1. INTRODUCTION AND PURPOSE

TriTech Environmental Health and Safety, Inc. ("TriTech"), f/k/a C&O Technologies, was contracted by the City of Rochester to prepare this Environmental Management Plan ("EMP") for use during the development (ie, future construction and maintenance activities) of property known as Anthony Square, f/k/a West Square Manor, located at 501 West Main Street in the City of Rochester, Monroe County 14608 (see Property Figures 1 and 2). The area of remediation, which occupies the Northwest corner of this parcel, consists of an irregular area approximately 88 feet wide by 99 feet long by 12 feet deep (7,000 square feet), in the area of a former on-Site gas station and has an address of is 2 Reynolds Street, Rochester, New York 14608 ("Site" see Figures 1 through 3). The Site is part of a 7.41-acre parcel that once accommodated rental housing units (now demolished). The Site borders the Susan B. Anthony Historic District, which is situated on the north side of Main Street.

This EMP is intended to be used by developers, engineers/architects, construction workers, maintenance personnel, City of Rochester employees, or other entities involved with the re-development of the Site and/or the potential disturbances of subsurface media (ie, soil, fill materials, groundwater) at the Site. These entities are responsible for implementing, and adhering to, this EMP.

The Site was formerly part of a 7.41-acre parcel containing ten housing units and a central building (main office and community center). It is fronted on the north by West Main Street and commercial properties; on the east by a City park; on the south by residences and a mechanics shop; and on the west by residences and a vacant gas station.

The purpose of this EMP is to address the handling of: (1) petroleum-impacted soil and/or fill material; and (2) free product and/or contaminated groundwater that may be encountered during the development of the Site.

Specifically, this EMP addresses how to identify, characterize, and handle contaminated media during construction activities. This EMP establishes goals, procedures, and appropriate response actions to be used by on-Site personnel should petroleum-impacted soil and/or fill material or free product and/or contaminated groundwater be encountered/disturbed during development activities. The EMP also identifies how to dispose of or re-use these materials in accordance with applicable regulations when they are encountered and disturbed.

1.1 Site History and Environmental Conditions

The following summarizes Site history and environmental conditions to development activities and Site use and maintenance.

1.1.1 Site History

Rochester General Hospital occupied the majority of properties adjacent to the Site from at least 1888 until the late 1960's.

A gas station was located at the Site from at least 1939 until the late 1960's. At that time of its closure, the station operated four 3,000-gallon underground fuel storage tanks. The City was not able to verify through their records that any of the tanks were removed or closed at that time. The Site was developed into a multi-family housing complex in the late 1960's and early 1970's (originally called Fight Square) until 1998 when the housing complex was closed and subsequently demolished.

1.1.2 Evaluation of Environmental Conditions

The following documentation of Site investigations and remediation is available for review and consideration:

- Phase II Environmental Site Assessment (May 1998)
- Remediation Evaluation Report (July 1998)
- Remediation Work Plan (December 1998)
- Phase I (August 2000)
- Remediation and Closure Report (September 2000)
- Phase II Environmental Site Assessment (Sunoco Site) (November 1997)
- Phase II Environmental Site Assessment (Sunoco Site) (February, July, August and December 1999)
- Remediation Action Plan (Sunoco Site) (November 1999)

1.1.3 Former Gas Station Area

Seven (7) borings were placed in the area of the former gas station to determine whether soils and/or groundwater were impacted, and to investigate for the presence of fuel storage tanks. During the drilling, no indications of petroleum tanks (eg, inability to drill below grade, metal parts in boring samples) were encountered. Based on these results, the coverage of the 7 borings, and from the location of the now demolished apartment buildings, it appears that the former petroleum tanks were removed.

Petroleum products were observed in 6 of the 7 borings. Samples were subsequently analyzed for volatile and semi-volatile petroleum compounds.

Soils from the central portion of this area had the highest concentration of petroleum (gasoline) which exceeded NSYDEC STARS Alternative Guidance Values for Petroleum Contaminated Soils. Samples on the fringe of this area also exceeded the STARS values, but to a much lesser degree.

1.2 Remediation and Closure Activities

Remediation and closure activities were completed at the Site from January 24 to February 10, 2000.

The following activities were completed as a part of the remediation:

1.2.1 Excavation and Removal of Contaminated Soils

The area of contamination was delineated.

Approximately 3,696 tons of non-hazardous contaminated soil was transferred and disposed of at the Mill Seat Landfill in Riga, New York.

1.2.2 Air Monitoring

Throughout the remediation activities, monitoring (ie, dust, combustible vapor and organic vapor) of the work area and perimeter was completed by TriTech. No readings over action limits were observed during remediation activities.

1.2.3 Closure Sampling and Analyses

Closure soil samples were collected from the bottom and sidewalls of the excavation. Closure sample locations are indicated in Figures 2 and 3. Sample analyses results are summarized in Tables 1.1 and 1.2.

Contamination levels in soil from the bottom of the excavation (Bottom), North excavation wall (NW1 and NW2) and portions of the West excavation wall (WW1 and WW2) exceeded NYSDEC TCLP Alternative Guidance Values for Petroleum Contaminated Soils. All other closure samples met either NYSDEC TCLP Alternative or Extraction Guidance Values for Petroleum Contaminated Soils. See Tables 1.1 and 1.2.

The bottom of the excavation was terminated due to the presence of solid bedrock. The confirmatory soil sample from the bottom of the excavation represented the relatively small quantity of soil that could not be physically removed by the excavator.

Soil samples (NW1, NW2, WW1 and WW2) were collected from excavation sidewalls, where additional soil removal could not be performed due to underground utilities and/or property line issues.

1.2.4 Remedial Applications and System Installation

In order to remediate residual petroleum compounds in the bottom of the excavation, 220 pounds of Regenesis Bioremediation Product's ORC®, oxygen releasing

compound, was applied prior to backfilling.

