BROWNFIELDS ASSESSMENT
of the
ROSSNAN PROPERTY

Goldsboro, Maryland

October 2001

Prepared for: U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

And

Town of Goldsboro
64 S. Main Street
Goldsboro, Maryland 21626

Prepared by: Maryland Department of the Environment
Waste Management Administration
2500 Broening Highway
Baltimore, Maryland 21224

TABLE OF CONTENTS

EXECUTIVE SUMMARY

As part of the State of Maryland's Brownfields Remediation and Redevelopment Initiative, the Maryland Department of the Environment (MDE) conducted a Brownfields Assessment of the Rossnan Property site located at 316 Railroad Avenue in Goldsboro, Maryland at the request of the Town Manager of Goldsboro.

The property is situated on the easternmost part of the town of Goldsboro in rural Caroline County immediately east of former railroad tracks owned by Delaware and Chesapeake Railroad, LLC. A 447-acre farm borders the site to the east and single-family homes surround the remainder of the site. Railroad Avenue forms the northwest border of the site.

The site is a former milk plant that operated from sometime in the early 1920s until the late 1960s. In the late 1970s to the early 1980s, the site operated as a crab processing plant. The site has remained abandoned since the early 1980s and is occasionally used by vagrants. In 1995, the main processing building was struck by lightning and was damaged in the ensuing fire. Currently, the site contains three abandoned buildings: a masonry building, a dilapidated barn and a former residence.

A site visit was conducted by MDE on March 6, 2001 in response to a request for the Goldsboro Town Manager seeking State assistance in getting the property cleaned up and sold to recoup back taxes and other expenses incurred by the town. Potential hazards observed on-site included several hundred scrap tires, approximately 30 unlabelled 55-gallons drums, several smaller drums in which some contained product, an assortment of paint containers, five gallon buckets and trash scattered throughout the barn. An 18' x 30' concrete-lined lagoon adjacent to the north side of the barn and a hand dug well near the east side of the barn were also observed.

In the prepared sampling plan, MDE proposed to collect ten surface and subsurface soil grab samples, five groundwater samples and one surface water grab sample across the property and within areas of obvious concern. The soil samples were collected and field screened by MDE personnel for the presence of carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs), the petroleum hydrocarbons benzene, toluene, ethylbenzene and xylenes (BTEX), Polychlorinated Biphenyls (PCBs), and metals. Samples that revealed the highest field screened levels of contamination were sent to a private laboratory, along with the groundwater and surface water samples for confirmatory analyses of a suite of fourteen metals, pesticides, PCBs, semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs). Also, samples from two 55-gallon drums were collected and sent to the Department of Health and Mental Hygiene (DHMH) for SVOC analyses. Field screened and fixed laboratory analyses of the samples collected on site failed to reveal contamination above human health screening values (except arsenic and mercury).

A toxicological evaluation prepared by MDE for the Rossnan Property site utilized the analytical data provided by a private laboratory under a residential use

scenario. The residential scenario was used in order to establish a baseline for the minimum risk to human health posed to any population that may become exposed to contaminants found on site.

In evaluating risk to human health, maximum concentrations of all chemicals detected in the sampling were compared to U.S. Environmental Protection Agency (EPA) Region III Risk Based Concentrations (RBCs) and assumed 100 percent bioavailability of each contaminant. The evaluation of groundwater was performed as if the water were being used as drinking water. Relevant toxicological data and RBC values from structurally similar compounds were used for some of the chemicals with no corresponding RBC value.

For this residential scenario, the following populations were evaluated:

- Adult resident
- Construction worker
- Youth (6-17 years)
- Child (1-6 years)

For each population, the following scenarios were evaluated:

- Soil ingestion
- Inhalation on volatiles and fugitive dust
- Dermal contact with soils
- Ingestion of drinking water
- Dermal contact with groundwater

When determining whether an increased risk to human health exists at this site, it is important to understand that this evaluation was prepared as a first level screening evaluation. Many conservative assumptions are included in this evaluation, which were developed with the understanding that if the estimated risk, using the conservative assumptions, does not exceed EPA's recommended levels, then the risk estimated using more realistic scenarios will not exceed these levels.

The toxicological evaluation found that noncarcinogenic and carcinogenic risks estimated for all residential populations were within EPA and MDE recommended levels. Additionally, all detected surface water contaminants were within EPA levels of risk for the adult, youth and child recreational swimmer scenario.

No detected surface water contaminants exceeded EPA or MDE recommended water quality criteria for the protection of aquatic life.

I. INTRODUCTION

The MDE conducted a Brownfields Assessment of the Rossnan property located at 316 Railroad Avenue, Goldsboro, Maryland. The purpose of this report is to address potential environmental conditions that may impair the value of the property and/or pose a risk to human health and the environment.

Surface and subsurface soil samples were obtained using direct push (Geoprobe®) technology and were field screened for cPAHs, BTEX and PCBs using immunoassay techniques. Metals were field screened utilizing X-ray Fluorescence techniques. A private laboratory analyzed six of the soil samples, a surface water sample from the on-site lagoon and 3 groundwater samples for the following parameters: VOCs, SVOCs, pesticides and PCBs, and metals.

II. PROPERTY DESCRIPTION

A. Property location and legal description

The 4.28-acre Rossnan property site is located at 316 Railroad Avenue, in Goldsboro, Caroline County, Maryland. The site is located at 39° 02' 04" North latitude by 75° 47’ 11" West longitude with Maryland grid coordinates of 440,375 feet North by 1,154,875 feet East. The site is located on the Goldsboro, MD quadrangle 7.5-minute topographic map. The site is located on Caroline County Tax Map 11A, Parcel 111 and is zoned for commercial use (Figure 1).[1, 2, 3]

B. Property and vicinity characteristics

The property is situated on the easternmost part of the town of Goldsboro in rural Caroline County immediately east of former railroad tracks owned by Delaware and Chesapeake Railroad, LLC. A 447-acre farm borders the site to the east and single-family homes surround the remainder of the site. Railroad Avenue forms the northwest border of the site[1].

