APPENDIX F
Fish and Wildlife Impact Analysis

Geosyntec consultants

engineers | scientists | innovators

FORMER SPERRY REMINGTON SITE (NYSDEC SITE I.D. #808043)

REMEDIAL INVESTGATION FISH AND WILDLIFE IMPACT ANALYSIS

CITY OF ELMIRA, CHEMUNG COUNTY, NY

Prepared for
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, New York 14414-9519

Prepared by
Geosyntec Consultants, Inc.
10220 Old Columbia Road, Suite A
Columbia, Maryland 21046

And

EA Engineering, P.C. and Its Affiliate
EA Science and Technology
6712 Brooklawn Pkwy., Suite 104
Syracuse, New York 13211

Project Number MN0832

JANUARY 2013

Agency Review Draft

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

1.1 Background

On behalf of Unisys Corporation (Unisys), Geosyntec Consultants, Inc. (Geosyntec) and EA Engineering, P.C. and Its Affiliate, EA Science and Technology (EA) have prepared Steps IIA (pathway analysis) and IIB (criteria analysis) of the Fish and Wildlife Impact Analysis (FWIA) for the Former Sperry Remington Site (Site #808043) (Site) in Elmira, New York. The FWIA is part of the Remedial Investigation (RI) being conducted by Unisys at the Site in accordance with the Order on Consent and Administrative Settlement (AOC) (Index #B8-0815-09-10) with the New York State Department of Environmental Conservation (NYSDEC) approved by NYSDEC on 30 March 2010.

The Site is located at 1051 South Main Street in Elmira, Chemung County, New York (see **Figure 1**). The Site is a 185' x 65' rectangular area (0.28 acres) as shown on **Figure 2**. The Site includes an 8 to 12-foot diameter covered concrete culvert (Site Culvert) which extends from a former holding pond (immediately to the east and adjacent to the Site) to a discharge point to the east northeast and off-site. The culvert is approximately 275 feet long and extends beneath a railroad line owned by Norfolk Southern. The Site Culvert discharges into a 580 feet long Drainage Swale, which subsequently drains into a 3.5 acre Wetlands Area and Coldbrook Creek at two outfall locations (Off-Site Areas). The Site and Off-Site Areas consist of a number of parcels owned by multiple parties. Samples collected in 2006 by NYSDEC indicated that there were polychlorinated biphenyls (PCBs) and inorganic constituents present in sediments in the Drainage Swale, Wetlands Area and Coldbrook Creek.

In accordance with the AOC, Advanced GeoServices prepared a Remedial Investigation/Feasibility Study (RI/FS) Work Plan dated 7 July 2010 and revised 11 November 2010. The overall purpose and objective of the RI is to determine the nature and extent of constituents of concern (COCs) that may have been potentially discharged from the Site, determining if residual sources of COCs still exist, and identifying both current and potential routes of human exposure, if any, to COCs. Data collected in accordance with the RI/FS Work Plan and Work Plan Addenda #1 and #2 have been presented previously in the Remedial Investigation Phase 1 Data Report (Phase 1 Data Report) dated 18 November 2011 prepared by Advanced GeoServices Engineering P.C. (Advanced GeoServices). Geosyntec and EA have collected additional data in Off-Site Areas to further delineate the horizontal and vertical extent of PCBs as an indicator of COC concentrations in soil, sediment and surface water in accordance with the RI/FS Work Plan Addendum #3 dated 12 July 2012. Those data are presented in Remedial Investigation Phase 2 Data Report to which this report is appended. Furthermore, Geosyntec and EA have collected additional data to characterize sediments in the Site Culvert and OS2 as potential sources of COCs as part of an Interim Removal Measure (IRM) pre-design investigation (PDI). These data have been presented in the IRM PDI Data Report submitted to NYSDEC as an agency draft on 16 October 2012.

1.2 Purpose

In its approval of RI/FS Work Plan Addendum #3, NYSDEC requested that Steps I through Step IIB of the FWIA be completed. Step I of the FWIA (Site Description) was presented in Appendix B of the Phase 1 Data Report. Step II of the FWIA is a constituent-specific assessment of site-related impacts on fish and wildlife resources. This report presents the results of Step IIA and Step IIB in accordance with the NYSDEC guidance, *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites*, dated October 1, 1994. Step IIA is a pathway analysis to identify potential exposure pathways of COCs to the surrounding fish and wildlife resources. If a complete pathway exists, a criteria analysis is conducted as Step IIB to assess the impacts of COC migration by comparing COC levels to numerical criteria that have been established for specific media or biota.

2. PATHWAY ANALYSIS

Pathway analysis includes the identification of fish and wildlife resources as the receptor, potential sources of COCs, and potential pathways for migration and exposure. Step I of the FWIA identified fish and wildlife resources on-Site and in Off-Site Areas. Ecological resources are limited on-Site due to the high level of anthropogenic influences. The Site pond discharges into the off-Site Drainage Swale, Coldbrook Creek and the Wetlands Area which have more natural characteristics. Potential off-Site receptors of Site-related COCs include fish, bird reptile and amphibian species, and mammals (AGE, 2011). Fish and wildlife resources utilizing the stream or habitat surrounding the areas could potentially be exposed to Site-related COCs in sediment, surface water and soil. Consequently, the potential exposure pathways to wildlife are through ingestion of water from the on-Site and off-Site water bodies and surrounding wetlands, direct contact with sediments and soils and the consumption of impacted vegetation.

