ARM Group LLC
Engineers and Scientists

July 26, 2021

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: RADWP Addendum & SLRA Update
Area B: Sub-Parcel B5-1
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic (TPA), is submitting this Response and Development Work Plan (RADWP) Addendum to modify the extent and shape of Sub-Parcel B5-1 (the Site), which is part of Area B of the TPA property located in Sparrows Point, Maryland. The original scope of development work was presented to the Maryland Department of the Environment (MDE) and United States Environmental Protection Agency (USEPA) in the Sub-Parcel B5-1 RADWP (Revision 3 dated September 27, 2017) which was approved by the MDE on July 19, 2017 and by the USEPA on October 12, 2017. The RADWP has been modified by two subsequent RADWP Addenda. The first RADWP Addendum (Revision 2 dated July 12, 2018) was approved by the MDE in an email dated July 25, 2018. The second RADWP Addendum (Revision 0 dated December 14, 2018) was supplemented by a Comment Response Letter (dated June 28, 2019) and approved by the MDE in an email dated November 26, 2019.

This is the third RADWP Addendum associated with Sub-Parcel B5-1. This RADWP Addendum further modifies the scope of development work to account for adjustments in the sub-parcel boundary. The final area of the Site is 108 acres, and the revised boundary is shown on **Figure 1**. This RADWP Addendum includes an updated Screening Level Risk Assessment (SLRA) to assess Composite Worker and Construction Worker risk within Sub-Parcel B5-1 accounting for the updated boundary (and acreage) and modified soil dataset.

Previous documents indicated that the sub-parcel boundary extended north into the areas that have subsequently been developed as Sub-Parcels B1-2, B2-2, and B2-3. Therefore, this RADWP Addendum modifies the Sub-Parcel B5-1 boundary so it does not overlap with these adjoining sub-parcels. As a result, select soil boring data included in the previous SLRA (along the northern edge of the sub-parcel) are no longer relevant. This Addendum also includes the addition of a new parking lot located northwest of the bulk storage buildings. A conceptual development drawing

for this area is included as **Attachment 1**. As a result of this expansion to Sub-Parcel B5-1, additional soil data (B5-005-SB, B5-006-SB, B5-007-SB, B5-008-SB, and B5-163-SB) have been incorporated into the SLRA.

As shown on **Figure 1**, two bulk storage buildings have been constructed at the Site. No additional construction is currently proposed; however, additional utility work and paving is expected to be completed. This includes the completion of a new parking lot as described above. Note that slag aggregate was used as fill material during the construction of the bulk storage buildings and used as subbase for existing pavements. Therefore, a remedy consisting of capping and institutional controls is required to be protective of Composite Workers to prevent exposures to slag aggregate that has been placed in these specific areas below pavements. All paved areas, including the new proposed parking lot, will meet the required minimum capping thickness consisting of 4 inches of asphalt or concrete pavement.

SLRA Analysis Process

A human health SLRA has been completed for the Composite Worker and Construction Worker scenarios based on the analytical data obtained from the characterization of surface and subsurface soils within Sub-Parcel B5-1 (accounting for the updated sub-parcel boundary). The SLRA was conducted to evaluate baseline soil conditions to determine if any response measures are necessary.

The SLRA included the following evaluation process:

Identification of Exposure Units (EUs): Soil data were divided into three datasets (surface, subsurface, and pooled) for the three Sub-Parcel B5-1 development EUs (EU1 – "B5 Road", EU2 – "B5 Building", and EU3 – "B13 Road") to evaluate potential current and future exposure scenarios. **Figure 2** shows the extent of each EU, as well as the locations of relevant soil boings. Both Composite Worker and Construction Worker scenarios were evaluated using the same EUs. Note that, as shown on **Figure 2**, the Finger Pier is constructed of concrete, and does not contain any soil which could be a potential exposure risk. Therefore, it has been excluded from the SLRA.

Identification of Constituents of Potential Concern (COPCs): For the project-specific SLRA, compounds that were present at concentrations at or above the USEPA Regional Screening Levels (RSLs) set at a target cancer risk of 1E-6 or target non-cancer Hazard Quotient (HQ) of 0.1 were identified as COPCs to be included in the SLRA. A COPC screening analysis is provided in **Table 1** to identify compounds above the relevant screening levels.

All aroclor mixtures (e.g., Aroclor 1242, Aroclor 1260) are taken into account for the reported concentrations of total PCBs. The total PCBs concentrations are used to evaluate the carcinogenic risk associated with PCBs; therefore, Aroclor 1260 (which was identified in the COPC screening) is not evaluated individually.

Exposure Point Concentrations (EPCs): The COPC soil datasets for the EUs were divided into surface (0 to 2 foot), subsurface (>2 foot), and pooled depths for estimation of potential EPCs. Thus, there are three soil datasets associated with each EU. A statistical analysis was performed for each COPC dataset using the ProUCL software (version 5.1) developed by the USEPA to determine representative reasonable maximum exposure (RME) values for the EPC for each constituent. The RME value is typically the 95% Upper Confidence Limit (UCL) of the mean. For lead, the arithmetic mean for each depth was calculated for comparison to the Adult Lead Model (ALM) based values, and any individual results exceeding 10,000 mg/kg would be delineated for possible excavation and removal (not applicable at this Site). For PCBs, all results equaling or exceeding 50 mg/kg would be delineated for excavation and removal (not applicable at this Site).

Risk Ratios: The surface soil EPCs, subsurface soil EPCs, and pooled soil EPCs were compared to the USEPA RSLs for the Composite Worker and to site-specific Soil Screening Levels (SSLs) for the Construction Worker based on equations derived in the USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, December 2002). Risk ratios were calculated with a cancer risk of 1E-6 and a non-cancer HQ of 1. The risk ratios for the carcinogens were summed to develop a screening level estimate of the baseline cumulative cancer risk. The risk ratios for the non-carcinogens were segregated and summed by target organ to develop a screening level estimate of the baseline cumulative non-cancer Hazard Index (HI).

For the Construction Worker, site-specific risk-based evaluations were completed for a range of potential exposure frequencies to determine the maximum exposure frequency for each EU that would result in risk ratios equivalent to a cumulative cancer risk of 1E-5 or HI of 1 for the individual target organs. This analysis indicated that the allowable exposure frequencies before additional worker protections or more detailed job safety evaluations would be needed is 70 days for EU1, 75 days for EU2, and 55 days for EU3.

There is no potential for direct human exposure to groundwater for a Composite Worker since groundwater is not used on the TPA property (and is not proposed to be utilized). In the event that any future construction/excavation leads to a potential Construction Worker exposure to groundwater during development, health and safety plans and management procedures shall be followed to limit exposure risk.

Assessment of Lead: For lead, the arithmetic mean concentrations for surface soils, subsurface soils, and pooled soils for each EU were compared to the RSL (800 mg/kg) as an initial screening. If the mean concentrations for all EUs were below the RSL, the Site was identified as requiring no further action for lead. If a mean concentration exceeded the RSL, the mean values were compared to calculated ALM values (ALM Version dated 6/21/2009 updated with the 5/17/2017 OLEM Directive) with inputs of 1.8 for the geometric standard deviation and a blood baseline lead level of 0.6 ug/dL. The ALM

calculation generates a soil lead concentration of 1,050 mg/kg, which is the most conservative (i.e., lowest) concentration which would yield a probability of 5% of a blood lead concentration of 5 ug/dL. If the arithmetic mean concentrations for the EUs were below 1,050 mg/kg, the Site was identified as requiring no further action for lead. The average and maximum lead concentrations for surface soils, subsurface soils, and pooled soils for each EU are presented in **Table 2**.

Assessment of TPH/Oil & Grease: EPCs were not calculated for total petroleum hydrocarbons (TPH) or Oil & Grease. Instead, the individual results were compared to the PAL set to a HQ of 1 (6,200 mg/kg). No soil samples exceeded the PAL for TPH/Oil & Grease. Additionally, none of the Sub-Parcel B5-1 boring locations exhibited any physical evidence of non-aqueous phase liquid (NAPL) in the soil cores.

Risk Characterization Approach: If the baseline risk ratio for each non-carcinogenic COPC or cumulative target organ does not exceed 1, and the sum of the risk ratios for the carcinogenic COPCs does not exceed a cumulative cancer risk of 1E-5, then a no further action determination will be recommended. If the baseline estimate of cumulative cancer risk exceeds 1E-5 but is less than or equal to 1E-4, then capping of the EU will be considered an acceptable remedy for the Composite Worker. The efficacy of capping for elevated non-cancer hazard will be evaluated in terms of the magnitude of exceedance and other factors such as bioavailability of the COPC. For the Construction Worker, cumulative cancer risks exceeding 1E-5 (but less than or equal to 1E-4) or HI values exceeding 1 will be mitigated via site-specific health and safety requirements.

