APPENDIX E

INTERIM REMEDIAL MEASURES WORK PLAN

Buffalo Business Park
Interim Remedial Measures
Groundwater Contamination/Soil Vapor Intrusion

April, 2007

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1.0 Current Overview

Buffalo Business Park (BBP) is currently implementing a Voluntary Cleanup at the facility located at 1800 Broadway Avenue in the City of Buffalo, New York (Voluntary Site Cleanup #V00663-9, Fig. 1). To accomplish this objective, BBP has entered into a Voluntary Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC) for the investigation and/or remediation of two operable units. Operable Unit #1 (OU #1) in the southwest central area of the Site consists of an area where soil contamination was delineated. OU#1 underwent remedial activities in mid April, 2006 in the form of excavation and removal of contaminated soils.

Operable Unit #2 (OU #2) is also located along the southwest property boundary, and consists of an area where previous investigations have encountered contaminated groundwater. Golder Associates, Inc. (Golder) implemented an investigative work plan to further characterize and delineate the groundwater contamination associated with OU#2. For groundwater issues related to OU#2, the work plan specified the installation and sampling of four (4) additional bedrock wells. Groundwater levels were also measured in all bedrock wells and potentiometric contour maps were developed to characterize bedrock groundwater flow and direction. The conclusion of the Golder report did not specify additional remedial action.

In response to the report, NYSDEC indicated that they did not agree with the Golder conclusions and that additional remedial action was required to prevent contaminant migration. Further, there were discussions as to the need for additional data to determine if sub slab venting was required for the western portion of the building closest to Broadway (New York Frame Building). Both issues appeared to require additional study.

In order to expedite completion of the voluntary cleanup activities, and in lieu of additional studies, BBP has elected to implement interim remedial measures to effect control of contaminant migration and to provide venting of the west end of the New York Frame Building.