The site is a former milk plant that operated from sometime in the early 1920s until the late 1960s. In the late 1970s to the early 1980s, the site operated as a crab processing plant. The site has remained abandoned since the early 1980s and is occasionally used by vagrants. In 1995, the main processing building was struck by lightning and was damaged in the ensuing fire. Currently, the site contains three abandoned buildings: a masonry building, a dilapidated barn and a former residence (Figure 2).[4, 5]

C. Property hydrology

Surface water on the site enters via precipitation and infiltrates into the poorly to very poorly drained soils of the Pocomoke-Fallingston soil association (Figure 3). Precipitation also collects in a 30' x 18' concrete lagoon located on site. The north end of the lagoon is approximately 2' deep and the south end is approximately 3.5' deep.[5, 6]

D. Property hydrogeology

Groundwater flow at the water table is assumed to follow topography and flow easterly toward Broadway Branch, approximately ½ mile from the site. The groundwater

flow through aquifers at depth trends in a southeasterly direction. Residential drinking water is primarily from groundwater. The MDE Well Database (Appendix A) indicates that there are 56 domestic use wells located within a 0.5-mile radius of the site; 91 wells located between 0.5 and 1.0 mile of the site; 268 wells located between 1.0 mile and 2.0 miles from the site; and 132 wells located between 3.0 and 4.0 miles of the site. The wells are primarily domestic use wells and principally tap the Piney Point and Aquia aquifers. According to MDE Well Database searches, depths of the those wells that exploit the Piney Point and Aquia aquifers range from approximately 115' to 365'.[7, 8]

E. Current use of adjoining properties

The railroad tracks bordering the site are no longer in use. The other properties immediately adjacent to the site and across Railroad Avenue are residential. A 447-acre farm is adjacent the site to the east (Figure 4).[1, 4]

III. STANDARD ENVIRONMENTAL RECORDS REVIEW

On September 20, 1994, the Town Code Inspector for Goldsboro issued Mr. Rossnan a code Violation Notice citing problems with the former crab processing building. Violations noted were: 1) the roof had fallen in on the front side of the building, 2) rubbish and weeds are to be cleaned up inside and outside of the building, and 3) windows and doors should be closed up. On July 12, 2000, the Town of Goldsboro issued another letter of notice to Mr. Rossnan regarding the unsafe and dilapidated condition of the buildings and property.[1]

On August 15, 2000 MDE's Oil Control Program (OCP) personnel met with the Goldsboro Town Manager and a resident to discuss possible abandoned tanks on the abandoned property. The Town Manager indicated that another dilapidated building on-site was razed several years prior after it was struck by lightning and partially burned. The OCP inspector observed a large amount of tires on the property and referred the site to MDE's Scrap Tire Program.[1]

On November 6, 2000 MDE's Scrap Tire Program issued Mr. and Mrs. Rossnan notice that the property was in violation of the Code of Maryland Regulations (COMAR) 26.04.08 due to the approximately 300 tires observed on site.[1]

On December 1, 2000 an OCP inspector met with a potential buyer of the property and verified the presence of an approximate 10,000-gallon underground storage tank (UST) on the south side of the masonry building, partially filled with #6 heating oil.[1]

On February 28, 2001 OCP issued Notice of Violation NOV 2001-098 to Mr. and Mrs. Rossnan to remove the UST within 30 days. Mr. Rossnan's son, acting on behalf of his father, gained a 60 day extension from OCP for the above notice and approval from the Scrap Tire Program to store scrap tires observed on the property in the barn until the sale of the property.[1]

Because Mr. Rossnan resides outside of the country, he has not responded to any of the notices requiring cleanup of the property, and back taxes continue to accrue. The Town of Goldsboro would like the property cleaned up for sale or reuse. As a result, on March 6, 2001 a representative from MDE's Environmental Restoration and Redevelopment Program met on site with the Goldsboro Town Manager, a Town Council member and the Town Clerk to gain preliminary information, site history and verify potential hazards in order to initiate a Brownfields Assessment. Potential hazards observed, other than the 10,000-gallon UST and several hundred scrap tires, were approximately thirty 55-gallon drums without labels (some containing product believed to be rancid cooking oil), an assortment of paint containers, five gallon buckets, various household debris and an approximate 18' x 30' concrete lagoon.[1, 4]

IV. PREVIOUS PROPERTY INVESTIGATIONS

There have been no known investigations on this property.

V. CURRENT AND PAST USES OF THE PROPERTY

Property ownership and land are summarized in Table 1:

Table 1. Property Ownership and Land Use of the Rossnan Property[9]

Dates	Property Owner	Land-Use
Early 1980s to 2001	Mr. and Mrs. Michael Rossnan	Vacant
1971to early 1980s	Mr. and Mrs. Michael Rossnan	Crab processing plant
1920s-1960s	Various dairy operation owners (City Dairy, Inc., Greenhill Dairies, Inc., Cooklyn Dairies, Inc., Israel Kodroff, Nathan Cooklyn, Farmers Milk Association of Goldsboro, Helvetica Milk Condensing Co.)	Milk processing plant
Prior to 1920s	Robert Jarrell	Unknown (farming?)

The site has no operational history pertaining to the handling of hazardous waste and no permits were issued by MDE for waste disposal.

VI. CURRENT AND PAST USES OF ADJOINING PROPERTIES

Most of the properties adjoining the Rossnan property are residential with the exception of a commercially zoned property south of the site and inactive railroad tracks along the northwest border of the site (Figure 2 and 4). A 447-acre farm borders the site to the east. The entire area surrounding the site is rural.

VII. PROPERTY RECONNAISSANCE

A site visit was conducted by MDE on March 6, 2001 in response to the Goldsboro Town Manager seeking State assistance in getting the property cleaned up and sold to recover back taxes and other expenses incurred by the town.