The Site Culvert and OS2 have been identified as potential sources of COCs in the Phase 1 Data Report with additional investigation during the IRM PDI (AGE, 2011; Geosyntec, 2012a, b). COCs have been identified by comparison to appropriate screening criteria in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10) dated May 3, 2010. Soil concentrations are compared to the unrestricted use soil cleanup objectives presented in the New York Code of Rules and Regulations (NYCRR) Subpart 375-6.8a in accordance with NYSDEC CP-51 Soil Cleanup Guidance. Sediment concentrations are compared to screening values in the NYSDEC Technical Guidance for Screening Contaminated Sediments. For sediment criteria for non-polar organic constituents presented in that guidance per unit mass of organic carbon, the lower 95% confidence limit of total organic carbon (TOC) concentrations in sediment reported in Phase 1 Data Report were used to convert screening criteria to a per unit mass of sediment basis. The TOC data and the derivation of the sediment criteria for non-polar organic constituents are presented in RI/FS Work Plan Addendum #3. Coldbrook Creek is listed in NYCRR Subpart 811 as Class "C" fresh surface water. Surface water concentrations are compared to the New York State Ambient Water Quality Standards (AWQS) for Class "C" fresh surface waters presented in Division of Water *Technical Operational Guidance Series (1.1.1)*.

Table 1 shows a summary of COCs identified in samples collected in soil, sediment and surface water within and in the vicinity of the Site Culvert and OS2. The most prevalent COCs in soil and sediment are PCBs. Additional COCs include various metals, pesticides, SVOCs, volatile organic compounds (VOCs), and cyanide. A single surface water sample collected from within OS2 exceeded the screening criteria for PCBs, pesticides and SVOCs.

The Site Culvert and the Drainage Swale have been identified as potential migration pathway of COCs in sediment and surface water within the Site Culvert and OS2 to the Wetland Area and Coldbrook Creek. The Site Culvert receives storm water from the Site and drainage from the City of Elmira storm water system. As shown on Figure 2, the Site Culvert extends from a

former holding pond (immediately to the east and adjacent of the Site) and discharges into the Drainage Swale to the east northeast. This Drainage Swale subsequently drains into the Wetlands Area and Coldbrook Creek at two outfall locations. The Site Culvert and the older storm water infrastructure as currently configured were identified as potential conduits to the Wetlands from documented historical surface spill events. OS2 is hydraulically connected to the Site Culvert. As presented in the IRM PDI Data Report, inlet connections to OS2 are inactive under normal conditions but flow may occur in these connections during high stormwater flow events with potential discharge to OS2 and subsequent discharge to the Site Culvert.

Based on this analysis, Site data and observations suggest that a complete exposure pathway exists between potential sources at the Site and ecological receptors in the Off-Site Areas. Therefore, a criteria analysis is presented in the following section.

3. CRITERIA SPECIFIC ANALYSIS

Table 2 summarizes all the Site-related COCs that were identified at off-Site locations. The numerical criteria for identification of COCs are the same as those used in the pathway analysis are also used in this Criteria Specific Analysis. As noted earlier, PCBs are the most prevalent COC, which can be used as the path-finder constituent. Summaries of COCs identified for each medium and screening criterion and the frequency of exceedance for on-Site and off-Site areas are listed in **Tables 1** and **2**, respectively. A comparison of analytical results to specific screening criterion indicates the following:

- PCBs are the most prevalent COCs in sediment. The frequency of exceedance of site-specific Wildlife Bioaccumulation the Benthic Aquatic Life Chronic Effect criteria in off-Site sediment samples for total PCBs is approximately 63% and 44%, respectively. In addition, various metals including copper, nickel, chromium, cadmium, lead and zinc. Over half of the sediment samples had exceedances of the Lowest Effect Level Criteria for nickel, copper, cadmium, zinc, chromium, lead, arsenic and mercury and the Severe Effect Level Criteria for nickel, copper, zinc, and chromium. Additional COCs for which concentrations exceed the site-specific sediment screening criteria include pesticide and SVOCs;
- PCBs are the most prevalent COCs in surface water. The frequency of samples having total PCB levels above the Health and Wildlife Criteria is approximately 52%. Additional COCs in surface water include pesticides, SVOCs and cyanide. Pesticides exceeded the Health Criteria whiles SVOCs exceeded the Health and Aquatic Life Chronic Effect Criteria. Cyanide concentrations exceeded the Aquatic Life Chronic Effect Criteria in 24% of off-Site samples; and
- The most prevalent COCs in soils are PCBs and metals including copper, nickel, lead and zinc. The frequency of off-Site soil samples exceeding the Unrestricted Use Soil Cleanup Objective for total PCBs is approximately 25%. Additional COCs in soils include pesticides, SVOCs and VOCs.

4. CONCLUSION

The results of Steps IIA and IIB of the FWIA indicate that a complete exposure pathway exists between potential on-Site COC sources and off-Site ecological receptors and that detected concentrations in off-site media exceed the appropriate screening criteria.

