

Dec 11 10 33 AM '97

CASELLA WASTE MANAGEMENT, INC.
LAKESIDE AVENUE
BURLINGTON, VERMONT

VTDEC Site #91-1069

SITE STATUS REPORT

SUPPLEMENTARY SOIL & WATER QUALITY INVESTIGATION

November 29, 1997

KDAI Project No. B118-008



KD ASSOCIATES, INC.
Environmental Consulting & Laboratory Services

1350 Shelburne Road, Suite 209 South Burlington, Vermont 05403 (802) 862-7490



State of Vermont

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Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
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AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Waste Management Division
103 South Main Street / West Building
Waterbury, Vermont 05671-0404
802-241-3888
Fax 802-241-3296

December 16, 1997

LARRY LACKEY
CASELLA WASTE SYSTEMS
16 STATE STREET
MONTPELIER VT 05602

RE: Status Report for the Casella facility located in Burlington / SMS Site #911069

Dear Mr. Lackey:

The Sites Management Section (SMS) has reviewed KD Associates, Inc. (KD) "Site Status Report", dated November 29, 1997, for the above referenced site. This report summarizes the additional work that was requested in relation to the petroleum contamination at this site. In general, the groundwater monitoring revealed that the subsurface is still impacted with petroleum compounds at concentrations above the current groundwater enforcement standards. It has also been concluded that the contamination has migrated from the original source area (former underground storage tank). In addition, the PID screening of the stockpiled soils revealed concentrations up to 2.2 ppm.

The SMS concurs with KD's site recommendations that additional work is needed to define to the downgradient extent of contamination, and that continued groundwater monitoring and soil screening are warranted. Based on the above, please have your consultant submit a work plan and cost estimate addressing the above within 30 days of your receipt of this letter.

Please feel free to contact me with any questions regarding the above at 802-241-3897.

Sincerely,


Linda Elliott, Project Manager
Sites Management Section

c: Bryan Schultz, KD Associates

LF:wpl/sites/casella/upd.1297

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1.0 INTRODUCTION

The following is a report on activities completed by K-D Associates, Inc. of South Burlington, VT to further characterize the nature, degree and extent of petroleum contamination in soil and groundwater at the Casella Waste Management (Casella) site in Burlington, Vermont. The site is located on the south side of Lakeside Avenue, in a historical industrial development, approximately 1000 feet east of Lake Champlain (see U.S.G.S. Topographic Map Section and Site Sketch, Appendix 1, pages 1 and 2).

1.1 Background

This Casella facility was listed as an active hazardous site by the Vermont Agency of Natural Resources - Hazardous Materials Management Division (VANR-HMMD) in June of 1991 following the discovery of petroleum contamination in soil during the removal of three underground storage tanks. At that time, Casella engaged the services of another consulting firm to define the degree and extent of the petroleum contamination in the subsurface environment and assess the potential for impact to sensitive receptors.

As of the last report on file with HMMD dated December 1991, three groundwater monitoring wells had been installed at the site and groundwater samples had been collected and analyzed for volatile organic compounds. Since that report, monitoring of groundwater flow, water quality conditions and the status of approximately 85 cubic yards of contaminated soil polyencapsulated on site has apparently gone unchecked.

In the most recent correspondence regarding this site (dated July 18, 1997), the HMMD requested that Casella have the groundwater re-sampled and analyzed using EPA Method 601/602, report on the status of the stockpiled soil, and determine the need for a treatment and/or monitoring plan.

In September, 1997 Casella retained the services of K-D Associates, Inc. (KDAI) to collect another round of groundwater samples, monitor the stockpiled soil and provide a Site Status Report outlining the work performed as well as conclusions and recommendations. This work plan and cost estimate was submitted to the HMMD and approved on 11 September, 1997.