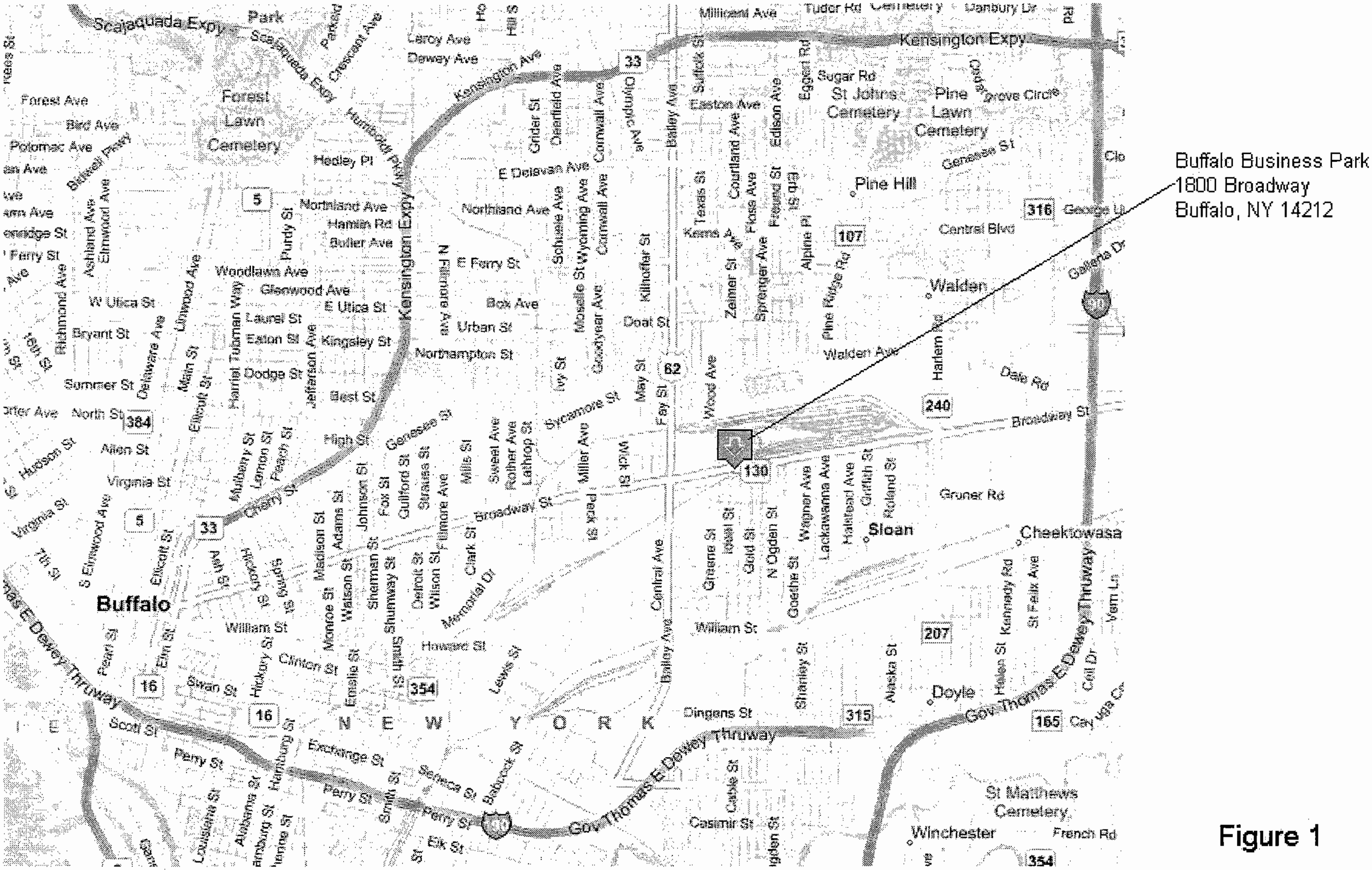

Buffalo Business Park
1800 Broadway
Buffalo, NY 14212
Kensington Expy
Scajaquada Expy
Forest Lawn Cemetery
Pine Lawn Cemetery
St Johns Cemetery
Pine Hill
Walden
Sloan
Cheektowasa
Doyle
Winchester
St Matthews Cemetery
Buffalo
Broadway St
Gov Thomas E Dewey Thruway
N E W Y O R K

Figure 1

2.0 Soil Vapor Intrusion

Although the result of sub slab sampling was not conclusive as to the need for sub slab depressurization. BBP will install a sub slab depressurizations system rather than incur the additional sub slab sampling costs. Attachment II provides design detail for the venting system. Upon approval by the NYS Health Department, BBP will install this system.

3.0 Groundwater Pumping

In place of additional studies to determine parameters for design of a groundwater control system, BBP is proposing interim remedial measures consisting of:

- Additional sampling
- Installation of a pumping system in the monitoring well with the highest levels of contamination (VCA-MW4-BR)
- Ongoing pumping of groundwater from VCA-MW4-BR ;and
- Follow up monitoring to demonstrate contaminant control by either reduction in contaminant levels, hydraulic control, or both.

A. Additional sampling

The most recent sampling event for MW4 occurred on 2/15/06. Subsequent to this sampling event, remediation of OU #1 occurred. The Investigative Work Plan for Operable Unit #2 consisted of installation of 4 additional bedrock wells, sampling of the newly installed wells and development of bedrock potentiometric contour maps utilizing all eight bedrock wells. Sampling of the original bedrock wells (VCA-MW1-BR through VCA-MW4-BR) was not included in this work.

The removal of a presumed source of groundwater contamination (OU#1) has been completed. Thus, prior to implementation of active remedial measures (i.e. pumping) it is appropriate to resample the wells in close proximity to OU#1 to evaluate if there has been an impact from the source removal. BBP proposes to resample wells VCA-MW3-BR, VCA-MW4-BR and VCA-MW5-BR and analyze for TCL volatile organics (Method 8260). Results from this sampling event would be compared to results from the 2/15/2006 sampling event for VCA-MW3-BR and VCA-MW4-BR and the 8/31/2007 sampling event for VCA-MW5-BR. Should the results show a significant decrease in contaminant levels, BBP proposes to meet with the NYSDEC prior to implementation of the pumping system described below to reassess if additional remedial actions are appropriate.

B. Pumping System

Should groundwater analytical results from the sampling described in A. above not show a significant decrease in contaminant levels, BBP proposes to convert VCA-MW4-BR into a pumping well. Conversion would be accomplished as follows:

i. The area around MW4 would be excavated and a precast vault installed around the well.

ii. A submersible pump (Grundfos REDI-FLO3-100 or equivalent) and associated controller would be installed in VCA-MW4-BR. (Fig. 2).

iii. A discharge line, including a totalizer, would be installed from VCA-MW4-BR to a location at the northeast corner of the New York Frame Building where a sewer inlet is available. (Fig. 2; Fig. 4)

iv. Application for a discharge Permit from the Buffalo Sewer Authority has been made on April 22, 2008. It is anticipated that the permit will be in place at such time as construction is complete. Since the permit is not yet in place, BBP does not have details as to what the BSA will require with respect to contingency plans for heavy rainy days. We would expect that a plan would call for temporary shutdown of the pumping system until the rain event has ended. We anticipate that temporary shut downs of the pumping system (on the order of a few days) would not have a significant impact on the efficacy of the pumping system.

