C. C. 106

City of Cambridge

MASSACHUSETTS

In City Council 8/4/97, 199

Agenda #34

	YEA	NAY	ABSENT	PRESENT
Ms. Kathleen L. Born	✓			
Ms. Henrietta Davis	✓			
Mr. Francis H. Duehay	✓			
Mr. Anthony Galluccio	✓			
Mr. Kenneth E. Reeves	✓			
Mr. Michael A. Sullivan	✓			
Mr. Timothy J. Toomey, Jr.	✓			
Ms Katherine Triantafillou	✓			
Mayor Sheila T. Russell	✓			
	9	0	0	0

CITY COUNCIL
CITY OF CAMBRIDGE

August 4, 1997

INTRODUCED BY CITY MANAGER ROBERT W. HEALY

AN ORDER CONCERNING APPROPRIATIONS FOR THE FISCAL YEAR BEGINNING JULY 1, 1997

ORDERED: That in addition to sums previously appropriated by the City Council for the fiscal period 1997-98 the following sum is hereby appropriated in the Public Investment Fund the City of Cambridge:

FUNCTION	DEPARTMENT OR PROGRAM	SALARY & WAGES	OTHER ORDINARY MAINTENANCE	TRAVEL & TRAINING	EXTRAORDINARY EXPENDITURES	APPROPRIATIONS
Community Development & Maintenance	Community Development				$155,000	$155,000.00

BE IT FURTHER ORDERED: That the above appropriation in the Public Investment Fund to be financed by estimated revenues drawn from the following sources:

FINANCING PLAN	REVENUE
Property taxes	$155,000.00

In City Council August 4, 1997.
Adopted by a yea and nay vote.
Yeas 9; Nays 0; Absent 0.
Attest:- D. Margaret Drury, City Clerk.

A true copy;

ATTEST:- D. Margaret Drury

D. Margaret Drury, City Clerk

WORKING DRAFT
RUSSELL FIELD
SAMPLING PROGRAM
CAMBRIDGE, MASSACHUSETTS
JULY 29, 1997 REVISIONS

Prepared For:

City of Cambridge
Community Development Department
57 Inman Street
Cambridge, MA 02139

Prepared By:

Environmental Health & Engineering, Inc.
60 Wells Avenue
Newton, MA 02159-3210

EH&E Report #10515
July 30, 1997

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LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

ASG	Alewife Study Group
The City	City of Cambridge, MA
EPA	U.S. Environmental Protection Agency
GC/MS	gas chromatography/mass spectrometry
MADEP	Massachusetts Department of Environmental Protection
MBTA	Massachusetts Bay Transportation Authority
MCP	Massachusetts Contingency Plan
PID	photoionization detector
RCS-1	Reportable Concentration Soil Category 1
RCS-2	Reportable Concentration Soil Category 2
RCGW-1	Reportable Concentration Groundwater Category 1
RCGW-2	Reportable Concentration Groundwater Category 2
S-1	Risk-based Criteria for Soil Category 1
SVOC	semivolatile organic compound
TIC	tentatively identified compound
TVOC	total volatile organic compound

1.0 INTRODUCTION

Russell Field is a municipally owned recreational facility located in North Cambridge, Massachusetts. The site is bounded by residential properties, Rindge Avenue, the W.R. Grace property, the Alewife Red Line Massachusetts Bay Transportation Authority (MBTA) Station and several pedestrian pathways, including Linear Park. The site includes a football field, soccer field, two baseball diamonds and a Metropolitan District Commission swimming pool. The site is heavily used by athletic teams and area residents.

The site is adjacent to the W.R. Grace property, a former chemical manufacturing facility, which is a Tier IC site according to Massachusetts Contingency Plan (MCP) regulations. In the early to mid-1980's, Russell Field was used by the MBTA during construction of the Red Line extension to Alewife. Detailed information on the materials that were stored on Russell Field is not available. A testing program is proposed to assess the potential presence of contaminants on Russell Field from either the MBTA construction or migration of contaminants from the W.R. Grace property.

2.0 BACKGROUND

During the late 1970s and early 1980s, the MBTA constructed an extension of the Red Line subway to Alewife from Harvard Square. The necessary tunnel alignment for the Alewife section required construction through property that served as a chemical manufacturing facility owned by W.R. Grace. Chemical manufacturing took place on the W.R. Grace site for more than 50 years. W.R. Grace primarily manufactured a product known as DAXAD, or naphthalene sulfonate. This product was used as a dispersant for rubber products manufacture. The waste products from this manufacturing process were discharged to on-site treatment lagoons, which essentially functioned as settling ponds for solids. The solids tended to settle to the bottom of the lagoons, forming sludges. These sludges were both acidic (due to the presence of sulfates in the liquid) and contained high levels of naphthalene. The tunnel and headhouse were constructed through the former treatment lagoons. There is also some question regarding possible use of asbestos on the adjacent W.R. Grace site.

In the late 1970s, the MBTA began construction to extend the Red Line subway to the Alewife area. The MBTA had to remediate the lagoons and adjacent areas to make the property suitable for tunnel construction. The MBTA hired SolidTek, Inc. to treat and dispose of treated sludges. The process employed by SolidTek entailed solidification of the sludges through cementation. It appears that this process took several months to complete. It is unclear how much of the sludge was treated, how long treated stockpiles remained on Russell Field, exactly where those materials were stockpiled, and how much, if any, of the sludge remains on Russell Field. Existing information reveals only proposed treatment process design, not actual conditions.