1.2 Scope of Work

The work plan provided for the sampling and laboratory analysis of the three existing monitoring wells. The samples were to be analyzed for BTEX and MTBE compounds via EPA Method 601/602. Since the existing wells had not been sampled on a regular schedule in the past, the work plan also provided the option of drilling replacement monitoring wells for those wells that may have been compromised or destroyed over time. KDAI did, in fact, install two replacement wells

using hand bucket auger drilling and conventional monitoring well construction. Other components of the work plan proposed for this Casella site included PID/headspace monitoring of the stockpiled soil on site removed from the 1991 UST closures.

Authorization to proceed with the work plan proposed by KDAI was given by SMS Project Manager Linda Elliott in September of 1997.

2.0 SOIL BORING AND MONITORING WELL INSTALLATION

The on-site characterization phase of the project was initiated by KDAI on October 8, 1997. An initial site visit and inspection of the existing groundwater monitoring wells proved the need for the replacement of two of the existing wells due to traffic damage. (see Site Investigation Map, Appendix 1, page 3). MW-1, located near the former tank excavation area, had had the road box and protective well cover damaged from heavy traffic and snow plowing and was covered over during past resurfacing of the parking area. MW-3, a downgradient well, was also found to have no road box or well cover and was filled with debris above the groundwater level. The soil boring and monitoring well re-installation was provided by KDAI using a hand bucket auger and 2" diameter PVC riser piping with 0.010" slotted screen sections.

The auger spoils and open borehole were screened for the presence of volatile organic compounds using a Photovac MicroTIP photoionization detector (PID) equipped with a 10.6 eV lamp. The PID was calibrated on site using an isobutylene standard gas (calibrated to the Benzene equivalent). Soil descriptions and the PID soil vapor screening results are provided in the attached Soil Boring Logs (see Appendix 1, page 4). PID vapor measurements noted from the auger spoils represent head-space readings of soil samples placed in 1 gallon size, self-sealing plastic bags. The new monitoring wells were developed via disposable bailers until all sediment was removed from the well bores. Techniques employed to minimize cross contamination during the soil boring operation included decontamination via Alconox detergent of all down-hole tools after each soil boring.

2.1 Soil Boring MW-1 Replacement

The first soil boring completed, MW-1, was located adjacent to a concrete loading ramp near the site of the former UST #3 (from a 1991 Dufresne-Henry site plan map, (see Appendix 1 page 5) which indicated the area of soil contamination discovered during the UST removal. This location is believed to serve as the "worst case" indicator or point of release to the surrounding soil and groundwater from the UST release.

The upper 2 feet of the soil profile at this location consisted of crushed gravel fill overlying 2 feet of dark brown to blackened coarse sand with occasional pieces of wood and glass. No PID-detectable volatile organic compounds (PID vapors) were present in these layers. Following this layer was a brown coarse to fine sand mixture which was free of debris to the limits of the boring at depth of 10.5 feet below ground surface (bgs). At 4.5 feet bgs the soil recovered exhibited a PID reading of 3.1 parts per million (ppm). It was also at this depth that recovered soil samples were becoming saturated, indicating the presence of the water table. No petroleum sheens were observed in the saturated soils recovered from 5 to 10.5 feet bgs. The results of the EPA Method 601/602 analysis of groundwater sampled from this location yielded only trace levels of Benzene (less than 1 part per billion), 11.3 ppb of Xylene and 12.6 ppb of MTBE.

2.2 Soil Boring MW-3 Replacement

The second soil boring was sited adjacent to the former MW-3, approximately 100 feet northeast of the former leaky UST site. This site was previously demonstrated to be hydraulically down-gradient of the former UST site.

The surficial material at this location consisted of a 1 ft. layer of crushed gravel fill overlying a 2.5 ft. layer of dark brown coarse sand with occasional pieces of wood and glass. No PID vapors were present in the gravel fill however, a PID vapor reading of 86 ppm was detected in the sandy soil at 3.5 ft. The soil profile from 3.5 ft. to 8.0 feet consisted of silty sand which yielded PID vapor readings of 72 ppm at 4.5 ft bgs, 23 ppm at 5.0 ft. bgs and 14 ppm at 6 ft. bgs. No petroleum sheens or discoloration was observed in the saturated sandy soil recovered from 4.5 ft to 8 ft. bgs.