In order to remediate residual petroleum compounds on the Northern and Western faces of the excavation, a passive soil venting system was installed. The system was constructed of 8 vertical soil vapor extraction wells (4-inch PVC pipe with slotted screen); 4 along the North and 4 along the West wall of the excavation (see Figures 2).

Upon completion of backfilling, remediation activities were complete.

Table 1.1 Closure Sampling Analyses Summary (NYSDEC TCLP Alternative Guidance Values for Petroleum Contaminated Soil)

Constituent (ug/kg or ppb)	NW1[1,2]	NW2	Bottom	WW1	WW2	WW3	SW24	SW4	EW1	EW2	NYSDEC STARS [3] Guidance Values (ppb)	NYSDEC TAGM[4] #4046 (ug/kg) (ppb)
Volatile Organics												
MTBE	ND(823)	ND(115)	ND(976)	ND(704)	ND(48)	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	1000	120
Benzene	376	ND(115)	901	ND(253)	ND(48)	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	14	60
Toluene	27,100	ND(115)	8,540	ND(704)	1,270	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	1500
Ethylbenzene	11,200	1,050	11,300	1,090	1,860	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	5500
m,p-Xylene	47,500	3,180	59,200	4,030	6,570	ND(10.2)	ND(9.25)	ND(20.0)	ND(8.02)	ND(9.20)	100	1200
o-Xylene	13,900	276	14,800	ND(704)	1,540	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	100
Isoproylbenzene	1,560	484	1,940	ND(704)	499	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	5000
n-Propylbenzene	2,870	989	2,900	742	859	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	14000
1,3,5-Trimethlybenzene	7,540	2,830	10,400	2,040	2,110	ND(10.2)	54.7	ND(10.7)	ND(8.02)	ND(9.20)	100	3310
tert-Butylbenzene	ND(823)	ND(115)	ND(976)	ND(704)	ND(48)	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	NL
1,2,4-Trimethylbenzene	25,400	9,700	35,100	7,090	5,470	ND(10.2)	32.4	ND(10.7)	ND(8.02)	ND(9.20)	100	13000
sec-Butylbenzene	ND(823)	131	ND(976)	ND(704)	204	ND(10.2)	11.3	ND(10.7)	ND(8.02)	ND(9.20)	100	25000
p-Isopropyltoluene	ND(823)	129	ND(976)	ND(704)	544	ND(10.2)	18.4	ND(10.7)	ND(8.02)	ND(9.20)	100	11000
n-Butylbenzene	ND(823)	ND(115)	3,040	ND(704)	ND(48)	ND(10.2)	ND(9.25)	ND(10.7)	ND(8.02)	ND(9.20)	100	17620
Napthalene	9,610	1,470	3,720	4,810	2,670	ND(50.9)	49.2	ND(53.3)	ND(40.1)	ND(46.0)	200	13000

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Table 1.1 Closure Sampling Analyses Summary (NYSDEC TCLP Alternative Guidance Values for Petroleum Contaminated Soil) (Contd.)

Constituent (ug/kg) (ppb)	NW1[1,2]	NW2	Bottom	WW1	WW2	WW3	SW24	SW4	EW1	EW2	NYSDEC STARS [3] Guidance Values (ppb)	NYSDEC TAGM[4] #4046 (ug/kg) (ppb)
Semi-Volatile Organics												
Napthalene	3,630	706	2,900	353	437	ND(323)	ND(324)	ND(368)	ND(319)	ND(323)	200	13000
Acenapthene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	436	ND(319)	ND(323)	1,000	50000 ***
Flourene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	415	ND(319)	ND(323)	1,000	50000 ***
Flouranthene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	6,220	ND(319)	ND(323)	1,000	50000 ***
Anthracene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	1,320	ND(319)	ND(323)	400	50000 ***
Phenathrene	ND(358)	806	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	5,890	ND(319)	ND(323)	1,000	50000 ***
Benzo(a)anthracene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	2,150	ND(319)	ND(323)	0.04	224 or MDL
Chrysene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	1,900	ND(319)	ND(323)	0.04	400
Pyrene	ND(358)	758	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	3,120	ND(319)	ND(323)	1,000	50000 ***
Benzo (b) flouranthene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	1,310	ND(319)	ND(323)	0.04	1100
Benzo (k) flouranthene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	1,380	ND(319)	ND(323)	0.04	1100
Benzo (g,h,I) perylene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	429	ND(319)	ND(323)	0.04	50000 ***
Benzo (a) pyrene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	1,590	ND(319)	ND(323)	0.04	61 or MDL
Dibenz (a,h) anthracene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	ND(368)	ND(319)	ND(323)	1,000	140 or MDL

Indeno (1,2,3-cd) pyrene	ND(358)	ND(699)	ND(362)	ND(320)	ND(349)	ND(323)	ND(324)	507	ND(319)	ND(323)	0.04	3200

1. See Figure 2 for soil sample locations.
2. Corresponding sample names are as follows: NW1=North Wall; Bottom=Ground-Bedrock Level; WW1=West Wall, North Side; WW2=West Wall, South Side; WW3=West Wall #3 South End; SW24=Southwest Wall 2-4-00; SW4=South Wall 2-4-00.
3. Corresponds to STARS Memo Values for TCLP, Alternative Guidance Values for contaminated soils.
4. Corresponds to Recommended Soil Cleanup Objective (ppm) from NYSDEC TAGM #4046, the current cleanup values for petroleum contaminants in soil and groundwater.

*** As per TAGM #4046, Total VOCs < 10,000 ppb; total Semi-VOCs < 500,000 ppb; and Individual Semi-VOCs < 50,000 ppb.

MDL means Method of Detection Limit.