Reconnaissance and photo-documentation of the property revealed a one-story house, a one level masonry building and a seriously dilapidated barn on site. All three structures were in unsafe condition. Inactive railroad tracks were observed along the entire length of Railroad Avenue, the northeast boundary of the site. A large farm borders the eastern edge of the property and residences were noted at the north and south borders of the site. A standpipe for an estimated 10,000-gallon UST (partially filled with no. 6 heating oil according to MDE/OCP site visit December 1, 2000) was identified adjacent to the masonry building.[5]

Potential hazards observed on-site included several hundred scrap tires, approximately 30 unlabelled 55-gallons drums, several smaller drums which contained product, an assortment of paint containers, five gallon buckets and trash scattered throughout the barn. One of the buckets was labeled Permacide Plus (known to contain pentachlorophenol). An 18' x 30' concrete lined lagoon adjacent to the north side of the barn and a hand dug well near the east side of the barn were also observed.[5]

MDE personnel conducted another site visit on June 7, 2001 in order to inventory and sample the drums on site. Thirteen 55-gallons drums were observed next to the masonry building and numbered with a grease pencil; five drums contained product believed to be rancid food grade cooking oil due to the odors present. An inventory of the wastes and debris in the dilapidated barn revealed approximately 100 tires, metal piping, scrap wood and doors, empty drums and containers of various sizes, wire, mesh fencing, several 4' x 10' plastic dome covers or sky lights, assorted furniture, chairs, trunks and mattresses, approximately 50 bags of a paraffin-like material, and bundled cardboard. Outside of the dilapidated barn approximately 100 more tires and assorted building debris were observed scattered about.[5]

VIII. INTERVIEWS

During the site visit of March 6, 2001, MDE personnel met with the Goldsboro Town Manager, a Town Council member and the Town Clerk. After discussion regarding the property a limited history of the site was developed. From the 1920s into the 1960s, the property was utilized for a dairy operation. The facility was transformed into a crab processing plant in the 1970s until closure in the late 1970s or early 1980s. The facility has remained abandoned from that time until present. In 1995, the main processing building was struck by lightning and was damaged in the ensuing fire. The Town of Goldsboro cleaned up the building debris that remained after the fire. The Goldsboro Town Manager expressed interest in utilizing the property for a park or a potential site for an anticipated municipal water supply and treatment facility.[4, 5]

IX. PHASE II ACTIVITIES

A. Scope of Assessment

In March 2001, the Town Manager of Goldsboro contacted MDE in order to request a Brownfields Environmental Assessment to begin the process of restoring the property to the point at which it could be sold to recover back taxes and other expenses incurred by the town, or transformed into a park, or a site for a municipal water supply and treatment facility. MDE conducted a site visit that confirmed the presence of environmental hazards (abandoned 55-gallon drums, unknown chemical substances stored in a dilapidated barn, an abandoned 10,000 gallon UST, a concrete lagoon and several hundred scrap tires). This Brownfields Assessment was initiated to characterize the potential hazards observed on site.

MDE generated a sampling plan and proposed to collect ten surface and subsurface soil grab samples, five groundwater samples and one surface water grab sample across the property and within areas of obvious concern (e.g. near the barn, UST, lagoon and drums). Refer to Figure 5. The soil samples were collected and field screened by MDE personnel for the presence of carcinogenic PAHs, PCBs, BTEX and metals. Samples that revealed the highest field screened levels of contamination were sent to a private laboratory, along with the groundwater and surface water samples for confirmatory analyses of a suite of fourteen metals, pesticides, PCBs, SVOCs and VOCs. A duplicate aqueous sample and soil sample was submitted to the fixed laboratory for data validation. Also, samples from two 55-gallon drums were collected and sent to the DHMH for SVOC analyses.

B. Field Explorations and Methods

Ten surface and ten subsurface soil samples were collected and field screened by MDE personnel (Figure 5). Surface and subsurface samples were collected by hand utilizing Geoprobe® methods. Six of the solid matrix samples in which field screening detected higher concentrations of contamination were submitted for analysis by a private laboratory, Martel Laboratories, Inc. (Martel). Four groundwater samples were collected at and just below the water table by MDE personnel (Figure 5) utilizing Geoprobe® methods and were submitted for chemical analysis by Martel.

Surface water sample from the concrete lined lagoon was collected by hand (Figure 5) and was submitted for chemical analysis by Martel. Because sediments do not exist on site, no sediment samples were collected.

C. Sampling and Analytical Methods

1. Soil Sampling and Analysis

Ten surface (0-2') and ten subsurface (4'-6') soil samples were collected and field screened by MDE personnel. Surface and subsurface samples were collected by hand

utilizing Geoprobe® methods. Six of the solid matrix samples that field screening revealed the highest levels of contamination were submitted to Martel for chemical analyses using appropriate EPA methods.

Martel analyzed six surface soil samples for metals (EPA method 200.8), pesticides (EPA method 8081A), PCBs (EPA method 8082), VOCs (EPA method 8260B) and SVOCs (EPA method 8270C). The methods used resulted in an elevated detection level for some contaminants that exceeded the level recommended in the MDE Cleanup Standards.

MDE personnel conducted field screening on all soil samples. Analyses by field screening techniques included immunoassay screening for carcinogenic PAHs and PCBs and BTEX using Strategic Diagnostics, Inc. (SDI) immunoassay test kits on a SDI RaPID Photometric Analyzer and X-ray Fluorescence (XRF) screening for metals on a Spectrace QuanX Analyzer System with an electronically cooled detector. Results from the private laboratory (Appendix B) were compared to raw XRF metal, cPAHs, PCBs and BTEX immunoassay screening results (Appendix C) to test for correlation. A regression analysis with an r^2 value of greater than 0.80 indicated a correlation between laboratory and field screened XRF data. If metals showed an adequate correlation, the XRF data would then corrected using the equation of the linear regression for the XRF data of each analyte:

$$y = mx + b$$

where y equals the corrected value, x equals the uncorrected value, m equals the slope of the linear regression and b equals the y-intercept of the linear regression (Table 2). For metals where the fixed lab results were below the detection limits, data was determined to correlate if the XRF determined value was below the fixed laboratory detection limit for 80% of the samples. The XRF data failed to correlate with the fixed laboratory analytical data due to overall low concentrations.

Table 2. Correlation for Metals Data

	R^2	SLOPE	Y-INTERCEPT	ST DEV of XRF	STD ERROR
TL	*				
CR	0.020	-0.030	9.090	1.724	9.040
MN	0.047	0.451	-9.199	14.236	7.453
CU	0.115	0.696	2.031	7.354	3.887
ZN	0.560	0.621	7.694	18.465	16.503
SE	*				
AS	0.092	0.159	1.916	0.671	1.363
AG	*				
CD	*			0.283	
PB	0.641	0.514	5.354	6.859	7.384
HG	*				

Asterisks indicate that XRF data and fixed laboratory data agree and show low or undetectable concentrations for thallium selenium, silver, cadmium, and mercury. Chromium, manganese, copper, zinc, arsenic and lead showed little correlation

For cPAHs, PCBs and BTEX immunoassay correlation with fixed laboratory results, the sum of the analytes for each field screen analysis was compared to the sum of the analytes for each fixed laboratory analysis. For analytes that were not detected, their detection limits were summed. The ranges for comparing the data were established by the calibration range of the immunoassay kits. Because fixed laboratory analyses failed to detect cPAHs, PCBs and BTEX, correlation occurs if the sum of the field screened analytes was less than the sum of the fixed laboratory detection limits (Tables 3-5).