The EPA Method 601/602 analysis of groundwater sampled from this location reports 229 ppb Benzene, trace levels of Ethylbenzene (<2 ppb), 5.1 ppb of Toluene, 90.6 ppb of Xylene and 89.9 ppb of MTBE.

3.0 GROUNDWATER QUALITY SAMPLING RESULTS

The groundwater monitoring well array was sampled by KDAI on October 17, 1997. The results of the groundwater quality sampling are summarized in Table 1 and the individual laboratory report forms for the groundwater sample analyses are also included in Appendix 2.

All the water quality samples were collected in 40 ml VOA containers equipped with Teflon septa and stored in a cooler on ice until delivery to the laboratory. All samples were analyzed in the laboratory for purgeable aromatic hydrocarbons (BTEX and MTBE) via EPA Method 601/602.

3.1 Sampling Methodology and Procedures

Prior to sampling, the groundwater monitoring wells were subjected water level measurements and free-product checks were made, and then the wells were developed (through the removal of three well volumes of groundwater) to insure that fresh groundwater was sampled. The wells were developed and sampled using disposable neoprene plastic bailers. The well development water was placed in a calibrated 5 gallon bucket and inspected for evidence of petroleum sheens. Upon completion of the well development procedure, the groundwater samples were collected and placed in the sample containers.

3.2 Field Measurements and Observations

The monitoring well elevations were also surveyed on October 17, 1997 establishing the location and elevation of all the existing monitoring wells. The well point elevation data, water level measurements, and groundwater elevation data are tabulated on the attached Table 2 (see Appendix 3, page 1). Depths to the water table at the site as measured on October 17, 1997 ranged from 3.98 feet at well MW-3, to 6.55 feet at MW-2.

Contouring of the water table (using water level measurements and well point elevations of the groundwater monitoring wells) indicates that groundwater flow is predominantly to the north-northeast (see Water Table Contour Map, Appendix 3, page 2). The presence of BTEX and MTBE contaminants in groundwater at MW-3 supports the prior premise that groundwater-borne contamination is flowing from the release site toward MW-3. However, the presence of PID-detectable contamination in the soil at depths well above the current water table suggests that the contamination reported in this groundwater sampling round may also be influenced by a source other than the former UST's (e.g. contaminated fill material used to develop the site). No previous groundwater data was available to compare to the results of this round of sampling to determine if groundwater flow and contaminant migration is consistent through seasonal water level fluxuations.

3.3 Groundwater Sampling Results

The groundwater quality sampling results are summarized in Table 1 located in Appendix 2 (page 1). Copies of the laboratory reports (from Endyne, Inc. of Williston, VT) are also included in Appendix 2.

The EPA Method 601/602 assays indicate that although detectable levels of BTEX and MTBE were found in the groundwater at monitoring well MW-1, only MW-3 contains levels of Benzene and MTBE compounds exceeding the VTDEC Ground Water Enforcement Standard limits (GWES).

Previous sampling data (1991) describes laboratory results with "evidence of petroleum contamination" in the former wells MW-1 and MW-3. A concentration of 320 ppb Benzene with "substantially lower concentrations of Toluene, Ethylbenzene and Xylene" was reported at that time. Comparatively, KDAI's recent sampling produced a Benzene level of 229 ppb in MW-3. The 1991 report does not mention if MTBE was detected, however Dufresne-Henry had surmised that MW-3 was at the lead edge of contaminant migration. Considering the length of time since the previous sampling, the location of MW-3 in relation to the property boundaries and the fact the Benzene contamination has not decreased substantially, it would seem likely the contaminant plume may have migrated beyond the former limit of MW-3. The limits of contamination have not been fully identified for this release and a potential receptor investigation was not within the scope of this investigation.

