E-05	0.250027603	0.25	2.76E-05	0.250027603	0.25	2.74E-05	0.250027376
Calcium	50	4100	3.19E+01	4131.851095	5130	3.19E+01	5161.851095	1210	8.83E+00	1218.832802	1850	8.83E+00	1858.832802	4620	8.76E+00	4628.760331
Chromium	0.5 - 2	52.2	1.49E-01	52.34930201	56.8	1.49E-01	56.94930201	9.4	4.14E-02	9.441403758	10.5	4.14E-02	10.54140376	58.8	4.11E-02	58.84106405
Cobalt	0.1 - 2	10.4	3.48E-02	10.43483714	11.9	3.48E-02	11.93483714	1	9.66E-03	1.009660877	3.1	9.66E-03	3.109660877	13.8	9.58E-03	13.80958161
Copper	0.5 - 1	13.8	1.09E-01	13.90948814	17	1.09E-01	17.10948814	4.7	3.04E-02	4.730362756	7.8	3.04E-02	7.830362756	19.1	3.01E-02	19.13011364
Iron	50	26300	4.88E+01	26348.77199	29100	4.88E+01	29148.77199	7130	1.35E+01	7143.525228	7950	1.35E+01	7963.525228	29700	1.34E+01	29713.41426
Lead	0.5 - 30	15	5.97E-04	15.00059721	15	5.97E-04	15.00059721	15	1.66E-04	15.00016562	15	1.66E-04	15.00016562	15	1.64E-04	15.00016426
Magnesium	20 - 50	10200	2.29E+01	10222.89297	11400	2.29E+01	11422.89297	1760	6.35E+00	1766.348576	2250	6.35E+00	2256.348576	11300	6.30E+00	11306.29649
Manganese	1	286	9.26E-01	286.9256724	362	9.26E-01	362.9256724	47.7	2.57E-01	47.9567033	67.2	2.57E-01	67.4567033	330	2.55E-01	330.2545971
Mercury	0.005 - 0.005	0.0107	9.95E-06	0.010709953	0.0205	9.95E-06	0.020509953	0.0025	2.76E-06	0.00250276	0.0025	2.76E-06	0.00250276	0.0079	2.74E-06	0.007902738
Molybdenum	0.5 - 4	2	4.98E-04	2.000497673	2	4.98E-04	2.000497673	2	1.38E-04	2.000138013	2	1.38E-04	2.000138013	2	1.37E-04	2.00013688
Nickel	0.5 - 5	23.3	7.17E-02	23.37166496	27.3	7.17E-02	27.37166496	2.5	1.99E-02	2.519873804	5.3	1.99E-02	5.319873804	29.8	1.97E-02	29.81971075
Phosphorus	50	402	2.19E-01	402.2189763	512	2.19E-01	512.2189763	310	6.07E-02	310.0607255	393	6.07E-02	393.0607255	584	6.02E-02	584.0602273
Potassium	100 - 200	3890	9.95E-02	3890.099535	4380	9.95E-02	4380.099535	510	2.76E-02	510.0276025	760	2.76E-02	760.0276025	4400	2.74E-02	4400.027376
Selenium	0.2 - 0.5	0.25	4.98E-04	0.250497673	0.25	4.98E-04	0.250497673	0.25	1.38E-04	0.250138013	0.25	1.38E-04	0.250138013	0.25	1.37E-04	0.25013688
Silver	0.1 - 2	1	9.95E-05	1.000099535	1	9.95E-05	1.000099535	1	2.76E-05	1.000027603	1	2.76E-05	1.000027603	1	2.74E-05	1.000027376
Sodium	100 - 200	520	2.49E-01	520.2488367	510	2.49E-01	510.2488367	100	6.90E-02	100.0690063	100	6.90E-02	100.0690063	460	6.84E-02	460.0684401
Strontium	0.5	23.2	1.39E-02	23.21393485	29.5	1.39E-02	29.51393485	5.22	3.86E-03	5.223864351	7.1	3.86E-03	7.103864351	24.7	3.83E-03	24.70383264
Thallium	0.05 - 1	0.5	9.95E-05	0.500099535	0.5	9.95E-05	0.500099535	0.5	2.76E-05	0.500027603	0.5	2.76E-05	0.500027603	0.5	2.74E-05	0.500027376
Tin	42771	2.5	1.99E-03	2.501990693	2.5	1.99E-03	2.501990693	2.5	5.52E-04	2.50055205	2.5	5.52E-04	2.50055205	2.5	5.48E-04	2.500547521
Titanium	1	1220	2.19E+00	1222.189763	1330	2.19E+00	1332.189763	255	6.07E-01	255.6072551	325	6.07E-01	325.6072551	1230	6.02E-01	1230.602273
Uranium	0.05	1.06	9.95E-05	1.060099535	1.26	9.95E-05	1.260099535	0.396	2.76E-05	0.396027603	0.547	2.76E-05	0.547027603	1.75	2.74E-05	1.750027376
Vanadium	0.2 - 2	58	9.95E-02	58.09953467	63.5	9.95E-02	63.59953467	16.7	2.76E-02	16.72760251	17.6	2.76E-02	17.62760251	64.6	2.74E-02	64.62737604
Zinc	1	47.4	5.87E-02	47.45872546	54.8	5.87E-02	54.85872546	8.4	1.63E-02	8.416285478	10.4	1.63E-02	10.41628548	51.3	1.62E-02	51.31615186

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		14 (10-20)			18 (0-10)			18 (10-20)			21 (0-10)			21 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	19200	7.94E+00	19207.93905	9170	9.59E+00	9179.58814	10900	9.59E+00	10909.58814	22500	9.84E+00	22509.8402	23200	9.84E+00	23209.8402
Antimony	0.1 - 10	5	2.74E-05	5.000027376	5	3.31E-05	5.000033063	5	3.31E-05	5.000033063	5	3.39E-05	5.000033932	5	3.39E-05	5.000033932
Arsenic	0.05 - 5	2.5	1.37E-04	2.50013688	2.5	1.65E-04	2.500165313	2.5	1.65E-04	2.500165313	2.5	1.70E-04	2.500169659	2.5	1.70E-04	2.500169659
Barium	0.5 - 1	112	8.21E-04	112.0008213	46.3	9.92E-04	46.30099188	53.5	9.92E-04	53.50099188	127	1.02E-03	127.001018	135	1.02E-03	135.001018
Beryllium	0.2 - 0.5	0.59	9.03E-05	0.590090341	0.25	1.09E-04	0.250109106	0.25	1.09E-04	0.250109106	0.61	1.12E-04	0.610111975	0.63	1.12E-04	0.630111975
Bismuth	0.2 - 20	10	2.74E-05	10.00002738	10	3.31E-05	10.00003306	10	3.31E-05	10.00003306	10	3.39E-05	10.00003393	10	3.39E-05	10.00003393
Cadmium	0.05 - 0.5	0.25	2.74E-05	0.250027376	0.25	3.31E-05	0.250033063	0.25	3.31E-05	0.250033063	0.25	3.39E-05	0.250033932	0.25	3.39E-05	0.250033932
Calcium	50	4860	8.76E+00	4868.760331	2560	1.06E+01	2570.580016	3180	1.06E+01	3190.580016	5470	1.09E+01	5480.858153	5650	1.09E+01	5660.858153
Chromium	0.5 - 2	60.9	4.11E-02	60.94106405	29.2	4.96E-02	29.24959383	33.1	4.96E-02	33.14959383	65.3	5.09E-02	65.35089759	65.8	5.09E-02	65.85089759
Cobalt	0.1 - 2	13.5	9.58E-03	13.50958161	5.4	1.16E-02	5.411571893	5.9	1.16E-02	5.911571893	13.6	1.19E-02	13.6118761	14.4	1.19E-02	14.4118761
Copper	0.5 - 1	17.8	3.01E-02	17.83011364	10.5	3.64E-02	10.53636881	12.4	3.64E-02	12.43636881	24.8	3.73E-02	24.8373249	27.7	3.73E-02	27.7373249
Iron	50	30600	1.34E+01	30613.41426	14600	1.62E+01	14616.20065	16200	1.62E+01	16216.20065	33100	1.66E+01	33116.62655	33800	1.66E+01	33816.62655
Lead	0.5 - 30	15	1.64E-04	15.00016426	15	1.98E-04	15.00019838	15	1.98E-04	15.00019838	15	2.04E-04	15.00020359	15	2.04E-04	15.00020359
Magnesium	20 - 50	11300	6.30E+00	11306.29649	5870	7.60E+00	5877.604387	6740	7.60E+00	6747.604387	13700	7.80E+00	13707.8043	14200	7.80E+00	14207.8043
Manganese	1	324	2.55E-01	324.2545971	122	3.07E-01	122.3074817	138	3.07E-01	138.3074817	345	3.16E-01	345.3155651	413	3.16E-01	413.3155651
Mercury	0.005 - 0.005	0.0069	2.74E-06	0.006902738	0.0025	3.31E-06	0.002503306	0.0025	3.31E-06	0.002503306	0.0078	3.39E-06	0.007803393	0.0099	3.39E-06	0.009903393
Molybdenum	0.5 - 4	2	1.37E-04	2.00013688	2	1.65E-04	2.000165313	2	1.65E-04	2.000165313	2	1.70E-04	2.000169659	2	1.70E-04	2.000169659
Nickel	0.5 - 5	29.4	1.97E-02	29.41971075	14.8	2.38E-02	14.82380504	17.3	2.38E-02	17.32380504	32.3	2.44E-02	32.32443084	34.7	2.44E-02	34.72443084
Phosphorus	50	600	6.02E-02	600.0602273	448	7.27E-02	448.0727376	529	7.27E-02	529.0727376	446	7.46E-02	446.0746498	531	7.46E-02	531.0746498
Potassium	100 - 200	4500	2.74E-02	4500.027376	2140	3.31E-02	2140.033063	2660	3.31E-02	2660.033063	5480	3.39E-02	5480.033932	6020	3.39E-02	6020.033932
Selenium	0.2 - 0.5	0.25	1.37E-04	0.25013688	0.25	1.65E-04	0.250165313	0.25	1.65E-04	0.250165313	0.25	1.70E-04	0.250169659	0.25	1.70E-04	0.250169659
Silver	0.1 - 2	1	2.74E-05	1.000027376	1	3.31E-05	1.000033063	1	3.31E-05	1.000033063	1	3.39E-05	1.000033932	1	3.39E-05	1.000033932
Sodium	100 - 200	490	6.84E-02	490.0684401	310	8.27E-02	310.0826564	410	8.27E-02	410.0826564	710	8.48E-02	710.0848293	680	8.48E-02	680.0848293
Strontium	0.5	27.1	3.83E-03	27.10383264	15.3	4.63E-03	15.30462876	20.4	4.63E-03	20.40462876	30.2	4.75E-03	30.20475044	33.3	4.75E-03	33.30475044
Thallium	0.05 - 1	0.5	2.74E-05	0.500027376	0.5	3.31E-05	0.500033063	0.5	3.31E-05	0.500033063	0.5	3.39E-05	0.500033932	0.5	3.39E-05	0.500033932
Tin	42771	2.5	5.48E-04	2.500547521	2.5	6.61E-04	2.500661251	2.5	6.61E-04	2.500661251	2.5	6.79E-04	2.500678635	2.5	6.79E-04	2.500678635
Titanium	1	1330	6.02E-01	1330.602273	660	7.27E-01	660.7273761	757	7.27E-01	757.7273761	1540	7.46E-01	1540.746498	1490	7.46E-01	1490.746498
Uranium	0.05	1.64	2.74E-05	1.640027376	0.841	3.31E-05	0.841033063	0.961	3.31E-05	0.961033063	1.57	3.39E-05	1.570033932	1.59	3.39E-05	1.590033932
Vanadium	0.2 - 2	66.6	2.74E-02	66.62737604	32.9	3.31E-02	32.93306255	37.2	3.31E-02	37.23306255	72.7	3.39E-02	72.73393173	72	3.39E-02	72.03393173
Zinc	1	52	1.62E-02	52.01615186	23.8	1.95E-02	23.8195069	29	1.95E-02	29.0195069	57.1	2.00E-02	57.12001972	61.2	2.00E-02	61.22001972