Samples S-9/SS-9 and S-1/SS-10 were duplicate samples collected and analyzed for field screen data validation purposes. The r^2 for the surface soil duplicates S-9 and S-10 was 0.98 and for the subsurface soil samples SS-9 and SS-10 was 0.93 suggesting that data for the two samples does not differ significantly. The r^2 value for the field screened data for S-10 and the fixed laboratory data 0.83 suggesting that the data for the two samples does not differ significantly.

Table 3. Correlation for cPAHs Immunoassay Data

	S-1	S-4	S-6	S-7	S-9	S-10
Total Field Screened cPAHs* (µg/Kg)	2	318	582	499	124	656
Calibration range 10 to 500 µg/Kg						
Fixed Lab Results (Total DL 6500 µg/Kg)	0	0	0	0	0	
No SVOCs detected						0
Correlation occurs if [ ] is <6500 µg/Kg	yes	yes	yes	yes	yes	yes

*Control sample actual concentration 2.00 ppb, measured at instrument at 2.67 ppb =133.5% correlation. Results should be used for qualitative purposes only.

Although correlation is observed in the above data, the 133.5% correlation between the measured control sample of [2.67] µg/Kg and the actual concentration of [2.00] µg/Kg is out of specification and the results should only be used qualitatively.

Table 4. Correlation for PCBs Immunoassay Data and Fixed Laboratory Analysis

	S-1	S-4	S-6	S-7	S-9	S-10
Total Field Screened PCBs (µg/Kg)	520	240	80	220	NA	100
Calibration range 500 to 10000 (µg/Kg)						
Fixed Lab Results (Total DL 3.5 µg/Kg)	0	0	0	0	0	0
No PCBs detected						
Correlation occurs if [ ] is <3.5 µg/Kg	no	no	no	no	NA	no

NA= not field screened (insufficient supplies). Field Screened PCBs do not correlate.

Because field screening immunoassay data revealed the presence of PCBs and fixed laboratory analysis failed to reveal the presence of PCBs, the data failed to correlate.

Table 5. Correlation for BTEX Immunoassay Data and Fixed Laboratory Analysis

	S-2	S-3	S-4	S-5	S-7	SS-4
Total Field Screened BTEX* (mg/Kg)	1.8	800.7	2	1.4	3.2	2.2
Calibration range 0.9 to 30 mg/Kg						
Fixed Lab Results (Total DL 20 µg/Kg)	0	0	0	0	0	0
No VOCs detected						
Correlation occurs if [ ] is <.9 mg/Kg	no	no	no	no	no	no

*Control sample actual concentration 2.1 ppm, measured at instrument at 1.73 ppm =82.4%.
Results should be used for qualitative purposes only. Field Screened BTEX do not correlate.

Because field screening immunoassay data revealed the presence of BTEX and fixed laboratory analysis failed to reveal the presence of BTEX, the data failed to correlate.

2. Groundwater Sampling and Analysis

Five groundwater grab samples were proposed to be collected at and just below the water table from the Rossnan Property. However, location GW-2, a hand dug well, was filled in and only four groundwater samples were collected (GW-1, -3, -4, -5). The four groundwater samples collected were sent to Martel and analyzed for metals (EPA method 200.8), pesticides (EPA method 8081A), PCBs (EPA method 8082), VOCs (EPA method 8260B) and SVOCs (EPA method 8270C).

3. Surface Water Sampling and Analysis

One surface water sample was collected from an on-site 18' x 30' concrete lined lagoon (LW-1) and was analyzed by Martel for metals (EPA method 200.8), pesticides (EPA method 8081A), PCBs (EPA method 8082), VOCs (EPA method 8260B) and SVOCs (EPA method 8270C).

4. Sediment Sampling and Analysis

Sediments do not exist on site, so sediment samples were not collected.

5. Other Sampling and Analysis

Samples from two 55-gallon drums (marked no. 2 and no. 6) were collected and sent to DHMH for SVOC analyses (Appendix D). A toxicological evaluation was completed by MDE for the property utilizing a residential use scenario to identify risks to human health caused by the identified contamination. Carcinogenic and non-carcinogenic risks to several populations were evaluated. Only data from the fixed laboratory was used in the toxicological evaluation.

D. Decontamination Procedures

Samples were collected using disposable scoops and samplers changed gloves between samples. The Geoprobe® was decontaminated between borings using a mixture of Alconox® and water.

X. EVALUATION AND PRESENTATION OF RESULTS

A. Subsurface Conditions

1. Geologic Conditions

The Rossnan property is located on the Eastern Shore Coastal Plain Province that is composed of numerous formations that consist of unconsolidated sediments ranging in age from the Cretaceous Age to recent and depths to over 2,700 feet. The site is situated in a region of unconsolidated Quaternary lowland surficial deposits or subcrop area of the Miocene Chesapeake Group (St. Mary's, Choptank, and Calvert units). Underlying the basal Calvert unit, which acts as a confining unit reaching 70' of thickness in this area, is the Piney Point aquifer. Underlying the Piney Point Aquifer is the Pamunkey Group which consists of the Nanjemoy confining unit and the Aquia aquifer. The Piney Point and Aquia aquifers are both major groundwater sources for this area. According to MDE Well Database searches, many wells in the area tap these formations at depths ranging from approximately 115' to 365' (Appendix D). Underlying the Aquia aquifer begins a series of four high quality aquifers separated by confining units that reach up to 90' of thickness. This series of units begin at approximately 500' below grade to approximately 1200' below grade. Beneath the above series of units is the Potomac Formation, which extends to the basement complex at approximately 2,700' below grade.[8, 10]