4.0 MONITORING OF STOCKPILED CONTAMINATED SOIL

The approximately 85 cubic yards of contaminated soil removed during the UST closure have remained on site since 1991. At some point since initial polyencapsulation, the soil had been moved to the northern side of the property (piled approximately 6 feet high and 50 feet long) to serve as a traffic berm and has been seeded with grass. On October 24, 1997, KDAI collected soil samples from the existing stockpile using a hand core sampler and bucket auger. Ten grab samples from random depths were screened using a calibrated PID and bagged headspace techniques. Soil vapor readings ranged from several readings of <1.0 ppm to a peak of 2.2 ppm, collected from a depth of 4 feet into the stockpile (approximate center). The range and peak PID readings measured during the tank pulls was not available for comparison, however, it appears that the reduction of contamination in this soil is near completion.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The groundwater sampling results indicate that contaminants have migrated from the UST release site (identified as UST #3) toward the north-northeast. The higher concentration of contaminants in groundwater at monitoring well MW-3 suggests that the contaminant plume may extend beyond the investigation area on site as well as beyond the property boundaries. To more accurately determine the extent of contamination at the eastern and northern margins of the site, we

recommend the installation of additional monitoring wells sited downgradient of MW-3. The sandy soil and shallow depth to the water table should facilitate the investigation of the area by hand-auger drilling methods.

Although no free-phase product was detected in any of the monitoring wells at the site, the concentration of BTEX and MTBE dissolved in groundwater at well MW-3 remains above the VANR Ground Water Enforcement Standard limits. Therefore, we recommend that monitoring of groundwater conditions at the site be continued with sampling on a quarterly basis. We also recommended that PID screening of the stockpiled soil be included in future sampling events (except mid-winter).

In conclusion, there is strong evidence of contamination in soil and groundwater at this Casella site. Evidence to date indicates that its presence may also be attributed to other on-site sources (e.g. contaminated fill used to develop the site), however, it appears likely that the UST release has had the greater impact on water quality and represents the primary threat to neighboring properties and potentially sensitive receptors in the area. Should you have any questions regarding this report, please feel free to contact me.