The USEPA's acceptable risk range is between 1E-6 and 1E-4. If the sum of the risk ratios for carcinogens exceeds a cumulative cancer risk of 1E-4, further analysis of site conditions will be required including the consideration of toxicity reduction in any proposal for a remedy. The magnitude of any non-carcinogen HI exceedances and bioavailability of the COPC will also dictate further analysis of site conditions including consideration of toxicity reduction in any proposal for a remedy. For lead, if the ALM results indicate that the mean concentrations would present a 5% to 10% probability of a blood concentration of 5 ug/dL for the EU, then capping would be an acceptable presumptive remedy. The mean soil lead concentrations corresponding to ALM probabilities of 5% and 10% are 1,050 mg/kg and 1,400 mg/kg, respectively. If the ALM indicates that the mean concentrations would present a >10% probability of a blood concentration of 5 ug/dL for the EU, further analysis of site conditions including toxicity reduction would be completed such that the probability would be reduced to less than 10% after toxicity reduction, but before capping.

SLRA Results and Risk Characterization

Soil data were divided into three datasets (surface, subsurface, and pooled) for Sub-Parcel B5-1 to evaluate potential exposure scenarios. Each of these potential exposure scenarios is relevant for both the Composite Worker and Construction Worker.

EPCs were calculated for each soil dataset in each of the three EUs. ProUCL output tables (with computed UCLs) derived from the data for each COPC in soils are provided as electronic attachments. The ProUCL input tables are also included as electronic attachments. The results were evaluated to identify any samples that may require additional assessment or special management based on the risk characterization approach. The calculated EPCs for the surface, subsurface, and pooled exposure scenarios are provided in **Table 3**. These EPCs were used for both the Composite Worker and Construction Worker assessments.

As indicated above, the EPCs for lead are the average (i.e., arithmetic mean) values for each dataset. A lead evaluation spreadsheet, providing the computations to determine lead averages for each dataset, is also included as an electronic attachment. The screening criterion for lead was set at an arithmetic mean of 800 mg/kg based on the RSL, with a secondary limit of 1,050 mg/kg based on the ALM developed by the USEPA (corresponding to a 5% probability of a blood lead level of 5 ug/dL). The average and maximum lead concentrations are presented for each dataset in **Table 2**, which indicates that neither surface, subsurface, nor pooled soils exceeded an average lead value of 800 mg/kg for any EU.

Composite Worker Assessment:

Risk ratios for the estimates of potential EPCs for the Composite Worker scenario for each EU are shown in **Table 4** (surface), **Table 5** (subsurface), and **Table 6** (pooled soils). The results are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Composite Worker	EU1 (13.8 acres)	Surface Soil	none	5E-6
		Subsurface Soil	none	3E-6
		Pooled Soil	none	4E-6
	EU2 (51.0 acres)	Surface Soil	none	1E-5
		Subsurface Soil	none	8E-6
		Pooled Soil	none	8E-6
	EU3 (41.3 acres)	Surface Soil	none	4E-6
		Subsurface Soil	none	5E-6
		Pooled Soil	none	4E-6

Based on the risk ratios for Sub-Parcel B5-1, no further action is required for the surface, subsurface, and pooled baseline exposure scenarios. None of the carcinogenic risk estimates for the Composite Worker were greater than the acceptable risk level of 1E-5 or the secondary risk level of 1E-4 which would warrant consideration of toxicity reduction. None of the non-carcinogenic HI values exceeded 1. Note that these findings differ from the SLRA presented in the prior RADWP (Revision 3 dated September 27, 2017), which had indicated that a capping remedy was required for EU2 due to a slightly elevated carcinogenic risk estimate (2E-5) for the surface scenario. Based on the revisions to the sub-parcel boundary as outlined in this RADWP Addendum, a capping remedy is not required.

However, because slag aggregate was used as fill material on EU2 during the construction of the bulk storage buildings and used as subbase for existing pavements, capping and institutional controls (to maintain the integrity of the cap) are required to prevent Composite Worker exposures to slag aggregate that has been placed in these specific areas below pavements. All paved areas, including the new proposed parking lot, will meet the required minimum capping thickness consisting of 4 inches of asphalt or concrete pavement.

Construction Worker Assessment:

Construction Worker risks were evaluated for several exposure scenarios to determine the maximum exposure frequency for each EU that would result in risk ratios equivalent to a cumulative cancer risk of 1E-5 or HI of 1 for any individual target organ. Risk ratios for the Construction Worker scenario using the selected durations (70 days for EU1, 75 days for EU2, and 55 days for EU3) are shown in **Table 7** (surface), **Table 8** (subsurface), and **Table 9** (pooled). The variables entered for calculation of the site-specific Construction Worker SSLs (EU area, input assumptions, and exposure frequency) are indicated as notes on the tables. The spreadsheet used for computation of the site-specific Construction Worker SSLs is included as **Attachment 2**. The results are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Construction Worker	EU1 (13.8 acres) (70 exposure days)	Surface Soil	none	3E-7
		Subsurface Soil	none	1E-7
		Pooled Soil	none	3E-7
	EU2 (51.0 acres) (75 exposure days)	Surface Soil	none	6E-7
		Subsurface Soil	none	8E-7
		Pooled Soil	none	6E-7
	EU3 (41.3 acres) (55 exposure days)	Surface Soil	none	2E-7
		Subsurface Soil	none	2E-7
		Pooled Soil	none	2E-7

Using the selected exposure durations for EU1, EU2, and EU3 (70 days, 75 days, and 55 days, respectively), the carcinogenic risks were all less than 1E-5, and none of the non-carcinogens caused a cumulative HI to exceed 1 for any target organ system. These findings are below the acceptable limits for no further action established by the agencies. This evaluation indicates that additional site-specific health and safety requirements (beyond standard Level D protection) would be required only if an individual worker exceeded these durations.

Institutional controls will be required to be established for the protection of future Construction Workers in the event of any future long-term construction projects which could include ground intrusive activities. During all development work on the TPA property, Construction Workers performing ground intrusive work will adhere to the upgraded Personal Protective Equipment (PPE) requirements outlined in the Sparrows Point Development PPE Standard Operational Procedure (SOP) provided as **Attachment 3**. The PPE SOP was created after the submission of the Sub-Parcel B5-1 RADWP but is presented at this time to serve as part of the project record. Construction Worker risks are mitigated via the implementation of these site-specific health and safety requirements throughout the project. The modified Level D PPE requirements, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the attached PPE SOP.

If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group LLC at 410-290-7775.

Respectfully Submitted,
ARM Group LLC

Joshua M. Barna, G.I.T.
Staff Geologist

T. Neil Peters, P.E.
Senior Vice President

FIGURES

B1-2

B2-2

B2-3

B5-1

Parcel B9

Parcel B5

Parcel B13

Revised Sub-Parcel B5-1 Development Boundary

Logistics Center Development Boundary

Bulk Storage Buildings

Parcel Boundary

Sub-Parcel B5-1
Development Plan Revisions
July 15, 2021

Figure 1

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0 125 250 500 Feet

Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

ARM Project 20010205

Sub-Parcel B5-1
Risk Assessment Exposure Units
July 15, 2021

Figure 2

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Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010205

