OhioEPA *State of Ohio Environmental Protection Agency*

Division of Emergency and Remedial Response

DECISION DOCUMENT

FOR THE REMEDIATION OF

North Guernsey Street Site

Belmont County, Ohio

prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

April 2007

Ted Strickland, Governor
Chris Korleski, Director, State of Ohio Environmental Protection Agency

DECLARATION

SITE NAME AND LOCATION

North Guernsey Street Site
Belmont County, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the North Guernsey Street Site in Belmont County, Ohio, chosen in accordance with the policies of the Ohio Environmental Protection Agency, statutes and regulations of the State of Ohio, and the National Contingency Plan, 40 CFR Part 300.

ASSESSMENT OF THE SITE

Actual and threatened releases of industrial waste to the ground water at the site, if not addressed by implementing the remedial action selected in the Decision Document, constitute a substantial threat to public health or safety and are causing or contributing to water pollution. Industrial wastes were released to the environment as a result of petroleum and chemical storage and distribution operations at the site.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy is Monitoring the Effects of the 1997 Removal Action. The elements of this alternative are 1) ground water monitoring and 2) prohibition of ground water use activities. Semi-annual monitoring of ground water will be conducted until it has been demonstrated that the COCs have not exceeded cleanup goals over a two year period. The contaminated soils that caused this ground water contamination were excavated and disposed of off-site in September 1997 by the Ohio Department of Transportation.

STATUTORY DETERMINATIONS

The selected remedial action is protective of human health and the environment, complies with legally applicable state and federal requirements, is responsive to public participation and input and is cost-effective. The remedy uses permanent solutions. The effectiveness of the remedy will be reviewed regularly.

4/19/07

Chris Korleski, Director Date

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for the North Guernsey Street Site
Belmont County, Ohio

1.0 SUMMARY OF SITE CONDITIONS

1.1 Site History

The Site is located at 4900 North Guernsey Site, in the City of Bellaire, Belmont County, Ohio (see Figure 1). The Site is bordered by the Ohio River to the east, North Guernsey Street to the west, Muxie Beer Distributing to the north and the State Route 7 overpass to the south. The Site is 1,200 feet southwest of the Belmont County Sanitary Sewer District #3 (BCSSD) public water supply well.

In 1924, William Phillips purchased the 0.7 acre property from Cummins Company. Following the death of William Phillips, ownership transferred to his daughter, Frances C. Salvaterra, in 1979. William Salvaterra, et al. currently owns the property.

Pure Oil Company leased the property from William Phillips from 1934 to 1944 for sale and distribution of petroleum products. In 1965, Pure Oil merged with Union Oil Company of California (UNOCAL). From 1962 to 1977, Anderson Pritcher Oil Corporation leased the Site and operated a bulk chemical storage and distribution facility. Anderson Pritcher was acquired by Ashland Oil and Refining Company, Bronoco Solvent and Chemical Division, in the late 1960s.

From 1977 to 1995, R&F Coal Company operated a coal transfer facility at the Site. During this time period, R&F decommissioned the former storage and distribution facilities, removed tanks and structures, and regraded the Site. R&F operations included two settling ponds, a loading dock, and a coal loading/ unloading and conveyor system on the northern portion of the Site. In 1999, R&F Coal LLC and Capstone Holding Company merged, with Capstone being the entity surviving the merger.

In December 1995, soil and ground water contamination was discovered at the Site during a Phase I & II Environmental Site Assessment (ESA) conducted to determine baseline conditions in preparation for the Ohio Department of Transportation's (ODOT) State Route 7 relocation project. The Phase I ESA concluded that the Site had been used historically for storage of unknown chemicals, bulk oil, gasoline, and diesel fuels.

During the Phase II ESA, a Geoprobe was used to collect soil and ground water samples. Monitoring wells and piezometers were installed to further evaluate ground water quality and ground water flow. The Phase II ESA determined that historical operations had affected both soil and ground water quality at the Site. Contaminated soils were located at the southern portion of the Site in an area that encompassed the former concrete pad (see Figure 2). Contaminants detected in soil included the following volatile organic compounds (VOCs): vinyl chloride, Trichloroethylene (TCE), Perchloroethylene (PCE), cis 1,2-Dichloroethylene (DCE) and benzene, toluene,

ethylbenzene and xylene (BTEX). The Phase II ESA identified a VOC plume migrating from the Site toward the BCSSD public water supply well.

In the interest of completing the State Route 7 relocation project, ODOT conducted a removal action in 1997 to address the contaminated soils. The cleanup objectives for the project were the Ohio Voluntary Action Program (VAP) undiluted leach-based standards for soil Type 2 (sand and gravel with silt and clay lenses or till). During the removal action, contaminated soils were excavated to a depth of approximately 20 feet below ground surface (bgs) and replaced with clean fill. At the conclusion of the excavation, confirmation soil samples were collected at the based elevation of 633 feet mean sea level (msl). Since elevated VOCs were detected in the soil at 633 feet msl, ODOT removed an additional 2 foot depth of soil beneath the entire extent of the excavation base. Removal of soil was limited to a based elevation of 631 feet msl due to a concern with stability of the bottom of the excavation. In addition, the depth of the excavation was approaching the depth of the water table and ODOT did not want to cause ground water to enter the excavation.

Confirmatory sampling indicated that cleanup objectives were not met in all areas; however, the ODOT Soil Remediation Report (April 1998) states that the contaminants were believed to be within the smear zone of the water table and, potentially, reflective of ground water quality. Approximately 21,077 tons of contaminated soils were disposed of as non-hazardous waste at Arden Landfill in Washington, Pennsylvania or one of two Petro treatment facilities in Seville, Ohio and Washington Court House, Ohio. Approximately 1,583 tons were disposed of as hazardous waste at City Environmental in Detroit, Michigan. After the removal action was completed, ODOT constructed an off-ramp from State Route 7 over the area of the excavation. A large portion of this off ramp area is paved and/or contains gravel or vegetative cover.