NL means no established/published limit.

Table 1.2 Closure Sampling Analyses Summary (NYSDEC TCLP Extraction Guidance Values for Petroleum Contaminated Soil)

Constituent (ug/l or ppb)	SW4[1,2]	NYSDEC Guidance Values [3] (ppb)
Volatile Organics		
MTBE	NA	10
Benzene	NA	1
Toluene	NA	5
Ethylbenzene	NA	5
m,p-Xylene	NA	5
o-Xylene	NA	5
Isoproylbenzene	NA	5
n-Propylbenzene	NA	5
1,3,5-Trimethlybenzene	NA	5
tert-Butylbenzene	NA	5
1,2,4-Trimethylbenzene	NA	5
sec-Butylbenzene	NA	5
p-Isopropyltoluene	NA	5
n-Butylbenzene	NA	5
Napthalene	NA	10
Semi-Volatile Organics		
Napthalene	ND (10)	10
Acenapthene	ND (10)	50
Flourene	ND (10)	50
Flouranthene	ND (10)	50
Anthracene	ND (10)	20
Phenathrene	ND (10)	50
Benzo(a)anthracene	ND (10)	0.002
Chrysene	ND (10)	0.002
Pyrene	ND (10)	50
Benzo (b) flouranthene	ND (10)	0.002
Benzo (k) flouranthene	ND (10)	0.002
Benzo (g,h,i) perylene	ND (10)	0.002
Benzo (a) pyrene	ND (10)	0.002
Dibenz (a,h) anthracene	ND (10)	50
Indeno (1,2,3-cd) pyrene	ND (10)	0.002

NA=Not Analyzed.

See Figure 2 for soil sample location.

Corresponding sample name on lab sheets is: SW4=South Wall 2-4-00.

Corresponds to TLCP Extraction Guidance Value C_w from the NYSDEC STARS memo and TOGs addendum published April 2000.

1.2.5 Evaluation of Impact of Sunoco Gas Station at 567 West Main St.

Based on information provided by the NYSDEC and City of Rochester, the off-Site property directly West of the City Site at 567 West Main Street has operated as a gas station since at least 1961 to the present, ("Sunoco Site"). This facility was previously owned by Sun Oil Company and is presently being remediated under the direction of the NYSDEC.

There are presently 3 underground gasoline storage tanks at the Sunoco.

Table 2. Existing Storage Tank Summary-Sunoco Site

Tank No.	Tank Contents	Size (gallons)	Location	Material of Construction	Year Installed
1	Gasoline	10,000	Underground	Fiberglass	1986
2	Gasoline	10,000	Underground	Fiberglass	1986
3	Gasoline	10,000	Underground	Fiberglass	1986

As a part of a Phase II environmental assessment conducted by Groundwater and Environmental Services, Inc. ("GES") for Sunoco in November 1997, 4 overburden groundwater-monitoring wells were installed to evaluate subsurface conditions. Levels of Benzene, Ethylbenzene, Toluene and MTBE above NYSDEC Groundwater Quality Standards were identified and a NYSDEC spill file was opened. In addition, soil contamination above NYSDEC Alternative Guidance Values for Gasoline Contaminated Soils was identified.

Additional soil and groundwater sampling was completed at the Sunoco Site in 1999 by GES to further define the extent of contamination and verify groundwater quality (see GES reports of February 9, 1999; July 1, 1999; August 3, 1999; and December 21, 1999). Based on these findings, a Remedial Action Plan was prepared by Matrix Environmental Technologies, Inc. ("Matrix") in November 1999, and an oxygen injection system was installed to remediate soil and groundwater. The system began operation in June 2000.

1.2.5.1 Groundwater Monitoring Well Installation

Upon completion of the remediation and closure activities at the Site, 5 groundwater monitoring wells (ASMW5, ASMW6, ASMW7, ASMW8 and ASMW9) were installed at

the Site in March 2000 to evaluate Site impacts from the Sunoco Site.

1.2.5.2 Groundwater Flow Direction

Groundwater elevation measurements of the monitoring wells at the Site and Sunoco Site were taken on June 27, 2000. Elevations were mapped and contoured to evaluate groundwater flow directions. The contours show groundwater flow in the area to be generally from West to East, from the Sunoco Site toward the Site. The contours also show a groundwater flow component from the North, South and East, toward the Site excavation area.

1.2.5.3 Groundwater Monitoring and Analyses

Two (2) rounds of groundwater sampling were conducted as a part of the post-remediation activities. The first round was completed on the Site on March 27, 2000 (see Table 3).

- Groundwater to the West, North and within the excavation contained volatile organic compounds ("VOCs") (ie, gasoline constituents) at concentrations above NYSDEC groundwater quality standards, including Benzene, Toluene, Ethylbenzene and MTBE.

Groundwater to the East and South of the excavation (ASMW 5, ASMW7 and ASMW9) did not contain VOCs.