TABLES

Table 1 - Sub-Parcel B5-1
COPC Screening Analysis

Parameter	CAS#	Location of Max Result	Max Detection (mg/kg)	Final Flag	Min Detection (mg/kg)	Average Detection (mg/kg)	Total Samples	Frequency of Detection (%)	Cancer TR=1E-06 (mg/kg)	Non-Cancer HQ=0.1 (mg/kg)	COPC?
1,1-Biphenyl	92-52-4	B5-010-SB-1	3.1	J	0.01	0.41	119	10.92	410	20	no
2,4-Dimethylphenol	105-67-9	B5-024-SB-1	0.24	J	0.24	0.24	117	0.85		1,600	no
2-Butanone (MEK)	78-93-3	B5-054-SB-1	0.03		0.003	0.01	103	18.45		19,000	no
2-Chloronaphthalene	91-58-7	B13-056-SB-1	0.11		0.11	0.11	119	0.84		6,000	no
2-Hexanone	591-78-6	B5-017-SB-1	0.002	J	0.002	0.002	103	0.97		130	no
2-Methylnaphthalene	91-57-6	B5-020-SB-1	12.2		0.001	0.44	119	87.39		300	no
2-Methylphenol	95-48-7	B5-024-SB-1	0.09	J	0.09	0.09	117	0.85		4,100	no
Acenaphthene	83-32-9	B5-010-SB-1	16.2		0.0006	0.24	119	73.95		4,500	no
Acenaphthylene	208-96-8	B5-010-SB-1	21.4		0.0007	0.28	119	83.19			no
Acetone	67-64-1	B5-054-SB-1	0.54		0.008	0.06	99	60.61		67,000	no
Acetophenone	98-86-2	B5-024-SB-1	0.68		0.03	0.16	119	5.04		12,000	no
Aluminum	7429-90-5	B5-016-SB-8.5	49,200		2,520	19,589	119	100.00		110,000	no
Anthracene	120-12-7	B5-010-SB-1	30.7		0.0008	0.41	119	89.92		23,000	no
Antimony	7440-36-0	B5-174-SB-1	2.6		1.30	1.80	119	2.52		47	no
Aroclor 1016	12674-11-2	B5-107-SB-1	0.16		0.16	0.16	68	1.47	27	5.1	no
Aroclor 1242	53469-21-9	B5-108-SB-1	0.78		0.03	0.25	68	8.82	0.95		no
Aroclor 1248	12672-29-6	B13-049-SB-1	0.13		0.10	0.11	68	2.94	0.95		no
Aroclor 1254	11097-69-1	B5-007-SB-1	0.31	J	0.03	0.10	68	20.59	0.97	1.5	no
Aroclor 1260	11096-82-5	B5-077-SB-1	13.6		0.01	3.04	68	13.24	0.99		YES (C)
Arsenic	7440-38-2	B13-058-SB-10	27.0		1.90	6.81	128	79.69	3	48	YES (C)
Barium	7440-39-3	B5-022-SB-1	1,100		13.0	235	119	100.00		22,000	no
Benz[a]anthracene	56-55-3	B5-010-SB-1	38.1		0.002	0.76	119	94.96	21		YES (C)
Benzaldehyde	100-52-7	B13-055-SB-1	0.13		0.02	0.04	106	5.66	820	12,000	no
Benzene	71-43-2	B5-010-SB-7	0.13		0.002	0.01	103	13.59	5.1	42	no
Benzo[a]pyrene	50-32-8	B5-010-SB-1	31.4		0.001	0.73	120	93.33	2.1	22	YES (C/NC)
Benzo[b]fluoranthene	205-99-2	B5-010-SB-1	52.6		0.0005	1.31	119	96.64	21		YES (C)
Benzo[g,h,i]perylene	191-24-2	B5-160-SB-4	12.6		0.001	0.35	119	94.12			no
Benzo[k]fluoranthene	207-08-9	B5-010-SB-1	18.3		0.002	0.63	119	94.96	210		no
Beryllium	7440-41-7	B5-016-SB-8.5	7.2		0.16	2.21	119	89.08	6,900	230	no
bis(2-Ethylhexyl)phthalate	117-81-7	B13-049-SB-1	0.51	J	0.02	0.19	119	2.52	160	1,600	no
Cadmium	7440-43-9	B5-158-SB-5	38.3		0.2	3.60	119	31.09	9,300	98	no
Carbazole	86-74-8	B5-010-SB-1	47.1		0.02	4.79	119	8.40			no
Chloroform	67-66-3	B5-027-SB-5	0.02		0.009	0.01	103	1.94	1.4	100	no
Chromium	7440-47-3	B5-074-SB-1	3,960		5.60	395	119	99.16		180,000	no
Chromium VI	18540-29-9	B5-075-SB-1	8.10		0.17	1.30	119	30.25	6.3	350	YES (C)

Table 1 - Sub-Parcel B5-1
COPC Screening Analysis

Parameter	CAS#	Location of Max Result	Max Detection (mg/kg)	Final Flag	Min Detection (mg/kg)	Average Detection (mg/kg)	Total Samples	Frequency of Detection (%)	Cancer TR=1E-06 (mg/kg)	Non-Cancer HQ=0.1 (mg/kg)	COPC?
Chrysene	218-01-9	B5-010-SB-1	32.0		0.0008	0.74	119	96.64	2,100		no
Cobalt	7440-48-4	B13-019-SB-4	50.5		0.30	7.21	119	87.39	1,900	35	YES (NC)
Copper	7440-50-8	B5-160-SB-4	2,560		1.80	76.15	119	100.00		4,700	no
Cyanide	57-12-5	B5-005-SB-4.5	49.7	J-	0.10	3.2	119	85.71		120	no
Cyclohexane	110-82-7	B5-052-SB-1	0.21	J	0.007	0.06	103	3.88		2,700	no
Dibenz[a,h]anthracene	53-70-3	B5-010-SB-1	26.8		0.001	0.39	119	80.67	2.1		YES (C)
Diethylphthalate	84-66-2	B13-064-SB-1	0.09		0.09	0.09	119	0.84		66,000	no
Di-n-butylphthalate	84-74-2	B5-010-SB-1	7.70		0.03	3.87	119	1.68		8,200	no
Ethylbenzene	100-41-4	B5-020-SB-1	0.08	J	0.002	0.02	103	5.83	25	2,000	no
Fluoranthene	206-44-0	B5-010-SB-1	116		0.0006	2.03	119	99.16		3,000	no
Fluorene	86-73-7	B5-010-SB-1	28.9		0.0007	0.36	119	81.51		3,000	no
Indeno[1,2,3-c,d]pyrene	193-39-5	B5-160-SB-4	11.9		0.001	0.37	119	89.92	21		no
Iron	7439-89-6	B5-110-SB-4	391,000		4,430	99,764	119	100.00		82,000	YES (NC)
Isopropylbenzene	98-82-8	B5-005-SB-4.5	0.004	J	0.004	0.004	103	0.97		990	no
Lead^	7439-92-1	B5-015-SB-1	4,910		2.10	191	119	94.12		800	YES (NC)
Manganese	7439-96-5	B13-055-SB-9	90,000		48.7	11,099	119	100.00		2,600	YES (NC)
Mercury	7439-97-6	B5-019-SB-1	7.80		0.002	0.37	115	63.48		35	no
Methyl Acetate	79-20-9	B5-064-SB-1	0.13	J	0.13	0.13	81	1.23		120,000	no
Naphthalene	91-20-3	B5-010-SB-7	72.9		0.001	1.36	120	73.33	8.6	59	YES (C/NC)
Nickel	7440-02-0	B13-056-SB-1	865		1.10	42.3	119	96.64	64,000	2,200	no
N-Nitrosodiphenylamine	86-30-6	B13-055-SB-1	0.06	J	0.06	0.06	119	0.84	470		no
PCBs (total)*	1336-36-3	B5-077-SB-1	13.6		0.03	1.16	68	38.24	0.94		YES (C)
Phenanthrene	85-01-8	B5-010-SB-1	130		0.001	1.85	119	98.32			no
Pyrene	129-00-0	B5-010-SB-1	86.1		0.002	1.72	119	96.64		2,300	no
Selenium	7782-49-2	B5-010-SB-7	7.20		2.10	3.95	119	17.65		580	no
Silver	7440-22-4	B5-110-SB-4	11.1		0.60	2.53	119	31.09		580	no
Styrene	100-42-5	B5-010-SB-7	0.02		0.02	0.02	103	0.97		3,500	no
Tetrachloroethene	127-18-4	B5-028-SB-4.5	0.03		0.004	0.02	103	4.85	100	39	no
Thallium	7440-28-0	B13-055-SB-9	14.3		3.50	6.56	119	5.88		1.2	YES (NC)
Toluene	108-88-3	B5-052-SB-1	0.45		0.003	0.08	103	10.68		4,700	no
Vanadium	7440-62-2	B5-179-SB-9	2,850	J	8.30	346	119	100.00		580	YES (NC)
Xylenes	1330-20-7	B5-052-SB-1	0.88		0.007	0.33	103	6.80		250	no
Zinc	7440-66-6	B5-158-SB-5	17,600		4.60	838	119	99.16		35,000	no

J: The positive result reported for this analyte is a quantitative estimate.

COPC = Constituent of Potential Concern
TR = Target Risk
HQ = Hazard Quotient

C = Compound was identified as a cancer COPC
NC = Compound was identified as a non-cancer COPC

*PCBs (total) include the sum of all detected aroclor mixtures, including those without regional screening levels (e.g. Aroclor 1262, Aroclor 1268) which are not displayed.
^The COPC screening level for lead was not adjusted to the HQ=0.1 because lead is not assessed in the SLRA. The 800 mg/kg PAL is relevant to the Adult Lead Model procedure.