Once installed, the pumping system would be adjusted to achieve maximum sustainable pumping from VCA-MW4-BR. While a formal pumping test for VCA-MW4-BR has not been performed, it is anticipated that the proposed system, which has a maximum pumping capacity of 9 gpm, will be adequate. Operation of the system is described in Attachment III, O&M Plan for Groundwater Pumping. This plan contains details on the pump and controller proposed for use..

C. Follow up monitoring

Once the pumping system has been in operation for a minimum of three months an additional round of groundwater levels will be obtained to produce a potentiometric contour map for bedrock groundwater. Also, an additional round of groundwater samples will be collected for wells VCA-MW3-BR, VCA-MW4-BR and VCA-MW5-BR and analyzed for TCL volatile organics (Method 8260).

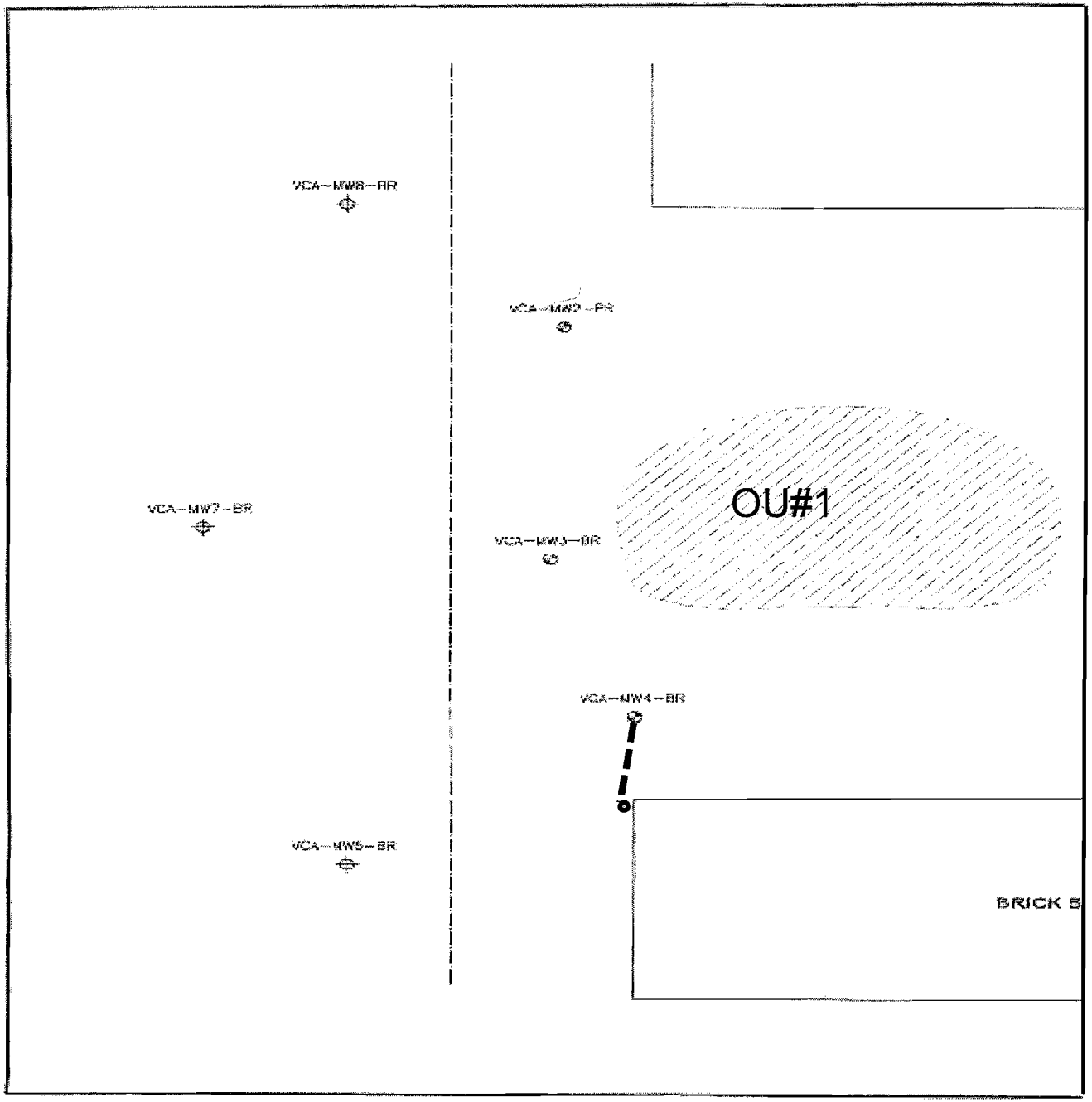


Figure 2
Buffalo Business Park
Discharge line
location

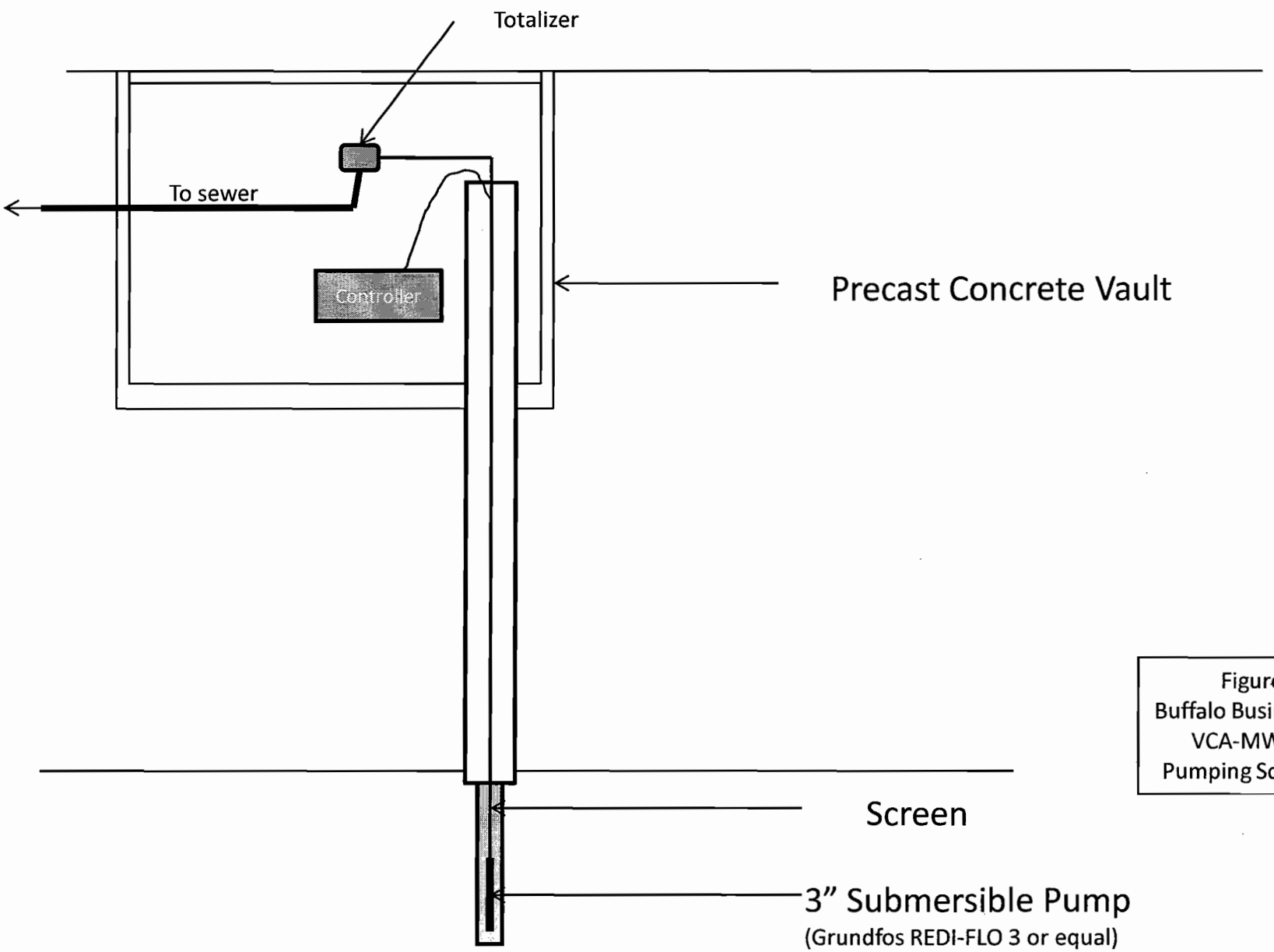


Figure 3
Buffalo Business Park
VCA-MW4-BR
Pumping Schematic

Figure 4

4.0 Final Remedial Action

It is anticipated that the actions described previously will result in acceptable control of groundwater contamination, either chemically, hydraulically or both. Should this be the result, BBP will prepare a Final Engineering Report for NYSDEC approval. The final engineering report will include a Site Management Plan describing Institutional Controls.