Table 3. Groundwater Sampling Analyses Summary—Site

Constituent Concentration (µg/l or ppb)	Well ID Number and Date of Sampling										
	ASMW3[2]		ASMW5	ASMW6		ASMW7	ASMW8		ASMW9	NYSDEC STARS [3] (ppb)	NY TA # (
	3/27/00	6/27/00	3/27/00	3/27/00	6/27/00	3/27/00	3/27/00	6/27/00	3/27/00	GW Std.	GW
MTBE	14.7[1]	15	ND(2.00)	ND (20.0)	33	ND(2.00)	ND(100)	<1	ND(2.00)	10	
Benzene	74	270	ND(0.7)	950	670ve	ND(0.70)	3,100	2,100ve	ND(0.7)	1	
Toluene	ND(2.00)	3	ND(2.00)	387	36	ND(2.00)	5,830	3,900ve	ND(2.00)	5	
Ethylbenzene	ND(2.00)	3	ND(2.00)	ND(20.0)	32	ND(2.00)	1,210	840ve	ND(2.00)	5	
m,p-Xylene	ND(2.00)	5	ND(2.00)	227	170	ND(2.00)	4,410	2,800ve	ND(2.00)	5	
o-Xylene	ND(2.00)	<1	ND(2.00)	52.6	28	ND(2.00)	1,410	1,200ve	ND(2.00)	5	
Isoproylbenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	2	ND(2.00)	ND(100)	66	ND(2.00)	5	
n-Propylbenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	2	ND(2.00)	ND(100)	53	ND(2.00)	5	
1,3,5-Trimethlybenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	17	ND(2.00)	217	240	ND(2.00)	5	
tert-Butylbenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	<1	ND(2.00)	ND(100)	<1	ND(2.00)	5	
1,2,4-Trimethylbenzene	ND(2.00)	<1	ND(2.00)	24.4	42	ND(2.00)	916	8,600ve	ND(2.00)	5	
sec-Butylbenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	<1	ND(2.00)	ND(100)	3	ND(2.00)	5	
p-Isopropyltoluene	ND(2.00)	<1	ND(2.00)	ND (20.0)	1	ND(2.00)	ND(100)	14	ND(2.00)	5	
n-Butylbenzene	ND(2.00)	<1	ND(2.00)	ND (20.0)	<1	ND(2.00)	ND(100)	<1	ND(2.00)	5	
Napthalene	ND(5.00)	<1	ND(5.00)	ND (50.0)	12	ND(5.00)	ND(250)	410	ND(5.00)	10	
Petroleum hydrocarbon	BDL(250)	NA	BDL(250)	1,810*	NA	BDL(250)	12,700*	NA	BDL(250)	NL	
o-Isopropyltoluene	NA	<1	NA	NA	<1	NA	NA	9	NA	NL	
1 -Methyl-2-ethylbenzene	NA	<1	NA	NA	16	NA	NA	590	NA	NL	
1-Methyl-3-n-propylbenzene	NA	<1	NA	NA	<1	NA	NA	16	NA	NL	
1-Methyl-4-n-propylbenzene	NA	<1	NA	NA	<1	NA	NA	26	NA	NL	
1,2-Diethylbenzene	NA	<1	NA	NA	<1	NA	NA	6	NA	NL	
1-Methyl-2-n-propylbenzene	NA	<1	NA	NA	2	NA	NA	16	NA	NL	
1,4-Dimethyl-2-ethylbenzene	NA	<1	NA	NA	1	NA	NA	32	NA	NL	
1,2-Dimethyl-4-ethylbenzene	NA	<1	NA	NA	4	NA	NA	68	NA	NL	

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Table 3. Groundwater Sampling Analyses Summary—Site (Contd.)

Constituent Concentration (µg/l or ppb)	Well ID Number and Date of Sampling										
	ASMW3[2]		ASMW5	ASMW6		ASMW7	ASMW8		ASMW9	NYSDEC STARS [3] (ppb)	NY TA # (
	3/27/00	6/27/00	3/27/00	3/27/00	6/27/00	3/27/00	3/27/00	6/27/00	3/27/00	GW Std.	GW
1,3-Dimethyl-2-ethylbenzene	NA	<1	NA	NA	1	NA	NA	9	NA	NL	
1,2-Dimethyl-3-ethylbenzene	NA	<1	NA	NA	1	NA	NA	16	NA	NL	
Pentane	NA	11L	NA	NA	68L	NA	NA	31L	NA	NL	
Butane	NA	42L	NA	NA	220L	NA	NA	290L	NA	NL	
2-Butanone (MEK)	NA	<10	NA	NA	<10	NA	NA	61	NA	NL	

L Reported concentration was generated from a library search.
NA Not analyzed.
BDL Below detection limit.
NA Not Analyzed.
NL No established/published limit.
ve The value reported exceeded the calibration range established for the analyte. The reported concentration is an estimate.
1 Lightweight petroleum hydrocarbon as gasoline.
2 Corresponding sample names for lab sheets are as follows: ASMW3=MW3, ASMW5=MW5, etc.
3 Corresponds to STARS Memo Values for TCLP, Alternative Guidance Values (C_w).
4 Corresponds to TAGM # 4046 Ground Water Standards Criteria (C_w).

The second round of groundwater sampling was conducted on June 27, 2000 (see Table 4). Wells sampled included the 3 monitoring wells at the Site with measurable levels of VOCs (ASMW3, ASMW6 and ASMW8) and the 3 monitoring wells on the East side of the Sunoco Site (SUMW1 through SUMW3).

Table 4. Groundwater Sampling Analyses Summary—Sunoco Site, June 27, 2000

	Monitoring Well (Sunoco Site = "SU")				
Constituent (µg/l or ppb)	**SUMW1**	**SUMW2**	**SUMW3**	**NYSDEC STARS GW Std. TCLP Value C_a (ppb) [1]**	**NYSDEC TAGM #4046 Value C_w (ppb) [2]**
MTBE	4N	1,200ve	13N	100	10
Benzene	2,500ve	2	390	14	1.0
Toluene	510	<1	180	100	5
Ethylbenzene	610ve	<1	320	100	5
m,p-Xylene	2,900ve	<1	2,300ve	100	5
o-Xylene	480	2	1,300ve	100	5
Isoproylbenzene	6	<1	15	100	5
n-Propylbenzene	10	<1	16	100	5
1,3,5-Trimethlybenzene	430	<1	120	100	5
TAME (tert-amyl methyl ether)	<1	2	<1	NL	NL
1,2,4-Trimethylbenzene	880ve	<1	1,300ve	100	5
sec-Butylbenzene	<1	<1	4	100	5
p-Isopropyltoluene	8	<1	8	100	5
Isooctane	<1	<1	<1	NL	NL
4-Methyl-2-pentanone	39	<10	<10	NL	50
2-Hexanone	55	<10	<10	NL	50
Napthalene	480	2	300	200	10
o-Isopropyltoluene	4	<1	4	NL	NL
1 -Methyl-2-ethylbenzene	860ve	<1	290	NL	NL
1-Methyl-3-n-propylbenzene	22	<1	8	NL	NL
1-Methyl-4-n-propylbenzene	34	<1	36	NL	NL
1,2-Diethylbenzene	8	<1	5	NL	NL
1-Methyl-2-n-propylbenzene	23	<1	23	NL	NL
1,4-Dimethyl-2-ethylbenzene	47	<1	60	NL	NL