Table 2 - Sub-Parcel B5-1
Assessment of Lead

Exposure Unit	Surface/Sub-Surface	Maximum Concentration (mg/kg)	Arithmetic Mean (mg/kg)
EU1 - B5 Road (13.8 ac.)	Surface	219	72.1
	Sub-Surface	88.2	47.1
	Pooled	219	62.6
EU2 - B5 Building (51.0 ac.)	Surface	4,910	284
	Sub-Surface	3,180	206
	Pooled	4,910	252
EU3 - B13 Road (41.3 ac.)	Surface	445	79.3
	Sub-Surface	450	74.9
	Pooled	450	77.1

Table 3 - Sub-Parcel B5-1
Soil Exposure Point Concentrations

	EU1 - B5 Road (13.8 ac.)					
	EPCs - Surface Soils		**EPCs - Sub-Surface Soils**		**EPCs - Pooled Soils**	
Parameter	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)
Arsenic	95% KM (t) UCL	9.05	95% KM (t) UCL	6.81	95% KM (t) UCL	7.48
Chromium VI	95% KM (t) UCL	1.79	95% KM (t) UCL	0.42	95% KM (Chebyshev) UCL	2.04
Cobalt	95% KM (t) UCL	8.99	95% Student's-t UCL	7.75	95% KM (t) UCL	7.81
Iron	95% Student's-t UCL	176,449	95% Adjusted Gamma UCL	117,727	95% Adjusted Gamma UCL	158,464
Manganese	95% Chebyshev (Mean, Sd) UCL	19,422	95% Student's-t UCL	13,015	95% Chebyshev (Mean, Sd) UCL	16,146
Thallium	NA	NA	NA	NA	NA	NA
Vanadium	95% H-UCL	270	95% Student's-t UCL	734	95% Chebyshev (Mean, Sd) UCL	585
PCBs (total)	Gamma Adjusted KM-UCL	1.35	NA	NA	Gamma Adjusted KM-UCL	1.35
Benz[a]anthracene	95% KM (t) UCL	0.17	95% Student's-t UCL	0.23	Gamma Adjusted KM-UCL	0.19
Benzo[a]pyrene	Gamma Adjusted KM-UCL	0.23	95% KM (t) UCL	0.23	Gamma Adjusted KM-UCL	0.20
Benzo[b]fluoranthene	95% Adjusted Gamma UCL	0.63	95% KM (t) UCL	0.69	Gamma Adjusted KM-UCL	0.55
Dibenz[a,h]anthracene	95% KM Adjusted Gamma UCL	0.05	95% KM (t) UCL	0.05	95% KM Adjusted Gamma UCL	0.04
Naphthalene	95% KM Adjusted Gamma UCL	0.46	95% KM (t) UCL	0.10	95% KM Adjusted Gamma UCL	0.29

Bold indicates maximum value used as the EPC
NA = No Detections

Table 3 - Sub-Parcel B5-1
Soil Exposure Point Concentrations

	EU2 - B5 Building (51.0 ac.)					
	EPCs - Surface Soils		**EPCs - Sub-Surface Soils**		**EPCs - Pooled Soils**	
Parameter	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)
Arsenic	KM H-UCL	6.80	95% GROS Adjusted Gamma UCL	8.15	95% KM (Chebyshev) UCL	7.91
Chromium VI	95% KM (Chebyshev) UCL	1.60	Gamma Adjusted KM-UCL	1.47	95% KM (Chebyshev) UCL	1.38
Cobalt	95% GROS Adjusted Gamma UCL	7.14	95% KM Adjusted Gamma UCL	7.88	95% GROS Approximate Gamma UCL	6.61
Iron	95% Student's-t UCL	136,421	95% Adjusted Gamma UCL	110,037	95% Chebyshev (Mean, Sd) UCL	142,552
Manganese	95% Adjusted Gamma UCL	16,106	95% Adjusted Gamma UCL	16,031	95% Approximate Gamma UCL	14,275
Thallium	Maximum Value	**7.30**	NA	NA	Maximum Value	**7.30**
Vanadium	95% Adjusted Gamma UCL	532	95% Chebyshev (Mean, Sd) UCL	784	95% H-UCL	593
PCBs (total)	95% KM (Chebyshev) UCL	2.52	NA	NA	95% KM (Chebyshev) UCL	2.52
Benz[a]anthracene	97.5% Chebyshev (Mean, Sd) UCL	7.48	Gamma Adjusted KM-UCL	0.94	KM H-UCL	2.80
Benzo[a]pyrene	97.5% KM (Chebyshev) UCL	5.92	97.5% KM (Chebyshev) UCL	4.61	KM H-UCL	3.40
Benzo[b]fluoranthene	97.5% Chebyshev (Mean, Sd) UCL	10.3	97.5% KM (Chebyshev) UCL	6.50	KM H-UCL	7.11
Dibenz[a,h]anthracene	95% KM (Chebyshev) UCL	3.53	95% KM (Chebyshev) UCL	0.66	KM H-UCL	0.36
Naphthalene	95% KM (Chebyshev) UCL	1.55	97.5% KM (Chebyshev) UCL	17.9	KM H-UCL	3.94

Bold indicates maximum value used as the EPC
NA = No Detections

Table 3 - Sub-Parcel B5-1
Soil Exposure Point Concentrations

	EU3 - B13 Road (41.3 ac.)					
	EPCs - Surface Soils		**EPCs - Sub-Surface Soils**		**EPCs - Pooled Soils**	
Parameter	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)
Arsenic	95% KM (t) UCL	9.15	95% GROS Adjusted Gamma UCL	13.0	95% GROS Adjusted Gamma UCL	10.4
Chromium VI	Maximum Value	**2.50**	NA	NA	Maximum Value	**2.50**
Cobalt	95% Adjusted Gamma UCL	15.8	95% Adjusted Gamma UCL	24.4	95% Adjusted Gamma UCL	15.3
Iron	95% Student's-t UCL	151,644	95% Adjusted Gamma UCL	131,428	95% Student's-t UCL	120,957
Manganese	95% Adjusted Gamma UCL	17,960	95% H-UCL	26,366	95% H-UCL	16,971
Thallium	95% KM (t) UCL	5.25	95% KM (Chebyshev) UCL	10.8	95% KM (t) UCL	6.45
Vanadium	95% Student's-t UCL	514	95% Student's-t UCL	529	95% Student's-t UCL	468
PCBs (total)	95% KM (t) UCL	0.09	NA	NA	95% KM (t) UCL	0.09
Benz[a]anthracene	95% Student's-t UCL	0.33	95% KM Bootstrap t UCL	0.43	Gamma Adjusted KM-UCL	0.25
Benzo[a]pyrene	95% Student's-t UCL	0.29	99% KM (Chebyshev) UCL	0.83	5% KM (Chebyshev) UC	0.35
Benzo[b]fluoranthene	95% Student's-t UCL	0.53	95% KM Bootstrap t UCL	0.99	Gamma Adjusted KM-UCL	0.41
Dibenz[a,h]anthracene	95% Adjusted Gamma UCL	0.12	95% KM (Chebyshev) UCL	0.06	95% KM (Chebyshev) UCL	0.08
Naphthalene	95% Adjusted Gamma UCL	0.53	Gamma Adjusted KM-UCL	0.07	95% KM (Chebyshev) UCL	0.31