TABLES

TABLE 1
SUMMARY OF POTENTIAL SOURCE CONSTITUENTS OF CONCERN

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Sediment									
PCBs	Total PCBs	16	16	100.00%	234,000	82	0.047	Human Health Bioaccumulation	2
	Total PCBs	16	16	100.00%	234,000	82	79	Wildlife Bioaccumulation	2
	Total PCBs	7	16	43.75%	234,000	82	1,102	Benthic Aquatic Life Chronic Toxicity	2
	Total PCBs	1	16	6.25%	234,000	82	157,420	Benthic Aquatic Life Acute Toxicity	2
SVOC	Benzo(a)anthracene	10	10	100.00%	27,000	1900	75.0	Human Health Bioaccumulation	2
	Benzo(a)pyrene	10	10	100.00%	30,000	1900	75.0	Human Health Bioaccumulation	2
	Benzo(b)fluoranthene	10	10	100.00%	49,000	2700	75	Human Health Bioaccumulation	2
	Benzo(k)fluoranthene	2	10	20.00%	13,000	ND	75	Human Health Bioaccumulation	2
	Chrysene	10	10	100.00%	35,000	1700	75	Human Health Bioaccumulation	2
	Indeno(1,2,3-cd)pyrene	10	10	100.00%	27,000	1500	75	Human Health Bioaccumulation	2
	2-Methylnaphthalene	1	10	10.00%	2,000	ND	1941.5	Benthic Aquatic Life Chronic Toxicity	2
	Anthracene	3	10	30.00%	10,000	510	6106.8	Benthic Aquatic Life Chronic Toxicity	2
	Benzo(a)anthracene	10	10	100.00%	27,000	1900	696.9	Benthic Aquatic Life Chronic Toxicity	2
	bis(2-Ethylhexyl) phthalate	2	10	20.00%	25,000	ND	6826.2	Benthic Aquatic Life Chronic Toxicity	2
	Fluoranthene	2	10	20.00%	68,000	3100	58160.8	Benthic Aquatic Life Chronic Toxicity	2
	Fluorene	7	10	70.00%	7,500	ND	466.0	Benthic Aquatic Life Chronic Toxicity	2
	Naphthalene	2	10	20.00%	4,500	ND	1737.7	Benthic Aquatic Life Chronic Toxicity	2
	Phenanthrene	4	10	40.00%	73,000	1600	6842.4	Benthic Aquatic Life Chronic Toxicity	2
	Pyrene	2	10	20.00%	57,000	2400	54800.9	Benthic Aquatic Life Chronic Toxicity	2
	Benzo(a)anthracene	5	10	50.00%	27,000	1900	5342.7	Benthic Aquatic Life Acute Toxicity	2
	Fluorene	1	10	10.00%	7,500	ND	4142.6	Benthic Aquatic Life Acute Toxicity	2
Pesticides	4,4'-DDT	7	9	77.78%	200	ND	0.57	Human Health Bioaccumulation	2
	Aldrin	3	9	33.33%	170	ND	5.70	Human Health Bioaccumulation	2
	delta-BHC	5	9	55.56%	180	ND	3.24	Human Health Bioaccumulation	2
	Endrin	2	9	22.22%	110	ND	45.40	Human Health Bioaccumulation	2
	gamma-BHC (Lindane)	1	9	11.11%	9	ND	3.2	Human Health Bioaccumulation	2
	Heptachlor epoxide	8	9	88.89%	420	ND	0.04	Human Health Bioaccumulation	2
	4,4'-DDT	2	9	22.22%	200	ND	57.02	Wildlife Bioaccumulation	2
	Aldrin	2	9	22.22%	170	ND	43.9	Wildlife Bioaccumulation	2
	delta-BHC	2	9	22.22%	180	ND	82.7	Wildlife Bioaccumulation	2
	Endrin	2	9	22.22%	110	ND	43.1	Wildlife Bioaccumulation	2
	Heptachlor epoxide	8	9	88.89%	420	ND	1.4	Wildlife Bioaccumulation	2
	4,4'-DDT	2	9	22.22%	200	ND	57	Benthic Aquatic Life Chronic Toxicity	2
	delta-BHC	5	9	55.56%	180	ND	3.60	Benthic Aquatic Life Chronic Toxicity	2
	Endosulfan I	8	9	88.89%	84	ND	1.82	Benthic Aquatic Life Chronic Toxicity	2
	gamma-BHC (Lindane)	1	9	11.11%	9	ND	3.60	Benthic Aquatic Life Chronic Toxicity	2
	Heptachlor epoxide	8	9	88.89%	420	ND	5.44	Benthic Aquatic Life Chronic Toxicity	2
	Methoxychlor	1	9	11.11%	51	ND	34.13	Benthic Aquatic Life Chronic Toxicity	2
	Endosulfan I	1	9	11.11%	84	ND	45	Benthic Aquatic Life Acute Toxicity	2