Should the impact of the proposed IRM be such that effective control of contamination cannot be demonstrated, BBP will propose additional corrective action as appropriate (i.e. an additional pumping well).

Attachment I

Buffalo Sewer Authority Application

AUTHORIZATION TO DISCHARGE UNDER THE BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT NO. 08-03-BU124
EPA CATEGORY 40 CFR 403

In accordance with the provisions of the Federal Water Pollution Control Act, as amended, and the Sewer Regulations of the Buffalo Sewer Authority, authorization is hereby granted to:

BUFFALO BUSINESS PARK, INC.

to discharge groundwater from a remediation facility located at:

1800 Broadway, Buffalo, New York, 14212

to the Buffalo Municipal Sewer System.

Issuance of this permit is based upon a permit application filed on **April 23, 2008** and analytical data. This permit is granted in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

Effective this 15th day of August, 2008
To Expire the 14th day of August, 2011

General Manager

Signed this 11th **day of** AUGUST **, 2008**

PART I: SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall(s) (see attached map) shall be limited and monitored by the permittee **semi-annually** as specified below.

Sample Point	Parameter	Discharge Limitations Daily Maximum	Sampling Requirements Period	Type
001	EPA Test Method 624[1]	Monitor only	1 day	Grab
	PH	5.0-12.0 S.U.	1 day	Grab
	Total Flow	monitor only	1 day	Flow Meter

1. The permittee must report any compound whose concentration is greater than 0.01 mg/l. The permittee is not authorized to discharge any of the parameters evaluated by this test procedure which may cause or contribute to a violation of water quality standards or harm the sewerage system. Any parameter detected may, at the discretion of the Buffalo Sewer Authority, be specifically limited and incorporated into the permit.

PART I: SPECIFIC CONDITIONS

B. DISCHARGE MONITORING REPORTING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee **semi-annually** on the days specified below:

Sample Point	Parameter	Reporting Requirements	
		Initial Report	**Subsequent Reports**
001	All Parameters	Dec. 31, 2008	Dec.31st of 2008, June 30th & Dec.31st of 2009 & 2010, June 30th of 2011

Figure 1

N
BRICK B
VCA-MW4-BR
S.P. OCN
VCA-MW2-BR
VCA-MW3-BR
VCA-MW8-BR
VCA-MW5-BR
VCA-MW7-BR
BROADWAY

Attachment II

Building Venting System Plan

Building Venting System Plan

I. Vent Location

The sub slab depressurization system consists of the installation of two active vents at the west end of the New York Frame building. Because of interior walls and fixtures, the location of the vents will be approximately equidistant from the north and south walls and spaced approximately 60 and 120 feet east of the west wall of the building. Final locations will be determined based on interior wall/structure restrictions. Vents will be placed a minimum of 20 feet from any outside wall. (See Figure 6)

II. Vent Detail

Installation of the vent will consist of drilling a 4" hole through the slab and extending the hole approximately one foot below the bottom of the slab. The one foot distance below the slab will be filled with #1 washed stone. A 4" PVC pipe will be installed in the hole and run through the suspended ceiling. The joint between the slab and the PVC pipe will be sealed with silicone adhesive sealant. (See Figure 5)

A Festa Radon Technology extraction fan (Model AMG Fury, see Table 1) will be installed above the ceiling and below the roof line. The outlet of the extraction fan will be connected to another 4" PVC pipe which will penetrate the roof. A 180 elbow will be installed at the end of the PVC pipe to prevent rain intrusion.

III. Testing

Prior to installation of the vent a diagnostic test will be performed. Suction will be applied to the hole and a smoke test will be performed at the sampling hole installed during the previous investigation to confirm that the system works.

IV. Monitoring

A power warning light will be installed at the location of the vent pipe. The warning light will be wired to be on when the extraction fan is operating. The occupants of the space (New York Frame) will be advised to immediately notify the property manager if the light is not on.

An access port (1/2" diameter hole with seal) will be installed on each vent to allow for verification that the fan is operational. The vent piping will be labeled with the words "Sub slab depressurization system. Do not alter or remove"

Table 1

Performance Figures-AMG Fury, Radon Extract Fan

				CFM at STATIC PRESSURE in. w.g.									
Model	***Volts***	***Watts***	***Max. Amps***	***0"***	***0.25"***	***0.5"***	***1.0"***	***1.25"***	***1.5"***	***1.75"***	***2.0"***	***2.25"***	***2.48"***
AMG Fury	120V 60Hz	175	1.46	541	490	437	335	290	244	195	137	76	0

Weight:12.8 lbs. Fan Speed: 2940 rpm

Performance shown is for installation type D – Ducted inlet, Ducted outlet. Speed (rpm) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the airstream. The performance figures shown have been corrected to standard air density.