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		22 (0-10)			22 (10-20)			23 (0-10)			23 (10-20)			29 (0-10)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	8630	9.23E+00	8639.226217	12800	9.23E+00	12809.22622	21900	1.28E+01	21912.82389	22500	1.28E+01	22512.82389	12500	6.62E+00	12506.6192
Antimony	0.1 - 10	5	3.18E-05	5.000031815	5	3.18E-05	5.000031815	5	4.42E-05	5.00004422	5	4.42E-05	5.00004422	5	2.28E-05	5.000022825
Arsenic	0.05 - 5	2.5	1.59E-04	2.500159073	2.5	1.59E-04	2.500159073	2.5	2.21E-04	2.500221102	2.5	2.21E-04	2.500221102	2.5	1.14E-04	2.500114124
Barium	0.5 - 1	33.6	9.54E-04	33.60095444	69.4	9.54E-04	69.40095444	134	1.33E-03	134.0013266	131	1.33E-03	131.0013266	71	6.85E-04	71.00068474
Beryllium	0.2 - 0.5	0.25	1.05E-04	0.250104988	0.25	1.05E-04	0.250104988	0.66	1.46E-04	0.660145927	0.65	1.46E-04	0.650145927	0.25	7.53E-05	0.250075322
Bismuth	0.2 - 20	10	3.18E-05	10.00003181	10	3.18E-05	10.00003181	10	4.42E-05	10.00004422	10	4.42E-05	10.00004422	10	2.28E-05	10.00002282
Cadmium	0.05 - 0.5	0.25	3.18E-05	0.250031815	0.25	3.18E-05	0.250031815	0.25	4.42E-05	0.25004422	0.25	4.42E-05	0.25004422	0.25	2.28E-05	0.250022825
Calcium	50	3100	1.02E+01	3110.180653	3940	1.02E+01	3950.180653	4320	1.42E+01	4334.150504	5040	1.42E+01	5054.150504	4000	7.30E+00	4007.303946
Chromium	0.5 - 2	34.5	4.77E-02	34.54772181	42.7	4.77E-02	42.74772181	65.6	6.63E-02	65.66633049	67.2	6.63E-02	67.26633049	35.8	3.42E-02	35.83423725
Cobalt	0.1 - 2	9.2	1.11E-02	9.211135089	11.3	1.11E-02	11.31113509	12.9	1.55E-02	12.91547711	14.7	1.55E-02	14.71547711	8.7	7.99E-03	8.707988691
Copper	0.5 - 1	22.6	3.50E-02	22.634996	35.1	3.50E-02	35.134996	26.2	4.86E-02	26.24864236	25.6	4.86E-02	25.64864236	15.3	2.51E-02	15.32510731
Iron	50	16800	1.56E+01	16815.58913	22300	1.56E+01	22315.58913	30900	2.17E+01	30921.66796	32700	2.17E+01	32721.66796	19900	1.12E+01	19911.18417
Lead	0.5 - 30	15	1.91E-04	15.00019089	15	1.91E-04	15.00019089	15	2.65E-04	15.00026532	15	2.65E-04	15.00026532	15	1.37E-04	15.00013695
Magnesium	20 - 50	6540	7.32E+00	6547.317345	9770	7.32E+00	9777.317345	13000	1.02E+01	13010.17067	13200	1.02E+01	13210.17067	8750	5.25E+00	8755.249711
Manganese	1	278	2.96E-01	278.2958752	301	2.96E-01	301.2958752	294	4.11E-01	294.411249	360	4.11E-01	360.411249	230	2.12E-01	230.2122709
Mercury	0.005 - 0.005	0.0067	3.18E-06	0.006703181	0.0025	3.18E-06	0.002503181	0.0101	4.42E-06	0.010104422	0.0106	4.42E-06	0.010604422	0.0273	2.28E-06	0.027302282
Molybdenum	0.5 - 4	2	1.59E-04	2.000159073	2	1.59E-04	2.000159073	2	2.21E-04	2.000221102	2	2.21E-04	2.000221102	2	1.14E-04	2.000114124
Nickel	0.5 - 5	23.2	2.29E-02	23.22290647	30.2	2.29E-02	30.22290647	35	3.18E-02	35.03183863	35.7	3.18E-02	35.73183863	19.7	1.64E-02	19.71643388
Phosphorus	50	284	7.00E-02	284.069992	442	7.00E-02	442.069992	490	9.73E-02	490.0972847	578	9.73E-02	578.0972847	385	5.02E-02	385.0502146
Potassium	100 - 200	1040	3.18E-02	1040.031815	2630	3.18E-02	2630.031815	4770	4.42E-02	4770.04422	4710	4.42E-02	4710.04422	3580	2.28E-02	3580.022825
Selenium	0.2 - 0.5	0.25	1.59E-04	0.250159073	0.25	1.59E-04	0.250159073	0.25	2.21E-04	0.250221102	0.25	2.21E-04	0.250221102	0.25	1.14E-04	0.250114124
Silver	0.1 - 2	1	3.18E-05	1.000031815	1	3.18E-05	1.000031815	1	4.42E-05	1.00004422	1	4.42E-05	1.00004422	1	2.28E-05	1.000022825
Sodium	100 - 200	240	7.95E-02	240.0795364	510	7.95E-02	510.0795364	510	1.11E-01	510.1105508	520	1.11E-01	520.1105508	530	5.71E-02	530.0570621
Strontium	0.5	11.1	4.45E-03	11.10445404	17.3	4.45E-03	17.30445404	26.8	6.19E-03	26.80619085	29.1	6.19E-03	29.10619085	24.2	3.20E-03	24.20319548
Thallium	0.05 - 1	0.5	3.18E-05	0.500031815	0.5	3.18E-05	0.500031815	0.5	4.42E-05	0.50004422	0.5	4.42E-05	0.50004422	0.5	2.28E-05	0.500022825
Tin	42771	2.5	6.36E-04	2.500636291	2.5	6.36E-04	2.500636291	2.5	8.84E-04	2.500884406	2.5	8.84E-04	2.500884406	2.5	4.56E-04	2.500456497
Titanium	1	523	7.00E-01	523.6999199	744	7.00E-01	744.6999199	1470	9.73E-01	1470.972847	1510	9.73E-01	1510.972847	928	5.02E-01	928.5021463
Uranium	0.05	0.342	3.18E-05	0.342031815	0.416	3.18E-05	0.416031815	2.23	4.42E-05	2.23004422	2.05	4.42E-05	2.05004422	1.35	2.28E-05	1.350022825
Vanadium	0.2 - 2	35.2	3.18E-02	35.23181454	46	3.18E-02	46.03181454	71.7	4.42E-02	71.74422032	73.3	4.42E-02	73.34422032	43.6	2.28E-02	43.62282483
Zinc	1	22.8	1.88E-02	22.81877058	37.9	1.88E-02	37.91877058	59	2.61E-02	59.02608999	61	2.61E-02	61.02608999	36.8	1.35E-02	36.81346665