TABLE 1
SUMMARY OF POTENTIAL SOURCE CONSTITUENTS OF CONCERN

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Metals	Antimony	1	10	10.00%	2,000	ND	2,000	Lowest Effect Level	3
	Arsenic	7	10	70.00%	40,000	4,500	6,000	Lowest Effect Level	3
	Cadmium	9	10	90.00%	2,300	370	600	Lowest Effect Level	3
	Chromium	9	10	90.00%	400,000	16,000	26,000	Lowest Effect Level	3
	Copper	10	10	100.00%	630,000	32,000	16,000	Lowest Effect Level	3
	Iron	7	10	70.00%	110,000,000	13,000,000	20,000,000	Lowest Effect Level	3
	Lead	9	10	90.00%	430,000	30,000	31,000	Lowest Effect Level	3
	Manganese	1	10	10.00%	490,000	69,000	460,000	Lowest Effect Level	3
	Mercury	7	10	70.00%	3,600	57	150	Lowest Effect Level	3
	Nickel	10	10	100.00%	1,200,000	27,000	16,000	Lowest Effect Level	3
	Silver	2	10	20.00%	2,200	ND	1,000	Lowest Effect Level	3
	Zinc	9	10	90.00%	1,100,000	81,000	120,000	Lowest Effect Level	3
	Arsenic	2	10	20.00%	40,000	4,500	33,000	Severe Effect Level	3
	Chromium	4	10	40.00%	400,000	16,000	110,000	Severe Effect Level	3
	Copper	5	10	50.00%	630,000	32,000	110,000	Severe Effect Level	3
	Iron	3	10	30.00%	110,000,000	13,000,000	40,000,000	Severe Effect Level	3
	Lead	6	10	60.00%	430,000	30,000	110,000	Severe Effect Level	3
	Mercury	1	10	10.00%	3,600	57	1,300	Severe Effect Level	3
	Nickel	7	10	70.00%	1,200,000	27,000	50,000	Severe Effect Level	3
	Silver	1	10	10.00%	2,200	ND	2,200	Severe Effect Level	3
	Zinc	6	10	60.00%	1,100,000	81,000	270,000	Severe Effect Level	3
VOC	Trichloroethene	1	9	11.11%	1,400	ND	122	Human Health Bioaccumulation	2
Soil									
PCBs	Total PCBs	6	8	75.00%	48,000	ND	100	Unrestricted Use Soil Cleanup Objectives	1
Metals	Arsenic	4	5	80.00%	330,000	11,000	13,000	Unrestricted Use Soil Cleanup Objectives	1
	Copper	4	5	80.00%	260,000	20,000	50,000	Unrestricted Use Soil Cleanup Objectives	1
	Lead	3	5	60.00%	300,000	8,100	63,000	Unrestricted Use Soil Cleanup Objectives	1
	Mercury	3	5	60.00%	1,700	47	180	Unrestricted Use Soil Cleanup Objectives	1
	Nickel	3	5	60.00%	82,000	8,100	30,000	Unrestricted Use Soil Cleanup Objectives	1
	Selenium	2	5	40.00%	5,600	520	3,900	Unrestricted Use Soil Cleanup Objectives	1
	Zinc	1	5	20.00%	130,000	27000	109,000	Unrestricted Use Soil Cleanup Objectives	1
Pesticides	4,4'-DDD	1	5	20.00%	12	0.46	3	Unrestricted Use Soil Cleanup Objectives	1
	4,4'-DDE	3	5	60.00%	240	1.1	3	Unrestricted Use Soil Cleanup Objectives	1
	4,4'-DDT	1	5	20.00%	52	ND	3	Unrestricted Use Soil Cleanup Objectives	1
	Dieldrin	2	5	40.00%	14	ND	5	Unrestricted Use Soil Cleanup Objectives	1
	Endrin	2	5	40.00%	170	2	14	Unrestricted Use Soil Cleanup Objectives	1
	Heptachlor	1	5	20.00%	53	ND	42	Unrestricted Use Soil Cleanup Objectives	1
VOC	Benzene	1	5	20.00%	440	ND	60	Unrestricted Use Soil Cleanup Objectives	1
	Toluene	1	5	20.00%	2,400	ND	700	Unrestricted Use Soil Cleanup Objectives	1
	Trichloroethene	2	5	40.00%	1,500	ND	470	Unrestricted Use Soil Cleanup Objectives	1
	Xylenes (unspecified)	1	5	20.00%	5,200	ND	260	Unrestricted Use Soil Cleanup Objectives	1

TABLE 1
SUMMARY OF POTENTIAL SOURCE CONSTITUENTS OF CONCERN

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Surface Water									
PCBs	Total PCBs	1	1	100.00%	2.50	2.5	1.00E-06	Health (Fish Consumption)	4
	Total PCBs	1	1	100.00%	2.50	2.5	1.20E-04	Wildlife	4
Pesticides	4,4'-DDD	1	1	100.00%	0.00	0	8.00E-05	Health (Fish Consumption)	4
	4,4'-DDE	1	1	100.00%	0.02	0.019	7.00E-06	Health (Fish Consumption)	4
	Dieldrin	1	1	100.00%	0.00	0.0024	0.0000006	Health (Fish Consumption)	4
	Endrin	1	1	100.00%	0.02	0.023	0.002	Health (Fish Consumption)	4
	Heptachlor	1	1	100.00%	0.01	0.0058	2.00E-04	Health (Fish Consumption)	4
	Heptachlor epoxide	1	1	100.00%	0.05	0.053	3.00E-04	Health (Fish Consumption)	4
SVOC	Benzo(a)anthracene	1	1	100.00%	0.04	0.039	0.03	Aquatic (Chronic)	4

Notes:

1 Sediment screening criteria are taken from Table 2 the *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, 1999).

2 Sediment screening criteria are taken from Table 1 the *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, 1999). Criteria are presented in the guidance per unit mass of organic carbon. The lower 95% confidence limit of total organic carbon concentrations in sediment reported in Phase 1 Data Report were used to convert the screening criteria to a per unit mass of sediment basis.

3 Soil screening criteria are the Unrestricted Use Soil Cleanup Objectives presented in NYCRR Subpart 375-6.8a.

4 Surface water criteria are the New York State Ambient Water Quality Standards for Class "C" fresh surface waters presented in *Division of Water Technical Operational Guidance Series (1.1.1).*

5 All values are in units of micrograms per kilogram for soil and sediment and in micrograms per liter for surface water.