The City of Cambridge and the MBTA signed an agreement in June 1978 that enabled the MBTA to use Russell Field for "construction staging". Construction staging was defined in the agreement as "construction equipment, mills, laydown, storage, backfill and construction personnel." provided the MBTA reconstruct the field at the end of the construction period. Questions remain regarding exactly what activities took place on Russell Field. Some of these include:

- Where on Russell Field were treated sludge and/or contaminated materials stored?

- Did any of the sludge solidification activities take place on Russell Field? If so, where did those activities take place?

- Does any of the sludge remain on Russell Field?

- Are there contaminants present in the material used to raise the grade of Russell Field to its current elevation?

- Are contaminants moving in groundwater from the W.R. Grace site to Russell field and impacting soils under Russell Field?

The Russell Field area is slated for extensive renovations in the next one to two years. Proposed elements of the renovation plan include addition of a community garden, tot lot, and field house.

3.0 OBJECTIVES

The objective of this sampling program is for the City of Cambridge to characterize the environmental conditions of Russell Field and to determine whether contaminants may have migrated from the adjacent W.R. Grace site and whether earlier activities by the MBTA resulted in contamination of soil and/or groundwater on the site. Testing is proposed for the surface soils, soil gas, subsurface soils, and groundwater to determine whether contaminants are present. One additional task, the screening of sediments from Parkway Pond and Jerry's Pond, is included in this investigation. This screening of sediments will be contingent upon the authorization of access by the landowner because neither property is owned by the City.

Results of this proposed Russell Field Sampling Program will be used to assess whether the community surrounding Russell Field and citizens using the field are at risk due to potential contamination in surficial soil, subsurface soil, or groundwater. If contamination is detected, results will be forwarded to Massachusetts Department of Environmental Protection (MADEP) as soon as possible and the program will provide an assessment of potential risk to the community over time due to migration of contaminants.

4.0 STRATEGY AND METHODS

The sampling program will assess surficial soils, soil gas, subsurface soils, and groundwater. If access is granted initial sediment samples will be collected from Jerry's Pond and Parkway Pond. The first component of the investigation will be a surficial soil sampling program of Russell Field and its pathways. These soils will be tested first because they provide the most direct route of contact to users.

The second component of the program will be a soil gas survey; this screening technique will be employed to locate potential 'hot spots' of subsurface contamination. Results of this survey will be used to locate subsurface exploration locations.

Based upon the results of soil gas screening, locations will be selected for the installation of soil borings and monitoring wells. This third component of the program will allow quality testing of groundwater and subsurface soils. If possible, this work will be coordinated with additional subsurface study by W.R. Grace that will characterize groundwater flow patterns across Russell Field.

The City will coordinate with the Alewife study group (ASG) and/or their representative so that they will be present to observe the field program and collect split samples. All data, analyses, and reports, including draft reports, will be sent directly from the laboratory or agent to the ASG as soon as they are available. The field schedule will be established in consultation with neighborhood representatives.

4.1 SURFICIAL SOIL SAMPLING

The purpose of this effort is to determine if normal and expected use of the field poses any significant health risks due to the potential presence of contamination in surficial soils. It was reported by the MBTA that the field was covered with clean fill subsequent to use of portions of the property as a staging area during the excavation of potentially contaminated soils by the MBTA during tunnel construction in the early 1980's. However, the source and nature of that fill is not documented and is currently unknown. The surficial soil sampling program will use the following approach.

Russell Field will be divided into representative sampling zones based upon current use, historical use, and observed field conditions. Approximately 80 discrete samples be collected in eleven zones and a portion of each composited into 11 samples by representative zone. See Appendix A for proposed sample locations and descriptions. The extent of each zone and the number of samples in each zone was discussed during a field visit on June 9, 1997. This field visit was attended by City of Cambridge and neighborhood representatives of the Alewife Study Group. The remainder of each discrete sample will be saved in case additional analysis is warranted. The surficial soil sampling program will outline final spacing and location of samples. That outline will provide flexibility for the selected consultant in consultation with the neighborhood consultant, to use their best professional judgment in adding or modifying sample locations representing each zone and to include additional samples for analysis if unusual conditions are observed.

The City will coordinate with the ASG and/or their representative so that they will be present to observe the field program and collect split samples. Split samples will be taken from homogenized samples to provide the closest replication. All data, analyses, and reports, including draft reports will be sent directly from the laboratory or agent to the ASG as soon as they are available.

4.1.1 Sample Collection And Analysis Methods

Samples will generally be collected from the top six inches of soil. In each zone, samples with unusual appearance within that zone will only be composited with like samples. Within each zone, any sample with unusual odor or appearance suggestive of contamination shall not be composited and shall be individually analyzed. If no similar samples are observed within a zone, discrete samples will be selected for analysis. The consultant will maintain a field log that includes an accurate description of each discrete sample collected including, but not limited to, appearance and location. Marked, rounded, metal slugs (or equivalent method of identification) will be buried at the sample locations to simplify identification of any specific location for additional sampling. Duplicate samples will be collected and analyzed for not less than 10% of the composite

samples. No less than two samples will be selected and analyzed. Samples will be collected, handled, stored, and preserved in accordance with standard methods defined by the Massachusetts Department of Environmental Protection (MADEP) and the U.S. Environmental Protection Agency (EPA).

The composite samples will be analyzed for pH, for priority pollutant metals with EPA 200 series methods, for semivolatile organics with EPA Method 8270 including the first 30 Tentatively Identified Compounds (TICs), for total sulfate and sulfite, and total cyanide via EPA Method 335.4. Selected samples could be scheduled for additional analyses based upon field observations. Possible additional analytes include total sulfates and sulfites. In particular, all discrete samples per zone will be analyzed for asbestos content via EPA Protocol For Determining Asbestos Content in River Sediment and Soil Samples (US EPA Region1). Compositing of asbestos samples will not be conducted. The laboratory selected will be MADEP certified.