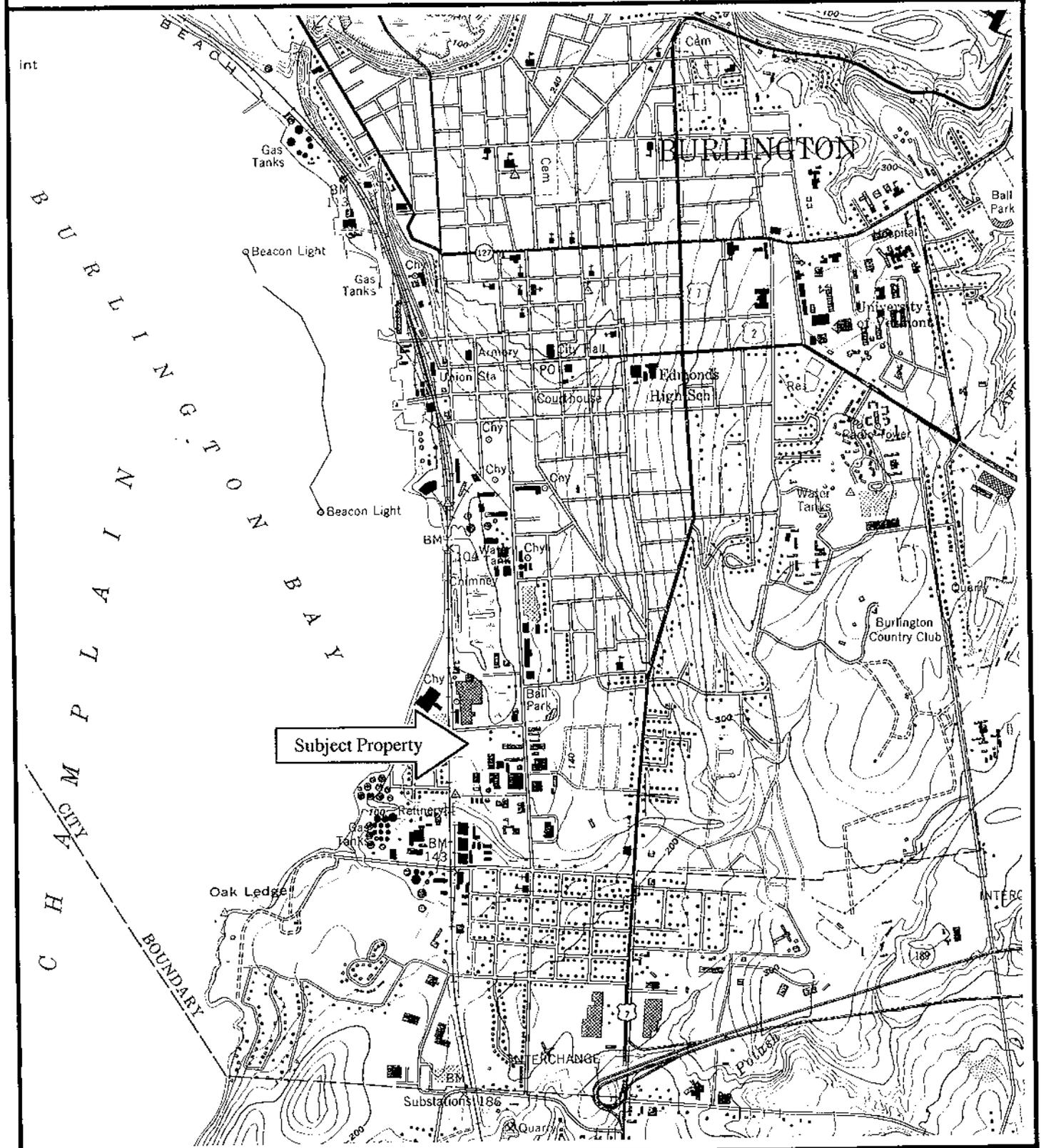
Respectfully,

Bryan Schultz

cc: Larry Lackey, Casella Waste Management
file B118-008

APPENDIX 1

Vicinity Map



Site: Casella Waste Management
Lakeside Avenue
Burlington, Vermont

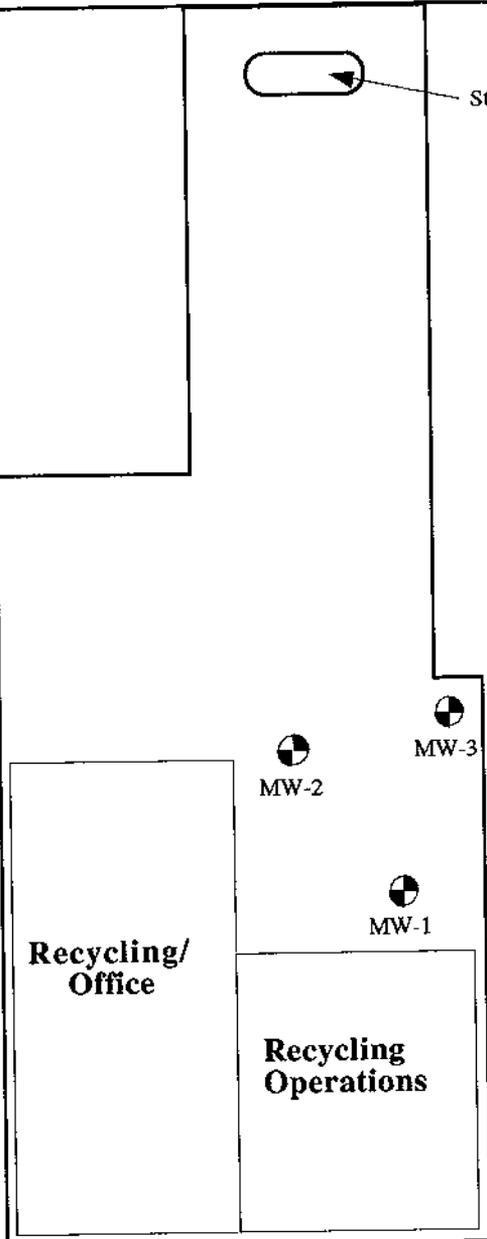
KDAI Project No. B118-008
Date: 11/25/97
Initial: BS

Scale: 1:24,000
Source: U.S.G.S. 7.5 minute topo
Burlington, VT Quadrangle

Lakeside Ave.