ND - Non-detect

PCB - Polychlorinated biphenyl

SVOC - Semivolatile organic compound

VOC - Volatile organic compound

TABLE 2
SUMMARY OF COMPARISON TO NUMERICAL CRITERIA

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Sediment									
PCBs	Total PCBs	177	223	79.37%	240,000	ND	0.047	Human Health Bioaccumulation	2
	Total PCBs	140	223	62.78%	240,000	ND	79	Wildlife Bioaccumulation	2
	Total PCBs	97	223	43.50%	240,000	ND	1,102	Benthic Aquatic Life Chronic Toxicity	2
	Total PCBs	1	223	0.45%	240,000	ND	157,420	Benthic Aquatic Life Acute Toxicity	2
SVOC	Benzo(a)anthracene	68	118	57.63%	160,000	ND	75	Human Health Bioaccumulation	2
	Benzo(a)pyrene	64	118	54.24%	99,000	ND	75	Human Health Bioaccumulation	2
	Benzo(b)fluoranthene	62	118	52.54%	110,000	ND	75	Human Health Bioaccumulation	2
	Benzo(k)fluoranthene	28	118	23.73%	7,800	ND	75	Human Health Bioaccumulation	2
	Chrysene	76	118	64.41%	96,000	ND	75	Human Health Bioaccumulation	2
	Indeno(1,2,3-cd)pyrene	55	118	46.61%	50,000	ND	75	Human Health Bioaccumulation	2
	2-Methylnaphthalene	2	118	1.69%	55000	ND	1,941	Benthic Aquatic Life Chronic Toxicity	2
	Acenaphthene	2	118	1.69%	41,000	ND	7,983	Benthic Aquatic Life Chronic Toxicity	2
	Anthracene	2	118	1.69%	100,000	ND	6,107	Benthic Aquatic Life Chronic Toxicity	2
	Benzo(a)anthracene	44	118	37.29%	160,000	ND	697	Benthic Aquatic Life Chronic Toxicity	2
	bis(2-Ethylhexyl) phthalate	6	118	5.08%	20,000	ND	6,826	Benthic Aquatic Life Chronic Toxicity	2
	Fluoranthene	1	118	0.85%	380,000	ND	58,161	Benthic Aquatic Life Chronic Toxicity	2
	Fluorene	22	118	18.64%	9,900	ND	466	Benthic Aquatic Life Chronic Toxicity	2
	Naphthalene	2	118	1.69%	95,000	ND	1,738	Benthic Aquatic Life Chronic Toxicity	2
	Phenanthrene	6	118	5.08%	470,000	ND	6,842	Benthic Aquatic Life Chronic Toxicity	2
	2-Methylnaphthalene	1	118	0.85%	55,000	ND	17,349	Benthic Aquatic Life Acute Toxicity	2
	Anthracene	1	118	0.85%	100,000	ND	56,247	Benthic Aquatic Life Acute Toxicity	2
	Benzo(a)anthracene	7	118	5.93%	160,000	ND	5,343	Benthic Aquatic Life Acute Toxicity	2
	Fluorene	1	118	0.85%	9,900	ND	4,143	Benthic Aquatic Life Acute Toxicity	2
	Naphthalene	1	118	0.85%	95,000	ND	14,704	Benthic Aquatic Life Acute Toxicity	2
Metals	Nickel	175	176	99.43%	13,700,000	15,600	16,000	Lowest Effect Level	3
	Copper	167	176	94.89%	4,800,000	9,500	16,000	Lowest Effect Level	3
	Cadmium	140	176	79.55%	467,000	ND	600	Lowest Effect Level	3
	Zinc	140	176	79.55%	20,400,000	ND	120,000	Lowest Effect Level	3
	Chromium	138	176	78.41%	7,550,000	11,400	26,000	Lowest Effect Level	3
	Lead	131	176	74.43%	1,450,000	8,500	31,000	Lowest Effect Level	3
	Arsenic	95	176	53.98%	36,700	ND	6,000	Lowest Effect Level	3
	Mercury	90	176	51.14%	1,000	ND	150	Lowest Effect Level	3
	Silver	57	176	32.39%	25,000	ND	1,000	Lowest Effect Level	3
	Iron	55	176	31.25%	58,400,000	10,000,000	20,000,000	Lowest Effect Level	3
	Antimony	19	176	10.80%	10,700	ND	2,000	Lowest Effect Level	3
	Manganese	19	176	10.80%	3,440,000	65,200	460,000	Lowest Effect Level	3
	Nickel	149	176	84.66%	13,700,000	15,600	50,000	Severe Effect Level	3
	Copper	92	176	52.27%	4,800,000	9,500	110,000	Severe Effect Level	3
	Zinc	90	176	51.14%	20,400,000	ND	270,000	Severe Effect Level	3
	Chromium	89	176	50.57%	7,550,000	11,400	110,000	Severe Effect Level	3
	Lead	81	176	46.02%	1,450,000	8,500	110,000	Severe Effect Level	3
	Cadmium	39	176	22.16%	467,000	ND	9,000	Severe Effect Level	3
	Silver	31	176	17.61%	25,000	ND	2,200	Severe Effect Level	3
	Iron	4	176	2.27%	58,400,000	10,000,000	40,000,000	Severe Effect Level	3
	Manganese	2	176	1.14%	3,440,000	65,200	1,100,000	Severe Effect Level	3
	Arsenic	1	176	0.57%	36,700	ND	33,000	Severe Effect Level	3