4.1.2 Evaluation of Results

The criteria for assessing the analytical results have been developed by the City of Cambridge in conjunction with the ASG and are based upon MADEP risk-based soil criteria, analytical detection limits, and established MADEP background levels for soils in this region. These criteria are listed in Appendix B. The MADEP S-1 criteria are very conservative and assume 30-year exposure to soils at the field and will be used for comparison to most analytical results. More stringent criteria were developed by the city and the ASG for the target compounds, which could be indicators of contamination during MBTA construction or migration of contamination from the adjacent Grace site. This more stringent criteria is based on the following formula:

The threshold value will be greater of the following three values, not to exceed S-1:

A. S-1/n (where n=number of discrete samples in the composite)

B. twice the detection limit

C. twice the MADEP published background concentration

The more stringent criteria are being used for target compounds because composite samples may not accurately reflect concentrations that may be encountered on the site. That is, the actual concentration at any one point could be significantly higher than the composited concentration.

Target compounds are indicated by boldfaced type in Appendix B tables and include semivolatiles and metals. The criteria considers both analytical detection limits and expected background concentrations. In two cases, benzo(k)fluoranthene and chrysene, the criteria was established by negotiation between the City and ASG.

Non-target compounds will be compared directly to the S-1 Standard. If S-1 has not been established for a particular compound, Method 2 or Method 3 Risk Assessment Criteria will be utilized and reported upon. These risk assessment methods involve the derivation of a site specific criterion for a compound based upon realistic exposure scenarios. These methods have been developed by the MADEP and are conducted according to MADEP methods.

Method 1, Method 2, and Method 3 are MADEP approved approaches for characterizing the risks of harm to health, safety, public welfare and the environment. Method 1 relies upon comparison of site-specific contaminant concentrations to a promulgated list of numerical standards for chemicals in groundwater and soil that are used for all sites. Method 2 allows for limited site- and chemical-specific information to be used to develop or supplement Method 1 standards for comparison to observed concentrations in water or soil. Method 3 relies on detailed information about the site, the contamination, and potential exposures to human and environmental receptors under all current and reasonably foreseeable site activities and uses. The ASG and the City will continue to work together to jointly establish the appropriate method.

If a composite sample exceeds the selected criteria, the saved discrete samples will be analyzed individually to better define the extent of potential contamination.

4.2 SOIL GAS SURVEY

The purpose of the soil gas survey is to assess the potential presence and location of 'hot spots' containing the target compounds listed below. Results of this survey will be utilized to determine subsurface exploration locations.

4.2.1 Sampling and Analysis Methods

Sampling points will be blockcentered at a 50 foot spacing across the 450 ft. by 1,000 ft. area of Russell Field; approximately 200 (including blanks and duplicates). GoreSorbers or equivalent devices will be installed using hand tools at a depth of 4 ft. below ground surface. GoreSorbers are passive detectors placed on the site for approximately one to two weeks. Contamination in soil gas will sorb to the detectors which are subsequently removed from the site and sent to a laboratory for analysis. The ASG and the City will work with the manufacturer of GoreSorbers, or their equivalent, to ensure that the gas sampling locations are properly secured.

GoreSorbers provide data on relative concentration levels only. They do not provide soil gas concentration data, but do allow the collection of a sample that is integrated over time (not a one time grab sample). Each installation hole will also be field screened for total volatile organic compounds (TVOCs) with a photoionization detector (PID).

GoreSorbers will be analyzed for target organic compounds utilizing a modified EPA 8270 Method via gas chromatography/mass spectrometry (GC/MS). Target compounds are naphthalene, toluene, trichloroethene, thio-bis-propane, isopropyl sulfide and seven PAH's (acenaphthylene, acenapthene, fluorene, phenanthene, fluoranthene, anthracene, an pyrene). In addition to these target compounds, the soil gas samples will be analyzed for the presence of the compounds listed in Gore option A4, or equivalent as modified by the City and ASG. Some of the compounds on the Gore option A4 list are not expected to be associated with previous industrial activities on the site.

4.2.2 Evaluation of Results

Results of GoreSorber analysis do not provide concentrations of chemicals in soil gas. They do indicate presence or absence of compounds and relative amounts from one location to another across the area surveyed. This allows the identification of hot spots for further investigation. Because the results do not provide concentrations there are no standards for comparison of results, and the data generated cannot be used for risk assessment. Results will be utilized to select locations for the installation of soil borings and wells. Based on findings from the GoreSorbers, from under Comeau Field, and surface samples collected elsewhere, the City and ASG will coordinate follow up action(s), if necessary. Analysis of data from the borings and wells will be the basis for any risk assessment of the subsurface soil and groundwater. If the data from the borings and wells cannot be reconciled with the soil gas data, then ASG and the City will meet jointly to decide a course of action.

4.3 SUBSURFACE SOIL/GROUNDWATER INVESTIGATION

The City in consultation with the ASG will use the results of the soil gas survey to determine the boring locations. At least 10 borings will be completed. If soil gas results are consistently high or low, then boring locations will be selected on a rough grid to provide adequate aerial coverage. If hot spots are detected, borings will be placed in the hottest zones and remaining wells may be placed in areas of potential trouble spots based upon site history. A boring location plan will be developed by the city in conjunction with the ASG or their representative subsequent to the completion of the soil gas survey.