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		29 (10-20)			11 (0-10)			11 (10-20)			16 (0-10)			16 (10-20)		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	21300	6.62E+00	21306.6192	3450	7.77E+00	3457.766569	9250	7.77E+00	9257.766569	2190	3.10E+01	2221.031741	13600	3.10E+01	13631.03174
Antimony	0.1 - 10	5	2.28E-05	5.000022825	5	2.68E-05	5.000026781	5	2.68E-05	5.000026781	5	1.07E-04	5.000107006	5	1.07E-04	5.000107006
Arsenic	0.05 - 5	2.5	1.14E-04	2.500114124	2.5	1.34E-04	2.500133906	2.5	1.34E-04	2.500133906	2.5	5.35E-04	2.50053503	2.5	5.35E-04	2.50053503
Barium	0.5 - 1	128	6.85E-04	128.0006847	19.2	8.03E-04	19.20080344	60.5	8.03E-04	60.50080344	13.8	3.21E-03	13.80321018	109	3.21E-03	109.0032102
Beryllium	0.2 - 0.5	0.56	7.53E-05	0.560075322	0.25	8.84E-05	0.250088378	0.25	8.84E-05	0.250088378	0.25	3.53E-04	0.25035312	0.25	3.53E-04	0.25035312
Bismuth	0.2 - 20	10	2.28E-05	10.00002282	10	2.68E-05	10.00002678	10	2.68E-05	10.00002678	10	1.07E-04	10.00010701	10	1.07E-04	10.00010701
Cadmium	0.05 - 0.5	0.25	2.28E-05	0.250022825	0.25	2.68E-05	0.250026781	0.25	2.68E-05	0.250026781	0.25	1.07E-04	0.250107006	0.25	1.07E-04	0.250107006
Calcium	50	5910	7.30E+00	5917.303946	1070	8.57E+00	1078.570007	3580	8.57E+00	3588.570007	1240	3.42E+01	1274.241921	13800	3.42E+01	13834.24192
Chromium	0.5 - 2	59.4	3.42E-02	59.43423725	8.5	4.02E-02	8.540171907	30.5	4.02E-02	30.54017191	7.6	1.61E-01	7.760509004	41.8	1.61E-01	41.960509
Cobalt	0.1 - 2	13.7	7.99E-03	13.70798869	2.2	9.37E-03	2.209373445	8.3	9.37E-03	8.309373445	2	3.75E-02	2.037452101	9.3	3.75E-02	9.337452101
Copper	0.5 - 1	27.6	2.51E-02	27.62510731	6.2	2.95E-02	6.229459398	19.4	2.95E-02	19.4294594	5.7	1.18E-01	5.817706603	40.3	1.18E-01	40.4177066
Iron	50	32000	1.12E+01	32011.18417	7470	1.31E+01	7483.122823	16200	1.31E+01	16213.12282	6020	5.24E+01	6072.432941	20400	5.24E+01	20452.43294
Lead	0.5 - 30	15	1.37E-04	15.00013695	15	1.61E-04	15.00016069	15	1.61E-04	15.00016069	15	6.42E-04	15.00064204	15	6.42E-04	15.00064204
Magnesium	20 - 50	13900	5.25E+00	13905.24971	1910	6.16E+00	1916.159692	6360	6.16E+00	6366.159692	1390	2.46E+01	1414.611381	8730	2.46E+01	8754.611381
Manganese	1	369	2.12E-01	369.2122709	48.2	2.49E-01	48.44906582	211	2.49E-01	211.2490658	39.7	9.95E-01	40.69515582	234	9.95E-01	234.9951558
Mercury	0.005 - 0.005	0.0084	2.28E-06	0.008402282	0.0064	2.68E-06	0.006402678	0.0025	2.68E-06	0.002502678	0.0025	1.07E-05	0.002510701	0.0239	1.07E-05	0.023910701
Molybdenum	0.5 - 4	2	1.14E-04	2.000114124	2	1.34E-04	2.000133906	2	1.34E-04	2.000133906	2	5.35E-04	2.00053503	2	5.35E-04	2.00053503
Nickel	0.5 - 5	32	1.64E-02	32.01643388	2.5	1.93E-02	2.519282515	18.9	1.93E-02	18.91928252	2.5	7.70E-02	2.577044322	28.5	7.70E-02	28.57704432
Phosphorus	50	538	5.02E-02	538.0502146	177	5.89E-02	177.0589188	303	5.89E-02	303.0589188	288	2.35E-01	288.2354132	521	2.35E-01	521.2354132
Potassium	100 - 200	5200	2.28E-02	5200.022825	480	2.68E-02	480.0267813	1910	2.68E-02	1910.026781	370	1.07E-01	370.107006	2860	1.07E-01	2860.107006
Selenium	0.2 - 0.5	0.25	1.14E-04	0.250114124	0.25	1.34E-04	0.250133906	0.25	1.34E-04	0.250133906	0.25	5.35E-04	0.25053503	0.25	5.35E-04	0.25053503
Silver	0.1 - 2	1	2.28E-05	1.000022825	1	2.68E-05	1.000026781	1	2.68E-05	1.000026781	1	1.07E-04	1.000107006	1	1.07E-04	1.000107006
Sodium	100 - 200	840	5.71E-02	840.0570621	100	6.70E-02	100.0669532	320	6.70E-02	320.0669532	100	2.68E-01	100.267515	550	2.68E-01	550.267515
Strontium	0.5	35.3	3.20E-03	35.30319548	6.93	3.75E-03	6.933749378	13.7	3.75E-03	13.70374938	4.56	1.50E-02	4.57498084	30.9	1.50E-02	30.91498084
Thallium	0.05 - 1	0.5	2.28E-05	0.500022825	0.5	2.68E-05	0.500026781	0.5	2.68E-05	0.500026781	0.5	1.07E-04	0.500107006	0.5	1.07E-04	0.500107006
Tin	42771	2.5	4.56E-04	2.500456497	2.5	5.36E-04	2.500535625	2.5	5.36E-04	2.500535625	2.5	2.14E-03	2.50214012	2.5	2.14E-03	2.50214012
Titanium	1	1470	5.02E-01	1470.502146	309	5.89E-01	309.589188	665	5.89E-01	665.589188	176	2.35E+00	178.3541321	746	2.35E+00	748.3541321
Uranium	0.05	1.94	2.28E-05	1.940022825	0.379	2.68E-05	0.379026781	1.06	2.68E-05	1.060026781	0.345	1.07E-04	0.345107006	1.3	1.07E-04	1.300107006
Vanadium	0.2 - 2	69.9	2.28E-02	69.92282483	16.8	2.68E-02	16.82678127	35.6	2.68E-02	35.62678127	14	1.07E-01	14.107006	41.3	1.07E-01	41.407006
Zinc	1	59.4	1.35E-02	59.41346665	10.5	1.58E-02	10.51580095	25.1	1.58E-02	25.11580095	6.9	6.31E-02	6.963133542	36.4	6.31E-02	36.46313354