TABLE 2
SUMMARY OF COMPARISON TO NUMERICAL CRITERIA

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Pesticides	4,4'-DDD	32	59	54.24%	22	ND	0.57	Human Health Bioaccumulation	2
	4,4'-DDE	27	59	45.76%	150	ND	0.57	Human Health Bioaccumulation	2
	4,4'-DDT	29	59	49.15%	240	ND	0.6	Human Health Bioaccumulation	2
	Aldrin	5	59	8.47%	300	ND	5.70	Human Health Bioaccumulation	2
	alpha-BHC	1	59	1.69%	53	ND	3.24	Human Health Bioaccumulation	2
	delta-BHC	13	59	22.03%	140	ND	3.2	Human Health Bioaccumulation	2
	Dieldrin	3	59	5.08%	23	ND	5.7	Human Health Bioaccumulation	2
	gamma-BHC (Lindane)	9	59	15.25%	110	ND	3.2	Human Health Bioaccumulation	2
	Heptachlor	27	59	45.76%	140	ND	0.043	Human Health Bioaccumulation	2
	Heptachlor epoxide	19	59	32.20%	200	ND	0.043	Human Health Bioaccumulation	2
	4,4'-DDE	2	59	3.39%	150	ND	57.0	Wildlife Bioaccumulation	2
	4,4'-DDT	5	59	8.47%	240	ND	57.0	Wildlife Bioaccumulation	2
	Aldrin	2	59	3.39%	300	ND	43.9	Wildlife Bioaccumulation	2
	delta-BHC	3	59	5.08%	140	ND	82.7	Wildlife Bioaccumulation	2
	gamma-BHC (Lindane)	1	59	1.69%	110	ND	82.7	Wildlife Bioaccumulation	2
	Heptachlor	17	59	28.81%	140	ND	1.4	Wildlife Bioaccumulation	2
	Heptachlor epoxide	17	59	28.81%	200	ND	1.4	Wildlife Bioaccumulation	2
	4,4'-DDT	5	59	8.47%	240	ND	57	Benthic Aquatic Life Chronic Toxicity	2
	alpha-BHC	1	59	1.69%	53	ND	3.6	Benthic Aquatic Life Chronic Toxicity	2
	delta-BHC	13	59	22.03%	140	ND	3.6	Benthic Aquatic Life Chronic Toxicity	2
	Endosulfan I	16	59	27.12%	35	ND	1.82	Benthic Aquatic Life Chronic Toxicity	2
	Endosulfan II	4	59	6.78%	10	ND	1.82	Benthic Aquatic Life Chronic Toxicity	2
	gamma-BHC (Lindane)	8	59	13.56%	110	ND	3.6	Benthic Aquatic Life Chronic Toxicity	2
	Heptachlor	14	59	23.73%	140	ND	5.4	Benthic Aquatic Life Chronic Toxicity	2
	Heptachlor epoxide	14	59	23.73%	200	ND	5.4	Benthic Aquatic Life Chronic Toxicity	2
	Methoxychlor	1	59	1.69%	62	ND	34.1	Benthic Aquatic Life Chronic Toxicity	2
Soil									
PCBs	Total PCBs	34	135	25.19%	18,000	ND	100	Unrestricted Use Soil Cleanup Objectives	1
SVOC	4-Methylphenol	1	6	16.67%	570	ND	330	Unrestricted Use Soil Cleanup Objectives	1
	Benzo(a)anthracene	6	48	12.50%	2,200	ND	1,000	Unrestricted Use Soil Cleanup Objectives	1
	Benzo(a)pyrene	6	48	12.50%	2,600	ND	1,000	Unrestricted Use Soil Cleanup Objectives	1
	Benzo(b)fluoranthene	9	48	18.75%	4,400	ND	1,000	Unrestricted Use Soil Cleanup Objectives	1
	Benzo(k)fluoranthene	3	48	6.25%	1,500	ND	800	Unrestricted Use Soil Cleanup Objectives	1
	Chrysene	7	48	14.58%	3,800	ND	1,000	Unrestricted Use Soil Cleanup Objectives	1
	Dibenzo(a,h)anthracene	4	48	8.33%	510	ND	330	Unrestricted Use Soil Cleanup Objectives	1
	Indeno(1,2,3-cd)pyrene	7	48	14.58%	2,300	ND	500	Unrestricted Use Soil Cleanup Objectives	1
Metals	Arsenic	19	111	17.12%	320,000	1,900	13,000	Unrestricted Use Soil Cleanup Objectives	1
	Barium	1	111	0.90%	831,000	13,600	350,000	Unrestricted Use Soil Cleanup Objectives	1
	Cadmium	13	111	11.71%	41,500	ND	2,500	Unrestricted Use Soil Cleanup Objectives	1
	Chromium, hexavalent	11	45	24.44%	15,900	ND	1,000	Unrestricted Use Soil Cleanup Objectives	1
	Copper	45	111	40.54%	6,760,000	9,100	50,000	Unrestricted Use Soil Cleanup Objectives	1
	Lead	37	111	33.33%	550,000	8100	63,000	Unrestricted Use Soil Cleanup Objectives	1
	Manganese	1	111	0.90%	1,700,000	95500	1,600,000	Unrestricted Use Soil Cleanup Objectives	1
	Mercury	16	111	14.41%	970	ND	180	Unrestricted Use Soil Cleanup Objectives	1
	Nickel	41	111	36.94%	2,050,000	6000	30,000	Unrestricted Use Soil Cleanup Objectives	1
	Silver	1	111	0.90%	4,900	ND	2,000	Unrestricted Use Soil Cleanup Objectives	1
	Zinc	37	111	33.33%	1,690,000	13,200	109,000	Unrestricted Use Soil Cleanup Objectives	1