4.3.1 Sampling and Analysis Methodology

Borings will be advanced using continuous split-spoon sampling, which provides a continuous log of subsurface conditions to the completion depth. As a preliminary screen for volatile contaminants, soil reference samples will be collected and soil jar headspace will be screened for TVOCs with a PID. The screening of soil samples will be done in a way that does not degrade sample.

The City's contractor will install permanent two-inch ID PVC wells with locking casings, as appropriate. Well screens will be placed to intercept the water table as determined in the field. Every effort will be made to install wells in a manner that will minimize disruption to the playing fields. If necessary, temporary Geoprobe wells may be utilized in these areas. The City will coordinate with the ASG and/or their representative so that they will be present to observe the field program and collect split samples. All data, analyses, and reports, including draft reports, will be sent directly from the laboratory or agent to the ASG as soon as they are available.

One soil sample per boring will be collected and analyzed for pH, for priority pollutant metals with EPA 200 series methods, for semivolatile organic compounds with EPA method 8270 including the first 30 Tentatively Identified Compounds (TICs), for volatile organic compounds (VOCs) using EPA Method 8240 including TIC (specifically isopropyl sulfide and thio-bis-propane), for total sulfates and sulfites, total cyanide via EPA Method 335.4, and asbestos (EPA Protocol for Soils and Sediments). In addition, soils will be field screened with a PID. At least one duplicate sample will be collected for every ten samples shipped for analysis.

The selected consultant in cooperation with the neighborhood consultant will select the soil sample for analysis based upon visual, olfactory, and PID information. If all samples in a boring have similar characteristics, the sample shipped for analysis will be taken from the depth where contamination is most likely to be observed. If this cannot be determined, then the sample shipped for analysis will be taken from just above the water table.

One groundwater sample will be collected from each well; in addition, one duplicate sample and one VOC trip blank will be analyzed for quality assurance/quality control purposes. Groundwater samples will be analyzed for the same set of compounds as the subsurface soil samples, excluding asbestos. In addition, groundwater will be monitored in the field for pH, dissolved oxygen, specific conductivity, and temperature. All wells will be gauged to determine depth to the water table. The City will coordinate with the ASG and/or their representative so that they will be present to observe the field program

and collect split samples. All data, analyses, and reports, including draft reports, will be sent directly from the laboratory or agent to the ASG as soon as they are available.

4.3.2 Evaluation of Results

Soil and groundwater data will be compared to appropriate MADEP standards, GW-2 or GW-3 and S-1, S-2, or S-3 respectively, as appropriate. Determination of appropriate standards will be based upon the results of the hydrogeologic investigation, in consultation with the ASG and/or their representative. Method 3 or Method 2 Risk Assessment will be conducted if no criteria is available. Soils will also be compared to RCS-1 criteria as appropriate to determine if MADEP notification is necessary. RCS-1, GW-2, and GW-3 are Reportable Concentration values that are compound specific. Reportable Concentration means the concentration of oil and/or hazardous material in soil or ground water which requires notification of MADEP in accordance with the MCP.

4.4 SEDIMENT SAMPLING

If the City is granted access, one sediment sample will be collected using hand coring devices in Jerry's Pond, and three will be collected in Parkway Pond. In Parkway Pond, the sampling will target locations where sediment deposits are observed at the discharge outfall, downstream of the discharge outfall and along the east bank, and will be selected by ASG. In Jerry's Pond, the sample will be collected from the northeast corner of the Pond at a location selected by ASG. This is adjacent to an area where the MBTA allowed wet excavate from the tunnel construction to drain.

One sample from each pond will be analyzed for the same compounds as groundwater and soils. In Parkway Pond, the ASG will select the sample to be analyzed. The remaining two Parkway Pond samples will be held for possible future analysis by the City or ASG pending results of the first sample. Sediment sample analysis will include pH, priority pollutant metals, cyanide, SVOCs, VOCs, TICs, total sulfates and sulfites, and asbestos. The City will coordinate with the ASG and/or their representative so that they will be present to observe the field program and collect split samples. All data,

APPENDIX A

SURFICIAL SOIL SAMPLING LOCATIONS

DRAFT Surficial Sampling Program Plan

Notes:

All locations proposed and approximate; precise locations to be determined in the field based upon field conditions.

Zones are delineated based upon current use and site history; the following is a zone by zone summary of sampling rationale:

Zone 1: 6-7 samples; relatively low impact based upon site history also lower use area.

Zone 2: 8-9 samples; baseball field - high use by young children; target disturbed areas of exposed soils.

Zone 3: 5-6 samples: adjacent to former area of wet excavate drainage; in addition, 3-4 samples will be collected along path to MBTA station if access is granted.