The removal action addressed the soil contamination but did not directly address the ground water contamination impacting the BCSSD public water supply well (Ranney Well). The well, which was installed in 1964, currently serves approximately 25,000 customers. It is located approximately 125 feet west of the Ohio River and approximately 300 feet north of the Site's northern property line. The Ranney Well is constructed of a central caisson set in unconsolidated alluvial deposits. Six laterals extend 130 feet to 170 feet radially outward from the caisson, approximately 6 to 10 feet above the bedrock surface. The average rate of production is approximately 2.8 million gallons per day (MGD).

Since 1982, cis 1,2-DCE has been detected in the BCSSD water system during several different sampling events (see Table 1). The highest concentration detected was 13.2 ug/L in March 1988. The maximum contaminant level (MCL) for cis 1,2-DCE is 70 ug/L. Other VOCs have periodically been detected in the system at low levels (see Table 2).

Table 1. Cis 1,2-DCE Concentrations (ug/L) Detected in the BCSSD Water Supply

Date	Type	Concentration (ug/L)	Date	Type	Concentration (ug/L)
04/24/06	P[1]	ND	10/07/91	P	4.2
05/23/05	P	0.5	10/07/91	R	5.1
04/12/04	P	ND	07/01/91	P	4.8
04/22/03	P	0.5	07/01/91	R	5.4
04/10/02	P	1.3	04/03/91	P	6.3
04/10/01	P	1.2	04/03/91	R	6.9
05/02/00	P	1.9	01/04/91	P	4.6
04/21/99	P	2.7	01/04/91	R	6.4
06/01/98	P	3.7	10/10/90	P	4.5
04/23/97	P	4.0	10/10/90	R	6.5
04/23/96	P	4.9	08/03/90	P	6.5
03/02/94	P	5.3	08/03/90	R	6.3
10/04/93	P	2.8	07/10/90	P	4.6
07/02/93	P	2.0	07/10/90	R	7.1
04/02/93	P	4.8	03/03/89	D[3]	5.2
01/29/93	P	4.3	08/16/88	D	10.7
10/16/92	P	3.6	03/16/88	D	13.2
10/16/92	R[2]	3.5	09/21/87	D	8.1
07/02/92	P	4.2	06/22/87	D	12.6
07/02/92	R	4.8	12/30/85	D	12.1
04/03/92	P	3.5	02/23/84	R	8.4
04/03/92	R	4.6	04/15/82	D	8.0
01/06/92	P	4.1	02/24/82	D	7.1
01/06/92	R	4.8	02/24/82	P	7.7

[1]P = Plant tap: immediately following treatment
[2]R = Raw water: pre-treatment
[3]D = Distribution system
ND - Not detected

Table 2. Other VOCs Detected in the BCSSD Water Supply

Date	Contaminant	Concentration (ug/L)
03/02/94	TCA	0.6
07/10/90	1,1 DCA	0.3
08/16/88	1,1 DCA	0.5
03/19/87	TCA	1.0
03/15/83	PCE	1.8
02/24/82	TCA	1.0

In 1996, Ohio EPA conducted a ground water investigation of the Site and the BCSSD well field. The Ohio EPA investigation confirmed the results of the ODOT investigation, which indicated that the concrete pad area was the source of ground water contamination. The investigations identified two ground water plumes: 1) a VOC plume that migrated north-northeast from the corner of the concrete pad area towards the BCSSD well, and 2) a BTEX plume that migrated south-southeast with a slight northern component from the concrete pad area. Data collected during the Ohio EPA investigation indicated that the VOCs were detected throughout the vertical and horizontal extent of the aquifer between the concrete pad area and the BCSSD well. The results also suggest that the upper portion of the aquifer was most affected. Cis 1,2-DCE was the most prevalent constituent detected in the VOC plume.

After evaluating the data from the investigation, Ohio EPA installed two monitoring wells, MW-7A and MW-8A. Ground water samples were periodically collected from these two wells from April 1997 through November 2000. Table 3 shows the concentrations of cis 1,2-DCE in the two monitoring wells over this time period. All concentrations, except the November 2000 sample from MW-8A, exceeded the MCL of 70 ug/L.

Table 3. Cis 1,2-DCE Concentrations (ug/L) in Monitoring Wells MW-7A and MW-8A

Date	MW-7A	MW-8A
04/08/97	300	200
05/28/97	350	170
07/22/97	-	140
09/03/97	420	190
10/15/97	340	160
11/25/97	380	160
01/21/98	310	150
03/26/98	310	160
05/19/98	360	140
06/24/98	360	180
09/16/98	330	150
03/25/99	273	123
11/08/00	156	62.8

During this time period, only one other contaminant was detected at concentrations exceeding its MCL. Vinyl chloride was detected at concentrations in excess of 2.0 ug/L in MW-8A during the April 1997, October 1997 and January 1998 sampling events.

In order to address the contaminated ground water, Ashland Inc., Union Oil Company of California, Capstone Holding Company, and the property owners (William and Frances Salvaterra) agreed to perform a remedial investigation and feasibility study under Director's Final Findings and Orders (Orders). The Orders were finalized and became effective on November 26, 2003.

1.2 Summary of the Remedial Investigation

The Remedial Investigation was conducted by the Respondents (Ashland Inc., Union Oil Company of California, and Capstone Holding Company) to identify the nature and extent of site-related chemical contaminants in ground water. The investigation was conducted with oversight by Ohio EPA, and was approved on January 4, 2006. The investigation included the collection of ground water samples to address data gaps in the previous (ODOT and Ohio EPA) investigations. The data obtained from the investigation were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. The Preferred Plan contains only a brief summary of the findings of the Remedial Investigation and Feasibility Study. Please refer to the Remedial Investigation Report and Feasibility Study Report for additional

information on contaminant concentrations. These reports are located in the public repository and in the Southeast District Office of Ohio EPA.