Bold indicates maximum value used as the EPC
NA = No Detections

Table 4 - Sub-Parcel B5-1
Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 - B5 Road (13.8 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	9.05	3.00	480	3.0E-06	0.02
Chromium VI	**Respiratory**	1.79	6.30	3,500	2.8E-07	0.0005
Cobalt	**Thyroid**	8.99	1,900	350	4.7E-09	0.03
Iron	**Gastrointestinal**	176,449		820,000		0.2
Manganese	**Nervous**	19,422		26,000		0.7
Thallium	**Dermal**	NA		12.0		
Vanadium	**Dermal**	270		5,800		0.05
PCBs (Total)		1.35	0.94		1.4E-06	
Benz(a)anthracene		0.17	21.0		8.1E-09	
Benzo(a)pyrene	**Developmental**	0.23	2.10	220	1.1E-07	0.001
Benzo(b)fluoranthene		0.63	21.0		3.0E-08	
Dibenz(a,h)anthracene		0.05	2.10		2.4E-08	
Naphthalene	**Nervous; Respiratory**	0.46	8.60	590	5.3E-08	0.0008
					5E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 4 - Sub-Parcel B5-1
Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU2 - B5 Building (51.0 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	6.80	3.00	480	2.3E-06	0.01
Chromium VI	**Respiratory**	1.60	6.30	3,500	2.5E-07	0.0005
Cobalt	**Thyroid**	7.14	1,900	350	3.8E-09	0.02
Iron	**Gastrointestinal**	136,421		820,000		0.2
Manganese	**Nervous**	16,106		26,000		0.6
Thallium	**Dermal**	**7.30**		12.0		0.6
Vanadium	**Dermal**	532		5,800		0.09
PCBs (Total)		2.52	0.94		2.7E-06	
Benz(a)anthracene		7.48	21.0		3.6E-07	
Benzo(a)pyrene	**Developmental**	5.92	2.10	220	2.8E-06	0.03
Benzo(b)fluoranthene		10.3	21.0		4.9E-07	
Dibenz(a,h)anthracene		3.53	2.10		1.7E-06	
Naphthalene	**Nervous; Respiratory**	1.55	8.60	590	1.8E-07	0.003
					1E-05	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	1
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 4 - Sub-Parcel B5-1
Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU3 - B13 Road (41.3 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	9.15	3.00	480	3.1E-06	0.02
Chromium VI	**Respiratory**	**2.50**	6.30	3,500	4.0E-07	0.0007
Cobalt	**Thyroid**	15.8	1,900	350	8.3E-09	0.05
Iron	**Gastrointestinal**	151,644		820,000		0.2
Manganese	**Nervous**	17,960		26,000		0.7
Thallium	**Dermal**	5.25		12.0		0.4
Vanadium	**Dermal**	514		5,800		0.09
PCBs (Total)		0.09	0.94		9.6E-08	
Benz(a)anthracene		0.33	21.0		1.6E-08	
Benzo(a)pyrene	**Developmental**	0.29	2.10	220	1.4E-07	0.001
Benzo(b)fluoranthene		0.53	21.0		2.5E-08	
Dibenz(a,h)anthracene		0.12	2.10		5.7E-08	
Naphthalene	**Nervous; Respiratory**	0.53	8.60	590	6.2E-08	0.0009
					4E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	1
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 5 - Sub-Parcel B5-1
Sub-Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 - B5 Road (13.8 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	6.81	3.00	480	2.3E-06	0.01
Chromium VI	**Respiratory**	0.42	6.30	3,500	6.7E-08	0.0001
Cobalt	**Thyroid**	7.75	1,900	350	4.1E-09	0.02
Iron	**Gastrointestinal**	117,727		820,000		0.1
Manganese	**Nervous**	13,015		26,000		0.5
Thallium	**Dermal**	NA		12.0		
Vanadium	**Dermal**	734		5,800		0.1
PCBs (Total)		NA	0.94			
Benz(a)anthracene		0.23	21.0		1.1E-08	
Benzo(a)pyrene	**Developmental**	0.23	2.10	220	1.1E-07	0.001
Benzo(b)fluoranthene		0.69	21.0		3.3E-08	
Dibenz(a,h)anthracene		0.05	2.10		2.4E-08	
Naphthalene	**Nervous; Respiratory**	0.10	8.60	590	1.2E-08	0.0002
					3E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 5 - Sub-Parcel B5-1
Sub-Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU2 - B5 Building (51.0 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	8.15	3.00	480	2.7E-06	0.02
Chromium VI	**Respiratory**	1.47	6.30	3,500	2.3E-07	0.0004
Cobalt	**Thyroid**	7.88	1,900	350	4.1E-09	0.02
Iron	**Gastrointestinal**	110,037		820,000		0.1
Manganese	**Nervous**	16,031		26,000		0.6
Thallium	**Dermal**	NA		12.0		
Vanadium	**Dermal**	784		5,800		0.1
PCBs (Total)		NA	0.94			
Benz(a)anthracene		0.94	21.0		4.5E-08	
Benzo(a)pyrene	**Developmental**	4.61	2.10	220	2.2E-06	0.02
Benzo(b)fluoranthene		6.50	21.0		3.1E-07	
Dibenz(a,h)anthracene		0.66	2.10		3.1E-07	
Naphthalene	**Nervous; Respiratory**	17.9	8.60	590	2.1E-06	0.03
					8E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 5 - Sub-Parcel B5-1
Sub-Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU3 - B13 Road (41.3 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	13.0	3.00	480	4.3E-06	0.03
Chromium VI	**Respiratory**	NA	6.30	3,500		
Cobalt	**Thyroid**	24.4	1,900	350	1.3E-08	0.07
Iron	**Gastrointestinal**	131,428		820,000		0.2
Manganese	**Nervous**	26,366		26,000		1
Thallium	**Dermal**	10.8		12.0		0.9
Vanadium	**Dermal**	529		5,800		0.09
PCBs (Total)		NA	0.94			
Benz(a)anthracene		0.43	21.0		2.0E-08	
Benzo(a)pyrene	**Developmental**	0.83	2.10	220	4.0E-07	0.004
Benzo(b)fluoranthene		0.99	21.0		4.7E-08	
Dibenz(a,h)anthracene		0.06	2.10		2.9E-08	
Naphthalene	**Nervous; Respiratory**	0.07	8.60	590	8.1E-09	0.0001
					5E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

NA = No Detections

Total HI	Cardiovascular	0
	Dermal	1
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 6 - Sub-Parcel B5-1
Pooled Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 - B5 Road (13.8 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	7.48	3.00	480	2.5E-06	0.02
Chromium VI	**Respiratory**	2.04	6.30	3,500	3.2E-07	0.0006
Cobalt	**Thyroid**	7.81	1,900	350	4.1E-09	0.02
Iron	**Gastrointestinal**	158,464		820,000		0.2
Manganese	**Nervous**	16,146		26,000		0.6
Thallium	**Dermal**	NA		12.0		
Vanadium	**Dermal**	585		5,800		0.1
PCBs (Total)		1.35	0.94		1.4E-06	
Benz(a)anthracene		0.19	21.0		9.0E-09	
Benzo(a)pyrene	**Developmental**	0.20	2.10	220	9.5E-08	0.0009
Benzo(b)fluoranthene		0.55	21.0		2.6E-08	
Dibenz(a,h)anthracene		0.04	2.10		1.9E-08	
Naphthalene	**Nervous; Respiratory**	0.29	8.60	590	3.4E-08	0.0005
					4E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 6 - Sub-Parcel B5-1
Pooled Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU2 - B5 Building (51.0 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	7.91	3.00	480	2.6E-06	0.02
Chromium VI	**Respiratory**	1.38	6.30	3,500	2.2E-07	0.0004
Cobalt	**Thyroid**	6.61	1,900	350	3.5E-09	0.02
Iron	**Gastrointestinal**	142,552		820,000		0.2
Manganese	**Nervous**	14,275		26,000		0.5
Thallium	**Dermal**	**7.30**		12.0		0.6
Vanadium	**Dermal**	593		5,800		0.1
PCBs (Total)		2.52	0.94		2.7E-06	
Benz(a)anthracene		2.80	21.0		1.3E-07	
Benzo(a)pyrene	**Developmental**	3.40	2.10	220	1.6E-06	0.02
Benzo(b)fluoranthene		7.11	21.0		3.4E-07	
Dibenz(a,h)anthracene		0.36	2.10		1.7E-07	
Naphthalene	**Nervous; Respiratory**	3.94	8.60	590	4.6E-07	0.007
					8E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	1
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 6 - Sub-Parcel B5-1
Pooled Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU3 - B13 Road (41.3 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	10.4	3.00	480	3.5E-06	0.02
Chromium VI	**Respiratory**	**2.50**	6.30	3,500	4.0E-07	0.0007
Cobalt	**Thyroid**	15.3	1,900	350	8.1E-09	0.04
Iron	**Gastrointestinal**	120,957		820,000		0.1
Manganese	**Nervous**	16,971		26,000		0.7
Thallium	**Dermal**	6.45		12.0		0.5
Vanadium	**Dermal**	468		5,800		0.08
PCBs (Total)		0.09	0.94		9.6E-08	
Benz(a)anthracene		0.25	21.0		1.2E-08	
Benzo(a)pyrene	**Developmental**	0.35	2.10	220	1.7E-07	0.002
Benzo(b)fluoranthene		0.41	21.0		2.0E-08	
Dibenz(a,h)anthracene		0.08	2.10		3.8E-08	
Naphthalene	**Nervous; Respiratory**	0.31	8.60	590	3.6E-08	0.0005
					4E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	1
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 7 - Sub-Parcel B5-1
Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	70 Day - EU1 - B5 Road (13.8 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	9.05	54.0	342	1.7E-07	0.03
Chromium VI	**Respiratory**	1.79	75.3	2,854	2.4E-08	0.0006
Cobalt	**Thyroid**	8.99	11,009	3,258	8.2E-10	0.003
Iron	**Gastrointestinal**	176,449		859,076		0.2
Manganese	**Nervous**	19,422		13,925		1
Thallium	**Dermal**	NA		49.1		
Vanadium	**Dermal**	270		5,635		0.05
PCBs (Total)		1.35	15.8		8.5E-08	
Benz(a)anthracene		0.17	509		3.3E-10	
Benzo(a)pyrene	**Developmental**	0.23	60.8	21.3	3.8E-09	0.01
Benzo(b)fluoranthene		0.63	605		1.0E-09	
Dibenz(a,h)anthracene		0.05	63.6		7.9E-10	
Naphthalene	**Nervous; Respiratory**	0.46	42.6	67.2	1.1E-08	0.007
					3E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 7 - Sub-Parcel B5-1
Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	75 Day - EU2 - B5 Building (51.0 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	6.80	50.4	322	1.3E-07	0.02
Chromium VI	**Respiratory**	1.60	72.3	2,671	2.2E-08	0.0006
Cobalt	**Thyroid**	7.14	18,061	3,200	4.0E-10	0.002
Iron	**Gastrointestinal**	136,421		801,804		0.2
Manganese	**Nervous**	16,106		14,201		1
Thallium	**Dermal**	**7.30**		45.8		0.2
Vanadium	**Dermal**	532		5,351		0.1
PCBs (Total)		2.52	13.6		1.9E-07	
Benz(a)anthracene		7.48	459		1.6E-08	
Benzo(a)pyrene	**Developmental**	5.92	56.3	17.2	1.1E-07	0.3
Benzo(b)fluoranthene		10.3	560		1.8E-08	
Dibenz(a,h)anthracene		3.53	59.4		5.9E-08	
Naphthalene	**Nervous; Respiratory**	1.55	34.2	53.3	4.5E-08	0.03
					6E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 7 - Sub-Parcel B5-1
Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	55 Day - EU3 - B13 Road (41.3 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	9.15	68.8	438	1.3E-07	0.02
Chromium VI	**Respiratory**	**2.50**	98.2	3,641	2.5E-08	0.0007
Cobalt	**Thyroid**	15.8	22,413	4,334	7.0E-10	0.004
Iron	**Gastrointestinal**	151,644		1,093,370		0.1
Manganese	**Nervous**	17,960		19,134		0.9
Thallium	**Dermal**	5.25		62.5		0.08
Vanadium	**Dermal**	514		7,281		0.07
PCBs (Total)		0.09	17.3		5.2E-09	
Benz(a)anthracene		0.33	608		5.4E-10	
Benzo(a)pyrene	**Developmental**	0.29	76.2	20.8	3.8E-09	0.01
Benzo(b)fluoranthene		0.53	758		7.0E-10	
Dibenz(a,h)anthracene		0.12	81.0		1.5E-09	
Naphthalene	**Nervous; Respiratory**	0.53	41.5	64.2	1.3E-08	0.008
					2E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 8 - Sub-Parcel B5-1
Sub-Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	70 Day - EU1 - B5 Road (13.8 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	6.81	54.0	342	1.3E-07	0.02
Chromium VI	**Respiratory**	0.42	75.3	2,854	5.6E-09	0.0001
Cobalt	**Thyroid**	7.75	11,009	3,258	7.0E-10	0.002
Iron	**Gastrointestinal**	117,727		859,076		0.1
Manganese	**Nervous**	13,015		13,925		0.9
Thallium	**Dermal**	NA		49.1		
Vanadium	**Dermal**	734		5,635		0.1
PCBs (Total)		NA	15.8			
Benz(a)anthracene		0.23	509		4.5E-10	
Benzo(a)pyrene	**Developmental**	0.23	60.8	21.3	3.8E-09	0.01
Benzo(b)fluoranthene		0.69	605		1.1E-09	
Dibenz(a,h)anthracene		0.05	63.6		7.9E-10	
Naphthalene	**Nervous; Respiratory**	0.10	42.6	67.2	2.3E-09	0.001
					1E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 8 - Sub-Parcel B5-1
Sub-Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	75 Day - EU2 - B5 Building (51.0 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	8.15	50.4	322	1.6E-07	0.03
Chromium VI	**Respiratory**	1.47	72.3	2,671	2.0E-08	0.0006
Cobalt	**Thyroid**	7.88	18,061	3,200	4.4E-10	0.002
Iron	**Gastrointestinal**	110,037		801,804		0.1
Manganese	**Nervous**	16,031		14,201		1
Thallium	**Dermal**	NA		45.8		
Vanadium	**Dermal**	784		5,351		0.1
PCBs (Total)		NA	13.6			
Benz(a)anthracene		0.94	459		2.0E-09	
Benzo(a)pyrene	**Developmental**	4.61	56.3	17.2	8.2E-08	0.3
Benzo(b)fluoranthene		6.50	560		1.2E-08	
Dibenz(a,h)anthracene		0.66	59.4		1.1E-08	
Naphthalene	**Nervous; Respiratory**	17.9	34.2	53.3	5.2E-07	0.3
					8E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002