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	REFA-01			REFA-02			REFA-03			REFB-01			REFB-02		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	7330	3.31E+00	7333.305608	19600	3.30E+00	19603.30289	5570	3.35E+00	5573.347258	4750	3.02E+00	4753.020266	9360	3.01E+00	9363.013861
Antimony	0.1 - 10	0.05	1.14E-05	0.050011399	0.05	1.14E-05	0.050011389	0.05	1.15E-05	0.050011542	0.05	1.04E-05	0.050010415	0.05	1.04E-05	0.050010393
Arsenic	0.05 - 5	2.44	5.70E-05	2.440056993	2.39	5.69E-05	2.390056946	0.724	5.77E-05	0.724057711	0.921	5.21E-05	0.921052074	0.949	5.20E-05	0.949051963
Barium	0.5 - 1	23.7	3.42E-04	23.70034196	131	3.42E-04	131.0003417	14.5	3.46E-04	14.50034627	16	3.12E-04	16.00031244	18.7	3.12E-04	18.70031178
Beryllium	0.2 - 0.5	0.1	3.76E-05	0.100037616	0.64	3.76E-05	0.640037585	0.1	3.81E-05	0.100038089	0.1	3.44E-05	0.100034369	0.1	3.43E-05	0.100034296
Bismuth	0.2 - 20	0.1	1.14E-05	0.100011399	0.21	1.14E-05	0.210011389	0.1	1.15E-05	0.100011542	0.1	1.04E-05	0.100010415	0.1	1.04E-05	0.100010393
Cadmium	0.05 - 0.5	0.025	1.14E-05	0.025011399	0.06	1.14E-05	0.060011389	0.025	1.15E-05	0.025011542	0.025	1.04E-05	0.025010415	0.062	1.04E-05	0.062010393
Calcium	50	2660	3.65E+00	2663.647567	6160	3.64E+00	6163.644563	2040	3.69E+00	2043.693526	1510	3.33E+00	1513.332708	1970	3.33E+00	1973.325639
Chromium	0.5 - 2	17.1	1.71E-02	17.11709797	54.4	1.71E-02	54.41708389	11.1	1.73E-02	11.1173134	9.93	1.56E-02	9.945622066	17.2	1.56E-02	17.21558893
Cobalt	0.1 - 2	4.35	3.99E-03	4.353989526	11.9	3.99E-03	11.90398624	4.1	4.04E-03	4.104039794	4.28	3.65E-03	4.283645149	5.85	3.64E-03	5.853637418
Copper	0.5 - 1	4.33	1.25E-02	4.342538512	25.2	1.25E-02	25.21252819	9.86	1.27E-02	9.872696496	9.95	1.15E-02	9.961456182	10	1.14E-02	10.01143188
Iron	50	12900	5.59E+00	12905.58534	28500	5.58E+00	28505.58074	10500	5.66E+00	10505.65571	8460	5.10E+00	8465.103208	15600	5.09E+00	15605.09239
Lead	0.5 - 30	3.02	6.84E-05	3.020068392	7.93	6.83E-05	7.930068336	1.66	6.93E-05	1.660069254	1.5	6.25E-05	1.500062488	2.96	6.24E-05	2.960062356
Magnesium	20 - 50	4220	2.62E+00	4222.621689	12600	2.62E+00	12602.61953	3400	2.65E+00	3402.654722	3260	2.40E+00	3262.395384	4810	2.39E+00	4812.390303
Manganese	1	126	1.06E-01	126.1060074	348	1.06E-01	348.1059201	101	1.07E-01	101.1073431	96.3	9.69E-02	96.39685681	157	9.67E-02	157.0966514
Mercury	0.005 - 0.005	0.0066	1.14E-06	0.00660114	0.0025	1.14E-06	0.002501139	0.006	1.15E-06	0.006001154	0.0025	1.04E-06	0.002501041	0.0287	1.04E-06	0.028701039
Molybdenum	0.5 - 4	0.73	5.70E-05	0.730056993	0.55	5.69E-05	0.550056946	0.25	5.77E-05	0.250057711	0.25	5.21E-05	0.250052074	0.25	5.20E-05	0.250051963
Nickel	0.5 - 5	8.56	8.21E-03	8.568207026	29.9	8.20E-03	29.90820027	7.67	8.31E-03	7.678310434	8.11	7.50E-03	8.117498592	13.5	7.48E-03	13.50748269
Phosphorus	50	254	2.51E-02	254.025077	714	2.51E-02	714.0250564	299	2.54E-02	299.025393	249	2.29E-02	249.0229124	282	2.29E-02	282.0228638
Potassium	100 - 200	900	1.14E-02	900.0113986	5830	1.14E-02	5830.011389	510	1.15E-02	510.0115423	590	1.04E-02	590.0104147	650	1.04E-02	650.0103926
Selenium	0.2 - 0.5	0.1	5.70E-05	0.100056993	0.1	5.69E-05	0.100056946	0.1	5.77E-05	0.100057711	0.1	5.21E-05	0.100052074	0.1	5.20E-05	0.100051963
Silver	0.1 - 2	0.05	1.14E-05	0.050011399	0.05	1.14E-05	0.050011389	0.05	1.15E-05	0.050011542	0.05	1.04E-05	0.050010415	0.05	1.04E-05	0.050010393
Sodium	100 - 200	300	2.85E-02	300.0284966	1450	2.85E-02	1450.028473	150	2.89E-02	150.0288557	50	2.60E-02	50.02603678	110	2.60E-02	110.0259816
Strontium	0.5	14.6	1.60E-03	14.60159581	39.7	1.59E-03	39.7015945	9.37	1.62E-03	9.371615918	7.65	1.46E-03	7.65145806	11.7	1.45E-03	11.70145497
Thallium	0.05 - 1	0.059	1.14E-05	0.059011399	0.258	1.14E-05	0.258011389	0.025	1.15E-05	0.025011542	0.025	1.04E-05	0.025010415	0.025	1.04E-05	0.025010393
Tin	42771	1	2.28E-04	1.000227973	1	2.28E-04	1.000227785	1	2.31E-04	1.000230845	1	2.08E-04	1.000208294	1	2.08E-04	1.000207852
Titanium	1	727	2.51E-01	727.2507702	1490	2.51E-01	1490.250564	481	2.54E-01	481.2539299	348	2.29E-01	348.2291236	746	2.29E-01	746.2286377
Uranium	0.05	0.495	1.14E-05	0.495011399	1.69	1.14E-05	1.690011389	0.329	1.15E-05	0.329011542	0.326	1.04E-05	0.326010415	0.417	1.04E-05	0.417010393
Vanadium	0.2 - 2	32.5	1.14E-02	32.51139865	62.3	1.14E-02	62.31138926	24.1	1.15E-02	24.11154227	17.5	1.04E-02	17.51041471	31.3	1.04E-02	31.31039262
Zinc	1	17.6	6.73E-03	17.6067252	58.7	6.72E-03	58.70671966	15.6	6.81E-03	15.60680994	15.3	6.14E-03	15.30614468	28.5	6.13E-03	28.50613165

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		REFB-03			REFC-01			REFC-02			REFC-03			LSA-01		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	6780	3.01E+00	6783.013081	17000	3.08E+00	17003.08454	4620	3.25E+00	4623.252869	5650	3.30E+00	5653.295843	9480	2.51E+01	9505.1414
Antimony	0.1 - 10	0.05	1.04E-05	0.05001039	0.05	1.06E-05	0.050010636	0.05	1.12E-05	0.050011217	0.05	1.14E-05	0.050011365	0.05	8.67E-05	0.050086694
Arsenic	0.05 - 5	1.08	5.19E-05	1.08005195	2.93	5.32E-05	2.930053182	0.87	5.61E-05	0.870056084	0.917	5.68E-05	0.917056825	2.97	4.33E-04	2.970433472
Barium	0.5 - 1	18.7	3.12E-04	18.7003117	77	3.19E-04	77.00031909	16.8	3.37E-04	16.8003365	15.4	3.41E-04	15.40034095	35.3	2.60E-03	35.30260083
Beryllium	0.2 - 0.5	0.1	3.43E-05	0.100034287	0.44	3.51E-05	0.4400351	0.1	3.70E-05	0.100037015	0.1	3.75E-05	0.100037504	0.1	2.86E-04	0.100286092
Bismuth	0.2 - 20	0.1	1.04E-05	0.10001039	0.1	1.06E-05	0.100010636	0.1	1.12E-05	0.100011217	0.1	1.14E-05	0.100011365	0.1	8.67E-05	0.100086694
Cadmium	0.05 - 0.5	0.025	1.04E-05	0.02501039	0.025	1.06E-05	0.025010636	0.025	1.12E-05	0.025011217	0.025	1.14E-05	0.025011365	0.025	8.67E-05	0.025086694
Calcium	50	2620	3.32E+00	2623.324779	5090	3.40E+00	5093.403635	2050	3.59E+00	2053.589372	1860	3.64E+00	1863.636792	3470	2.77E+01	3497.742234
Chromium	0.5 - 2	21.8	1.56E-02	21.8155849	43.6	1.60E-02	43.61595454	13.6	1.68E-02	13.61682518	17.3	1.70E-02	17.31704746	40.9	1.30E-01	41.03004172
Cobalt	0.1 - 2	7.47	3.64E-03	7.473636477	10.5	3.72E-03	10.50372273	4.46	3.93E-03	4.463925876	4.99	3.98E-03	4.993977741	9.92	3.03E-02	9.950343069
Copper	0.5 - 1	11.6	1.14E-02	11.61142893	16.8	1.17E-02	16.8117	4.84	1.23E-02	4.852338468	11.4	1.25E-02	11.41250147	23.5	9.54E-02	23.59536393
Iron	50	13200	5.09E+00	13205.09107	25100	5.21E+00	25105.21182	9910	5.50E+00	9915.496227	10700	5.57E+00	10705.56884	19100	4.25E+01	19142.4803
Lead	0.5 - 30	2.07	6.23E-05	2.07006234	6.16	6.38E-05	6.160063818	1.65	6.73E-05	1.650067301	1.64	6.82E-05	1.64006819	2.43	5.20E-04	2.430520167
Magnesium	20 - 50	4480	2.39E+00	4482.389685	7530	2.45E+00	7532.446363	2700	2.58E+00	2702.579861	3730	2.61E+00	3732.613944	6660	1.99E+01	6679.939731
Manganese	1	237	9.66E-02	237.0966264	253	9.89E-02	253.0989181	105	1.04E-01	105.1043161	125	1.06E-01	125.1056943	283	8.06E-01	283.8062587
Mercury	0.005 - 0.005	0.0025	1.04E-06	0.002501039	0.0101	1.06E-06	0.010101064	0.0025	1.12E-06	0.002501122	0.0025	1.14E-06	0.002501136	0.0084	8.67E-06	0.008408669
Molybdenum	0.5 - 4	0.25	5.19E-05	0.25005195	0.25	5.32E-05	0.250053182	0.25	5.61E-05	0.250056084	0.25	5.68E-05	0.250056825	0.25	4.33E-04	0.250433472
Nickel	0.5 - 5	11.7	7.48E-03	11.70748075	21.9	7.66E-03	21.90765818	6.63	8.08E-03	6.638076088	10.2	8.18E-03	10.20818278	27.2	6.24E-02	27.26242003
Phosphorus	50	398	2.29E-02	398.0228579	414	2.34E-02	414.0234	350	2.47E-02	350.0246769	282	2.50E-02	282.0250029	242	1.91E-01	242.1907279
Potassium	100 - 200	520	1.04E-02	520.0103899	2730	1.06E-02	2730.010636	590	1.12E-02	590.0112168	580	1.14E-02	580.011365	1050	8.67E-02	1050.086694
Selenium	0.2 - 0.5	0.1	5.19E-05	0.10005195	0.1	5.32E-05	0.100053182	0.1	5.61E-05	0.100056084	0.1	5.68E-05	0.100056825	0.1	4.33E-04	0.100433472
Silver	0.1 - 2	0.05	1.04E-05	0.05001039	0.05	1.06E-05	0.050010636	0.05	1.12E-05	0.050011217	0.05	1.14E-05	0.050011365	0.05	8.67E-05	0.050086694
Sodium	100 - 200	200	2.60E-02	200.0259748	460	2.66E-02	460.0265909	140	2.80E-02	140.028042	120	2.84E-02	120.0284124	240	2.17E-01	240.2167362
Strontium	0.5	13.7	1.45E-03	13.70145459	34.8	1.49E-03	34.80148909	11.6	1.57E-03	11.60157035	9.21	1.59E-03	9.211591097	14.9	1.21E-02	14.91213723
Thallium	0.05 - 1	0.025	1.04E-05	0.02501039	0.168	1.06E-05	0.168010636	0.025	1.12E-05	0.025011217	0.025	1.14E-05	0.025011365	0.056	8.67E-05	0.056086694
Tin	42771	1	2.08E-04	1.000207799	1	2.13E-04	1.000212727	1	2.24E-04	1.000224336	1	2.27E-04	1.0002273	1	1.73E-03	1.00173389
Titanium	1	695	2.29E-01	695.2285786	1210	2.34E-01	1210.234	478	2.47E-01	478.2467694	462	2.50E-01	462.2500295	594	1.91E+00	595.9072786
Uranium	0.05	0.909	1.04E-05	0.90901039	1.44	1.06E-05	1.440010636	0.415	1.12E-05	0.415011217	0.336	1.14E-05	0.336011365	0.476	8.67E-05	0.476086694
Vanadium	0.2 - 2	28.6	1.04E-02	28.61038993	53.3	1.06E-02	53.31063636	23	1.12E-02	23.01121679	23.1	1.14E-02	23.11136498	38.6	8.67E-02	38.68669448
Zinc	1	21.9	6.13E-03	21.90613006	41.1	6.28E-03	41.10627545	13.3	6.62E-03	13.30661791	16.8	6.71E-03	16.80670534	34.3	5.11E-02	34.35114974