The nature and extent of contamination in ground water at the North Guernsey Street Site and the contaminants of concern attributable to the Site are described below.

The investigation revealed the following information about site geology:

- Fill materials (mixtures of rock, slag, sand, gravel, silt and clay) are present from local grade to approximately 39 feet below ground surface (bgs).
- Sandy clay, silty clay and clayey silt underlie the fill materials. This horizon constitutes the upper portion of the aquifer underlying the Site and also acts as a semi-confining zone. This unit ranges in thickness from approximately 8 to 18 feet.
- Sand gravel deposits underlie the clay rich unit and comprise the major producing portions of the ground water aquifer. The sand and gravel aquifer ranges in thickness from approximately 25 to 35 feet.
- Red shale bedrock lines the base of the aquifer and is encountered at 67 to 73 feet bgs.

The soil horizons encountered during the remedial investigation are consistent with the previous investigations conducted at this Site.

Ground water levels were measured throughout the ground water monitoring network multiple times during the remedial investigation. The ground water monitoring network consists of ten monitoring wells that were in existence prior to the remedial investigation, in addition to eight monitoring wells installed during the investigation (see Figures 3 and 4). The data shows that current pumping volumes of the BCSSD well control the ground water flow in the entire investigation area for the Site. Past potentiometric surface maps indicated a ground water divide in the area of the former concrete pad, and past ground water quality data indicated a north plume (VOC) and a south plume (BTEX) leaving the former source area. Current ground water flow conditions and analytical data do not indicate the presence of a south plume.

Ground water samples were collected in two separate sampling events in March 2004. The initial sampling event consisted of sampling the ground water monitoring network and the BCSSD well. The BCSSD sample was collected at the raw water tap at the water treatment plant. COCs were only detected in three of the monitoring wells. MW-2 Upper had cis 1,2-DCE at 62 ug/L and 1,1-DCA at 2.1 ug/L. MW-7A had cis 1,2-DCE at 35 ug/L and 1,1-DCA at 1.2 ug/L. MW-11A had acetone at 54 ug/L.

A second ground water sampling event in November 2004 consisted of resampling the three wells that contained detectable VOCs during the previous sampling event. Only MW-7A had detectable concentrations of COCs. 1,1-DCA was present at 2.3 ug/L and cis 1,2-DCE was present at 52 ug/L.

After reviewing the data from the first two sampling events, additional samples were collected from MW-7A and MW-8A, which have historically had the highest concentrations of contaminants, and from MW-2 due to its proximity to the BCSSD well. The sampling events were conducted in June 2005 and September 2005. Ohio EPA split samples with the Respondents during the September 2005 event. Results are presented in Table 4. The sample collected from MW-7A in June 2005 and the sample collected by Ohio EPA in September 2005 had concentrations of cis 1,2-DCE exceeding the MCL of 70 ug/L.

Table 4. Results from June 2005 and September 2005 Sampling Events

		Benzene	1,4-Dichloro benzene	1,1-DCA	cis 1,2 DCE	TCA	PCE
MW-2	6/30/05	ND	NA	ND	ND	ND	ND
	9/30/05	ND	NA	ND	ND	ND	ND
	9/30/05*	ND	**0.185 J**	ND	ND	ND	ND
MW-7A	6/30/05	ND	NA	**2.3**	**72**	ND	ND
	9/30/05	ND	NA	**2.0**	**66**	ND	ND
	9/30/05*	**0.151 J**	**0.225 J**	**2.31**	**78.5**	ND	**0.263**
MW-8A	6/30/05	ND	NA	**1.7**	**36**	ND	ND
	9/30/05	ND	NA	**2.0**	**34**	ND	ND
	9/30/05*	ND	**0.208 J**	**1.89**	**39.8**	**0.256**	ND

All units in ug/L
ND - not detected
NA - not analyzed
J - result is estimated because the concentration is below the laboratory's reporting limit
* Ohio EPA Split Sample Results

1.3 Summary of Site Risks

A baseline risk assessment was conducted to evaluate current and potential future risks to human health associated with contaminants present at the Site. The results demonstrated that no significant exposure pathways were identified for the site-related constituents detected in ground water or subsurface soil.

Potential migration pathways for COCs at the Site are: 1) leaching of COCs in subsurface soils to the unconsolidated aquifer, and 2) migration of COCs in ground water beneath the Site to downgradient locations, including the BCSSD water supply well. The following potential receptors were identified: 1) future hypothetical on-site commercial/industrial workers, 2) future hypothetical on-site construction/ excavation workers, 3) current/future off-site workers and 4) current/future off-site residents

Subsurface soil samples for use in the risk assessment were collected between April 1996 and July 1996 during the 1996 Phase II ESA, in October 1996 during the Ohio EPA investigation and in September 1997 during the ODOT source removal activities (post-excavation sampling). Site related COCs were compared to U.S.EPA Region IX Preliminary Remediation Goals (PRGs) for industrial soil. COCs that exceeded screening criteria were benzene, 1,2-DCE (total), PCE, TCE, benzo(a)pyrene, and arsenic. Concentrations were also compared to U.S. EPA Region IX Soil Screening Levels (SSLs) to evaluate potential migration to ground water. The following COCs exceeded the SSLs: acetone, benzene chlorobenzene, 1,1-DCE, ethylbenzene, methylene chloride, PCE and TCE. Maximum detected concentrations were observed in boring locations collected at the excavation floor (approximately 20 feet deep) and believed to be within the smear zone of the water table and, potentially reflective of ground water quality.

COCs in soil only exist in deep soils on-site. The potential for exposure to COCs in subsurface soil is limited to excavation-related activities. Therefore, the only potential receptor is an on-site construction worker. However, subsurface COCs are at depths of 20 feet bgs or greater where reasonably anticipated construction/excavation activity is unlikely to occur. As a result, exposure pathways involving subsurface soils are incomplete.