Guidance Equation Input Assumptions:

5 cars/day (2 tons/car)

5 trucks/day (20 tons/truck)

3 meter source depth thickness

NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 8 - Sub-Parcel B5-1
Sub-Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	55 Day - EU3 - B13 Road (41.3 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	13.0	68.8	438	1.9E-07	0.03
Chromium VI	**Respiratory**	NA	98.2	3,641		
Cobalt	**Thyroid**	24.4	22,413	4,334	1.1E-09	0.006
Iron	**Gastrointestinal**	131,428		1,093,370		0.1
Manganese	**Nervous**	26,366		19,134		1
Thallium	**Dermal**	10.8		62.5		0.2
Vanadium	**Dermal**	529		7,281		0.07
PCBs (Total)		NA	17.3			
Benz(a)anthracene		0.43	608		7.1E-10	
Benzo(a)pyrene	**Developmental**	0.83	76.2	20.8	1.1E-08	0.04
Benzo(b)fluoranthene		0.99	758		1.3E-09	
Dibenz(a,h)anthracene		0.06	81.0		7.4E-10	
Naphthalene	**Nervous; Respiratory**	0.07	41.5	64.2	1.7E-09	0.001
					2E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002

Guidance Equation Input Assumptions:

5 cars/day (2 tons/car)

5 trucks/day (20 tons/truck)

3 meter source depth thickness

NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 9 - Sub-Parcel B5-1
Pooled Soils
Construction Worker Risk Ratios

Parameter	Target Organs	70 Day - EU1 - B5 Road (13.8 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	7.48	54.0	342	1.4E-07	0.02
Chromium VI	**Respiratory**	2.04	75.3	2,854	2.7E-08	0.0007
Cobalt	**Thyroid**	7.81	11,009	3,258	7.1E-10	0.002
Iron	**Gastrointestinal**	158,464		859,076		0.2
Manganese	**Nervous**	16,146		13,925		1
Thallium	**Dermal**	NA		49.1		
Vanadium	**Dermal**	585		5,635		0.1
PCBs (Total)		1.35	15.8		8.5E-08	
Benz(a)anthracene		0.19	509		3.7E-10	
Benzo(a)pyrene	**Developmental**	0.20	60.8	21.3	3.3E-09	0.009
Benzo(b)fluoranthene		0.55	605		9.1E-10	
Dibenz(a,h)anthracene		0.04	63.6		6.3E-10	
Naphthalene	**Nervous; Respiratory**	0.29	42.6	67.2	6.8E-09	0.004
					3E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

Table 9 - Sub-Parcel B5-1
Pooled Soils
Construction Worker Risk Ratios

Parameter	Target Organs	75 Day - EU2 - B5 Building (51.0 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	7.91	50.4	322	1.6E-07	0.02
Chromium VI	**Respiratory**	1.38	72.3	2,671	1.9E-08	0.0005
Cobalt	**Thyroid**	6.61	18,061	3,200	3.7E-10	0.002
Iron	**Gastrointestinal**	142,552		801,804		0.2
Manganese	**Nervous**	14,275		14,201		1
Thallium	**Dermal**	**7.30**		45.8		0.2
Vanadium	**Dermal**	593		5,351		0.1
PCBs (Total)		2.52	13.6		1.9E-07	
Benz(a)anthracene		2.80	459		6.1E-09	
Benzo(a)pyrene	**Developmental**	3.40	56.3	17.2	6.0E-08	0.2
Benzo(b)fluoranthene		7.11	560		1.3E-08	
Dibenz(a,h)anthracene		0.36	59.4		6.1E-09	
Naphthalene	**Nervous; Respiratory**	3.94	34.2	53.3	1.2E-07	0.07
					6E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

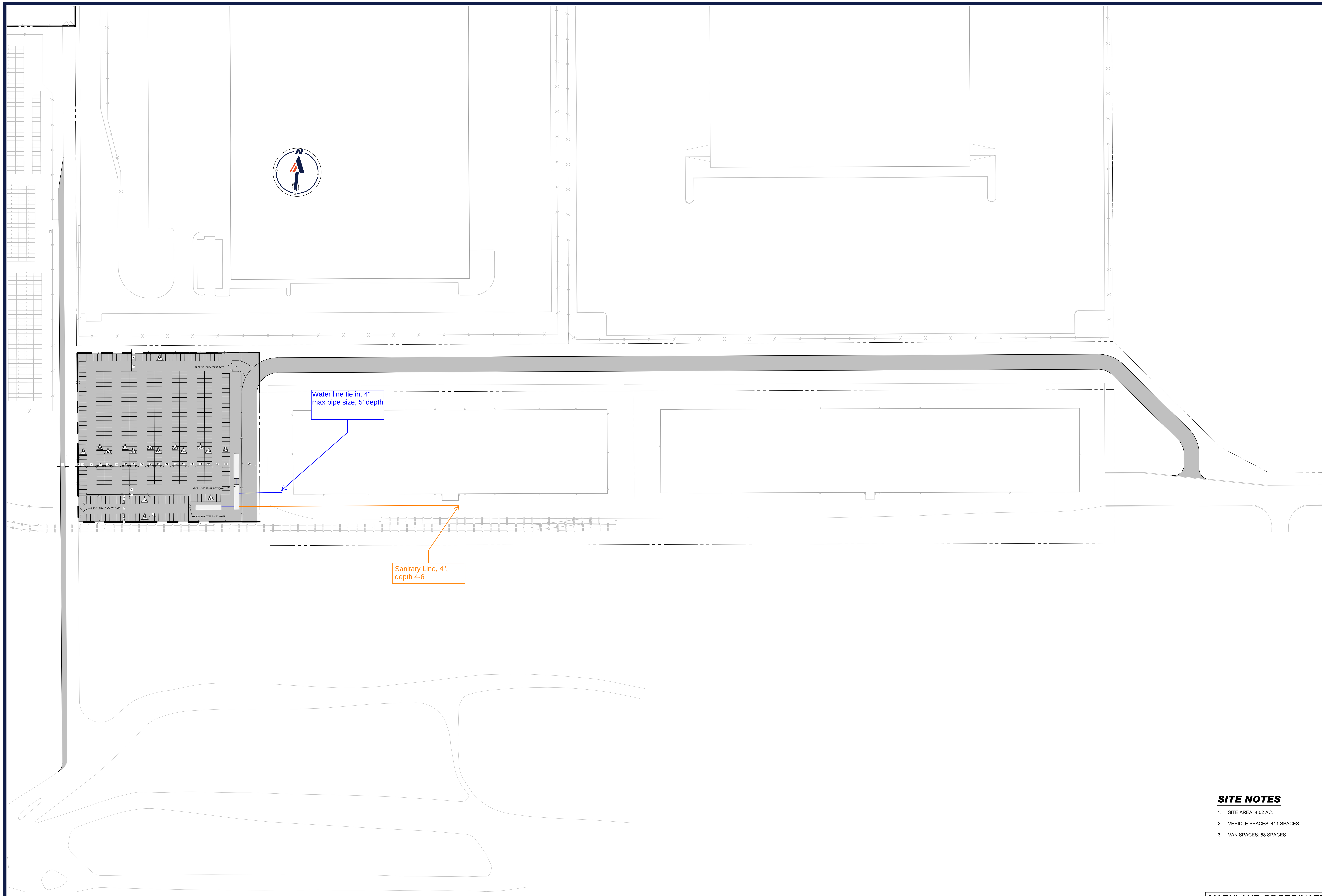
Table 9 - Sub-Parcel B5-1
Pooled Soils
Construction Worker Risk Ratios