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		LSA-02			LSA-03			LSA-04			LSA-05			LSA-06		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	27200	5.39E+00	27205.39437	5590	5.77E+00	5595.768034	12300	1.53E+01	12315.2585	5550	3.07E+00	5553.072397	4800	3.28E+00	4803.280166
Antimony	0.1 - 10	0.05	1.86E-05	0.050018601	0.05	1.99E-05	0.05001989	0.05	5.26E-05	0.050052616	0.05	1.06E-05	0.050010594	0.05	1.13E-05	0.050011311
Arsenic	0.05 - 5	3.77	9.30E-05	3.770093006	0.726	9.94E-05	0.726099449	2.35	2.63E-04	2.350263078	3.92	5.30E-05	3.920052972	0.855	5.66E-05	0.855056555
Barium	0.5 - 1	164	5.58E-04	164.000558	21.8	5.97E-04	21.80059669	54.2	1.58E-03	54.20157847	6.85	3.18E-04	6.850317834	11.9	3.39E-04	11.90033933
Beryllium	0.2 - 0.5	0.79	6.14E-05	0.790061384	0.1	6.56E-05	0.100065636	0.23	1.74E-04	0.230173631	0.1	3.50E-05	0.100034962	0.1	3.73E-05	0.100037326
Bismuth	0.2 - 20	0.23	1.86E-05	0.230018601	0.1	1.99E-05	0.10001989	0.1	5.26E-05	0.100052616	0.1	1.06E-05	0.100010594	0.1	1.13E-05	0.100011311
Cadmium	0.05 - 0.5	0.025	1.86E-05	0.025018601	0.025	1.99E-05	0.02501989	0.025	5.26E-05	0.025052616	0.025	1.06E-05	0.025010594	0.025	1.13E-05	0.025011311
Calcium	50	6790	5.95E+00	6795.952409	1860	6.36E+00	1866.364727	4720	1.68E+01	4736.836963	1740	3.39E+00	1743.390231	1530	3.62E+00	1533.619493
Chromium	0.5 - 2	77.8	2.79E-02	77.82790192	14.3	2.98E-02	14.32983466	39.7	7.89E-02	39.77892326	15	1.59E-02	15.01589171	13	1.70E-02	13.01696637
Cobalt	0.1 - 2	15.9	6.51E-03	15.90651045	4.71	6.96E-03	4.716961421	11.1	1.84E-02	11.11841543	5.72	3.71E-03	5.723708065	5.11	3.96E-03	5.113958821
Copper	0.5 - 1	41.2	2.05E-02	41.22046141	6.47	2.19E-02	6.491878751	23.8	5.79E-02	23.85787706	27.1	1.17E-02	27.11165392	12.2	1.24E-02	12.21244201
Iron	50	39800	9.11E+00	39809.11463	10100	9.75E+00	10109.74599	20900	2.58E+01	20925.7816	12200	5.19E+00	12205.19129	11400	5.54E+00	11405.54235
Lead	0.5 - 30	9.46	1.12E-04	9.460111608	1.78	1.19E-04	1.780119339	3.32	3.16E-04	3.320315693	1.75	6.36E-05	1.750063567	1.42	6.79E-05	1.420067865
Magnesium	20 - 50	17900	4.28E+00	17904.27829	3640	4.57E+00	3644.574648	7490	1.21E+01	7502.101567	3080	2.44E+00	3082.436729	2870	2.60E+00	2872.601511
Manganese	1	413	1.73E-01	413.1729919	123	1.85E-01	123.1849749	327	4.89E-01	327.4893242	145	9.85E-02	145.0985286	132	1.05E-01	132.1051915
Mercury	0.005 - 0.005	0.0073	1.86E-06	0.00730186	0.0074	1.99E-06	0.007401989	0.0088	5.26E-06	0.008805262	0.0025	1.06E-06	0.002501059	0.0025	1.13E-06	0.002501131
Molybdenum	0.5 - 4	0.25	9.30E-05	0.250093006	0.25	9.94E-05	0.250099449	0.25	2.63E-04	0.250263078	0.25	5.30E-05	0.250052972	0.25	5.66E-05	0.250056555
Nickel	0.5 - 5	39.9	1.34E-02	39.91339292	8.25	1.43E-02	8.264320637	24	3.79E-02	24.03788317	9.86	7.63E-03	9.86762802	8.66	8.14E-03	8.668143859
Phosphorus	50	363	4.09E-02	363.0409228	227	4.38E-02	227.0437575	170	1.16E-01	170.1157541	113	2.33E-02	113.0233078	161	2.49E-02	161.024884
Potassium	100 - 200	7790	1.86E-02	7790.018601	860	1.99E-02	860.0198898	2160	5.26E-02	2160.052616	160	1.06E-02	160.0105945	260	1.13E-02	260.0113109
Selenium	0.2 - 0.5	0.1	9.30E-05	0.100093006	0.1	9.94E-05	0.100099449	0.1	2.63E-04	0.100263078	0.1	5.30E-05	0.100052972	0.1	5.66E-05	0.100056555
Silver	0.1 - 2	0.05	1.86E-05	0.050018601	0.05	1.99E-05	0.05001989	0.05	5.26E-05	0.050052616	0.05	1.06E-05	0.050010594	0.05	1.13E-05	0.050011311
Sodium	100 - 200	1070	4.65E-02	1070.046503	180	4.97E-02	180.0497244	460	1.32E-01	460.1315388	50	2.65E-02	50.02648618	120	2.83E-02	120.0282773
Strontium	0.5	32.3	2.60E-03	32.30260418	9.66	2.78E-03	9.662784568	21.5	7.37E-03	21.50736617	7.52	1.48E-03	7.521483226	7.71	1.58E-03	7.711583528
Thallium	0.05 - 1	0.356	1.86E-05	0.356018601	0.025	1.99E-05	0.02501989	0.114	5.26E-05	0.114052616	0.025	1.06E-05	0.025010594	0.025	1.13E-05	0.025011311
Tin	42771	1	3.72E-04	1.000372026	1	3.98E-04	1.000397795	1	1.05E-03	1.00105231	1	2.12E-04	1.000211889	1	2.26E-04	1.000226218
Titanium	1	1760	4.09E-01	1760.409228	480	4.38E-01	480.437575	950	1.16E+00	951.1575412	479	2.33E-01	479.2330784	414	2.49E-01	414.2488401
Uranium	0.05	0.863	1.86E-05	0.863018601	0.392	1.99E-05	0.39201989	0.369	5.26E-05	0.369052616	0.405	1.06E-05	0.405010594	0.31	1.13E-05	0.310011311
Vanadium	0.2 - 2	82	1.86E-02	82.01860128	23.1	1.99E-02	23.11988977	46.9	5.26E-02	46.95261551	27.9	1.06E-02	27.91059447	24.7	1.13E-02	24.71131092
Zinc	1	80.5	1.10E-02	80.51097475	16.4	1.17E-02	16.41173497	34.2	3.10E-02	34.23104315	13.4	6.25E-03	13.40625074	14.3	6.67E-03	14.30667344