The ground water data set for risk assessment included 13 rounds of samples collected from two locations MW-7A and MW-8A between April 1997 and November 2000 and two rounds of samples collected from up to 14 locations in March 2004 and November 2004. Table 5 compares concentrations of COCs to MCLs and PRG values. COCs exceeding PRGs between 1997 and 2000 were: benzene, cis 1,2-DCE, PCE, TCE and vinyl chloride. Of these COCs that previously exceeded PRGs, only cis 1,2-DCE exceeded the PRG in the 2004 sampling.

Table 5. COCs in Ground Water

	Number of Samples	Number of Detects	Maximum Detect 1997-2000	Location	Maximum Detect 2004	Location	MCL	USEPA Region IX PRG for
Acetone	51	1	ND	-	54	MW-11A		5500
Benzene	51	4	**0.9**	MW-8A	ND	-	5	0.35
1,1 DCA	51	23	11	MW-7A	2.3	MW-7A		810
1,1 DCE	51	5	1.2	MW-8A	ND	-	7	340
cis 1,2 DCE	51	30	**420**	MW-7A	**62**	MW-2	70	61
trans 1,2 DCE	51	6	6.6	MW-8A	ND	-	100	120
PCE	51	7	**1.5**	MW-8A	ND	-	5	0.1
TCA	51	5	1.8	MW-8A	ND	-	200	3200
TCE	51	4	**0.9**	MW-8A	ND	-	5	0.028
Vinyl chloride	51	7	**12**	MW-8A	ND	-	2	0.0198

All units in ug/L
ND - not detected

Under current and expected future conditions, ground water is not used on-site for potable or industrial uses. The depth to ground water, approximately 20 - 25 feet at the source area and 35 feet in the area of MW-7A and MW-8A, precludes the potential for exposure during reasonably anticipated construction/excavation activities. Available access to the public water supply would also likely discourage the use of ground water on-site.

Tables 1 and 2 show concentrations of COCs have been detected in the BCSSD public water supply since 1982. Since the removal action in 1997, only cis 1,2-DCE has been detected in the water supply and concentrations have never exceeded the MCL or PRG. In 2003 and 2005, cis 1,2-DCE was detected at 0.5 ug/L and in 2004 and 2006, it was not detected in the water supply. Ground water modeling presented in the RI has indicated that future increased pumping of the BCSSD well would not increase cis 1,2-DCE concentrations in the public water supply. Based on concentrations over the past four years, exposure of off-site receptors to COCs in ground water is unlikely.

The vapor intrusion to indoor air from the ground water pathway was evaluated. Comparing the 2004 ground water monitoring data set to indoor air screening levels,

no constituents exceeded the screening levels in the U.S. EPA guidance Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, Subsurface Vapor Intrusion Guidance (2002). In addition, depth to ground water (approximately 20 to 35 feet bgs) precludes the potential for significant vapor migration.

2.0 REMEDIAL ACTION OBJECTIVES

A Feasibility Study was conducted by Ashland Inc., UNOCAL Corporation and Capstone Holding Company, to define and analyze appropriate remedial alternatives. That study was conducted with oversight by Ohio EPA, and was approved on August 25, 2006. The Remedial Investigation and Feasibility Study are the basis for the selection of Ohio EPA's preferred remedial alternative.

As part of the remedial investigation/feasibility study (RI/FS) process, remedial action objectives (RAOs) were developed in accordance with the National Contingency Plan (NCP), 40 CFR Part 300, which was promulgated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §9601 et seq., and U.S. EPA guidance. The RAOs are goals that a remedy should achieve in order to ensure the protection of human health and the environment. The goals are designed specifically to mitigate the potential adverse effects of site contaminants present in environmental media.

The RAOs were developed to ensure that remedial actions reduce the projected risk to humans to acceptable levels.
The RAOs developed for the Site are:

1) protection against human exposure to ground water that exceeds MCLs; and
2) reduction of concentrations of COCs to MCLs throughout the impacted aquifer.

3.0 SUMMARY OF REMEDIAL ALTERNATIVES

A total of three remedial alternatives were considered in the Feasibility Study. A brief description of the major features of each of the remedial alternatives follows. More detailed information about these alternatives can be found in the Feasibility Study.

3.1 No Action - No remedial action planned for the Site. The No Action alternative is included as a basis for comparison with the remaining alternatives. Under this alternative, no other activities would be performed at the Site.

3.2 Ground Water Monitoring - Renamed “Monitoring the Effects of the 1997 Removal Action” by Ohio EPA. This alternative consists of ground water monitoring to evaluate improvements to ground water resulting from the 1997 ODOT removal action. The removal action resulted in the removal of approximately 22,660 tons of contaminated soils (see Section 1.1). Ground water results demonstrate that concentrations of COCs in ground water continue to decrease since the removal action was conducted in 1997. This remedy includes semi-annual ground water monitoring of monitoring wells MW-2, MW-7A and MW-8A until results from four consecutive sampling events demonstrate that COCs have not exceeded their MCLs.

In addition, an Environmental Covenant between the property owner and Ohio EPA would be recorded with the Belmont County Recorder. This institutional control would prohibit the extraction or use of ground water except for investigation or remediation of ground water.

3.3 Monitored Natural Attenuation - The Monitored Natural Attenuation (MNA) approach includes provisions for MNA effectiveness assessment and demonstration as provided by U.S. EPA OSWER Directive 9200.4-17P (April 21, 1999) and Ohio EPA Technical Decision Compendium “Distinction Between Monitored Natural Attenuation and Enhanced Monitoring at DERR Remedial Sites” (October 2002). This alternative includes a prior demonstration and documentation that MNA is occurring, as well as the rate at which it is occurring, remedial time frame predictive modeling, and monitoring of MNA performance indicators in addition to monitoring of COCs.