2. Hydrogeologic Conditions

Precipitation infiltrates directly into the soils on site and also collects into the concrete lined lagoon on the north side of the barn. Precipitation entering groundwater at the water table is assumed to follow topography and flow easterly toward Broadway Branch, approximately ½ mile from the site (Figure 6). The groundwater flow through all of the aquifers at depth trend in a southeasterly direction. During Geoprobe® advancement, the water table was penetrated at approximately 7'. The only surface water on site is in the 18' x 30' concrete lined lagoon adjacent to the and north of the dilapidated barn.[1, 5, 8]

B. Analytical Data

1. Soil Sampling Results

Analyses of surface and subsurface samples by Martel revealed little to no metals contamination when screened against RBCs and failed to detect contamination from

pesticides, PCBs, SVOCs and VOCs (the analyte dichloromethane is suspected to be a laboratory artifact) (Table 6-7). Analyses of surface and subsurface samples by field screened techniques showed some contamination from PCBs, SVOCs and metals (Table 7; Appendix B). The field screened data, however, failed to correlate with the fixed laboratory data. Samples analyzed by the fixed laboratory and field screened technology indicated that levels of arsenic exceeded EPA RBC levels for residential soil (.43 mg/Kg) in all of the soil samples. Mercury was detected in fixed laboratory analyses of sample S-7 (.4 mg/Kg), which exceeds levels recommended in MDE Cleanup Standards (0.12 mg/Kg). Field screened analyses of mercury revealed mercury in sample SS-7 (1.604 mg/Kg). Although arsenic and mercury were detected at levels above those recommended in MDE Cleanup Standards, the anticipated typical concentration of arsenic found in soils of Eastern Maryland is 3.6 mg/Kg and mercury is 0.51 mg/Kg.[11]

Table 6 Fixed Laboratory Metals Data for Soil Samples (mg/Kg)

Analyte	S-1	S-4	S-6	S-7	S-9	S-10
Arsenic	2.8	1.5	3.3	3.2	2.3	2.9
Beryllium	<1	<.079	<1	<1	<1	<1
Cadmium	<1	<1	<1	1.6	1.2	<1
Chromium	5.8	6.4	10	9.2	8.5	8.6
Copper	6.1	3.7	5.7	8.6	9.9	22
Lead	8.6	8.3	23	21	36	17
Manganese	43	44	75	67	73	66
Mercury	<2	<2	<2	4	<2	<2
Nickel	6	3.5	7.5	6.6	5.9	5.4
Zinc	19	31	39	63	62	27

Analytes shaded in gray indicate that the detection limit exceeds the MDE Clean up Standards level for that analyte. Concentrations highlighted in yellow indicate values that exceed RBCs for residential soil.

Table 7: Fixed Laboratory VOC Data for Soil Samples (µg/Kg)

Analyte	S-1	S-2	S-3	S-4	SS-4	S-5
Dichloromethane	<5	6.2	5.5	<5	<5	<5

Highlight indicates suspected laboratory contaminant.

Except for dichloromethane (laboratory contaminant), VOCs were not detected in the solid samples.

2. Groundwater and Surface Water Sampling Results

Analyses of groundwater samples by Martel failed to reveal elevated levels of metals contamination when screened against MCLs and failed to reveal contamination from pesticides and PCBs, SVOCs and VOCs (Table 8). Analyses of the surface water sample from the lagoon on site by Martel failed to reveal elevated levels of metals contamination when screened against Maryland Toxic Criteria for Ambient Surface Water and failed to reveal contamination from pesticides and PCBs, SVOCs and VOCs (Table 8).

Table 8. Metals Data for Groundwater and Surface Water Samples (µg/L)

Analyte	GW-1	GW-3	GW-4	GW-5	LW-1
Antimony	<5	<5	<5	<5	<5
Arsenic	<5	<5	<5	<5	<5
Beryllium	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	<0.5	<0.5	0.9	0.9	<0.5
Chromium	<10	<10	<10	<10	<10
Copper	<10	<10	20	10	<10
Lead	<5	<5	<5	<5	<5
Manganese	20	50	40	30	23
Mercury	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	<20	<20	<20	<20	<20
Selenium	<5	<5	<5	<5	<5
Silver	<10	<10	<10	<10	<10
Thallium	<2	<2	<2	<2	<2
Zinc	60	<10	150	150	30

Concentrations highlighted in gray indicate detected levels of metals.

3. Sediment Sampling Results

Sediments do not exist on the property and therefore were not collected.

4. Other Sampling Results

Samples from two 55-gallon drums (drum no. 2 and no. 6) were collected and submitted to DHMH for SVOC analyses. Due to the heavy oil matrix and very high volatilization point of the drum samples, very high detection limits (10,000 µg/L) were required. The SVOC analyses failed to reveal SVOC contamination in the samples (Appendix D).

5. Toxicological Evaluation

A toxicological evaluation prepared by MDE for the Rossnan Property site (Appendix E) utilized the analytical data provided by a private laboratory under a residential use scenario. The residential scenario was used in order to establish a baseline for the minimum risk to human health posed to any population that may become exposed to contaminants found on site. Commercial use scenarios are expected to pose lesser levels of risk and should be evaluated to reflect appropriate land use scenarios.

In evaluating risk to human health, maximum concentrations of all chemicals detected in the sampling were compared to EPA Region III RBCs and assumed 100 percent bioavailability of each contaminant. The evaluation of groundwater was performed as if the water were being used as drinking water. Relevant toxicological data and RBC values from structurally similar compounds were used for some of the chemicals with no corresponding RBC value.

For this residential scenario, the following populations were evaluated:

- Adult resident
- Construction worker
- Youth (6-17 years)
- Child (1-6 years)

For each population, the following scenarios were evaluated:

- Soil ingestion
- Inhalation on volatiles and fugitive dust
- Dermal contact with soils
- Ingestion of drinking water
- Dermal contact with groundwater

When determining whether an increased risk to human health exists at this site, it is important to understand that this evaluation was prepared as a first level screening evaluation. Many conservative assumptions are included in this evaluation, which were developed with the understanding that if the estimated risk, using the conservative assumptions, does not exceed EPA's recommended levels, then the risk estimated using more realistic scenarios will not exceed these levels.

The toxicological evaluation found that noncarcinogenic and carcinogenic risks estimated for all residential populations were within EPA and MDE recommended levels. Additionally, all detected surface water contaminants were within EPA levels of risk for the adult, youth and child recreational swimmer scenario.