Stockpiled Soil



LEGEND

monitoring well



Site Sketch

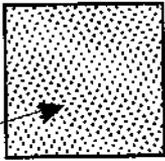
Project Name: Casella Waste Mgmt.

KDAI ID No.	date	initial
B118-008	11/25/97	ER

scale: 1" = 100'

Recycling/Office

location of former UST's



Recycling Operations



MW-1



MW-2



MW-3

catch basins (3)

above ground waste oil tank



SB-2



SB-1



LEGEND

- soil boring
- former site of UST's
- monitoring well

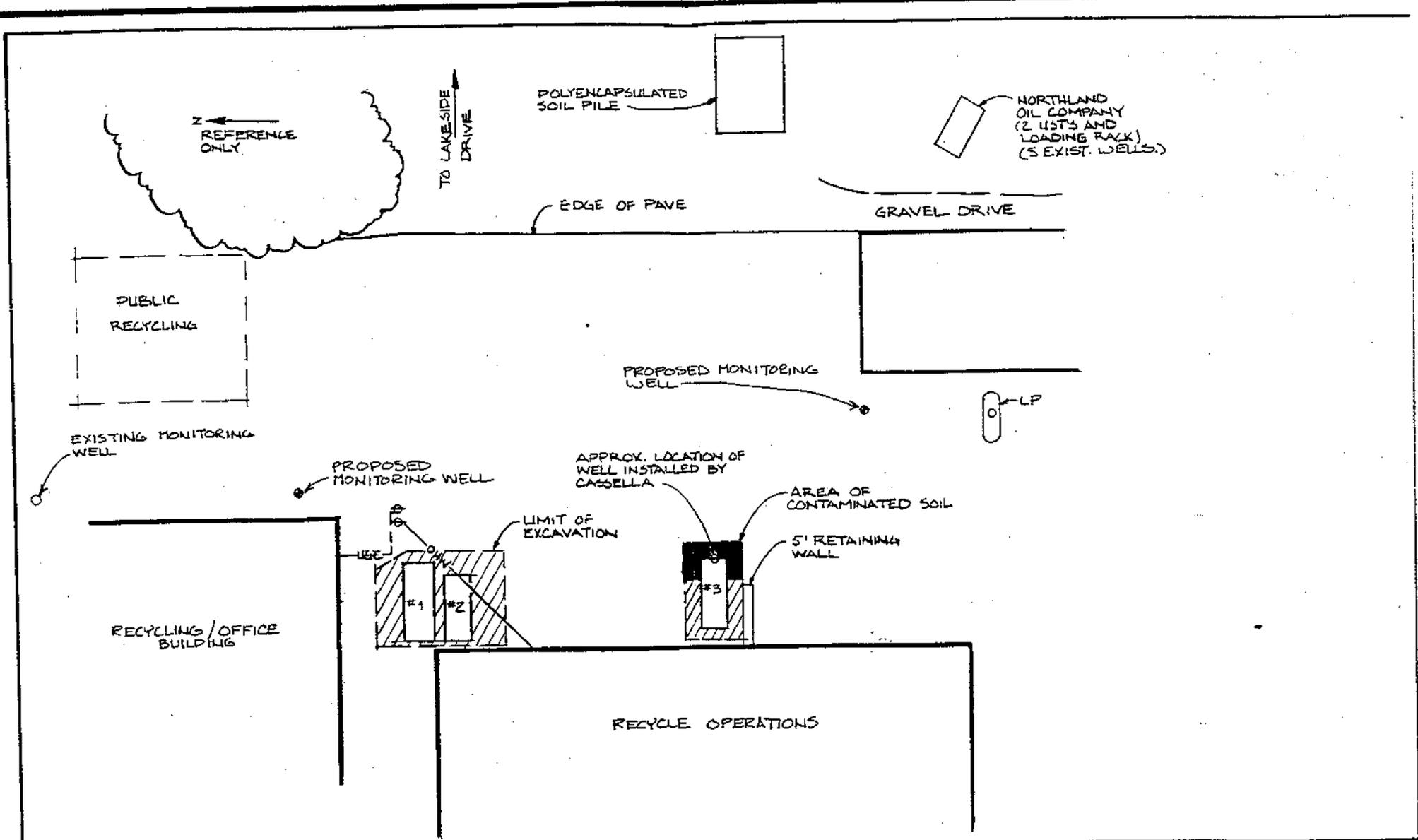
Survey Map		
Project Name: Casella Waste Mgmt.		
KDAI ID No. B118-008	date 11/14/97	initial ER
scale: 1" = 40'		

