



PROJECT
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DEPARTMENT OF
NATURAL RESOURCES
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REMEDIAL INVESTIGATION CLOSURE PLAN

ESTATE OF AARON L. TILTON
3217 WEST VILLARD AVENUE
MILWAUKEE, WISCONSIN

MAY 1992

PREPARED FOR:
ESTATE OF AARON L. TILTON
C/O MR. JAMES L. WALT
MILWAUKEE, WISCONSIN

•••

PREPARED BY:
WARZYN INC.
MILWAUKEE, WISCONSIN



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REMEDIAL INVESTIGATION CLOSURE PLAN

ESTATE OF AARON L. TILTON
3217 WEST VILLARD AVENUE
MILWAUKEE, WISCONSIN

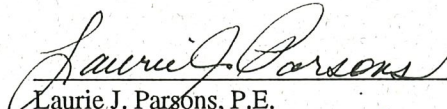
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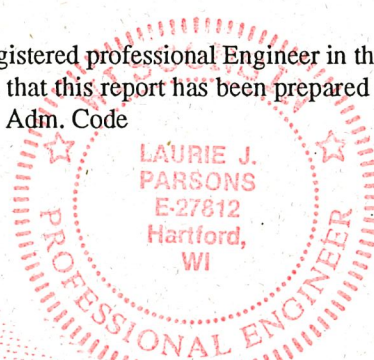
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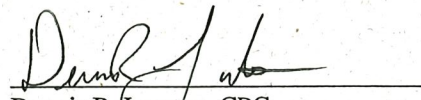
PREPARED BY:
WARZYN INC.
MILWAUKEE, WISCONSIN

I, Laurie J. Parsons, hereby certify that I am a registered professional Engineer in the State of Wisconsin in accordance with ch.A-E4, Wis. Adm. Code and that this report has been prepared in accordance with the Rules Of Professional Conduct in ch.A-E8, Wis. Adm. Code


Laurie J. Parsons, P.E.
Senior Environmental Engineer



I, Dennis R. Lawton, hereby certify that I am a hydrogeologist as defined in s.NR 600.03(98), Wis. Adm. Code and that to the best of my knowledge, all information contained in this document is correct.


Dennis R. Lawton, CPG
Senior Manager

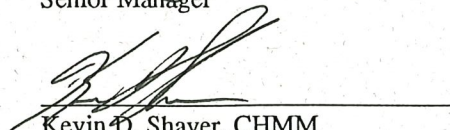

Kevin D. Shaver, CHMM
Senior Environmental Scientist

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INTRODUCTION

Warzyn Inc. (Warzyn) has been retained by the Estate of Aaron L. Tilton to prepare this closure plan document to fulfill the requirements of the January 2, 1992 Wisconsin Department of Natural Resources (WDNR) Notice of Incompleteness (NOI). The NOI indicated Warzyn's November 25, 1991 correspondence "Work Plan for Remedial Investigation" did not contain the minimum information required by Ch. NR 600-685 Wisconsin Administrative Code (Wis. Adm. Code). The purpose of the Remedial Investigation Closure Plan is to define the extent and degree of contamination associated with a release of dry cleaning solvents at the subject property.

Warzyn recognizes this Remedial Investigation Closure Plan only partially fulfills the requirements of NR 685.05 Wis. Adm. Code at this time. The closure process will involve a series of modifications leading to the development of a final closure plan for the property. Following the implementation of the Remedial Investigation Closure Plan, Warzyn will report the results of the investigation and provide recommendations and the basis for choosing additional investigation and/or remedial alternatives in a document to be entitled Remedial Action Closure Plan. Following the implementation of the selected remedial actions, Warzyn will prepare a final closure plan indicating whether the property has been closed in accordance with NR 645.17 and NR 685.05 Wis. Adm. Code.