Table 4. Groundwater Analyses Summary—Sunoco Site, June 27, 2000 (Contd.)

	Monitoring Well (Sunoco Site = "SU")				
Constituent (µg/l or ppb)	**SUMW1**	**SUMW2**	**SUMW3**	**NYSDEC STARS GW Std. TCLP Value C_a (ppb) [1]**	**NYSDEC TAGM #4046 Value C_w (ppb) [2]**
1,2-Dimethyl-4-ethylbenzene	110	<1	140	NL	NL
1,3-Dimethyl-2-ethylbenzene	11	<1	14	NL	NL
1,2-Dimethyl-3-ethylbenzene	20	<1	24	NL	NL
Pentane	100L	<10L	69L	NL	NL
Butane	97L	<10L	88L	NL	NL
2-Butanone (MEK)	42	<10	<10	NL	50

L Reported concentration was generated from a library search.

N The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

NL No established/published limit. Many of the substances with the "NL" designation are breakdown products of other regulated substances.

BDL Below detection limit.

ve The value reported exceeded the calibration range established for the analyte.
The reported concentration is an estimate.

1 Corresponds to Recommended STARS TCLP Alternative Guidance Value for groundwater C_a.

2 Corresponds to Recommended Soil Cleanup Objective (ppm) from NYSDEC TAGM #4046 that indicates the current cleanup values for petroleum contaminants C_W.

The results were reviewed by environmental chemists at F&B to determine whether the source of the VOCs in the groundwater on the Site was due to contamination migrating from the Sunoco Site. F&B concluded that several of the dissolved VOCs identified at the Site (ie, Butane, Pentane, MTBE, TAME, Benzene and Toluene) are due to a "recent" release of gasoline, and that the origin of these constituents is the Sunoco Site.

2. CURRENT ENVIRONMENTAL CONDITIONS AND IMPLEMENTATION OF THE EMP

The following information summarizes current environmental conditions and planned development at the Site as it relates to the implementation of the Environmental Management Plan set forth in Section 3.

Subsequent to redevelopment, workers involved with future on-Site work (ie, placing/repairing plantings, new installation/repair of buried utilities, etc.) that have the potential to disturb fill or petroleum-impacted media should be made aware of the potential exposure hazards. Precautions should be implemented to reduce fill and/or soil disturbance and air-borne release of particulates. Areas where work has been completed should be repaired (eg, clean soil/fill re-applied, paved, etc.). Property (including adjacent) owners and tenants should be provided with a copy of this EMP. Site and adjacent property owners and tenants including their respective contractors, and companies (eg, utilities) with easements relative to the property, will be responsible for assuring that the provisions of this EMP are followed when appropriate.

2.1 Environmental Conditions

The majority of the petroleum contaminant source and soil associated with the former gas station at the Site have been successfully removed with the exception of petroleum contaminated soils that could not be removed along the Northern and Western property lines due to the presence of public and private utilities, and a City sidewalk.

Residual contamination was present at the completion of the excavation work in the bottom of the excavation (ie, bedrock), and along the Northern and Western walls (ie, property line) above NYSDEC TCLP Alternative Guidance Values for petroleum contaminated soils (see Tables 1.1 and 1.2 in Section 1). The application of ORC® compound to the bottom of the excavation and the installation of the soil vapor extraction system along the Western and Northern excavation walls will promote removal and biodegradation of residual petroleum (see Figure 3).

Remaining contaminated soil (eg, the soil along the Northern and Western property lines) are within the area of groundwater contamination originating from the Sunoco Site. Due to contamination and the shallow groundwater table documented at the Sunoco Site, the potential exists for recontamination of clean backfill materials present on the City may occur, as groundwater flows from the Sunoco Site to the City Site.

Soil toward the East of the Site excavation, including the Housing Opportunities development property, and toward the South, including the Home Expo property, have not been impacted by petroleum compounds above NYSDEC TCLP Alternative Guidance Values for petroleum contaminated soil.

Detailed information including Site history, investigation and remediation is discussed in Section 1.

2.2 Planned Development and Implementation of the EMP

The portion of the Site that is the subject of this Environmental Management Plan is located in the northwest corner, at the intersection of Reynolds Street and West Main Street (see Figure 3). The future use of the Site includes a proposed “tot lot” play area, which is associated with the new residential development that is currently under

construction on adjacent parcels that are South and East of the Site. The Environmental Management Plan must be implemented as a result of current and potential environmental conditions that may be encountered during development and use of the Site.

The development was acquired by Housing Opportunities, Inc., in May 1998. During the summer months the existing residents were relocated. Each resident was given a Section 8 voucher to assist in his/her move. Demolition began in December 1998 and was completed in the spring of 1999 completion. Construction activities began in the spring of 2000.

Housing Opportunities, Inc. has retained NH Architecture and Passero Associates to prepare a Site plan for the entire 7.3 acres. The proposed Site plan calls for 23 single-family homes to be constructed along Troup Street and around a new interior road which will have an access off Troup Street. These homes will be developed through the City of Rochester's Home Expo program they will be marketed to first-time home buyers with income between 60 and 80% of the area median family income.