This alternative would involve the development of an appropriate monitoring network using existing monitoring wells, MW-1, MW-2, MW-3, MW-7A and MW-8A, and possibly some additional wells.

In addition, an Environmental Covenant between the property owner and Ohio EPA would be recorded with the Belmont County Recorder. This institutional control would prohibit the extraction or use of ground water except for investigation or remediation of ground water.

4.0 COMPARISON AND EVALUATION OF ALTERNATIVES

4.1 Evaluation Criteria

In selecting a remedy for a contaminated site, Ohio EPA considers the following eight evaluation criteria as outlined in U.S. EPA’s NCP promulgated under CERCLA (40 CFR 300.430):

1. Overall protection of human health and the environment - Remedial alternatives shall be evaluated to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site.

2. Compliance with all applicable or relevant and appropriate requirements (ARARs) - Remedial alternatives shall be evaluated to determine whether a remedy will meet all of the applicable or relevant and appropriate requirements of state and federal environmental laws.

3. Long-term effectiveness and permanence - Remedial alternatives shall be evaluated to determine the ability of a remedy to maintain reliable protection of human health and the environment over time once pollution has been abated and RAOs have been met. This includes assessment of the residual risks remaining from untreated wastes, and the adequacy and reliability of controls such as containment systems and institutional controls (i.e., environmental covenant).

4. Reduction of toxicity, mobility, or volume through treatment - Remedial alternatives shall be evaluated to determine the degree to which recycling or treatment are employed to reduce toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

5. Short-term effectiveness -Remedial alternatives shall be evaluated to determine the following: (1) Short-term risks that might be posed to the community during implementation of an alternative; (2) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) Time until protection is achieved.

6. Implementability - Remedial alternatives shall be evaluated to determine the ease or difficulty of implementation and shall include the following as appropriate: Technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy; (2) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions); and (3) Availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to secure any necessary additional resources; the availability of services and materials; and the availability of prospective technologies.

7. Cost - Remedial alternatives shall evaluate costs and shall include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance costs (O&M); and (3) Net present value of capital and O&M costs. The cost estimates include only the direct costs of implementing an alternative at the Site and do not include other costs, such as damage to human health or the environment associated with an alternative. The cost estimates are based on figures provided by the Feasibility Study.

8. Community acceptance - Remedial alternatives shall be evaluated to determine which of their components interested persons in the community support, have reservations about, or oppose. This assessment may not be completed until comments on the Preferred Plan are received.

Evaluation Criteria 1 and 2 are threshold criteria required for acceptance of an alternative that has accomplished the goal of protecting human health and the environment and complied with the law. Any acceptable remedy must comply with both of these criteria. Evaluation Criteria 3 through 7 are the balancing criteria for selecting the best remedial alternatives. Evaluation Criterion 8, community acceptance, is a modifying criterion that is determined by the public comments on the alternatives.

4.2 Analysis of Evaluation Criteria

This section looks at how each of the evaluation criteria is applied to each of the remedial alternatives found in Section 3.0 and compares how the alternatives achieve the criteria.

4.2.1 Overall Protection of Human Health and the Environment

The potential risks to human health posed by the Site are associated with exposure to contaminated ground water. MCLs are the standards that must be met to insure that unacceptable risks have been addressed.

Based on previous data, all three alternatives could be protective of human health and the environment because concentrations of COCs, specifically cis 1,2-DCE, are expected to continue to decrease since the source area was addressed during the ODOT removal action in 1997. However, the No Action alternative does not include a mechanism to verify that RAOs 1 and 2 have been achieved.

4.2.2 Compliance with ARARs

The Monitoring the Effects of the 1997 Removal Action alternative and the MNA alternative would both comply with applicable requirements, and RAO 2 would be met. The No Action alternative does not include a mechanism to insure compliance with RAO 2.

4.2.3 Long-Term Effectiveness and Permanence

Under the Monitoring the Effects of the 1997 Removal Action alternative and the MNA alternative, concentrations of contaminants in ground water would be permanently reduced. This would eliminate potential risk of exposure to receptors after RAOs 1 and 2 are achieved. The No Action alternative may also result in a permanent remedy; however, RAOs 1 and 2 would not be met since there is no mechanism to determine concentrations of COCs in ground water.

4.2.4 Reduction of Toxicity, Mobility or Volume by Treatment

None of the alternatives employ active treatment; instead, all three alternative rely on natural degradation to reduce the volume of contaminants. Under the No Action alternative, RAOs 1 and 2 would not be met since there is no mechanism to determine concentrations of COCs in ground water.

4.2.5 Short-Term Effectiveness

Based on previous data, only cis 1,2-DCE has been detected on-site at concentrations exceeding the MCL since 1998. This data suggests that concentrations should continue to decrease, and that level of cis 1,2-DCE should consistently meet or fall below the MCL over the next ten years; hence RAOs 1 and 2 would be met. This is expected to occur under all three alternatives; however, RAOs 1 and 2 would not be met under the No Action alternative since there is no mechanism to determine concentrations of COCs in ground water.

No risks to site workers are anticipated for any of the alternatives. Only the Monitoring the Effects of the 1997 Removal Action and MNA alternatives could potentially result in limited site worker exposure to contaminants. This exposure could occur during ground water sampling activities. However, sampling techniques that would reduce potential exposure to contaminated ground water would be required in the ground water monitoring plan.

4.2.6 Implementability

The Monitoring the Effects of the 1997 Removal Action alternative is readily implementable, because the monitoring wells are already in place and ground water monitoring activities are routine and well established practices.

The Monitoring the Effects of the 1997 Removal Action and MNA alternatives are readily implementable in terms of site access which would be maintained through agreements with the property owners. In addition, the environmental covenant required by these alternatives is readily implementable.