BACKGROUND

Warzyn was retained by the Estate of Aaron L. Tilton to perform limited Phase II Environmental Site Assessment (ESA) of the subject property located at 3217 West Villard Avenue, Milwaukee, Wisconsin as part of a real estate transaction. The representative for the subject property is:

Mr. James L. Walt
Attorney for the Estate of Aaron L. Tilton
845 North Eleventh Street
Milwaukee, Wisconsin 53233
(414) 271-8860

During September and October 1991, as part of the Phase II ESA, Warzyn began investigating whether the past dry cleaning operations that occurred at the property had impacted the subsurface soil and groundwater at the subject property.

Subsequent to the findings of the Phase II ESA, Warzyn verbally notified Ms. Pamela Mylotta of the Wisconsin Department of Natural Resources (WDNR) on October 25, 1991 regarding discovery of hazardous substances (i.e., dry cleaning solvents) at the subject property in accordance with Chapter NR 158 Wis. Adm. Code and Wisconsin Statute s.144.76(2). A follow-up written notice was submitted to Ms. Mylotta on November 7, 1991.

Subsequent to the verbal notification, on October 28, 1991 the WDNR requested the submittal of a work plan for conducting a remedial investigation. On November 25, 1991, Warzyn submitted a work plan in accordance with the requirements outlined in the October 28, 1991 letter. Warzyn's November 25, 1991 Work Plan submittal was based on the remedial investigation being conducted in accordance with Chapter NR 158 Wis. Adm. Code, which applies to spill or releases of hazardous substances. As discussed below, the WDNR, however, subsequently determined that the apparent release would be attributed to the generation and on-site accumulation of a hazardous waste (as defined in Wisconsin Statute s.144.61), and thus would be subject to the requirements of Chapter NR 600-685 Wis. Adm. Code and Wisconsin Statute s.144.64(2m). As a

result, on January 2, 1992 Mr. Scott J. Ferguson issued a Notice of Incompleteness (NOI) indicating that the work plan did not contain the minimum information required by the WDNR.

The WDNR has determined that the suspected releases of chlorinated solvents from the past dry cleaning operations at the property would deem the property an unlicensed hazardous waste facility as outlined in Wisconsin Statute s.144.64(2m). In addition, the WDNR has determined that the sump located inside the building, which was installed to collect spilled dry cleaning solvents, should be classified as an underground storage tank and be subject to the closure requirements set forth in NR 645.17 Wis. Adm. Code. Therefore, based on these regulations, the WDNR has requested that a closure plan be submitted in accordance with NR 685.05 Wis. Adm. Code for the remedial investigation. Subsequently Warzyn has developed this Remedial Investigation Closure Plan in accordance with the appropriate regulations and guidance information contained in the January 2, 1992 letter received from Mr. Scott Ferguson of the WDNR.

SITE DESCRIPTION

The subject property (Estate of Aaron L. Tilton) is located at 3217 West Villard Avenue in the City of Milwaukee, Wisconsin. The subject property is located in the Northwest Quarter of the Southwest Quarter of Section 36, Township 8 North, Range 21 East, in the City of Milwaukee, Milwaukee County, Wisconsin.

The subject property is bounded by West Villard Avenue and across the way by an industrial development to the north; the Chicago, Minneapolis, Saint Paul and Pacific (Soo Line) railroad tracks and across the way by an industrial development to the east and southeast; and an industrial development, a church and a U.S. Post Office to the west and southwest.

The subject property is approximately 56,296 square feet in size and is occupied by a one-story brick building. The building is approximately 17,400 square feet in size. Approximately 16,400 square feet is occupied by a grocery store (Sheridan's Shop Rite) and 1,000 square feet by a pick-up dry cleaning shop (Valet Cleaners). The remaining surface area of the property is covered with an asphalt parking lot.

The City of Milwaukee provides potable water and sanitary sewer services to the subject property. According to the City of Milwaukee zoning records, the property is zoned industrial and business (I-B-85). A review of the Milwaukee, Wisconsin 7.5 minute U.S.G.S. topographic quadrangle map indicated that the surface topography on the vicinity gently slopes to the east-southeast towards Lincoln Creek, which is located approximately 950 feet to the east-southeast. In addition, review of the WDNR map *Wisconsin Wetland Inventory (Revised February 1989)* showed that wetlands are not located on the subject property.