Zone 4: 8-9 samples; soccer field and walk-way; high use area

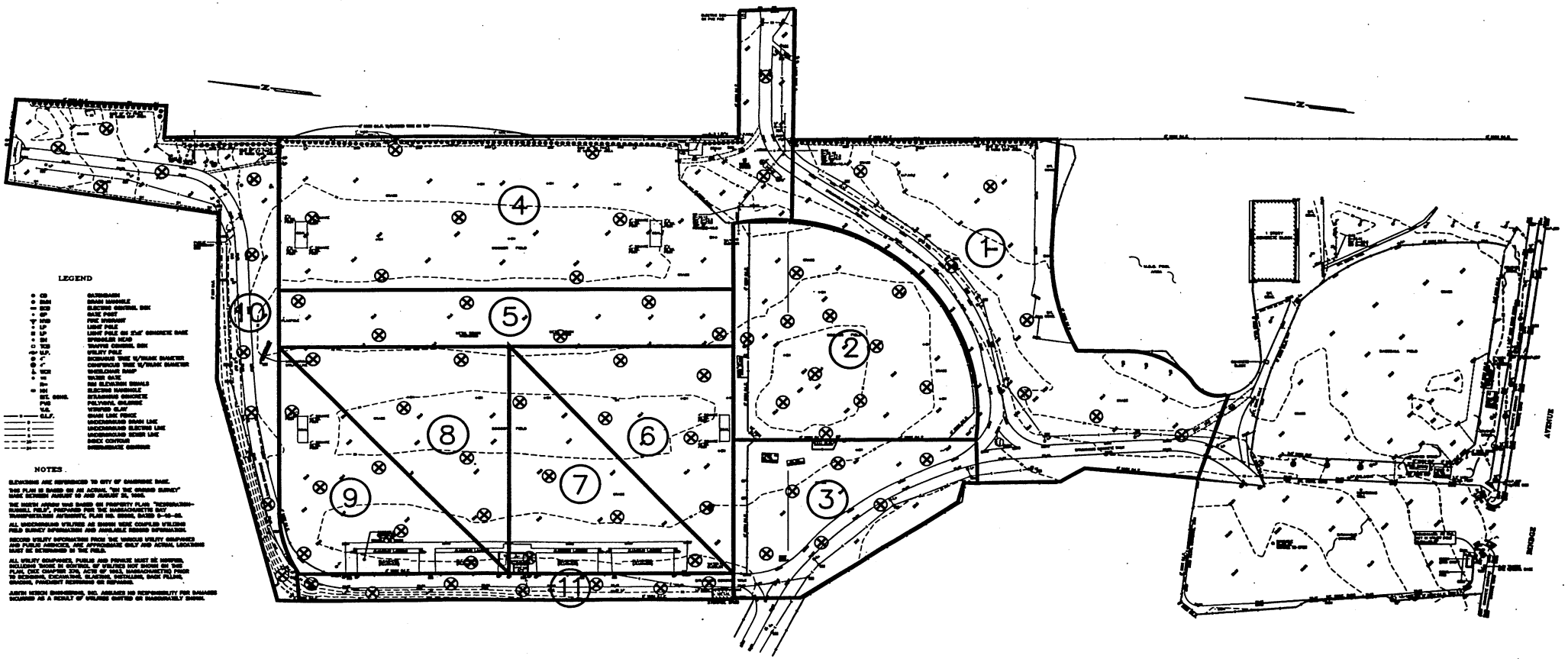
Zone 5: 6 samples; low area between soccer and football fields; water often ponds here.

Zones 6 and 7: 5-6 samples each; south end of football field; high use area

Zones 8 and 9: 5-6 samples each; north end of football field; high use area; solidified sludge storage nearby.

Zone 10: 7-8 samples; bikeway; high use area; temporary solidified sludge stockpiles.

Zone 11: 6-7 samples; bikeway and slope to Grace property; high use area.



Environmental Health & Engineering

DRAWING TITLE		
PROPOSED SURFICIAL SOIL SAMPLING LOCATIONS		
Russell Field	Cambridge, Massachusetts	

Edit by:	CAB
Chk'd By:	CDC
Project No:	10515
Date:	7/22/97
Scale:	NTS

Drawing by:

Judith Nitsch Engineering, Inc.
Boston, MA

APPENDIX B

SURFICIAL SOIL EVALUATION CRITERIA[1]

[1] Additions or corrections require ASG and City approval

Metals Criteria for Russell Field Surficial Soil Sampling

Compound	Reportable Concentration S 1 Soil Standard (mg/kg)	Laboratory Detection Limit (mg/kg)	MADEP Backgrnd Soil Concns (mg/kg)	MADEP Proposed Urban Backgd Concns (mg/kg)	Project Evaluation Criteria (mg/kg)*				
					# of samples per zone				
					6	7	9	10	11
ANTIMONY	10	6	1.4	7					
ARSENIC	30	1	17	14					
BERYLLIUM	**0.7**	**0.4**	**0.4**	**0.88**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
CADMIUM	**30**	**0.5**	**2**	**3**	**5**	**4.3**	**4**	**4**	**4**
CHROMIUM (TOTAL)	1,000	1	29	39					
COPPER	1,000	2.5	38	170					
LEAD	300	0.3	99	570					
MERCURY	20	0.05	0.3	1.4					
NICKEL	**300**	**4**	**17**	**31**	**50**	**43**	**34**	**34**	**34**
SELENIUM	400	0.5	0.5	1					
SILVER	100	1	0.6	5					
THALLIUM	8	1	0.6	5					
ZINC	2,500	2	116	340					
CYANIDE (TOTAL)	100	2							

Notes on Compounds
Compounds in **boldface** are on W.R. Grace site-related compound list.

Notes on Reportable Concentration, S-1 Soil Standards
Values from 310 CMR 40.1600 Massachusetts Oil and Hazardous Material List (5/30/97)

Notes on Laboratory Detection Limits
Laboratory Detection Limits (Practical Quantitation Limits) were obtained from Eric Jensen at Groundwater Analytical
For a 0.500 g Sample, 100% Solids (Mercury 0.100 g Sample)

Notes on Background Soil Concentrations
From Table 2.1 of the Guidance for Disposal Site Risk Characterization (MADEP, July 1995)

Notes on Proposed Urban Background Soil Concentrations
From DRAFT DOCUMENT Proposed Changes: Supplement to
the Guidance for Disposal Site Risk Characterization (MADEP, May 1997).