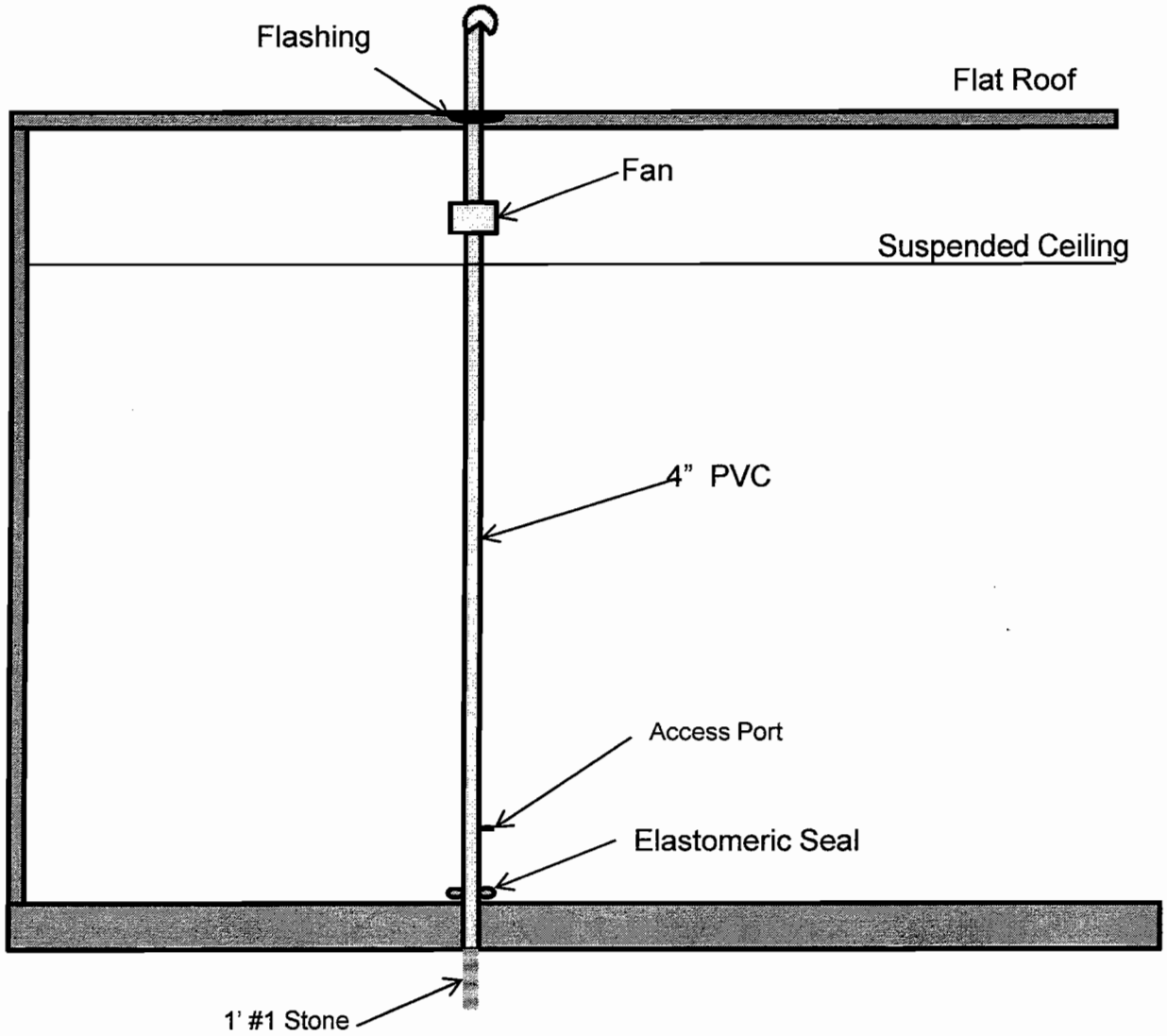