TABLE 2
SUMMARY OF COMPARISON TO NUMERICAL CRITERIA

Former Sperry Remington Site
Elmira, New York

Group	Constituent of Concern	Number of Exceedances	Number of Samples Analyzed	Frequency of Exceedance	Maximum	Minimum	Screening Value	Criterion	Notes
Pesticides	4,4'-DDD	14	57	24.56%	42	ND	3	Unrestricted Use Soil Cleanup Objectives	1
	4,4'-DDE	9	57	15.79%	15	ND	3.3	Unrestricted Use Soil Cleanup Objectives	1
	4,4'-DDT	14	57	24.56%	190	ND	3.3	Unrestricted Use Soil Cleanup Objectives	1
	Aldrin	3	57	5.26%	360	ND	5	Unrestricted Use Soil Cleanup Objectives	1
	delta-BHC	2	57	3.51%	130	ND	40	Unrestricted Use Soil Cleanup Objectives	1
	Dieldrin	1	57	1.75%	23	ND	5	Unrestricted Use Soil Cleanup Objectives	1
	Endrin	1	57	1.75%	91	ND	14	Unrestricted Use Soil Cleanup Objectives	1
	Heptachlor	1	57	1.75%	110	ND	42	Unrestricted Use Soil Cleanup Objectives	1
Wet Chemistry	Cyanide	2	105	1.90%	145,000	ND	27,000	Unrestricted Use Soil Cleanup Objectives	1
Surface Water									
PCBs	Total PCBs	23	44	52.27%	0.17	ND	1.00E-06	Health (Fish Consumption)	4
	Total PCBs	23	44	52.27%	0.17	ND	1.20E-04	Wildlife	4
Pesticides	4,4'-DDD	4	33	12.12%	0.01	ND	8.00E-05	Health (Fish Consumption)	4
	4,4'-DDE	3	33	9.09%	0.00	ND	7.00E-06	Health (Fish Consumption)	4
	alpha-BHC	3	33	9.09%	0.02	ND	0.002	Health (Fish Consumption)	4
	delta-BHC	2	33	6.06%	0.02	ND	0.008	Health (Fish Consumption)	4
	Dieldrin	2	33	6.06%	0.00	ND	6.00E-07	Health (Fish Consumption)	4
	gamma-BHC (Lindane)	1	33	3.03%	0.01	ND	8.00E-03	Health (Fish Consumption)	4
	Heptachlor	1	33	3.03%	0.01	ND	0.0002	Health (Fish Consumption)	4
SVOC	Benzo(a)pyrene	5	33	15.15%	0.20	ND	0.0012	Health (Fish Consumption)	4
	Benzo(a)anthracene	6	33	18.18%	0.17	ND	0.03	Aquatic (Chronic)	4
	bis(2-Ethylhexyl) phthalate	2	33	6.06%	2.40	ND	0.6	Aquatic (Chronic)	4
Wet Chemistry	Cyanide	8	33	24.24%	110	ND	5.2	Aquatic (Chronic)	4
	Cyanide	2	33	6.06%	110	ND	22	Aquatic (Acute)	4

Notes:

1 Sediment screening criteria are taken from Table 2 the *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, 1999).

2 Sediment screening criteria are taken from Table 1 the *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, 1999). Criteria are presented in the guidance per unit mass of organic carbon. The lower 95% confidence limit of total organic carbon concentrations in sediment reported in Phase 1 Data Report were used to convert the screening criteria to a per unit mass of sediment basis.

3 Soil screening criteria are the Unrestricted Use Soil Cleanup Objectives presented in NYCRR Subpart 375-6.8a.

4 Surface water criteria are the New York State Ambient Water Quality Standards for Class "C" fresh surface waters presented in *Division of Water Technical Operational Guidance Series (1.1.1).*

5 All values are in units of micrograms per kilogram for soil and sediment and in micrograms per liter for surface water.