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

	Detection Limit (mg/kg)	LSA-07A			LSA-07B			LSA-08			LSA-09A			LSA-09B		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals																
Aluminum	50	6960	3.04E+00	6963.037769	5920	3.04E+00	5923.037769	7070	3.03E+00	7073.031383	3480	7.40E+00	3487.404552	3920	7.40E+00	3927.404552
Antimony	0.1 - 10	0.05	1.05E-05	0.050010475	0.05	1.05E-05	0.050010475	0.05	1.05E-05	0.050010453	0.05	2.55E-05	0.050025533	0.05	2.55E-05	0.050025533
Arsenic	0.05 - 5	3.03	5.24E-05	3.030052375	2.37	5.24E-05	2.370052375	1.31	5.23E-05	1.310052265	0.999	1.28E-04	0.999127665	1.01	1.28E-04	1.010127665
Barium	0.5 - 1	25	3.14E-04	25.00031425	20.6	3.14E-04	20.60031425	18.6	3.14E-04	18.60031359	14.6	7.66E-04	14.60076599	18.2	7.66E-04	18.20076599
Beryllium	0.2 - 0.5	0.1	3.46E-05	0.100034568	0.1	3.46E-05	0.100034568	0.1	3.45E-05	0.100034495	0.1	8.43E-05	0.100084259	0.1	8.43E-05	0.100084259
Bismuth	0.2 - 20	0.1	1.05E-05	0.100010475	0.1	1.05E-05	0.100010475	0.1	1.05E-05	0.100010453	0.1	2.55E-05	0.100025533	0.1	2.55E-05	0.100025533
Cadmium	0.05 - 0.5	0.025	1.05E-05	0.025010475	0.025	1.05E-05	0.025010475	0.025	1.05E-05	0.025010453	0.025	2.55E-05	0.025025533	0.025	2.55E-05	0.025025533
Calcium	50	2310	3.35E+00	2313.352021	2060	3.35E+00	2063.352021	2260	3.34E+00	2263.344974	2560	8.17E+00	2568.170541	2540	8.17E+00	2548.170541
Chromium	0.5 - 2	18.2	1.57E-02	18.2157126	20.7	1.57E-02	20.7157126	16.4	1.57E-02	16.41567956	12.2	3.83E-02	12.23829941	13.1	3.83E-02	13.13829941
Cobalt	0.1 - 2	7.28	3.67E-03	7.283666273	5.87	3.67E-03	5.873666273	6.87	3.66E-03	6.873658565	2.84	8.94E-03	2.848936529	3.1	8.94E-03	3.108936529
Copper	0.5 - 1	16.5	1.15E-02	16.51152257	12.9	1.15E-02	12.91152257	33.4	1.15E-02	33.41149835	4.06	2.81E-02	4.088086233	4.86	2.81E-02	4.888086233
Iron	50	14000	5.13E+00	14005.13278	12000	5.13E+00	12005.13278	13600	5.12E+00	13605.12199	8150	1.25E+01	8162.51114	8650	1.25E+01	8662.51114
Lead	0.5 - 30	3.08	6.29E-05	3.08006285	2.37	6.29E-05	2.37006285	2.55	6.27E-05	2.550062718	2.17	1.53E-04	2.170153198	2.19	1.53E-04	2.190153198
Magnesium	20 - 50	4610	2.41E+00	4612.409265	3910	2.41E+00	3912.409265	3400	2.40E+00	3402.4042	1940	5.87E+00	1945.872576	2160	5.87E+00	2165.872576
Manganese	1	175	9.74E-02	175.0974181	127	9.74E-02	127.0974181	112	9.72E-02	112.0972133	91.6	2.37E-01	91.83745634	92.2	2.37E-01	92.43745634
Mercury	0.005 - 0.005	0.0148	1.05E-06	0.014801048	0.0103	1.05E-06	0.010301048	0.0079	1.05E-06	0.007901045	0.0025	2.55E-06	0.002502553	0.0025	2.55E-06	0.002502553
Molybdenum	0.5 - 4	0.25	5.24E-05	0.250052375	0.25	5.24E-05	0.250052375	0.25	5.23E-05	0.250052265	0.25	1.28E-04	0.250127665	0.25	1.28E-04	0.250127665
Nickel	0.5 - 5	13.9	7.54E-03	13.90754205	13	7.54E-03	13.00754205	13.2	7.53E-03	13.20752619	5.43	1.84E-02	5.448383716	5.86	1.84E-02	5.878383716
Phosphorus	50	351	2.30E-02	351.0230451	277	2.30E-02	277.0230451	131	2.30E-02	131.0229967	429	5.62E-02	429.0561725	364	5.62E-02	364.0561725
Potassium	100 - 200	640	1.05E-02	640.0104751	640	1.05E-02	640.0104751	370	1.05E-02	370.010453	610	2.55E-02	610.0255329	790	2.55E-02	790.0255329
Selenium	0.2 - 0.5	0.1	5.24E-05	0.100052375	0.1	5.24E-05	0.100052375	0.1	5.23E-05	0.100052265	0.1	1.28E-04	0.100127665	0.1	1.28E-04	0.100127665
Silver	0.1 - 2	0.05	1.05E-05	0.050010475	0.05	1.05E-05	0.050010475	0.05	1.05E-05	0.050010453	0.05	2.55E-05	0.050025533	0.05	2.55E-05	0.050025533
Sodium	100 - 200	50	2.62E-02	50.02618767	100	2.62E-02	100.0261877	230	2.61E-02	230.0261326	220	6.38E-02	220.0638323	230	6.38E-02	230.0638323
Strontium	0.5	10.1	1.47E-03	10.10146651	8.33	1.47E-03	8.331466509	12.6	1.46E-03	12.60146343	12.4	3.57E-03	12.40357461	13.3	3.57E-03	13.30357461
Thallium	0.05 - 1	0.025	1.05E-05	0.025010475	0.025	1.05E-05	0.025010475	0.025	1.05E-05	0.025010453	0.025	2.55E-05	0.025025533	0.025	2.55E-05	0.025025533
Tin	42771	1	2.10E-04	1.000209501	1	2.10E-04	1.000209501	1	2.09E-04	1.000209061	1	5.11E-04	1.000510659	1	5.11E-04	1.000510659
Titanium	1	417	2.30E-01	417.2304515	432	2.30E-01	432.2304515	539	2.30E-01	539.229967	458	5.62E-01	458.5617247	477	5.62E-01	477.5617247
Uranium	0.05	0.541	1.05E-05	0.541010475	1.07	1.05E-05	1.070010475	0.408	1.05E-05	0.408010453	0.678	2.55E-05	0.678025533	0.641	2.55E-05	0.641025533
Vanadium	0.2 - 2	24.5	1.05E-02	24.51047507	23.7	1.05E-02	23.71047507	30	1.05E-02	30.01045304	19	2.55E-02	19.02553294	20	2.55E-02	20.02553294
Zinc	1	21.7	6.18E-03	21.70618029	19.4	6.18E-03	19.40618029	16.5	6.17E-03	16.5061673	8.9	1.51E-02	8.915064434	10.3	1.51E-02	10.31506443

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		LSA-10			LSA-11			LSA-12			LSA-13A			LSA-13B		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	6590	3.17E+00	6593.171902	18600	3.12E+00	18603.12462	11200	3.46E+00	11203.45685	20100	1.81E+01	20118.11036	17300	1.81E+01	17318.11036
Antimony	0.1 - 10	0.05	1.09E-05	0.050010938	0.05	1.08E-05	0.050010775	0.05	1.19E-05	0.05001192	0.05	6.24E-05	0.05006245	0.05	6.24E-05	0.05006245
Arsenic	0.05 - 5	1.11	5.47E-05	1.110054688	3.92	5.39E-05	3.920053873	1.74	5.96E-05	1.740059601	3.04	3.12E-04	3.040312248	2.96	3.12E-04	2.960312248
Barium	0.5 - 1	17.2	3.28E-04	17.20032813	102	3.23E-04	102.0003232	71.2	3.58E-04	71.20035761	108	1.87E-03	108.0018735	89	1.87E-03	89.00187349
Beryllium	0.2 - 0.5	0.1	3.61E-05	0.100036094	0.68	3.56E-05	0.680035556	0.33	3.93E-05	0.330039337	0.56	2.06E-04	0.560206083	0.52	2.06E-04	0.520206083
Bismuth	0.2 - 20	0.1	1.09E-05	0.100010938	0.1	1.08E-05	0.100010775	0.1	1.19E-05	0.10001192	0.1	6.24E-05	0.10006245	0.1	6.24E-05	0.10006245
Cadmium	0.05 - 0.5	0.025	1.09E-05	0.025010938	0.025	1.08E-05	0.025010775	0.025	1.19E-05	0.02501192	0.025	6.24E-05	0.02506245	0.025	6.24E-05	0.02506245
Calcium	50	1730	3.50E+00	1733.500029	5230	3.45E+00	5233.44786	4210	3.81E+00	4213.814454	4160	2.00E+01	4179.983841	3900	2.00E+01	3919.983841
Chromium	0.5 - 2	24.6	1.64E-02	24.61640639	49.2	1.62E-02	49.21616184	30.8	1.79E-02	30.81788025	63.4	9.37E-02	63.49367425	54.4	9.37E-02	54.49367425
Cobalt	0.1 - 2	6.4	3.83E-03	6.403828157	9.2	3.77E-03	9.203771096	7.65	4.17E-03	7.654172059	12	2.19E-02	12.02185733	10.3	2.19E-02	10.32185733
Copper	0.5 - 1	11.4	1.20E-02	11.41203135	21.3	1.19E-02	21.31185202	19	1.31E-02	19.01311219	26.5	6.87E-02	26.56869445	23.8	6.87E-02	23.86869445
Iron	50	13700	5.36E+00	13705.35942	23700	5.28E+00	23705.27954	16700	5.84E+00	16705.84088	29200	3.06E+01	29230.60026	26000	3.06E+01	26030.60026
Lead	0.5 - 30	2.15	6.56E-05	2.150065626	7.5	6.46E-05	7.500064647	4.79	7.15E-05	4.790071521	7.88	3.75E-04	7.880374697	7.25	3.75E-04	7.250374697
Magnesium	20 - 50	4150	2.52E+00	4152.515646	9020	2.48E+00	9022.478149	5500	2.74E+00	5502.741639	10700	1.44E+01	10714.36339	9550	1.44E+01	9564.363386
Manganese	1	149	1.02E-01	149.1017196	199	1.00E-01	199.1002034	210	1.11E-01	210.1108576	250	5.81E-01	250.5807804	218	5.81E-01	218.5807804
Mercury	0.005 - 0.005	0.0068	1.09E-06	0.006801094	0.0173	1.08E-06	0.017301077	0.0054	1.19E-06	0.005401192	0.0116	6.24E-06	0.011606245	0.0103	6.24E-06	0.010306245
Molybdenum	0.5 - 4	0.25	5.47E-05	0.250054688	0.25	5.39E-05	0.250053873	0.25	5.96E-05	0.250059601	0.25	3.12E-04	0.250312248	0.25	3.12E-04	0.250312248
Nickel	0.5 - 5	13.5	7.88E-03	13.50787507	26.7	7.76E-03	26.70775768	15.9	8.58E-03	15.90858252	32.9	4.50E-02	32.94496364	27.9	4.50E-02	27.94496364
Phosphorus	50	160	2.41E-02	160.0240627	391	2.37E-02	391.023704	289	2.62E-02	289.0262244	392	1.37E-01	392.1373889	390	1.37E-01	390.1373889
Potassium	100 - 200	310	1.09E-02	310.0109376	3840	1.08E-02	3840.010775	1990	1.19E-02	1990.01192	3950	6.24E-02	3950.06245	3190	6.24E-02	3190.06245
Selenium	0.2 - 0.5	0.1	5.47E-05	0.100054688	0.1	5.39E-05	0.100053873	0.1	5.96E-05	0.100059601	0.1	3.12E-04	0.100312248	0.1	3.12E-04	0.100312248
Silver	0.1 - 2	0.05	1.09E-05	0.050010938	0.05	1.08E-05	0.050010775	0.05	1.19E-05	0.05001192	0.05	6.24E-05	0.05006245	0.05	6.24E-05	0.05006245
Sodium	100 - 200	140	2.73E-02	140.027344	580	2.69E-02	580.0269364	410	2.98E-02	410.0298004	550	1.56E-01	550.1561238	430	1.56E-01	430.1561238
Strontium	0.5	9.07	1.53E-03	9.071531263	51.7	1.51E-03	51.70150844	21.6	1.67E-03	21.60166882	24.1	8.74E-03	24.10874293	22	8.74E-03	22.00874293
Thallium	0.05 - 1	0.025	1.09E-05	0.025010938	0.181	1.08E-05	0.181010775	0.127	1.19E-05	0.12701192	0.208	6.24E-05	0.20806245	0.214	6.24E-05	0.21406245
Tin	42771	1	2.19E-04	1.000218752	1	2.15E-04	1.000215491	1	2.38E-04	1.000238403	1	1.25E-03	1.00124899	1	1.25E-03	1.00124899
Titanium	1	563	2.41E-01	563.240627	986	2.37E-01	986.2370404	996	2.62E-01	996.2622437	1390	1.37E+00	1391.373889	1190	1.37E+00	1191.373889
Uranium	0.05	0.349	1.09E-05	0.349010938	1.06	1.08E-05	1.060010775	0.782	1.19E-05	0.78201192	1.75	6.24E-05	1.75006245	1.6	6.24E-05	1.60006245
Vanadium	0.2 - 2	28.7	1.09E-02	28.71093759	48.6	1.08E-02	48.61077456	37.2	1.19E-02	37.21192017	65.2	6.24E-02	65.2624495	57.7	6.24E-02	57.7624495
Zinc	1	15.5	6.45E-03	15.50645318	40	6.36E-03	40.00635699	28.7	7.03E-03	28.7070329	56.4	3.68E-02	56.43684521	50.3	3.68E-02	50.33684521