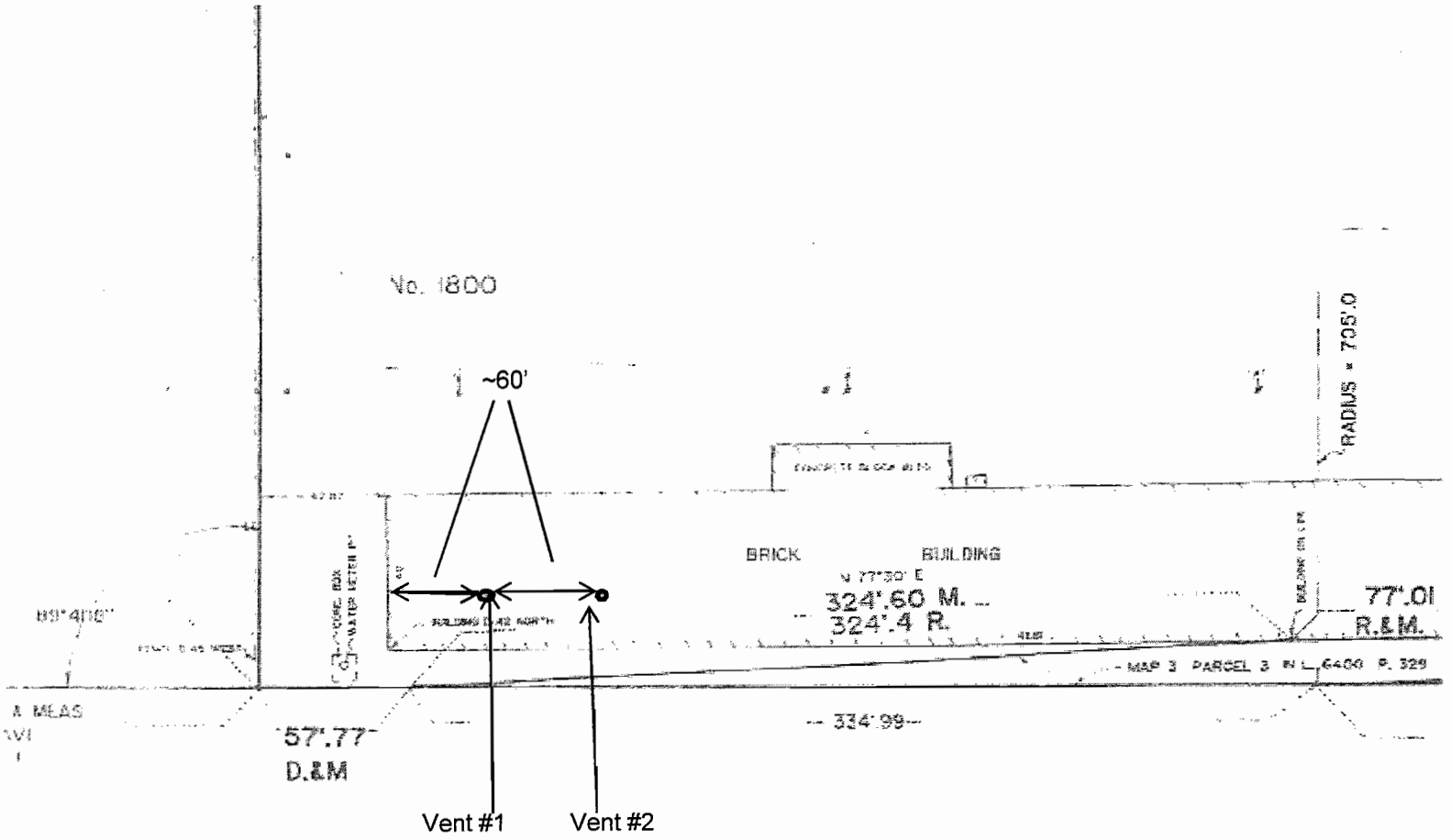