Notes on Project Evaluation Criteria
These criteria were developed by the City of Cambridge in cooperation with the Alewife Study Group for target compounds and are based on MADEP standards and guidance, and analytical detection limits.

* Criteria depends on the number of samples composited per zone.
N=6 for zones 3, 5, 6, 7, 8, and 9; N=7 for zones 4 and 11; N=9 for zone 1; N=10 for zone 10; N=11 for zones 2 and 12.

Semi-Volatile Organics Criteria for Russell Field Surficial Soil Sampling

Compound	Reportable Concentration S-1 Soil Standard (mg/kg)	Laboratory Detection Limit (mg/kg)	MADEP Proposed Urban Backgd Concns (mg/kg)	Project Evaluation Criteria (mg/kg)*				
				# of samples per zone				
				6	7	9	10	11
ACENAPHTHENE	20	0.330	0.5					
ACENAPHTHYLENE	100	0.330	0.5					
ANTHRACENE	**1,000**	0.330	1	**167**	**143**	**111**	**100**	**91**
BENZO(a)ANTHRACENE	**0.7**	0.330	2	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
BENZO(a)PYRENE	**0.7**	0.330	1	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
BENZO(b)FLUORANTHENE	**0.7**	0.330	2	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
BENZO(k)FLUORANTHENE*	**7**	0.330	1	**2**	**2**	**2**	**2**	**2**
BENZO(g,h,i)PERYLENE	1,000	0.330	1					
BIS (2-CHLOROETHOXY) METHANE	500	0.330						
BIS (2-CHLOROETHYL) ETHER	0.7	0.330						
BIS (2-ETHYLHEXYL) PHTHALATE	**100**	0.330		**33**	**29**	**22**	**20**	**18**
BROMOPHENYL PHENYL ETHER, 4-	100	0.330						
BUTYL BENZYL PHTHALATE	100	0.330						
CARBAZOLE	N/A	0.330						
CHLORO-m-CRESOL, p- synonym: 4-CHLORO-3-METHYLPHENOL	1,000	0.330						
CHLOROANILINE, p- synonym: 4-CHLOROANILINE	1	0.330						
CHLOROPHENOL, 2-	0.7	0.330						
CHLOROPHENYL PHENYL ETHER, 4-	1,000	0.330						
CHRYSENE*	**7**	0.330	2	**3**	**3**	**3**	**3**	**3**
DI-N-BUTYL PHTHALATE	50	0.330						
DI-N-OCTYL PHTHALATE	1,000	0.330						
DIBENZO(a,h)ANTHRACENE	0.7	0.330						
DIBENZOFURAN	100	0.330						
DICHLOROBENZENE, 1,2- (o-DCB)	100	0.330						
DICHLOROBENZENE, 1,4- (p-DCB)	2	0.330						
DICHLOROBENZENE, 1,3- (m-DCB)	100	0.330						
DICHLOROBENZIDINE, 3,3'-	1	0.330						
DICHLOROPHENOL, 2,4-	10	0.330						
DIETHYL PHTHALATE	0.7	0.330						
DIMETHYL PHTHALATE	0.7	0.330						
DIMETHYLPHENOL, 2, 4-	0.7	0.330						
DINITRO-2-METHYLPHENOL, 4,6- synonym: METHYL-4,6-DINITROPHENOL, 2	50	0.800						
DINITROPHENOL, 2,4-	3	0.830						
DINITROTOLUENE, 2, 4-	0.7	0.800						
DINITROTOLUENE, 2,6-	100	0.330						
FLUORANTHENE	**1,000**	0.330	4	**167**	**143**	**111**	**100**	**91**
FLUORENE	400	0.330	1					
HEXACHLOROBENZENE	0.7	0.330						
HEXACHLOROBUTADIENE	3	0.330						
HEXACHLOROCYCLOPENTADIENE	50	0.330						
HEXACHLOROETHANE	6	0.330						
INDENO(1,2,3- cd)PYRENE	**0.7**	0.330		**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
ISOPHORONE	100	0.330						
ISOPROPYL SULFIDE	N/A	n/a						
METHYLNAPHTHALENE, 2-	4	0.330	0.5					
METHYL-PHENOL, 2- synonym: o-CRESOL	500	0.330						
METHYL-PHENOL, 4- synonym: p-CRESOL	500	0.330 [1]						

Semi-Volatile Organics Criteria for Russell Field Surficial Soil Sampling

Compound	Reportable Concentration S-1 Soil Standard (mg/kg)	Laboratory Detection Limit (mg/kg)	MADEP Proposed Urban Backgd Concns (mg/kg)	Project Evaluation Criteria (mg/kg)*				
				# of samples per zone				
				6	7	9	10	11
N-NITROSO-DI-N-PROPYLAMINE	50	0.330						
N-NITROSODIPHENYLAMINE	100	0.330 [2]						
NAPHTHALENE	**4**	0.330	**0.5**	**17**	**14**	**11**	**10**	**9**
NITROANILINE, 2-	N/A	0.800						
NITROANILINE, 3-	N/A	0.800						
NITROANILINE, 4-	1,000	0.800						
NITROBENZENE	500	0.330						
NITROPHENOL, 2-	100	0.330						
NITROPHENOL, 4-	100	0.800						
OXYBIS (1-CHLOROPROPANE), 2,2'-	0.7	0.330						
PENTACHLOROPHENOL	5	0.800						
PHENANTHRENE	**100**	**0.330**	**3**	**167**	**143**	**111**	**100**	**91**
PHENOL	**60**	**0.330**		**83**	**71**	**56**	**50**	**45**
PYRENE	**700**	**0.330**	**4**	**117**	**100**	**78**	**70**	**64**
THIOBISPROPANE	N/A	N/A						
TRICHLOROBENZENE, 1,2,4-	100	0.330						
TRICHLOROPHENOL, 2,4,5-	2	0.800						
TRICHLOROPHENOL, 2,4,6-	3	0.330						

Notes on Compounds
Compounds in **boldface** are on W.R. Grace site-related compound list.