The northern portion of the Site will be developed by Housing Opportunities, Inc. Thirty-nine rental units are projected for this portion of the Site. These units will serve families with incomes at or below 60% of the area median family income. A primary goal of the proposed development is to reduce the number of units on the Site. The density will be reduced from 149 units to 62 units.

3. ENVIRONMENTAL MANAGEMENT PLAN

This Environmental Management Plan (EMP) covers activities associated with the redevelopment of the Site where impacted soils, and free product/contaminated groundwater will be disturbed. Prior to redevelopment activities, Site-specific investigations may be necessary to characterize subsurface conditions and to determine if any modifications to this EMP are necessary. Any modifications must be accepted by the City of Rochester.

As indicated in NYCRR Part 360, Section 360-1.15 (b)(8), non-hazardous soil will not be considered a solid waste if it is excavated during redevelopment and re-used on Site as backfill for excavations containing similar contaminants. However, criteria for re-use established in this EMP (eg, comparing contaminant levels to NYSDEC TAGM 4046 and/or STARS Memo #1 guidance values, etc.) must be achieved. If the material does not meet appropriate criteria it can not be re-used; it is considered a solid waste and it must be handled/disposed of accordingly.

This EMP provides options regarding the disposal and/or re-use of petroleum-impacted media, fill material, and free product/contaminated groundwater. This EMP also provides a protocol for preventing fugitive emissions during disturbance of these

materials, and reducing future impacts associated with these materials. The EMP describes the procedures to be implemented in order to manage these materials in accordance with applicable regulations if they are encountered and/or disturbed during development and/or other activities that may involve disturbing contaminated media (eg, soil). The procedures presented are intended to reduce potential exposure to construction workers and nearby residents during redevelopment; and Site workers, Site occupants, and nearby workers and residents during future operation and/or occupation of the Site. A Summary Flow Chart included in Appendix A provides recommended handling and disposal options for materials covered by this EMP.

3.1 Roles and Responsibilities

For every project, clear definition of the roles and responsibilities of both the organizations and personnel involved is a fundamental necessity. For each of the key organizations involved in this project, these duties are outlined below.

3.1.1 Site Owner–City of Rochester

The City of Rochester is the present owner of the Site. Their responsibilities in the remediation project will consist of the following:

- Overall project scheduling and coordination relative to the Environmental Management Plan;
- Site access; and
- Review of Work Plans, and other project documents to identify activities that may necessitate the implementation and/or modification of the Environmental Management Plan.

3.1.2 Site Developer–Housing Opportunities, Inc.

Housing Opportunities is a co-developer of the Site along with the City of Rochester. Their responsibilities in the remediation project will consist of the following:

- Review of Work Plans, and other project documents to identify activities that may necessitate the implementation and/or modification of the Environmental Management Plan.

3.1.3 Project Monitor

It is recommended that an environmental project monitor be present during construction activities. The environmental project monitor will assist in identifying contaminated soil and/or fill and monitoring/documenting conditions encountered. The environmental project monitor must be on Site during all construction activities when disturbance of contaminated media is anticipated and/or exposure potential is the greatest (eg, during foundation excavation work, installation of utilities, Site grading, etc.).

3.2 Management of Petroleum-Impacted Media

During the redevelopment of the Site, petroleum-impacted media (eg, fill, soil, etc.) may be encountered. The following sections of the EMP report define how to handle, dispose of and/or re-use these media.

3.2.1 Handling of Petroleum-Impacted Media

If the presence of petroleum contaminants are suspected in the work area (eg, through visual and/or olfactory inspection), a PID/FID should be used during excavation activities to assist in detecting total VOC vapors that may emanate from excavated material. The PID/FID can detect many VOCs typically present in many petroleum products/stoddard solvents. If PID/FID readings in the air above excavated and/or in-situ material and/or selected samples of the material exceed typical upwind air background measurements by 5.0 parts per million (ppm) or more, it will be presumed that VOC contamination is present. The environmental project monitor will document information regarding suspect areas that have PID /FID readings that show contamination is present. The material exhibiting evidence of contamination will require disposal or treatment, unless analytical laboratory data confirms otherwise.

Petroleum-contaminated materials that are excavated or otherwise disturbed, (eg, based on visual and olfactory assessment, PID/FID readings, analytical data, etc.) must be removed, segregated from non-contaminated media, and be placed on, and covered with, plastic sheeting that is a minimum of 10 ml. thick. The contaminated material's location, appearance, and quantity (if possible) should be documented. The appropriate regulatory authorities (eg, NYSDEC, Monroe County Department of Health (MCDOH) and the City of Rochester must be notified regarding any suspect contamination encountered. If contaminated material is staged on-Site, any disposal, treatment, etc., must be conducted within 60 days, unless otherwise authorized by the NYSDEC.

3.2.2 Analytical Laboratory Testing

If warranted, representative samples of suspected petroleum-impacted material will be tested for one or more of the following:

- NYSDEC STARS-list VOCs using USEPA Method 8021 (plus MTBE);
- TPH using New York State Department of Health (NYSDOH) Method 310.13 (ie, to determine the presence and relative quantity of stoddard solution and other petroleum-related compounds); and
- Semi-volatile organic compounds (SVOCs) using USEPA Method 8270.

Consideration for appropriate analyses should include the field observations, PID/FID readings measured, NYSDEC requirements and guidance and potential testing requirements of a NYSDEC-approved disposal facility (ie, landfill). The laboratory

testing will also be used to assist in determining whether the petroleum-impacted material can be re-used on-Site or require off-Site disposal; and to confirm that the petroleum-impacted media is non-hazardous.