Figure 5
Buffalo Business Park
Sub slab Depressurization Vent



Sub slab depressurization vents
Located no closer than 20 feet from outside wall

BRO,

(FORMERLY BATAVI

Figure 6
Buffalo Business Park
Sub slab Depressurization Vent Locations

Attachment III

O&M Plan for Groundwater Pumping

Operation and Maintenance Plan for Groundwater Pumping

I. Pre- Start up

A. Pump Test

Prior to installation of a permanent pumping system, a temporary system will be set up utilizing a pump in MW4 and temporary piping to determine the ability of this well to achieve adequate pumping volume. Since the well is located approximately 20 feet from the sewer inlet the temporary set up will not interfere with site access.

Should there be problems encountered in achieving sufficient pumping volume BBP will first re-develop the well. If re-development fails a new well may need to be installed. Prior to installation, BBP will contact the NYSDEC to propose a location for a new pumping well.

B. Temporary Pumping System

If the results of the pump test are such that utilization of MW4 for remedial pumping is appropriate, the temporary system will continue to be operated until the permanent system is in place.

II. Permanent System

A. Start up

Once the permanent system is in place the pump will be adjusted to achieve optimum flow rates. The system will be checked on a daily basis during the first week of operation to assure that the pump is working properly and that the totalizer is operational.

B. Continued operation

During the first two months of operation the pumping system will be checked twice weekly. Checks will consist of observations to assure that the power is on and that the pump is working. Totalizer readings will be taken weekly. Should the weekly totalizer reading be significantly different from the pump rate that was initially established, further action will be taken to verify that the difference in readings is not caused by a malfunctioning pumping system. Subsequently, the system will be checked weekly.

C. Documentation

Documentation of pumping system inspections will be maintained using the Pumping Well Log Sheet (Figure 7)

Figure 7
Buffalo Business Park
Pumping Well Log Sheet

Date:_____ Time: _____

Checked by: _____

Totalizer Reading: _____

Previous Totalizer Reading:_____ Date:_____

Time:_____

Total Gallons Pumped:_____

Total Hours Pumped: _____

Avg. Gallons / hr. pumped _____

Power on: Y____ N _____ If no provide reason:

_____

When was problem corrected?_____

Pump Operational: Y____ N _____ If no provide reason:

_____

When was problem corrected?_____

Attachment IV

O&M Plan for Building Venting

O&M Plan for Building Venting

I. Pre Start-up

Prior to the start of the system the tenant (New York Frame) will be advised as to the design and operation of the sub slab depressurization system. The tenant will also be advised that the facility maintenance department be contacted immediately should the operating light at either Vent #1 or Vent # 2 not be illuminated.

II. Post Start-up

During the first month of operation the sub slab depressurization system will be checked weekly. Checks will consist of observations to assure that the power is on and that the fan is working. Should the power be off or the fan not be operating, the facility maintenance department will take steps to correct the problem and bring the system back on-line. Subsequently, the system will be checked monthly.

If notified of a problem by the tenant, the facility maintenance department will take steps to correct the problem and bring the system back on-line. Subsequent to the repair, the system will be checked the following week and then monthly.

III. Documentation

Documentation of pumping system inspections will be maintained using the Sub Slab Depressurization System Log Sheet (Figure 8)

Figure 8
Buffalo Business Park
Sub Slab Depressurization System Log Sheet

Date:_____ Time: _____

Checked by: _____

Vent #1
Power on: Y____ N _____ If no provide reason:

_____
When was problem corrected?_____

Fan opeational: Y____ N _____ If no provide reason:

_____

When was problem corrected?_____

Vent #2
Power on: Y____ N _____ If no provide reason:

_____
When was problem corrected?_____

Fan opeational: Y____ N _____ If no provide reason:

_____

When was problem corrected?_____

Attachment V

Monitoring Plan

Monitoring Plan

I. Introduction

Monitoring during the implementation of interim corrective measures will consist of two elements. The first is water quality monitoring of three wells as outlined in section 3.0 A. of the report. It is anticipated that this monitoring will occur the week of April 28, 2008. Water levels will also be taken at the wells being sampled. Subsequent to this monitoring event, the pumping system will be activated. Once the pumping system has been operational for two months an additional round of samples will be collected from the three wells sampled previously and water levels will be obtained from all the bedrock wells.

II. Initial round

Samples will be collected from the following wells:

- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW4-BR (duplicate)
- VCA-MW5-BR

Samples will be analyzed for TCL volatiles (Method 8260)

Groundwater elevations will be collected from the following wells:

- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW5-BR

III. Post Pumping Round

Samples will be collected from the following wells:

- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW4-BR (duplicate)
- VCA-MW5-BR

Samples will be analyzed for TCL volatiles (Method 8260)

Groundwater elevations will be collected from the following wells:

- VCA-MW1-BR
- VCA-MW2-BR
- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW5-BR
- VCA-MW6-BR
- VCA-MW7-BR
- VCA-MW8-BR

IV. Ongoing Sampling

Should the post pumping round of sampling demonstrate adequate control of groundwater contamination, either chemically, hydraulically, or both the ongoing monitoring program would consist of an annual sampling event as follows:

Samples will be collected from the following wells:

- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW4-BR (duplicate)
- VCA-MW5-BR

Samples will be analyzed for TCL volatiles (Method 8260)

Groundwater elevations will be collected from the following wells:

- VCA-MW1-BR
- VCA-MW2-BR
- VCA-MW3-BR
- VCA-MW4-BR
- VCA-MW5-BR
- VCA-MW6-BR
- VCA-MW7-BR
- VCA-MW8-BR

Attachment VI

Pump Specifications