CASELLA WASTE MANAGEMENT
Lakeside Ave., Burlington, VT

SOIL BORING LOG

MONITORING WELL MW-1		
Location:	60 ft. NW of NE corner of bldg. in front of concrete loading ramp	
Surface:	asphalt pavement	
Sample Interval	PID Reading	Soil Description
0 - 1 in.	<0.1 ppm	asphalt
1 in. - 2 ft.	<0.1 ppm	crushed gravel mixed with dk. brown/black coarse sand
2 ft. - 4.5 ft.	3.1 ppm	tan/brown coarse sand, saturated
4.5 ft. - 10.5 ft.	1.2 ppm	tan/brown coarse sand, saturated
Well Construction:		
Pipe:	2 in sch 40 PVC, flush coupled	
Screen:	0.010 in. slotted screen	
Screen Interval:	2.0 - 9.0 ft.	
Sand pack:	native fill	
Bentonite:	1.0 - 2.0 ft.	
Well Covering:	8 in. dia. leak-resistant cast iron, flush-mounted in concrete	

MONITORING WELL MW-3		
Location:	135 ft. N of NE corner of bldg.	
Surface:	asphalt pavement	
Sample Interval	PID Reading	Soil Description
0 - 1 in.	<0.1 ppm	asphalt
1 in. - 1.0 ft.	<0.1 ppm	crushed gravel sand mix
1.0 ft. - 3.5 ft.	86 ppm	dk. brown/black coarse sand w/ wood & glass debris
3.5 ft. - 4.5 ft.	72 ppm	tan silty sand, saturated
4.5 ft. - 5.0 ft.	23 ppm	tan silty sand, saturated
5.0 ft. - 6.0 ft.	14 ppm	tan silty sand, saturated
6.0 ft. - 8.0 ft.	1.4 ppm	tan silty sand, saturated
Well Construction:		
Pipe:	2 in sch 40 PVC, flush coupled	
Screen:	0.010 in. slotted screen	
Screen Interval:	2.0 - 8.0 ft.	
Sand pack:	native fill	
Bentonite:	1.0 - 2.0 ft.	
Well Covering:	8 in. dia. leak-resistant cast iron, flush-mounted in concrete	



SITE PLAN
NOT TO SCALE



CASSELLA WASTE MANAGEMENT			
TANK REMOVAL			
BURLINGTON,			VERMONT
Client No. 431906	Proj. Mgr.	F.D.D.	Date 6/91

SEP 21
 DRAWING 431906 FOR 11/1/91

APPENDIX 2

TABLE 1

CASELLA WASTE MANAGEMENT
Lakeside Avenue, Burlington, Vermont

BTEX and MTBE Concentrations in Groundwater - EPA Method 601/602
17 October, 1997

PARAMETER	MW-1	MW-2	MW-3
BENZENE	TBQ <1	<1	229
TOLUENE	<1	<1	5.1
ETHYLBENZE	<1	<1	TBQ<2
XYLENE	11.3	<1	90.6
MTBE	12.6	<10	89.9
TOTAL BTEX	11.3	<1	324.7
UIPs	>10	0	>10