In order to determine if the petroleum-impacted soil/fill can be re-used on-Site or necessitates off-Site disposal, it will be required that the test results be compared to soil guidance values listed in the August, 1992 NYSDEC STARS Memo #1 and/or the December 2000 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 (refer to Table I included in Appendix C). If test results for representative samples of the petroleum-impacted material exceed soil guidance values, then the material will require off-Site disposal or on-Site treatment. If test results for representative samples of the petroleum-impacted material do not exceed soil guidance values, either initially or after on-Site treatment, then the material can be re-used on-Site.

3.2.3 Disposal of Petroleum-Impacted Media

Excavated and/or disturbed petroleum-impacted material can be disposed of at a landfill that is approved by the NYSDEC. Transporters of petroleum-impacted media must have the appropriate NYSDEC part 360 permits and be approved by the disposal facility. In addition, testing must satisfy the specific requirements of the waste disposal facility.

3.2.4 Re-use of Petroleum-Impacted Soil/Fill

Excavated and/or disturbed petroleum-impacted material that has been confirmed via analytical testing not to exceed soil guidance values can be re-used on-Site. This material can be re-used in lawn areas, under parking lots or in architectural berms. This material cannot be used in planters, flower beds, etc. If such material is re-used on-Site it must be covered with a minimum 1.5 foot thick layer of uncontaminated soil.

If authorized by the appropriate regulatory authorities, petroleum-impacted soil can be placed at the Site and treated to reduce petroleum-impacted concentrations to levels below STARS designated guidance values. Following this treatment, the soil can be re-used.

3.3 Fill Material

During development of the Site, fill material will be encountered. Fill materials primarily consist of reworked soil, with lesser amounts of cinders, slag, cole fragments, brick and ash.

3.3.1 Handling of Fill Material

Excavated fill can be re-used on-Site so long as it exhibits normal analytical characteristics and/or characteristics as identified in previous Site investigations.

If fill material must be disposed of, it must be segregated from other material. The fill

material's location, appearance and approximate quantity should be documented.

3.3.2 Disposal of Fill Material

Transporters of fill material must have the appropriate NYSDEC Part 360 permits, and the disposal facility (ie, landfill) must be approved by the NYSDEC. Based on the test results of samples of fill previously analyzed, it is anticipated that the fill would be disposed of as non-hazardous waste. If the fill is to be disposed of off-Site, the disposal facilities may require additional characterization testing prior to accepting this fill for proposal.

3.3.3 Re-use of Fill Material

Fill material can be re-used in lawn areas, under parking lots, or in architectural berms. Fill cannot be used in planters, flower beds, etc. Fill that is reused on-Site must be covered with a minimum 1.5 foot thick layer of uncontaminated soil.

3.4 Unanticipated Material

If unanticipated material and/or suspect/suspicious contamination (eg, drums) are encountered that significantly differs from that described above, or if unusual odors, staining, sheens, fumes or vapors are encountered from excavated materials, then the construction activities where the material is being disturbed must be discontinued, and the appropriate regulatory authorities and the City of Rochester must be notified. Additionally, non-essential personnel must be evacuated from the area of the unanticipated material, and the area should be secured to prevent inadvertent exposure to any on-Site personnel until the unanticipated material is properly characterized and it has been determined how it should be handled.

Characterization of unanticipated material in the field will include visual observations and screening with a PID/FID by the environmental project monitor. If PID/FID readings and/or visual observations indicate the presence of unanticipated contamination, then the unanticipated fill material must be sampled and further characterized prior to any additional work being conducted in that area. All sampling and handling of unknown waste materials must be completed utilizing appropriate personnel protective equipment and health and safety procedures.

Recommended analytical testing of unanticipated material may include one or more of the following: VOCs, Toxicity, Characteristic Leaching Procedure (TCLP) VOCs and/or metals; total metals, pH, reactivity and ignitability. The actual parameters tested for must be approved by the appropriate regulatory authorities and may also be dependant upon the field observations, PID readings measured, and potential testing requirements of an approved disposal facility (ie, landfill).

In order to determine if unanticipated material can be re-used on-Site or requires off-Site disposal, it will be required that the analytical test results be compared to the appropriate

NYSDEC clean-up objectives, and background ranges for naturally occurring metals. Specifically, the test results must be compared to the recommended soil clean-up objectives and/or background ranges for naturally occurring metals such as those listed in the December 2000 TAGM #4046. Additionally, the test results may require comparison to NYSDEC Part 371 hazardous waste .

If appropriate, unanticipated fill that is adequately characterized must be removed, segregated from other material, and placed on, and covered with, 10 millimeter plastic sheeting. If off-Site disposal is warranted, the fill must be disposed of in accordance with applicable regulations within 60 days, unless otherwise authorized by the NYSDEC.

3.5 Contaminated Groundwater

Contaminated groundwater (ie, observed in monitoring wells) were encountered while conducting intrusive studies at the Site.

This section of the plan defines how to handle and dispose of or treat this impacted media. Based on the intrusive studies conducted to date, it appears unlikely that free product will be encountered during redevelopment on the Site. However, its handling, disposal, along with that of dissolved-phase groundwater contamination, is included in this EMP.

3.5.1 Handling and Disposal

Contaminated groundwater that is encountered during the development activities must be removed from excavations using pumps and associated hoses. The material can be pumped into a holding tank or vacuum tank truck, and must be disposed off-Site in accordance with applicable regulations.

As an alternative, the contaminated water could be treated through an oil/water separator and potentially appropriate filters, and the water could then be discharged to a sanitary sewer system. The appropriate regulatory approval and permitting (eg, sewer use permit) must be obtained prior to handling the material in this manner. Treated water cannot be discharged unless it meets the sewer use discharge limitations that are established for the Site.

Transporters of free product and/or contaminated groundwater must have the appropriate permits, and the disposal/recycling facility must be approved by the NYSDEC.