Notes on Laboratory Detection Limits
Laboratory Detection Limits (Practical Quantitation Limits) (1995) were obtained from Eric Jensen at Groundwater Analytical
EPA Method 8270/TCL
1 - Reported as the sum of 3-Methylphenol and 4-Methylphenol.
2 - Reported as the sum of n-Nitrosodiphenylmine and Diphenylamine.

Notes on Proposed Urban Background Soil Concentrations
From DRAFT DOCUMENT Proposed Changes: Supplement to the Guidance for
Disposal Site Risk Characterization (MADEP, May 1997).

Notes on Project Evaluation Criteria
These criteria were developed by the City of Cambridge in cooperation with the Alewife Study Group for target compounds and are based on MADEP standards and guidance, and analytical detection limits.

* Criteria depends on the number of samples composited per zone
N=6 for zones 3, 5, 6, 7, 8, and 9; N=7 for zones 4 and 11; N=9 for zone 1; N=10 for zone 10; N=11 for zones 2 and 12

** Exceptions to criteria - values negotiated considering proposed MADEP urban background values.

APPENDIX C

ANALYTE LISTS

Table 1 Priority Pollutant Metals

Compound	Reporting Limit (mg/kg)
ANTIMONY	6
ARSENIC	1
BERYLLIUM	0.4
CADMIUM	0.5
CHROMIUM (TOTAL)	1
COPPER	2.5
LEAD	0.3
MERCURY	0.05
NICKEL	4
SELENIUM	0.5
SILVER	1
THALLIUM	1
ZINC	2

Notes on Reporting Limits
Reporting limits (Practical Quantitation Limits) were obtained from Eric Jensen at Groundwater Analytical
For a 0.500 g Sample, 100% Solids (Mercury 0.100 g Sample)

Table 2 EPA Method 8270/TCL Semivolatile Organic Compounds

Compound	Reporting Limit (µg/kg)
ACENAPHTHENE	330
ACENAPHTHYLENE	330
ANTHRACENE	330
BENZO(a)ANTHRACENE	330
BENZO(a)PYRENE	330
BENZO(b)FLUORANTHENE	330
BENZO(g,h,i)PERYLENE	330
BENZO(k)FLUORANTHENE	330
BIS (2-CHLOROETHOXY) METHANE	330
BIS (2-CHLOROETHYL) ETHER	330
BIS (2-ETHYLHEXYL) PHTHALATE	330
BROMOPHENYL-PHENYL ETHER, 4-	330
BUTYL BENZYL PHTHALATE	330
CARBAZOLE	330
CHLORO-m-CRESOL, p- synonym: 4-CHLORO-3-METHYLPHENOL	330
CHLOROANILINE, p- synonym: 4-CHLOROANILINE	330
CHLORONAPHTHALENE, 2-	330
CHLOROPHENOL, 2-	330
CHLOROPHENYL-PHENYLETHER, 4-	330
CHRYSENE	330
DI-N-BUTYL PHTHALATE	330
DI-N-OCTYL PHTHALATE	330
DIBENZO(a,h)ANTHRACENE	330
DIBENZOFURAN	330
DICHLOROBENZENE (o-DCB), 1,2-	330
DICHLOROBENZENE (p-DCB), 1,4-	330
DICHLOROBENZENE (m-DCB), 1,3-	330
DICHLOROBENZIDINE, 3,3'-	330
DICHLOROPHENOL, 2,4-	330
DIETHYL PHTHALATE	330
DIMETHYL PHTHALATE	330
DIMETHYLPHENOL, 2, 4-	330
DINITRO-2-METHYLPHENOL, 4,6-	800
DINITROTOLUENE, 2, 4-	800
DINITROTOLUENE, 2,6-	330
FLUORANTHENE	330
FLUORENE	330
HEXACHLOROBENZENE	330
HEXACHLOROBUTADIENE	330
HEXACHLOROCYCLOPENTADIENE	330

Table 3 Continued

Compound	Reporting Limit (µg/kg)
ISOPROPYLBENZENE	5
ISOPROPYLTOLUENE, 4-	5
METHYL-2-PENTANONE, 4- synonym: METHYL ISOBUTYL KETONE	50
METHYLENE CHLORIDE	5
NAPHTHALENE	5
PROPYLBENZENE, n-	5
STYRENE	5
TETRACHLOROETHANE, 1,1,1,2-	5
TETRACHLOROETHANE, 1,1,2,2-	5
TETRACHLOROETHENE synonym: TETRACHLOROETHYLENE	5
TOLUENE	5
DICHLOROETHENE, trans-1,2- synonym: TRANS-1,2-TRICHLOROETHYLENE	5
TRICHLOROBENZENE, 1,2,3-	5
TRICHLOROBENZENE, 1,2,4-	5
TRICHLOROETHANE 1,1,2-	5
TRICHLOROETHANE, 1,1,1-	5
TRICHLOROETHENE synonym: TRICHLOROETHYLENE	5
TRICHLOROFLUOROMETHANE	10
TRICHLOROPROPANE, 1,2,3-	5
TRIMETHYLBENZENE 1,2,4-	5
TRIMETHYLBENZENE, 1,3,5-	5
VINYL ACETATE	50
VINYL CHLORIDE	10
XYLENES (mixed isomers)	5