The No Action alternative is readily implementable because it requires no construction, equipment, or specialty services to implement. The only activity under this alternative would be the abandonment of existing ground water monitoring wells, which would

ultimately be required under the Monitoring the Effects of the 1997 Removal Action and MNA alternatives after RAOs 1 and 2 are met. The abandonment would involve administrative work to secure access and to document the abandonment activities.

The MNA alternative is readily implementable from a technical perspective, given that most of the wells for the network are already in place. The ground water monitoring activities are routine and well established practices. However, additional monitoring wells may be needed and access to preferred locations could be complicated by the presence of roads, bridges and railroads in these areas.

4.2.7 Cost

Table 6 includes cost estimates for implementing the three remedial alternatives.

Table 6. Cost Estimates for the Remedial Alternatives

Alternative	Capital Cost	Total O&M Cost	10% Contingency	Total Cost
No Action	$25,000	$0	$2,500	$27,500
Monitoring the Effects of the 1997 Removal Action	$27,500	$27,684	$5,518	$60,702
Monitored Natural Attenuation	$22,700	$53,085	$7,578	$83,363

Although the No Action alternative is the least expensive, it would not achieve RAOs 1 and 2. Of the remaining two alternatives which would meet RAOs 1 and 2, Monitoring the Effects of the 1997 Removal Action is the least expensive alternative.

4.2.8 Community Acceptance

The Ohio EPA did not receive any comments during the public comment period through December 12, 2006. The public meeting and hearing were held at the Bellaire Administration Building on December 5, 2006. No comments were given during the public hearing.

5.0 SELECTED REMEDIAL ALTERNATIVE

The selected remedial alternative is the Monitoring the Effects of the 1997 Removal Action alternative. The elements of this alternative are 1) ground water monitoring and 2) prohibition of ground water use and well installation activities without Ohio EPA approval. As described in Section 1.1, ODOT conducted a removal action in 1997 and removed approximately 22,660 tons of contaminated soils from this site. Ground water

results demonstrate that concentrations of COCs in ground water continue to decrease since the removal action was conducted in 1997.

Monitoring wells MW-2, MW-7A and MW-8A will be sampled semi-annually for COCs until all COCs have met the performance standard of achieving MCLs for at least four consecutive semi-annual sampling events. In addition, Ohio EPA will work with the property owner to finalize an Environmental Covenant that will be recorded with the Belmont County Recorder. This institutional control will prohibit the extraction of ground water except for monitoring or remediation of ground water. It will also prohibit well installation without prior written authorization from Ohio EPA. This institutional control would meet RAO 1. At a minimum, an annual review of compliance with this Environmental Covenant will be conducted **until** MCLs have been met for at least four consecutive semi-annual sampling events (RAO 2).

Performance Standards:

- Achieve MCLs for COCs in ground water for at least four consecutive semi-annual sampling events within ten years.

- Comply with an Environmental Covenant to prevent human exposure to ground water that exceeds MCLs.

- Restrict access to contaminated ground water at the monitoring wells by maintaining and locking the monitoring wells. This performance standard shall be achieved upon the implementation of the Operation and Maintenance program and its continued enforcement.

- Abandon monitoring wells in accordance with the State of Ohio Technical Guidance for Sealing Unused Wells (State Coordinating Committee on Ground Water, 1996). This performance standard shall be achieved upon the successful recording of the Water Well Sealing Reports with the Ohio Department of Natural Resources, Division of Waters, and providing copies to Ohio EPA.

6.0 RESPONSIVENESS SUMMARY

No comments were received by Ohio EPA during the public comment period (see Section 4.2.8). Therefore, a responsiveness summary was not prepared.

7.0 GLOSSARY

Aquifer -	An underground geological formation capable of holding and yielding water.
ARARs -	Applicable or relevant and appropriate requirements. Those statutes and rules which strictly apply to remedial activities at the site, or those statutes and rules whose requirements would help achieve the remedial goals for the site.
Baseline Risk Assessment -	An evaluation of the risks to humans and the environment posed by a site.
Carcinogen -	A chemical that causes cancer.
CERCLA -	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. §9601 et seq. A federal law that regulates cleanup of hazardous substances sites under the U.S. EPA Superfund Program.
Chemicals of Concern (COCs) -	Chemicals identified at the site which are present in concentrations that may be harmful to human health or the environment.
cis 1,2-DCE -	cis 1,2-Dichloroethylene. A common industrial solvent.
Decision Document -	A statement issued by the Ohio EPA giving the Director's selected remedy for a site and the reasons for its selection.
Environmental Covenant -	A servitude arising under an environmental response project that imposes activity and use limitations and that meets the requirements established in section 5301.82 of the Revised Code.
Exposure Pathway -	Route by which a chemical is transported from the site to a human or ecological receptor
Feasibility Study -	A study conducted to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be

presented to a decision-maker and an appropriate remedy selected.

Final Cleanup Levels - Final cleanup levels are identified in the Decision Document along with the RAOs and performance standards.

Human Receptor - A person or population exposed to chemicals released from a site.

Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in a public drinking water supply. The level is established by U.S. EPA and incorporated into OAC 3745-81-11 and 3745-81-12.

NCP - National Oil and Hazardous Substances Pollution Contingency Plan, codified at 40 C.F.R. Part 300 (1990), as amended. A framework for remediation of hazardous substance sites specified in CERCLA.

O&M - Operation and Maintenance. Long-term measures taken at a site, after the initial remedial actions, to assure that a remedy remains protective of human health and the environment.

PCE - Tetracholoethene or Perchloroethylene. A common industrial solvent and cleaner, often used for dry cleaning.

Performance Standard - Measures by which Ohio EPA can determine if RAOs have been met.