3.5.2 Analytical Laboratory Testing

Samples of contaminated groundwater and/or free product will require analytical testing at a NYSDOH-approved laboratory prior to being disposed, recycled, or discharged to a public sewer system. Additionally, if treated water is discharged to a public sewer system; the POTW (eg, Monroe County Pure Waters) will require a monitoring program

(eg, monthly sampling and analysis).

It is anticipated that laboratory analysis may include one or more of the following analytes: volatile aromatics, volatile halocarbons and total petroleum hydrocarbons. The actual parameters tested for must be approved by the appropriate regulatory authorities and the City of Rochester and may also be dependant upon the field observations, PID/FID readings measured, and potential testing requirements of an approved disposal facility (eg, POTW).

3.6 Health and Safety Plan

As part of any implementation of this Environmental Management Plan, a Site-specific Health And Safety Plan (HASP) must be developed. The HASP must be implemented when work involving the potential disturbance of contaminated media (ie, soil, groundwater, etc.), or fill material is being performed. The purpose of the HASP is to outline the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during redevelopment of the Site. In part, the HASP includes an air monitoring (including for dust) program to be used during redevelopment activities that disturb fill and/or petroleum-impacted material. The HASP must specify appropriate levels or personal protective equipment, and specify the action limits for particulates and VOCs in air.

A Health And Safety Plan (HASP) must include the following safety procedures and precautions to be used by workers at the Site:

- General information
- Waste characteristics
- Hazard evaluation
- Site safety work plan

Site control/security

Personal protective equipment

Action levels

Community air monitoring activities

Decontamination procedures

Sample handling

- Emergency information

A copy of a **sample** HASP is attached as Appendix B.

3.7 Dust Suppression

Real time particulate monitors should be used to continuously monitor dust levels upwind, down wind, and within the work area at temporary particulate monitoring stations. Actions to be taken, based on measured levels of particulates, are presented in Table 7. All readings will be recorded and be available for NYSDEC and Health Department personnel to review.

Table 7. Dust Action Plan

Location	Meter Reading	Action
Downwind Perimeter	150 $\mu g/m^3$ greater than upwind levels	Halt operations. Determine source of dust. Implement dust control and suppression steps.

If dust suppression is required during construction activities, the following techniques must be implemented where appropriate:

- Applying water to haul roads;
- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Covering materials that are being hauled;
- Restricting equipment speeds; and
- Other approved methods covering excavated areas and exposed areas of fill and/or petroleum-impacted material.

Dust suppression techniques will be utilized until air monitoring indicates that dust levels are within an acceptable range.

3.8 Site Controls

If contaminated media are encountered (eg, fill that is different than that characterized during previous studies), a temporary fence will be placed around these areas in order to restrict access and exposure. Fencing will also be placed around contaminated excavations, and/or materials, particularly if they will not be removed immediately ie, left overnight, over the weekend, or for any other extended period of time. Contaminated excavations must be to be backfilled or otherwise contained if there is significant potential for the release of odors, vapors and/or liquids that may cause exposure or other risk related to meeting applicable regulatory requirements.

During construction activities that involve the excavation or disturbance of petroleum contaminated media and/or fill material, appropriate erosion and siltation control

measures must be implemented to prevent surface runoff.

4. FUTURE SITE INVESTIGATION AND REMOVAL ACTIVITIES

The following sections summarize potential future investigative and remedial activities that may be conducted at the Site.

4.1 Short-Term Groundwater Monitoring

The 4 new and 2 existing groundwater-monitoring wells will be sampled every 6 months for the first year following the completion of remediation activities. This monitoring will be conducted to determine the following:

- Groundwater quality in the remediation area;
- Changes in groundwater quality downgradient of the remediation area; and
- Groundwater elevations and flow directions.

Well samples will be collected and analyzed for the following:

- pH;
- Total petroleum hydrocarbons (DOH Method 310.13); and
- Volatile organic compounds (VOCs) (NYSDEC STARS /EPA Method 8021 plus MTBE.

In addition, groundwater elevations will be measured during each sampling round, to allow for development of a groundwater contour map and subsequent determination of flow direction. The results of each round of sampling will be summarized in short reports that will include the following:

- Description of sampling methodology;
- Summary of analytical results;
- Groundwater contour map;
- Conclusions and recommendations;
- Laboratory data; and
- Field notes.

Groundwater monitoring wells are illustrated in Figures 2 and 3. Precautions must be taken to preserve access to such wells during any and all Site activities.

4.2 Potential Groundwater Remediation Activities

Upon completion of the Site remediation and the short-term groundwater-monitoring program, the need for groundwater remediation will be evaluated. If a dissolved contaminant plume is identified which could impact receptors in the area, the need for modeling and/or design of remediation systems will be considered.

4.3 Long Term Groundwater Monitoring

Regardless of the status of the need for groundwater remediation activities, upon completion of the short-term groundwater-monitoring program, the need for a long-term monitoring plan will be addressed, developed and implemented if requested. The plan will be submitted to the NYSDEC and Health Departments for review and comment prior to initiation.

4.4 Potential Area Monitoring

If, upon completion of the construction of the multi-family housing units directly east of the remediation area, groundwater concentrations indicate a potential impact on these units, the basement levels of these structures will be monitored to determine whether organic vapors are accumulating. Organic vapors will be measured using a PID/FID. Measurements will be taken of ambient air quality in the basement, as will as in the area of floor cracks, sumps, or other potential vapor sources.

If levels greater than 5 ppm are measured, additional testing will be conducted in similar units, to determine if background levels of organic chemicals are present due to construction techniques or materials. The results of each round of air monitoring will be provided to the NYSDEC and Health Departments.

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SOIL MANAGEMENT PLAN
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