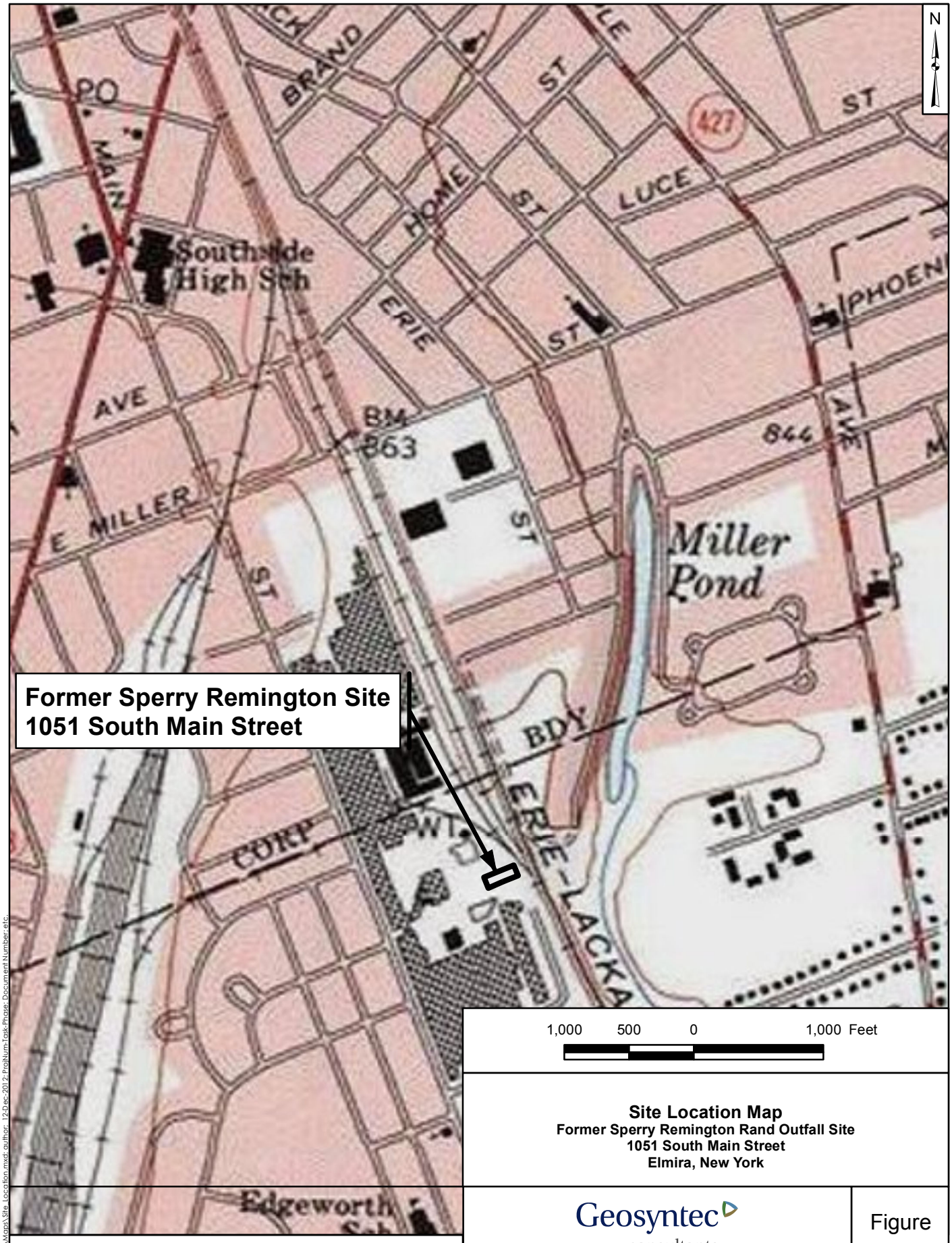
VOC - Volatile organic compound

SVOC - Semivolatile organic compound

PCB - Polychlorinated biphenyl

ND - Non-detect

FIGURES



1,000 500 0 1,000 Feet

Site Location Map
Former Sperry Remington Rand Outfall Site
1051 South Main Street
Elmira, New York

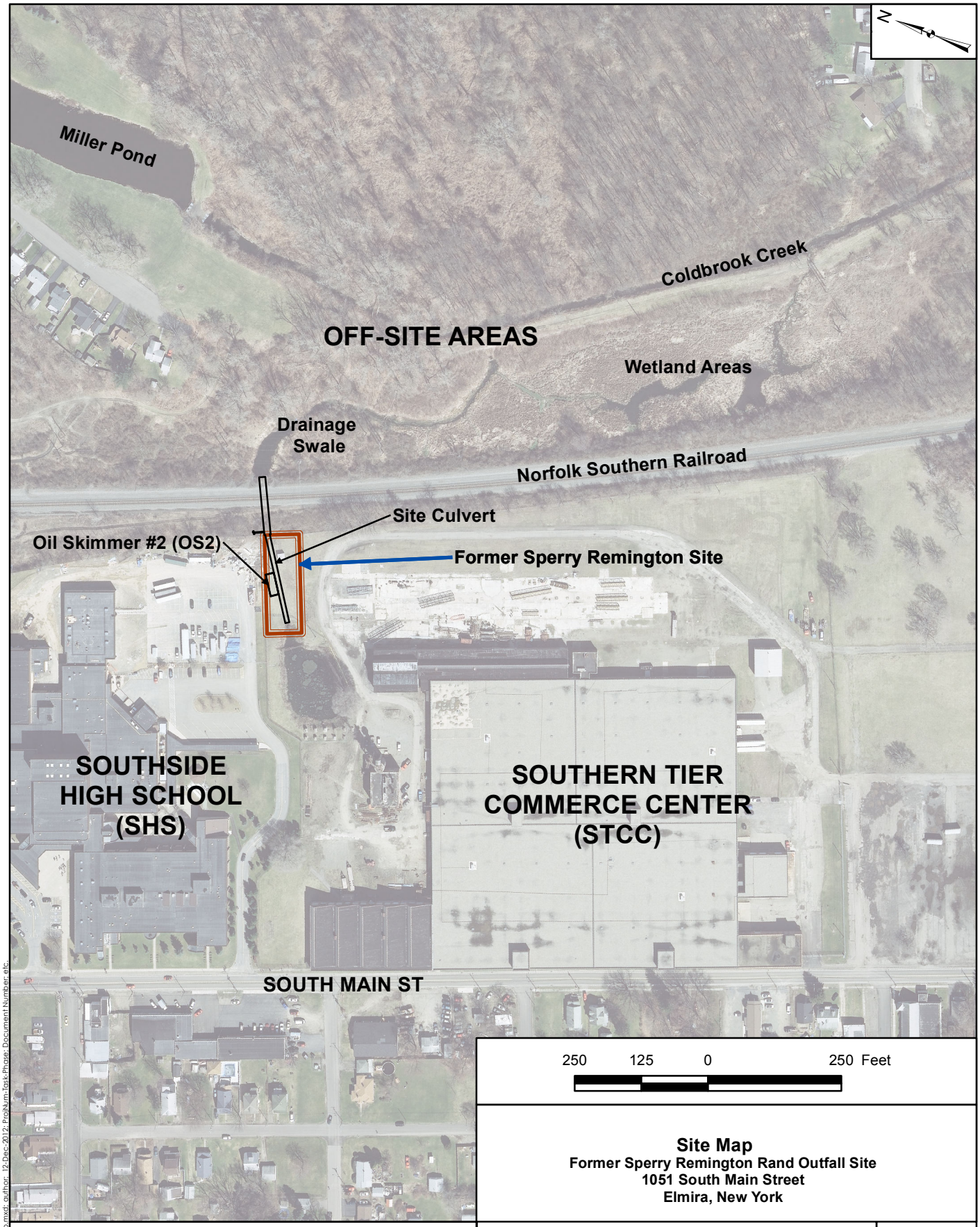
Notes
USGS 7.5' Quadrangle Elmira (1976)

Geosyntec consultants

Columbia, Maryland | December 2012

Figure 1

P:\GIS\WA\0892\Maps\Site Location.mxd; author: 12-Dec-2012; ProjNum-Task-Phase; Document Number etc.



250 125 0 250 Feet

Site Map
Former Sperry Remington Rand Outfall Site
1051 South Main Street
Elmira, New York

Notes
2010 imagery in Chemung County, NYS Digital Ortho-imagery Program (NYSDOP), NYS Office of Cyber Security (2010)

Geosyntec consultants

Columbia, Maryland | December 2012

Figure 2

P:\GIS\MN0892\Mxds\SiteMap.mxd; author: 12-Dec-2012; ProjNum-Task-Phase; Document Number; etc.