VTDEC Limit
5
2420
680
400
50
-3505

*11/97 GW Rule
Enf. standards*

*1,000
700
10,000
40*

Notes: TBQ = Trace Below Quantitation
<1 = detection limit
UIP = Unidentified Peaks (non-target compounds)



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: K-D Associates
PROJECT NAME: B118-008
REPORT DATE: October 30, 1997
DATE SAMPLED: October 17, 1997

PROJECT CODE: KDAS1954
REF.#: 111,763 - 111,767

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: K-D Associates
PROJECT NAME: B118-008
CLIENT PROJ. #: B118-008

DATE RECEIVED: October 17, 1997
REPORT DATE: October 30, 1997
PROJECT CODE: KDAS1954

Ref. #:	111,763	111,764	111,765	111,766	111,767
Site:	MW-1	MW-2	MW-3	Trip Blank	Field Blank
Date Sampled:	10/17/97	10/17/97	10/17/97	10/17/97	10/17/97
Time Sampled:	13:40	13:55	14:20	12:45	13:15
Sampler:	B. Schultz				
Date Analyzed:	10/29/97	10/28/97	10/28/97	10/29/97	10/28/97
UIP Count:	>10	0	>10	0	0
Dil. Factor (%):	100	100	50	100	100
Surr % Rec. (%):	87	95	100	93	97
Parameter	Conc. (ug/L)				
Benzene	TBQ <1	<1	229.	<1	<1
Chlorobenzene	<1	<1	<2	<1	<1
1,2-Dichlorobenzene	<1	<1	<2	<1	<1
1,3-Dichlorobenzene	<1	<1	<2	<1	<1
1,4-Dichlorobenzene	<1	<1	<2	<1	<1
Ethylbenzene	<1	<1	TBQ <2	<1	<1
Toluene	<1	<1	5.1	<1	<1
Xylenes	11.3	<1	90.6	<1	<1
MTBE	12.6	<10	89.9	<10	<10

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated



32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

24341

Project Name: B118-008	Reporting Address: K-D Associates	Billing Address: Same
Site Location: Burlington, UT		
Endyne Project Number: KDAS1954	Company: Bryan Schultz	Sampler Name: B. Schultz
	Contact Name/Phone #: 862-7490	Phone #:

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
111763	MW-1	H ₂ O	✓		10-17-97 1340	2	40ml		20	HC1	
111764	MW-2	↓	↓		1355	↓	↓		↓	↓	
111765	MW-3	↓	↓		1420	↓	↓		↓	↓	
111766	Trip Blank	↓	↓		1245	↓	↓		↓	↓	
111767	Field Blank	↓	↓		1315	↓	↓		↓	↓	

Relinquished by: Signature <i>Bryan Schultz</i>	Received by: Signature <i>[Signature]</i>	Date/Time 10/17/97 4:00
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes No

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

APPENDIX 3

TABLE 2

Groundwater Elevation Measurements Casella Waste Management, Lakeside Ave., Burlington, VT

VT DEC Site # 91-1069

Sampling Date: 17 October, 1997

Well ID	Elevation T.O. Casing	Depth to Groundwater	Groundwater Elevation
MW-1	96.55	4.19	92.36
MW-2	98.58	6.55	92.03
MW-3	93.27	3.98	89.29

Notes:

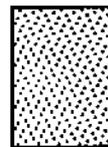
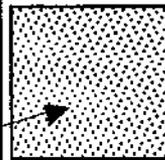
All measurements given in decimal feet
Elevations are relative to an on-site benchmark of 100.00 feet



catch basins (3)

Recycling/Office

excavation area for former UST's



MW-2
92.03

MW-1
92.36

MW-3
89.29

92.0

91.0

90.0

89.0

Recycling Operations

above ground waste oil tank

SB-2

SB-1



LEGEND

water table contours

92.0

soil boring



former site of UST's



monitoring well



Water Table Contour Map (decimal ft.)

Project Name: Casella Waste Mgmt.

KDAI ID No.
B118-008

date
10/17/97

initial
ER

scale: 1" = 40'