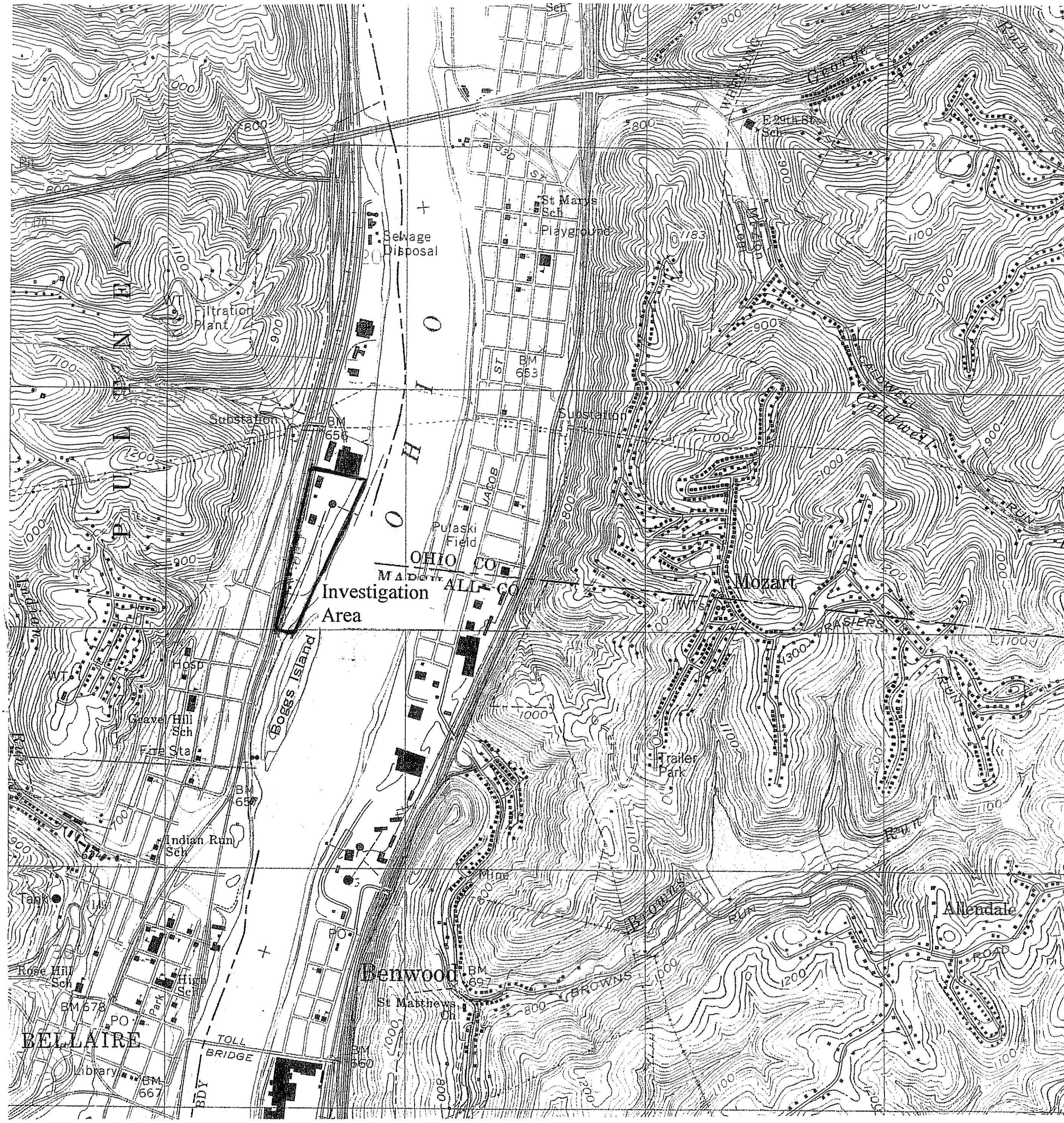
Preferred Plan - The plan that evaluates the preferred remedial alternative chosen by Ohio EPA to remediate the site in a manner that best satisfies the evaluation criteria.

RCRA - Resource Conservation and Recovery Act of 1976 codified at 42 C.F.R. Part 9601 et seq. (1988), as amended. A federal law that regulates the handling of hazardous wastes.

Remedial Action Objectives (RAOs) - Specific goals of the remedy for reducing risks posed by the site.

Remedial Investigation - A study conducted to collect information necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives.

Responsiveness Summary-	A summary of all comments received concerning the Preferred Plan and Ohio EPA's response to all issues raised in those comments.
TCE -	Trichloroethylene. A common industrial solvent and cleaner.



Reference

USGS Wheeling Topographic Quadrangle
West Virginia – Ohio 1994.
Scale 1:24,000

URS
5200 Blazer Parkway
EH&S, DS-4
Dublin, Ohio 43017

FIGURE 2-1

SITE LOCATION MAP

4900 North Guernsey Street . Bellaire, Ohio

PZ01
(664.42)

RAILROAD

RAILROAD

PRIVATE HAUL ROAD

NORTH GUERNSEY STREET

PUMP STA

PZ02
(650.70)

ODOTMW01
(653.34)

ODOTMW02
(650.95)

APPROXIMATE SOURCE AREA

ODOTMW03
(651.60)

ODOTMW04
(652.98)

PZ03
(652.64)

LINED SEDIMENT POND

LINED SEDIMENT POND

MW-7A
(651.02)

MW-8A
(651.94)

MW-2
(654.20)

MW-3
(654.44)

MUXIE BUILDING

MW-5
(653.43)

COAL BLDG

RAILROAD

CONVEYOR BELT

COAL SILO

MW-1
(654.75)

RANNEY COLLECTOR WELL

OB1N
(655.55)

MW-4
(655.59)

OBS2
(656.19)

OB1S
(655.26)