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		LSA-14			LSA-15			LSA-16			LSA-17			LSA-18		
		Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Predicted Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)
Metals	Detection Limit (mg/kg)															
Aluminum	50	8100	8.59E+00	8108.587797	13900	4.35E+00	13904.35429	13300	1.12E+01	13311.18159	3220	2.51E+01	3245.1414	2570	3.63E+00	2573.62779
Antimony	0.1 - 10	0.05	2.96E-05	0.050029613	0.05	1.50E-05	0.050015015	0.05	3.86E-05	0.050038557	0.05	8.67E-05	0.050086694	0.05	1.25E-05	0.05001251
Arsenic	0.05 - 5	1.87	1.48E-04	1.870148065	2.78	7.51E-05	2.780075074	7.17	1.93E-04	7.170192786	0.756	4.33E-04	0.756433472	0.645	6.25E-05	0.645062548
Barium	0.5 - 1	19.8	8.88E-04	19.80088839	71	4.50E-04	71.00045044	47.9	1.16E-03	47.90115672	19.1	2.60E-03	19.10260083	14.1	3.75E-04	14.10037529
Beryllium	0.2 - 0.5	0.1	9.77E-05	0.100097723	0.41	4.95E-05	0.410049549	0.24	1.27E-04	0.240127239	0.1	2.86E-04	0.100286092	0.1	4.13E-05	0.100041282
Bismuth	0.2 - 20	0.1	2.96E-05	0.100029613	0.1	1.50E-05	0.100015015	0.1	3.86E-05	0.100038557	0.1	8.67E-05	0.100086694	0.1	1.25E-05	0.10001251
Cadmium	0.05 - 0.5	0.025	2.96E-05	0.025029613	0.025	1.50E-05	0.025015015	0.025	3.86E-05	0.025038557	0.025	8.67E-05	0.025086694	0.025	1.25E-05	0.02501251
Calcium	50	2370	9.48E+00	2379.47619	3550	4.80E+00	3554.804737	4110	1.23E+01	4122.33831	1850	2.77E+01	1877.742234	1900	4.00E+00	1904.003078
Chromium	0.5 - 2	36.9	4.44E-02	36.94441964	44.1	2.25E-02	44.1225222	44.9	5.78E-02	44.95783583	10.9	1.30E-01	11.03004172	9.09	1.88E-02	9.10876443
Cobalt	0.1 - 2	8.56	1.04E-02	8.570364583	8.86	5.26E-03	8.865255181	14.9	1.35E-02	14.91349503	2.87	3.03E-02	2.900343069	2.25	4.38E-03	2.254378367
Copper	0.5 - 1	20.1	3.26E-02	20.1325744	16.8	1.65E-02	16.81651628	40.6	4.24E-02	40.64241294	6.13	9.54E-02	6.225363931	8.15	1.38E-02	8.163760582
Iron	50	15000	1.45E+01	15014.51042	20600	7.36E+00	20607.35725	25900	1.89E+01	25918.89304	7520	4.25E+01	7562.480296	7010	6.13E+00	7016.129714
Lead	0.5 - 30	2.02	1.78E-04	2.020177679	5.51	9.01E-05	5.510090089	2.97	2.31E-04	2.970231343	1.91	5.20E-04	1.910520167	1.59	7.51E-05	1.590075058
Magnesium	20 - 50	5520	6.81E+00	5526.811012	7180	3.45E+00	7183.453405	9120	8.87E+00	9128.86816	1700	1.99E+01	1719.939731	1260	2.88E+00	1262.877213
Manganese	1	213	2.75E-01	213.2754018	207	1.40E-01	207.1396377	394	3.59E-01	394.3585821	67	8.06E-01	67.80625869	49.6	1.16E-01	49.71633947
Mercury	0.005 - 0.005	0.0025	2.96E-06	0.002502961	0.012	1.50E-06	0.012001501	0.006	3.86E-06	0.006003856	0.0025	8.67E-06	0.002508669	0.0025	1.25E-06	0.002501251
Molybdenum	0.5 - 4	0.25	1.48E-04	0.250148065	0.25	7.51E-05	0.250075074	0.25	1.93E-04	0.250192786	0.25	4.33E-04	0.250433472	0.25	6.25E-05	0.250062548
Nickel	0.5 - 5	24.1	2.13E-02	24.12132143	24.7	1.08E-02	24.71081066	33.6	2.78E-02	33.6277612	4.94	6.24E-02	5.002420027	3.81	9.01E-03	3.819006926
Phosphorus	50	137	6.51E-02	137.0651488	182	3.30E-02	182.0330326	357	8.48E-02	357.0848259	289	1.91E-01	289.1907279	325	2.75E-02	325.0275212
Potassium	100 - 200	380	2.96E-02	380.0296131	2180	1.50E-02	2180.015015	1400	3.86E-02	1400.038557	600	8.67E-02	600.0866945	280	1.25E-02	280.0125096
Selenium	0.2 - 0.5	0.1	1.48E-04	0.100148065	0.1	7.51E-05	0.100075074	0.1	1.93E-04	0.100192786	0.1	4.33E-04	0.100433472	0.1	6.25E-05	0.100062548
Silver	0.1 - 2	0.05	2.96E-05	0.050029613	0.05	1.50E-05	0.050015015	0.05	3.86E-05	0.050038557	0.05	8.67E-05	0.050086694	0.05	1.25E-05	0.05001251
Sodium	100 - 200	300	7.40E-02	300.0740327	450	3.75E-02	450.037537	320	9.64E-02	320.096393	150	2.17E-01	150.2167362	140	3.13E-02	140.0312741
Strontium	0.5	10.1	4.15E-03	10.10414583	19.7	2.10E-03	19.70210207	13.5	5.40E-03	13.50539801	8.99	1.21E-02	9.002137228	7.88	1.75E-03	7.881751347
Thallium	0.05 - 1	0.025	2.96E-05	0.025029613	0.147	1.50E-05	0.147015015	0.093	3.86E-05	0.093038557	0.025	8.67E-05	0.025086694	0.025	1.25E-05	0.02501251
Tin	42771	1	5.92E-04	1.000592262	1	3.00E-04	1.000300296	1	7.71E-04	1.000771144	1	1.73E-03	1.00173389	1	2.50E-04	1.000250192
Titanium	1	635	6.51E-01	635.6514881	962	3.30E-01	962.3303257	826	8.48E-01	826.8482588	396	1.91E+00	397.9072786	320	2.75E-01	320.2752116
Uranium	0.05	0.302	2.96E-05	0.302029613	1.06	1.50E-05	1.060015015	0.485	3.86E-05	0.485038557	0.517	8.67E-05	0.517086694	0.456	1.25E-05	0.45601251
Vanadium	0.2 - 2	35.3	2.96E-02	35.32961309	46.2	1.50E-02	46.2150148	56	3.86E-02	56.03855722	17.1	8.67E-02	17.18669448	17.2	1.25E-02	17.21250962
Zinc	1	22.5	1.75E-02	22.51747173	32.9	8.86E-03	32.90885873	41.4	2.27E-02	41.42274876	9.1	5.11E-02	9.151149745	6.4	7.38E-03	6.407380676

Notes:

¹ Soil baseline concentrations are from samples collected in 2010 and 2014.

² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

³ Total soil concentration is the sum of the baseline concentration and the incremental concentration.

The predicted fugitive dust deposition rates used to estimate metal dustfall deposition (and in turn soil metal concentrations) are the maximum values from two different air quality model cases - one based on existing infrastruture (the "Madrid North Reference Location" case), and another based on proposed changes to infrastructure (the "Madrid North Alternate location" case).

Samples where the concentration was below the detection limit were replaced with values of half the detection limit for calculation purposes.

Cs = Average soil concentration over exposure duration (mg COPC/kg soil)

100 = Units conversion factor (mg-m² /kg-cm²)

DEPOSITION = Yearly deposition rate of COPC from model (g/m² year)

tD = Time period over which deposition occurs (4 years of the Construction phase)

Zs = Soil mixing zone depth (2 cm)

BD = Soil bulk density (1.5 g soil/cm³ soil)

(-) = no value

All soil concentrations are dry weights.

Appendix V6-5H. Predicted Metal Concentrations in Soil from Dust Deposition during the Construction Phase

		LSA-19			LSA-20			LSA-21			Summary Statistics							
		Baseline Soil Concentration ¹ (mg/kg)	Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Baseline Soil Concentration ¹ (mg/kg)	Incremental Soil Concentration ² (mg/kg)	Predicted Total Soil Concentration ³ (mg/kg)	Mean of Baseline Concentrations (mg/kg)	Median of Baseline Concentrations (mg/kg)	95th Percentile of Baseline Concentrations (mg/kg)	Maximum of Baseline Concentrations (mg/kg)	Mean of Predicted Total Concentrations (mg/kg)	Median of Predicted Total Concentrations (mg/kg)	95th Percentile Predicted Total Concentrations (mg/kg)	Maximum of Predicted Total Concentrations (mg/kg)
Metals	Detection Limit (mg/kg)																	
Aluminum	50	6590	4.80E+00	6594.79941	12100	1.16E+01	12111.62485	4760	1.85E+01	4778.49595	10095.56311	8630	21280	27200	10107.52674	8639.226217	21286.55286	27205.39437
Antimony	0.1 - 10	0.05	1.65E-05	0.05001655	0.05	4.01E-05	0.050040086	0.05	6.38E-05	0.050063779	3.41407767	5	5	5	3.414118924	5.000017995	5.000143692	5.000164845
Arsenic	0.05 - 5	1.83	8.27E-05	1.830082748	1.37	2.00E-04	1.370200428	0.963	3.19E-04	0.963318896	2.40276699	2.5	3.697	7.17	2.40297326	2.500127665	3.697114931	7.170192786
Barium	0.5 - 1	19.4	4.96E-04	19.40049649	61.8	1.20E-03	61.80120257	16	1.91E-03	16.00191337	53.87912621	35.3	130.7	164	53.88036383	35.30260083	130.700376	164.000558
Beryllium	0.2 - 0.5	0.1	5.46E-05	0.100054614	0.3	1.32E-04	0.300132283	0.1	2.10E-04	0.100210471	0.296407767	0.25	0.639	0.79	0.296543905	0.250091088	0.639076828	0.790061384
Bismuth	0.2 - 20	0.1	1.65E-05	0.10001655	0.1	4.01E-05	0.100040086	0.1	6.38E-05	0.100063779	6.830485437	10	10	10	6.830526691	10.00001799	10.00014369	10.00016484
Cadmium	0.05 - 0.5	0.025	1.65E-05	0.02501655	0.025	4.01E-05	0.025040086	0.025	6.38E-05	0.025063779	0.17861165	0.25	0.25	0.25	0.178652904	0.250017995	0.250143692	0.250164845
Calcium	50	1830	5.30E+00	1835.2959	5730	1.28E+01	5742.827419	2220	2.04E+01	2240.409324	3629.456311	2660	9018	14000	3642.657558	2663.647567	9026.368634	14004.33279
Chromium	0.5 - 2	19.6	2.48E-02	19.62482453	31.8	6.01E-02	31.86012853	27.3	9.57E-02	27.39566871	30.89048544	24.9	65.57	81.8	30.95236629	24.93829941	65.6347872	81.86012853
Cobalt	0.1 - 2	9.83	5.79E-03	9.835792391	7.99	1.40E-02	8.00402999	5.83	2.23E-02	5.852322698	7.164660194	6.6	14.34	17.1	7.179099059	6.603759186	14.35164666	17.11402999
Copper	0.5 - 1	41.7	1.82E-02	41.71820466	13.2	4.41E-02	13.24409425	6.4	7.02E-02	6.470157051	16.85291262	16.2	37.89	67.7	16.89829191	16.21979399	37.93318443	67.74409425
Iron	50	12700	8.11E+00	12708.10935	18200	1.96E+01	18219.64199	10800	3.13E+01	10831.25178	16717.37864	15100	30870	39800	16737.59305	15125.8892	30890.84259	39809.11463
Lead	0.5 - 30	2.4	9.93E-05	2.400099298	3.77	2.41E-04	3.770240514	1.53	3.83E-04	1.530382675	11.28524272	15	15	15	11.28549024	15.00010797	15.00086215	15.00098907
Magnesium	20 - 50	3810	3.81E+00	3813.806428	7010	9.22E+00	7019.219707	3280	1.47E+01	3294.669202	5878.834951	4810	12960	17900	5888.323348	4812.390303	12969.41556	17904.27829
Manganese	1	190	1.54E-01	190.1539121	224	3.73E-01	224.3727969	149	5.93E-01	149.593146	188.8563107	157	368.9	790	189.2399719	157.0966514	369.1044362	790.3727969
Mercury	0.005 - 0.005	0.0061	1.65E-06	0.006101655	0.0091	4.01E-06	0.009104009	0.0088	6.38E-06	0.008806378	0.012921359	0.0078	0.04978	0.158	0.012925485	0.007803393	0.04978207	0.158001354
Molybdenum	0.5 - 4	0.25	8.27E-05	0.250082748	0.25	2.00E-04	0.250200428	0.25	3.19E-04	0.250318896	1.446893204	2	2	2	1.447099473	2.000089973	2.000718459	2.000824224
Nickel	0.5 - 5	12.8	1.19E-02	12.81191578	17.6	2.89E-02	17.62886169	13	4.59E-02	13.04592098	16.73378641	15.1	34.67	53.5	16.76348922	15.10974879	34.70137008	53.52886169
Phosphorus	50	128	3.64E-02	128.0364093	279	8.82E-02	279.0881885	192	1.40E-01	192.1403141	385.7961165	364	667.3	943	385.8868751	364.0561725	667.3554774	943.029788
Potassium	100 - 200	350	1.65E-02	350.0165497	2090	4.01E-02	2090.040086	310	6.38E-02	310.0637791	1836.213592	900	4833	7790	1836.254846	900.0113986	4833.121701	7790.018601
Selenium	0.2 - 0.5	0.1	8.27E-05	0.100082748	0.1	2.00E-04	0.100200428	0.1	3.19E-04	0.100318896	0.201941748	0.25	0.25	0.25	0.202148017	0.250089973	0.250718459	0.250824224
Silver	0.1 - 2	0.05	1.65E-05	0.05001655	0.05	4.01E-05	0.050040086	0.05	6.38E-05	0.050063779	0.695631068	1	1	1	0.695672322	1.000017995	1.000143692	1.000164845
Sodium	100 - 200	180	4.14E-02	180.0413742	390	1.00E-01	390.1002142	110	1.59E-01	110.1594478	307.4757282	240	707	1450	307.5788629	240.0535678	707.0848293	1450.028473
Strontium	0.5	8.4	2.32E-03	8.402316956	30.5	5.61E-03	30.505612	7.86	8.93E-03	7.868929079	19.4292233	14.9	39.37	79.9	19.43499885	14.91213723	39.37163665	79.91162186
Thallium	0.05 - 1	0.025	1.65E-05	0.02501655	0.12	4.01E-05	0.120040086	0.025	6.38E-05	0.025063779	0.365058252	0.5	0.5	0.5	0.365099506	0.500017995	0.500143692	0.500164845
Tin	42771	1	3.31E-04	1.000330994	1	8.02E-04	1.000801714	1	1.28E-03	1.001275583	2.019417476	2.5	2.5	2.5	2.020242554	2.500359891	2.502873835	2.503296896
Titanium	1	505	3.64E-01	505.3640931	851	8.82E-01	851.8818851	366	1.40E+00	367.403141	711.684466	584	1470	1760	712.5920518	584.284312	1470.925777	1760.409228
Uranium	0.05	0.399	1.65E-05	0.39901655	0.449	4.01E-05	0.449040086	0.314	6.38E-05	0.314063779	0.802951456	0.547	1.75	2.23	0.80299271	0.547027603	1.750058942	2.23004422
Vanadium	0.2 - 2	27.8	1.65E-02	27.81654969	39.6	4.01E-02	39.64008568	26.4	6.38E-02	26.46377914	36.03495146	32	69.57	82	36.07620536	32.0528351	69.59327995	82.01860128
Zinc	1	17.5	9.76E-03	17.50976432	37.6	2.37E-02	37.62365055	15.8	3.76E-02	15.83762969	29.56213592	26.5	59.09	80.5	29.58647572	26.50798859	59.16180363	80.51097475

Notes:

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² Equation used to calculate incremental soil concentration is from the US EPA (2005): Cs =100*((DEPOSITION/(Zs*BD)))*tD

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