No detected surface water contaminants exceeded EPA or MDE recommended water quality criteria for the protection of aquatic life.

XI. FINDINGS AND CONCLUSIONS

Surface and subsurface soils were field screened by MDE personnel for BTEX, cPAHs, PCBs and metals. Field screening revealed no gross contamination across the site. Martel analyzed surface soil, groundwater at the water table and surface water from an on-site lagoon for VOCs, SVOCs, PCBs, selected pesticides and metals. A subsurface soil sample was analyzed by Martel for VOCs. These analyses by Martel revealed only low levels of metals. Two drums on site, which are suspected to contain rancid cooking oil, were analyzed for SVOCs by DHMH. Analysis of the drum samples failed to reveal SVOC contamination.

Because the fixed laboratory data revealed only low level metals contamination on site and failed to detect organic contamination on site, the toxicological evaluation revealed acceptable levels of risk to all residential populations.

XII. REFERENCES

1. MDE Waste Management files.

2. ADC of Alexandria, Inc., *Caroline County, MD. Street Map,* 1982.

3. http://www.TopoZone.com/find.asp. Goldsboro Quad.

4. MDE interview with representatives of the Town of Goldsboro, March 6, 2001.

5. MDE site visits on March 6 and June 7, 2001.

6. U.S. Department of Agriculture, *Soil Survey of Caroline County, MD.*, series 1959, No.33.

7. MDE Well Database.

8. U.S. Geological Survey, *Hydrogeological Framework of the Coastal Plain of Maryland, Delaware, and the District of Columbia,* Vroblesky and Fleck. January 1, 1991.

9. MDE Land records search at the Caroline County Courthouse.

10. State of Maryland Department of Geology, Mines and Water Resources, *Caroline, Dorchester and Talbot Counties Water Resources,* Bulletin 18, 1959.

11. State of Maryland, Department of the Environment, *Cleanup Standards for Soil and Groundwater, Interim Final Guidance,* August 2001.

XIII. FIGURES

Figure 1: Vicinity Map of the Rossnan Property

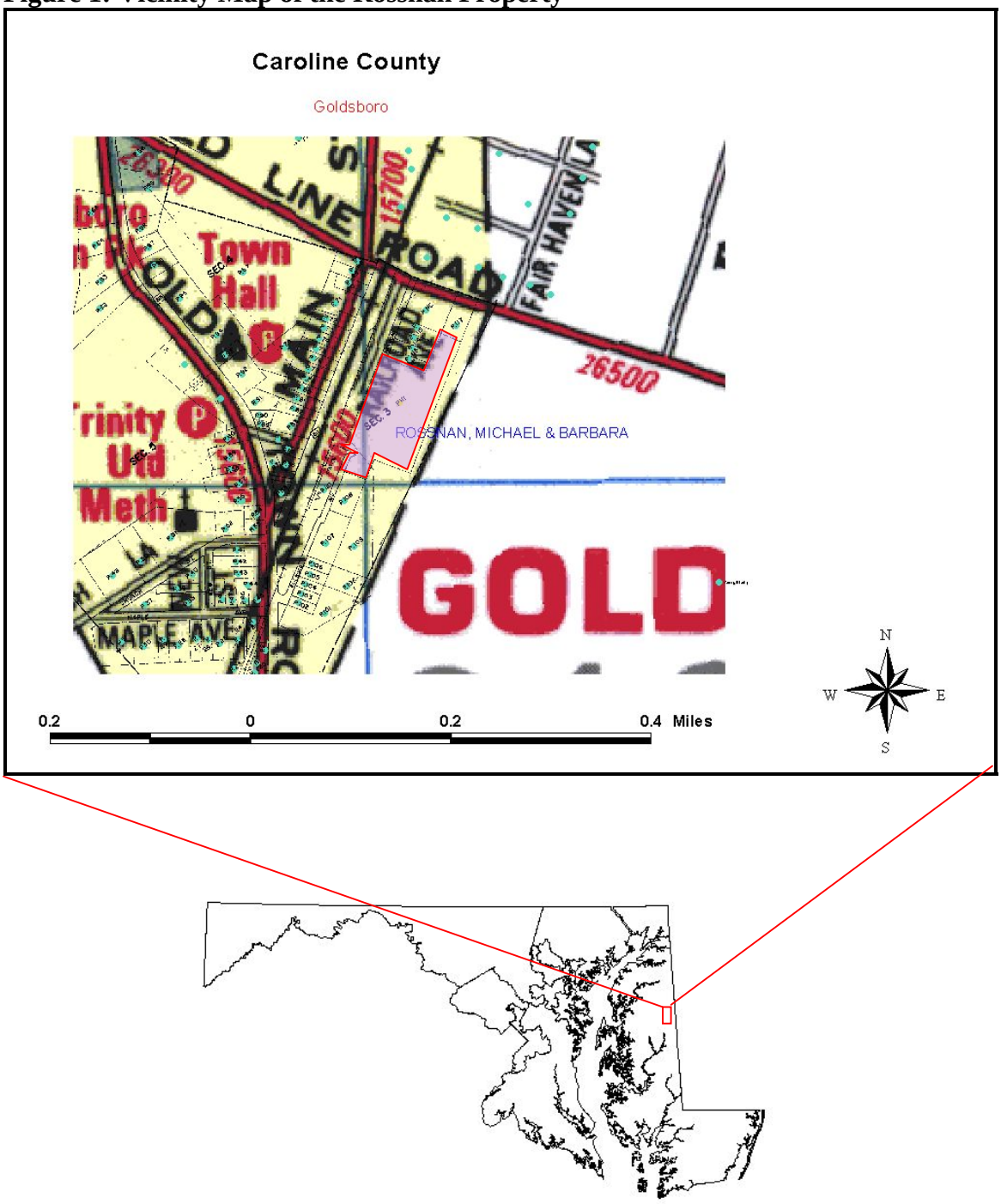


Figure 2: Aerial Photographs

Figure 3: Caroline County Soil Map[6]