Notes on Reporting Limits
Reporting limits (Practical Quantitation Limits) (July 1996) were obtained from Eric Jensen at Groundwater Analytical
EPA Method 8260/TCL

Table 2 Continued

Compound	Reporting Limit (µg/kg)
HEXACHLOROETHANE	330
INDENO(1,2,3- cd)PYRENE	330
ISOPHORONE	330
METHYLNAPHTHALENE, 2-	330
METHYLPHENOL, 2-	330
METHYLPHENOL, 4-	330[1]
N-NITROSO-DI-N-PROPYLAMINE	330
N-NITROSODIPHENYLAMINE	330[2]
NAPHTHALENE	330
NITROANILINE, 2-	800
NITROANILINE, 3-	800
NITROANILINE, 4-	800
NITROBENZENE	330
NITROPHENOL, 2-	330
NITROPHENOL, 4-	800
OXYBIS (1-CHLOROPROPANE), 2,2'-	330
PENTACHLOROPHENOL	800
PHENANTHRENE	330
PHENOL	330
PYRENE	330
TRICHLOROBENZENE, 1,2,4-	330
TRICHLOROPHENOL, 2,4,5-	800
TRICHLOROPHENOL, 2,4,6-	330

Notes on Reporting Limits

Reporting limits (Practical Quantitation Limits) (July 1996) were obtained from Eric Jensen at Groundwater Analytical

EPA Method 8270/TCL

1 - Reported as the sum of 3-Methylphenol and 4-Methylphenol.

2 - Reported as the sum of n-Nitrosodiphenylmine and Diphenylamine.

Table 3 EPA Method 8260 Volatile Organics

Compound	Reporting Limit (µg/kg)
ACETONE	50
BENZENE	5
BROMOBENZENE	5
BROMOCHLORMETHANE	5
BROMODICHLOROMETHANE	5
BROMOFORM	5
BROMOMETHANE	10
BUTANONE, 2- synonym: METHYL ETHYL KETONE	50
BUTYLBENZENE, tert-	5
BUTYLBENZENE, n-	5
BUTYLBENZENE,sec-	5
CARBON DISULFIED	5
CARBON TETRACHLORIDE	5
CHLOROBENZENE	5
CHLOROETHANE	10
CHLOROFORM	5
CHLOROMETHANE	10
CHLOROTOLUENE, 4-	5
CHLOROTOLUENE,2-	5
DICHLOROPROPENE, cis-1,3-	5
DIBROMO,-3- CHLOROPROPANE,1,2- synonym: DBCP	5
DIBROMOCHLOROMETHANE	5
DIBROMOETHANE 1,2- synonym: EDB	5
DIBROMOMETHANE	5
DICHLOROBENZENE, 1,2- (o-DCB)	5
DICHLOROBENZENE, 1,4-(p-DCB)	5
DICHLOROBENZENE, 1,3-	5
DICHLOROBENZENE, 1,4-	5
DICHLORODIFLUOROMETHANE	10
DICHLOROETHANE, 1,1-	5
DICHLOROETHANE, 1,2-	5
DICHLOROETHENE, 1,1- synonym: 1,1-DICHLOROETHYLENE	5
DICHLOROETHENE,cis 1,2- synonym: cis-1,2-DICHLOROETHYLENE	5
DICHLOROPROPANE, 1,2-	5
DICHLOROPROPANE, 1,3-	5
DICHLOROPROPANE, 2,2-	5
DICHLOROPROPENE, 1,1-	5
DICHLOROPROPENE, trans-1,3-	5
DINITROPHENOL, 2, 4-	830
ETHYLBENZENE	5
HEXACHLOROBUTADIENE	5
HEXANONE, 2-	50

analyses, and reports, including draft reports, will be sent directly from the laboratory or agent to the ASG as soon as they are available.

Analytical data will be assessed utilizing Stage I Environmental Screening Methodologies defined in the MCP.

5.0 COORDINATION WITH GRACE INVESTIGATION

Every effort will be made to coordinate the subsurface investigation with ongoing work by W.R. Grace's consultant, Haley & Aldrich, who is scheduled to complete soil borings for the purpose of determining groundwater flow patterns across Russell Field. Currently, Haley & Aldrich plans to install temporary well points utilizing GeoProbe technology. Every effort will be made to negotiate an agreement with W.R. Grace, which would require installation of permanent wells by Haley & Aldrich.

34.

CITY OF CAMBRIDGE
CAMBRIDGE, MASSACHUSETTS 02139
TEL. 349-4300
FAX. 349-4307

EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

August 4, 1997

To The Honorable, The City Council:

I am hereby requesting the appropriation of $155,000.00 in Property Taxes to the Public Investment Fund Community Development Extraordinary Expenditures Account to provide funds for the collection of surface soil, soil gas, subsurface soil, groundwater, and sediment samples from the Russell Field area adjacent to the W.R. Grace site in addition to the laboratory analysis and data interpretation by the consultant. Also, funds are included for consultant services to be provided to the Alewife Study Group during implementation of the sampling program.

Very truly yours,

Robert W. Healy
City Manager

RWH/mec

F-137

Consent Agenda #34

Relative to an order requesting the appropriation of $155,000 to provide funds for the collection of surface soil, soil gas, subsurface soil, groundwater, and sediment samples from the Russell Field area adjacent to the W.R. Grace site in addition to the laboratory analysis and date interpretation by the consultant.

In City Council August 4, 1997

ORDER ADOPTED

9-0-0