Parameter	Target Organs	55 Day - EU3 - B13 Road (41.3 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	10.4	68.8	438	1.5E-07	0.02
Chromium VI	**Respiratory**	**2.50**	98.2	3,641	2.5E-08	0.0007
Cobalt	**Thyroid**	15.3	22,413	4,334	6.8E-10	0.004
Iron	**Gastrointestinal**	120,957		1,093,370		0.1
Manganese	**Nervous**	16,971		19,134		0.9
Thallium	**Dermal**	6.45		62.5		0.1
Vanadium	**Dermal**	468		7,281		0.06
PCBs (Total)		0.09	17.3		5.2E-09	
Benz(a)anthracene		0.25	608		4.1E-10	
Benzo(a)pyrene	**Developmental**	0.35	76.2	20.8	4.6E-09	0.02
Benzo(b)fluoranthene		0.41	758		5.4E-10	
Dibenz(a,h)anthracene		0.08	81.0		9.9E-10	
Naphthalene	**Nervous; Respiratory**	0.31	41.5	64.2	7.5E-09	0.005
					2E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
Bold = Maximum Value
NA = No Detections

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Respiratory	0

ATTACHMENT 1



SITE NOTES

1. SITE AREA: 4.02 AC.
2. VEHICLE SPACES: 411 SPACES
3. VAN SPACES: 58 SPACES

MARYLAND COORDINATE SYSTEM (MCS)

ELEVATIONS BASED ON NAVD 88, COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER MONUMENTS BCO #1433 AND GIS 2

TRACKING # N/A; DRC# N/A; DIST 15C7

50 25 12.5 0 50

1"= 50'

BOHLER//™

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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ALWAYS CALL 811

It's fast. It's free. It's the law.

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PROJECT No.:	MD16206649
DRAWN BY:	MJG
CHECKED BY:	MJG
DATE:	05/06/2021
CAD I.D.:	ILA CONCEPT B

PROJECT:

CONCEPT PLANS

FOR

TRADEPOINT ATLANTIC

CONCEPT PLAN

ILA LOT
BALTIMORE, MD 21219
TM 111, GRID 14 PARCEL 318
ELECTION DISTRICT 15
COUNCILMANIC DISTRICT 7
BALTIMORE COUNTY

BOHLER//

901 DULANEY VALLEY ROAD, SUITE 801
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MD@BohlerEng.com

M.J. GESELL

PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 44097
PROFESSIONAL CERTIFICATION
I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44097, EXPIRATION DATE: 6/9/21

SHEET TITLE:

CONCEPT PLAN 'B'

SHEET NUMBER:

C-301

ORG. DATE - 05/06/2021

ATTACHMENT 2

Construction Worker Soil Screening Levels
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B5-1

Description	Variable	Value
Days worked per week	DW	5
Exposure duration (yr)	ED	1
Hours worked per day	ET	8
A/constant (unitless) - particulate emission factor	Aconst	12.9351
B/constant (unitless) - particulate emission factor	Bconst	5.7383
C/constant (unitless) - particulate emission factor	Cconst	71.7711
Dispersion correction factor (unitless)	FD	0.185
Days per year with at least .01" precipitation	P	130
Target hazard quotient (unitless)	THQ	1
Body weight (kg)	BW	80
Averaging time - noncancer (yr)	ATnc	1
Soil ingestion rate (mg/d)	IR	330
Skin-soil adherence factor (mg/cm2)	AF	0.3
Skin surface exposed (cm2)	SA	3300
Event frequency (ev/day)	EV	1
Target cancer risk (unitless)	TR	01E-06
Averaging time - cancer (yr)	ATc	70
A/constant (unitless) - volatilization	Aconstv	2.4538
B/constant (unitless) - volatilization	Bconstv	17.566
C/constant (unitless) - volatilization	Cconstv	189.0426
Dry soil bulk density (kg/L)	Pb	1.5
Average source depth (m)	ds	3
Soil particle density (g/cm3)	Ps	2.65
Total soil porosity	Lpore/Lsoil	0.43
Air-filled soil porosity	Lair/Lsoil	0.28

Construction Worker Soil Screening Levels
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B5-1

Area of site (ac)	Ac	13.8	→ EU1
Overall duration of construction (wk/yr)	EW	14	
Exposure frequency (day/yr)	EF	**70**	
Cars per day	Ca	5	
Tons per car	CaT	2	
Trucks per day	Tru	5	
Tons per truck	TrT	20	
Mean vehicle weight (tons)	w	**11**	
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**14.8**	
Overall duration of construction (hr)	tc	**2,352**	
Overall duration of traffic (s)	Tt	**2,016,000**	
Surface area (m2)	AR	**55,847**	
Length (m)	LR	**236**	
Distance traveled (km)	ΣVKT	**165**	
Particulate emission factor (m3/kg)	PEFsc	**90,488,726**	
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**7.99**	
Total time of construction (s)	Tcv	**2,016,000**	

Input
Calculation

Chemical	RfD & RfC Sources	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				54.1	23,043	54.0	348	21,233	342
Chromium(VI)	A/C/I	5.00E-01	8.40E-02	5.00E-03	3.00E-04	0.025	1.25E-04	**0.01**	1			-	1.90E+01				80.4	1,180	75.3	2,873	424,651	2,854
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					11,009	11,009	3,682	28,310	3,258
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							859,076		859,076
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							17,336	70,775	13,925
Thallium (Soluble Salts)	P	-	-	4.00E-05	-	1	4.00E-05	**0.01**	1			-	7.10E+01							49.1		49.1
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							5,869	141,550	5,635
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.68E+4	31.2	32.2	15.8			
Benz[a]anthracene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	2.60E-02	6.70E-06	4.91E-04	1.08E+03	1.80E+05	6.71E-10	1.40E+5	637	2,548	509			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	7.45E+5	63.7	1,348	60.8	273	23.1	21.3
Benzo[b]fluoranthene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	4.80E-02	5.60E-06	2.69E-05	3.60E+03	6.00E+05	2.91E-11	6.71E+5	637	12,163	605			
Dibenz[a,h]anthracene	I	1.00E+00	6.00E-04	-	-	1		0.13	1	4.50E-02	5.20E-06	5.76E-06	1.14E+04	1.90E+06	4.13E-12	1.78E+6	63.7	165,142	63.6			
Naphthalene	C/I/A	1.20E-01	3.40E-05	2.00E-02	3.00E-03	1	2.00E-02	0.13	1	6.00E-02	8.40E-06	1.80E-02	9.00E+00	1.50E+03	6.35E-06	1.44E+3	530	46.3	42.6	18,188	67.5	67.2

*chemical specific parameters found in Chemical Specific Parameters Spreadsheet at https://www.epa.gov/risk/regional-screening-levels-rsls
^chemical specific parameters found in Unpaved Road Traffic calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
I: chemical specific parameters found in the IRIS at https://www.epa.gov/iris
C: chemical specific parameters found in Cal EPA at https://www.dtsc.ca.gov/AssessingRisk
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Construction Worker Soil Screening Levels
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B5-1