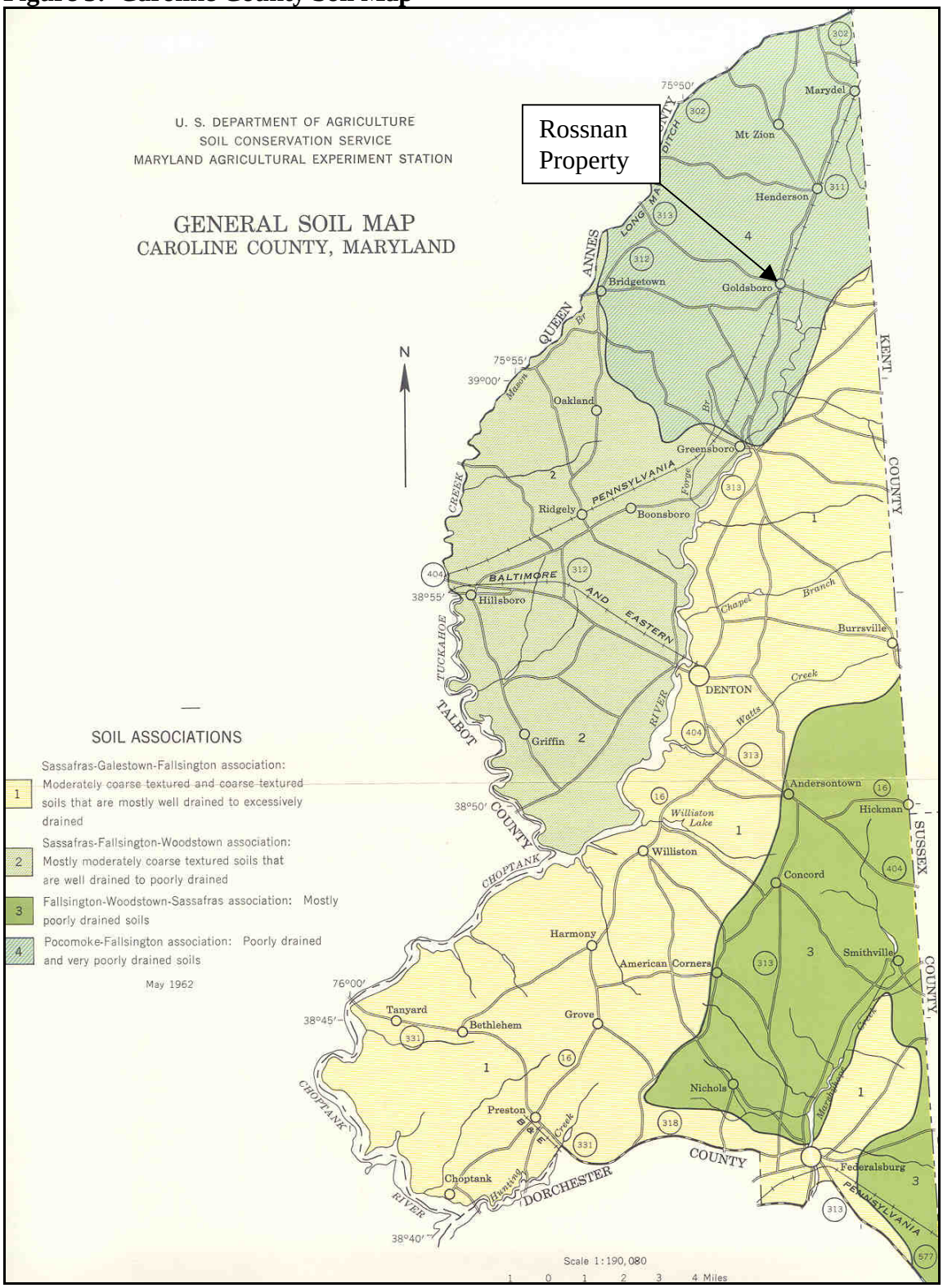


Figure 4: Land Use Map

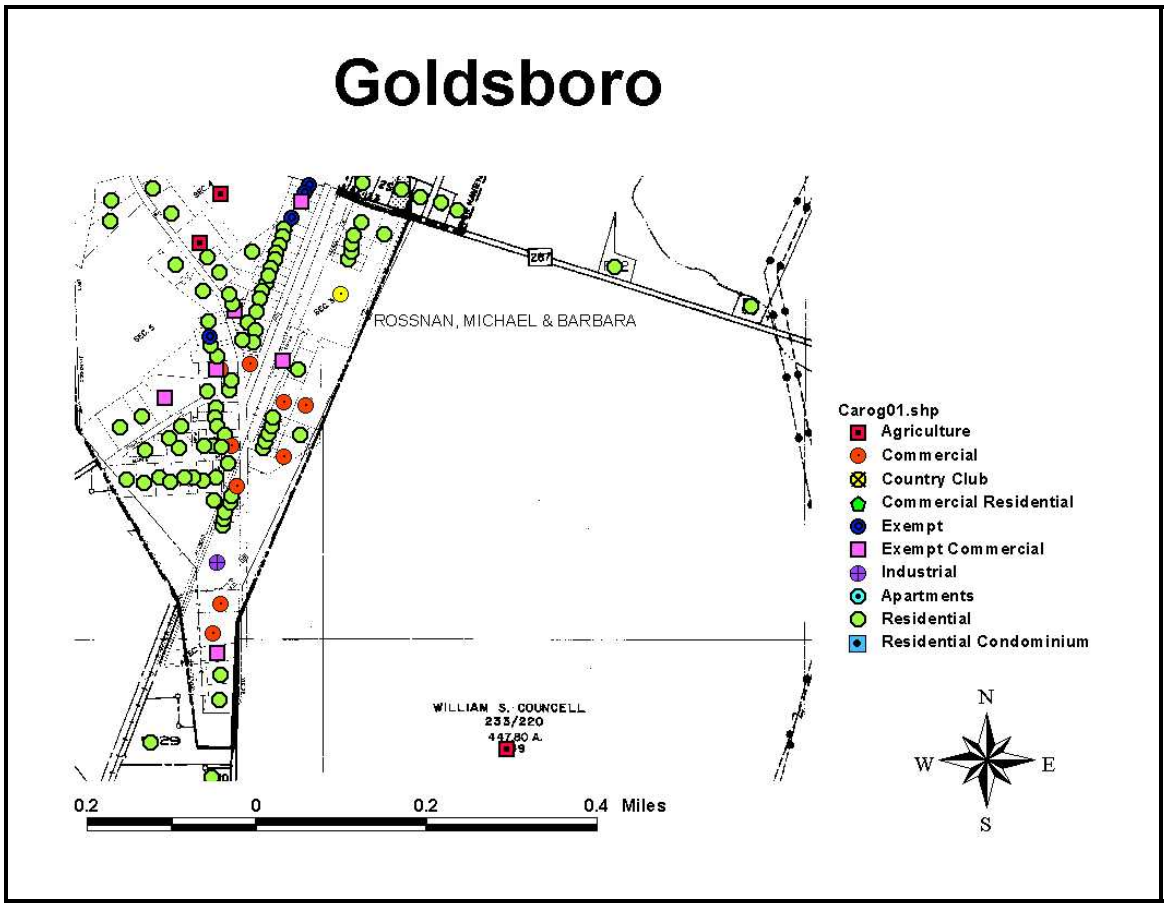
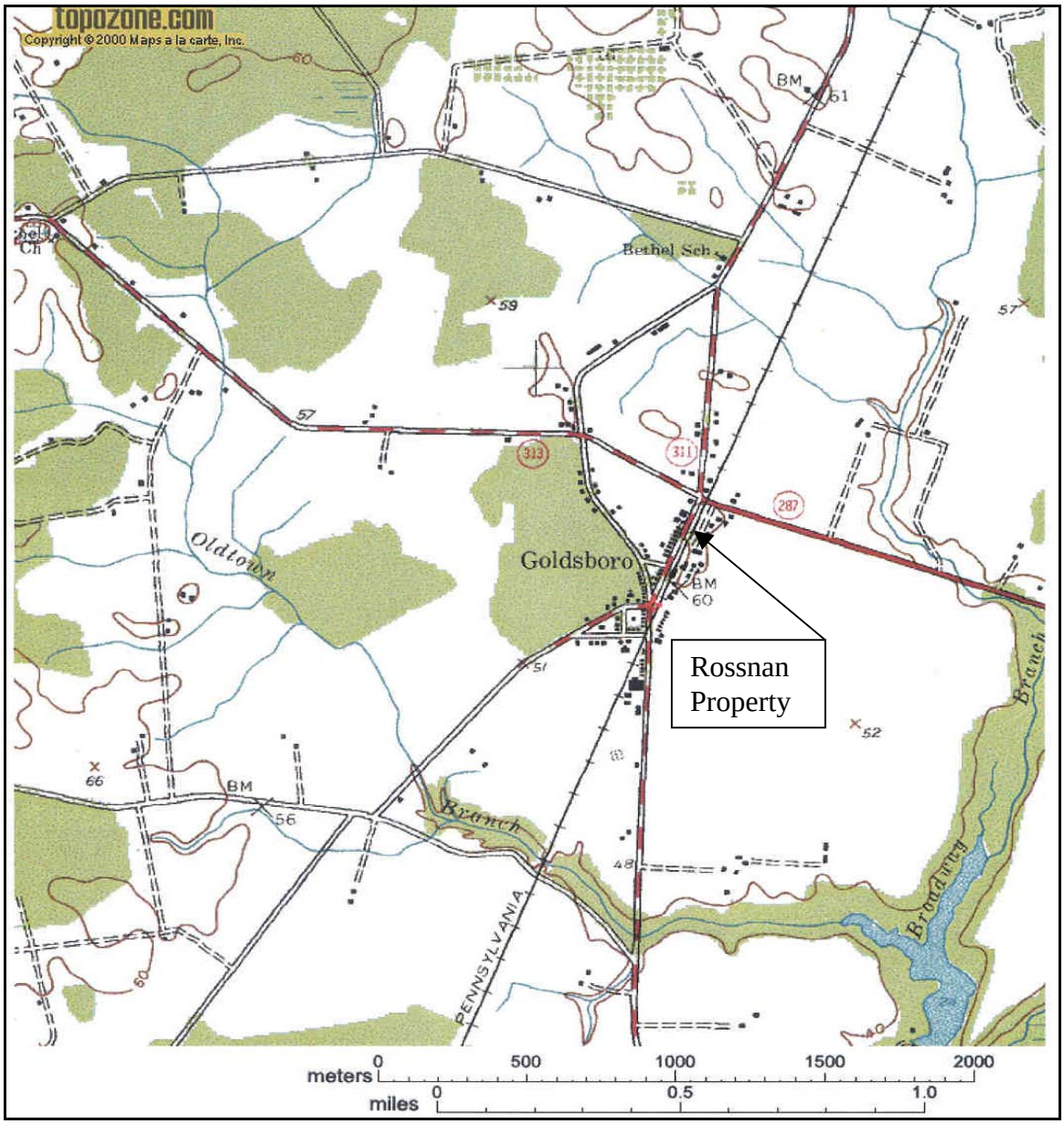


Figure 5: Sampling Sketch

Figure 6: Topographic Map[3]



XIV. PHOTOGRAPHS

Photograph of the property and three on-site buildings from Goldsboro Road, facing southeast. Photograph was taken during the March 6, 2001 site visit.

Photograph of the masonry building taken during March 6, 2001 site visit.

Photograph of the first floor of the barn, taken during March 6, 2001 site visit.

.Photograph of a tire and debris pile at the rear of the barn taken March 6, 2001.

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Photographs of the interior of the barn taken during the March 6, 2001 site visit.

Photograph of debris pile on north end of the masonry building.

Photograph of the 10,000 gallon UST intake valve located on the south side of the building.

Photograph of drums No. 2 and 6 during June 7, 2001 site visit.

Photograph of location S-1/SS-1/GW-1 facing north.

Photograph of location S-2/SS-2, the hand dug well is visible right of center.

Photograph of location S-3/SS-3/GW-3 facing north.

Photograph of location S-4/SS-4/GW-4/GW-5 facing west towards the rear of the barn.

Photograph of location S-6/SS-6 north of lagoon, facing east.

Photograph of location S-7/SS-7 facing east towards the former residence.

Photograph of location S-9/SS-9S-10/SS-10 facing south.

Photograph of the concrete lined lagoon facing south. Approximately 2 dozen tires were observed in the lagoon at the time of sampling on August 7, 2001.

Photograph of accumulated tires collected from inside the dilapidated barn.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Appendices appear in Volume II of the report.