WOODED SLOPE TO RIVER

RIVER EDGE

BOGGS ISLAND

OHIO RIVER

BB CC DD EE FF GG HH

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15

LEGEND

- ○ = ODOT PIEZOMETER LOCATION
- ◒ = ODOT MONITORING WELL LOCATION
- □ = BELMONT COUNTY MONITORING / OBSERVATION WELL
- ● = BELMONT COUNTY MONITORING WELL INSTALLED BY L&A
- (#) = (TOC TOP OF CASING ELEVATION)

NORTH

0 60' 120'
SCALE IN FEET

DRAWN BY	DLH
DESIGNED BY	RICK D.
SCALE DRAWING	1:1
SCALE PLOT	1:1
DATE	JULY 1997
FILE	FIG2A
EDIT	DLH072997

LAWHON & associates inc.
6300 PROPRIETORS RD, WORTHINGTON,OHIO 43850
OFFICE:(614)436-8400 FAX:(614)438-5499

CLIENT
OHIO EPA SEDO

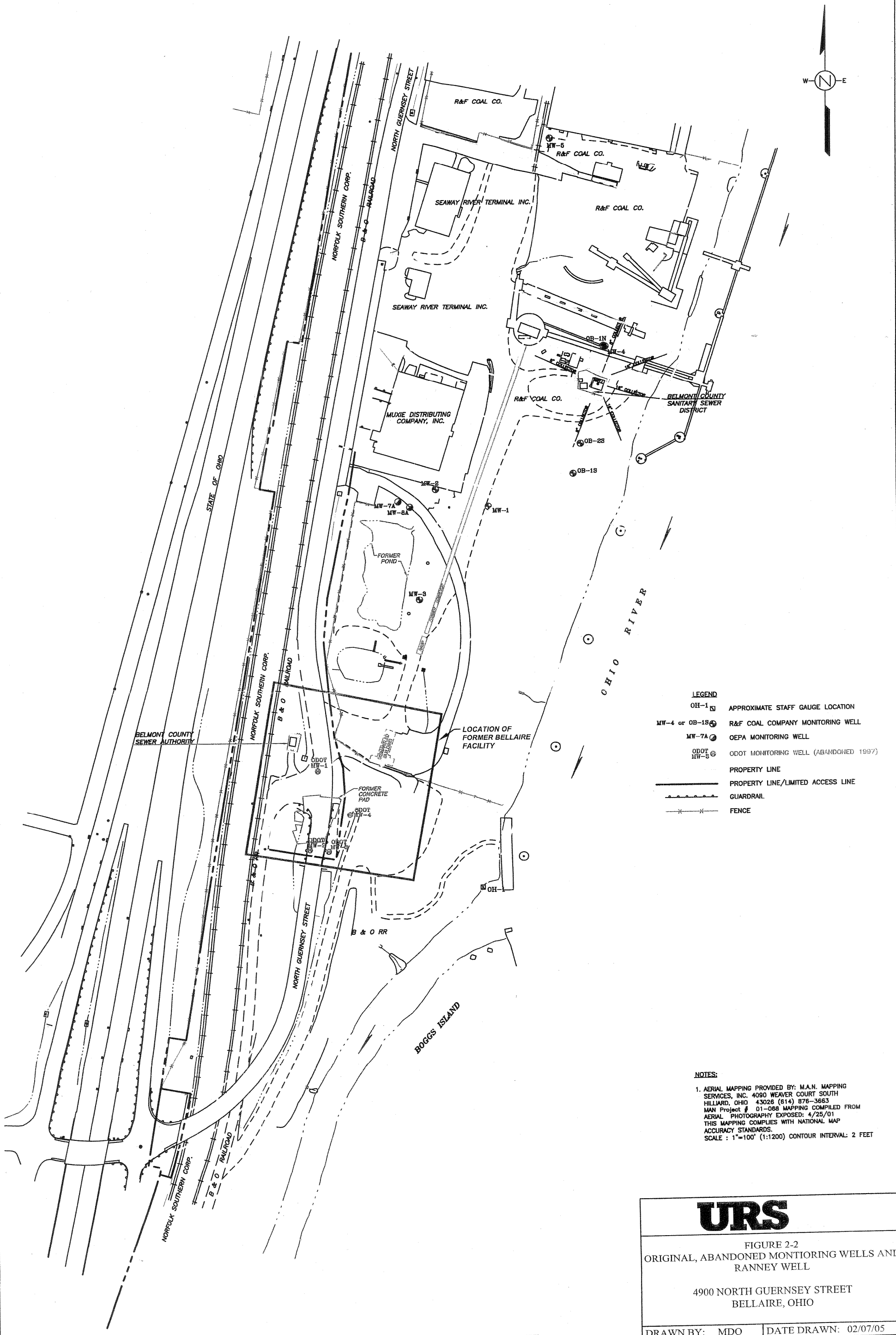
PROJECT
BELMONT COUNTY SANITARY SEWER DISTRICT #3
RANNEY WELL
GROUND WATER INVESTIGATION

MONITORING WELL NETWORK

REVISE

FIGURE
2

PROJECT 5177000



NOTES:

1. AERIAL MAPPING PROVIDED BY: M.A.N. MAPPING SERVICES, INC. 4090 WEAVER COURT SOUTH HILLIARD, OHIO 43026 (614) 876-3663 MAN Project # 01-088 MAPPING COMPILED FROM AERIAL PHOTOGRAPHY EXPOSED: 4/25/01 THIS MAPPING COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS. SCALE : 1"=100' (1:1200) CONTOUR INTERVAL: 2 FEET

URS

FIGURE 2-2
ORIGINAL, ABANDONED MONTIORING WELLS AND RANNEY WELL

4900 NORTH GUERNSEY STREET
BELLAIRE, OHIO

DRAWN BY: MDO	DATE DRAWN: 02/07/05
REVIEWED BY: JR	DATE REVIEWED:
SCALE: 1" = 200'	PLOT DATE:
PROJECT NO.: 37679462.05304	

Figure 3.

Figure 4. North Guernsey Street Site - Monitoring Well Network