Area of site (ac)	Ac	51.0	→ EU2
Overall duration of construction (wk/yr)	EW	15	
Exposure frequency (day/yr)	EF	**75**	
Cars per day	Ca	5	
Tons per car	CaT	2	
Trucks per day	Tru	5	
Tons per truck	TrT	20	
Mean vehicle weight (tons)	w	**11**	
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**13.5**	
Overall duration of construction (hr)	tc	**2,520**	
Overall duration of traffic (s)	Tt	**2,160,000**	
Surface area (m2)	AR	**206,390**	
Length (m)	LR	**454**	
Distance traveled (km)	ΣVKT	**341**	
Particulate emission factor (m3/kg)	PEFsc	**159,046,179**	
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**6.56**	
Total time of construction (s)	Tcv	**2,160,000**	

Input
Calculation

Chemical	RfD & RfC Sources	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				50.5	37,801	50.4	325	34,831	322
Chromium(VI)	A/C/I	5.00E-01	8.40E-02	5.00E-03	3.00E-04	0.025	1.25E-04	**0.01**	1			-	1.90E+01				75.1	1,935	72.3	2,681	696,622	2,671
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					18,061	18,061	3,436	46,441	3,200
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							801,804		801,804
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							16,180	116,104	14,201
Thallium (Soluble Salts)	P	-	-	4.00E-05	-	1	4.00E-05	**0.01**	1			-	7.10E+01							45.8		45.8
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							5,478	232,207	5,351
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.43E+4	29.1	25.5	13.6			
Benz[a]anthracene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	2.60E-02	6.70E-06	4.91E-04	1.08E+03	1.80E+05	6.71E-10	1.19E+5	594	2,022	459			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	6.33E+5	59.4	1,073	56.3	255	18.4	17.2
Benzo[b]fluoranthene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	4.80E-02	5.60E-06	2.69E-05	3.60E+03	6.00E+05	2.91E-11	5.70E+5	594	9,681	560			
Dibenz[a,h]anthracene	I	1.00E+00	6.00E-04	-	-	1		0.13	1	4.50E-02	5.20E-06	5.76E-06	1.14E+04	1.90E+06	4.13E-12	1.51E+6	59.4	270,909	59.4			
Naphthalene	C/I/A	1.20E-01	3.40E-05	2.00E-02	3.00E-03	1	2.00E-02	0.13	1	6.00E-02	8.40E-06	1.80E-02	9.00E+00	1.50E+03	6.35E-06	1.22E+3	495	36.7	34.2	16,976	53.5	53.3

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Construction Worker Soil Screening Levels
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B5-1

Area of site (ac)	Ac	41.3	→ EU3
Overall duration of construction (wk/yr)	EW	11	
Exposure frequency (day/yr)	EF	**55**	
Cars per day	Ca	5	
Tons per car	CaT	2	
Trucks per day	Tru	5	
Tons per truck	TrT	20	
Mean vehicle weight (tons)	w	**11**	
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**13.7**	
Overall duration of construction (hr)	tc	**1,848**	
Overall duration of traffic (s)	Tt	**1,584,000**	
Surface area (m2)	AR	**167,135**	
Length (m)	LR	**409**	
Distance traveled (km)	ΣVKT	**225**	
Particulate emission factor (m3/kg)	PEFsc	**144,742,020**	
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**6.76**	
Total time of construction (s)	Tcv	**1,584,000**	

Input
Calculation

Chemical	RfD & RfC Sources	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				68.9	46,911	68.8	443	43,225	438
Chromium(VI)	A/C/I	5.00E-01	8.40E-02	5.00E-03	3.00E-04	0.025	1.25E-04	**0.01**	1			-	1.90E+01				102	2,401	98.2	3,656	864,505	3,641
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					22,413	22,413	4,686	57,634	4,334
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							1,093,370		1,093,370
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							22,064	144,084	19,134
Thallium (Soluble Salts)	P	-	-	4.00E-05	-	1	4.00E-05	**0.01**	1			-	7.10E+01							62.5		62.5
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							7,470	288,168	7,281
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.26E+4	39.7	30.7	17.3			
Benz[a]anthracene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	2.60E-02	6.70E-06	4.91E-04	1.08E+03	1.80E+05	6.71E-10	1.05E+5	810	2,435	608			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	5.59E+5	81.0	1,293	76.2	347	22.2	20.8
Benzo[b]fluoranthene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	4.80E-02	5.60E-06	2.69E-05	3.60E+03	6.00E+05	2.91E-11	5.04E+5	810	11,658	758			
Dibenz[a,h]anthracene	I	1.00E+00	6.00E-04	-	-	1		0.13	1	4.50E-02	5.20E-06	5.76E-06	1.14E+04	1.90E+06	4.13E-12	1.34E+6	81.0	336,196	81.0			
Naphthalene	C/I/A	1.20E-01	3.40E-05	2.00E-02	3.00E-03	1	2.00E-02	0.13	1	6.00E-02	8.40E-06	1.80E-02	9.00E+00	1.50E+03	6.35E-06	1.08E+3	675	44.2	41.5	23,148	64.4	64.2

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ATTACHMENT 3

Sparrows Point Development - PPE Standard Operational Procedure, Revision 3

Planning, Tracking/Supervision, Enforcement, and Documentation

Planning

- Response and Development Work Plan (RDWP) for each individual redevelopment sub-parcel identifies and documents site conditions.
- RDWP is reviewed and approved by regulators.
- Contractor HASP to address site-specific conditions and PPE requirements:
    - Contractor H&S professional to sign-off on PPE requirements for site workers;
    - Job Safety Analysis (JSA) to be performed for ground intrusive work.
- Project Environmental Professional (EP) assigned to each construction project – monitors project during environmentally sensitive project phases and is available to construction contractor on an as needed basis. EP responsibilities include the following:
    - Dust monitoring
    - Routine ground intrusive breathing space air monitoring
    - Soil tracking
    - Water handling oversight
    - Ground intrusive work observation
    - Notification for unexpected conditions
- Pre-construction meeting identifies EP roles and responsibilities and reviews site conditions.
- Contractor to perform job-site HazCom. HazCom to be addressed in Contractor HASP and include:
    - PPE requirements,
    - Exposure time limits,
    - Identification of chemicals of concern and potential effects of over-exposure (adverse reactions),
    - Methods and routes of potential exposure.
- All personnel that will be performing ground intrusive work within impacted soils shall sign-off on HazCom.
- If, based on a thorough review of Site conditions, it is expected that construction workers will have the potential to encounter materials considered hazardous waste under RCRA or DOT regulations, HAZWOPER-trained personnel will be utilized.

Tracking/Supervision

- Contractor to record any day that there is ground intrusive work and confirm that proper PPE is being worn.
- EP will note ground intrusive work on daily work sheets and perform at least one spot check per day.
- EP will log on daily work sheets PPE compliance for all intrusive work areas at least once per day.

- EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically.

Work Zones Delineation

- Exclusion Zone – The Exclusion Zones will include the areas proposed for excavation or with active trenches, excavations, or ground intrusive work, at a minimum. Personnel working within the exclusion zone will be required to wear Modified Level D PPE as described in this SOP. EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically. The Exclusion Zones will be identified each work day.
- Contamination Reduction Zone – This work zone is located outside of the exclusion zone, but inside of the limits of development (LOD). The Contamination Reduction Zone will be located adjacent to the Exclusion Zone, and all personal decontamination including removal of all disposable PPE/removal of soil from boots will be completed in the Contamination Reduction Zone.

Documentation

- Contractor HASP and HazCom.
- Contractor ground intrusive tracking record.
- HASP and HazCom sign-in sheets.
- EP pre-con memos.
- EP daily work sheets.
- Records documenting intrusive work and proper PPE use to be provided in completion report.

Enforcement

- Non-compliance of PPE requirements will result in disciplinary action up to and including prohibition from working on Sparrows Point.

Unknown and/or Unexpected Conditions

If unknown and/or unexpected conditions are encountered during the project that the EP determines to have a reasonable potential to significantly impact construction worker health and safety, the following will be initiated:

1. Job stoppage,
2. TPA and MDE notification,
3. Re-assessment of conditions.

Work will not continue until EP has cleared the area. If hazardous waste is identified, a HAZWOPER contractor will be brought in to address. The approved contingency plan will be implemented, where appropriate.

Modified Level D PPE

Modified Level D PPE will include, at a minimum, overalls such as polyethylene-coated Tyvek or clean washable cloth overalls, latex (or similar) disposable gloves (when working in wet/chemical surroundings) or work gloves, steel-toe/steel-shank high ankle work boots with taped chemical-protective over-boots (as necessary), dust mask, hard hat, safety glasses with

side shields, and hearing protection (as necessary). If chemical-protective over-boots create increased slip/trip/fall hazardous, then standard leather or rubber work boots could be used, but visible soils from the sides and bottoms of the boots must be removed upon exiting the Exclusion Zone.