A Site Location Map (Figure 1) and Site Features Map (Figure 2) are provided to indicate the location and general layout of the subject property.

HISTORICAL PROPERTY USE AND OPERATIONS

HISTORICAL OWNERSHIP OF PROPERTY

To obtain information pertaining to site ownership and operations history, records were reviewed from the following sources:

- City of Milwaukee Building Inspector Records
- City of Milwaukee Tax Assessor Records
- City of Milwaukee Records Center blue prints
- Sanborn Map Company Inc. (Sanborn Inc.) maps for the years 1910, 1929, 1950, and 1967
- Southeastern Wisconsin Regional Planning Commission (SEWRPC) aerial photographs for the years 1963, 1967, 1970, 1975, 1980 and 1985

The following is a composite summary of the past ownership, development, and operations at the site dating back to 1910.

The Sanborn Inc. map for 1910 showed the subject property was occupied by the Westfield & Fall River Lumber Company, and contained lumber piles, sheds and an office located in the northwest corner of the subject property. Between 1910 and 1924 the ownership of the property changed to the Alexander Stewart Lumber Company. According to the City of Milwaukee Tax Assessor's records, the North Milwaukee Lumber & Supply Company subsequently owned the property from 1924 to 1962. During the Milwaukee Lumber & Supply Company ownership of the subject property, the Sanborn Inc. maps for 1929 and 1950 depicted the property as not changing significantly from the features on the 1910 Sanborn Inc. map.

According to the City of Milwaukee Tax Assessor's records, in 1962 the ownership title was transferred to Pentler-Mikkelson Venture, who subsequently leased the property to the National Food Stores, Inc. In addition, the records revealed that construction of the current building at the subject property was completed in 1963. In 1964, the subject property was transferred from the

Pentler-Mikkelson Venture to Mr. Aaron L. Tilton (currently the property is held in a irrevocable trust). The SEWRPC aerial photographs (1963-1985) indicated the subject property had not changed from the original 1962 site plan on file at the City of Milwaukee Records Center.

According to the City of Milwaukee Building Inspector's records, the northeastern 1,000 square feet of the building was operated as a coin operated laundry from 1962 until 1976. In 1976, an application for occupancy was filed with the City of Milwaukee Building Inspector's office for a dry cleaning operation using perchloroethylene (tetrachloroethene). During 1978, the dry cleaning operation was modified by One Hour Fabricare Cleaners. According to the equipment schedule for the modification, a concrete sump was installed to collect spillage from the cleaning machine. According to an August 1989 Environmental Site Assessment completed for Michael, Best and Friedrich by Geraghty & Miller, Inc., the dry cleaning operations of the site discontinued in 1984.

PAST HAZARDOUS WASTE ACTIVITIES AT PROPERTY

According to the historical records, dry cleaning solvent (i.e., perchloroethylene) was used at the property. According to the City of Milwaukee Building Inspector's records, the dry cleaning operations were performed in a type IV nontransfer Permac dry cleaning unit. A dike was constructed around the dry cleaning unit to direct any spillage of solvent into the concrete sump. Records are not available regarding the disposal practices of any solvent collected in the sump or the frequency and amount of any generated waste dry cleaning solvents. Dry cleaning solvents that may have accumulated within the sump have been removed. Prior to conducting the Phase II ESA, the concrete sump appeared to be in good condition and had no evidence of deterioration or cracks. In addition, the WDNR publication, *Statewide Spills and Hazardous Incidents Report (January 1990)* did not indicate past spills or other incidents which could be potential sources of contamination at the subject property. As previously mentioned, during a Phase II ESA conducted in September and October of 1991, Warzyn began investigating whether the sump had impacted the subsoils or groundwater at the subject property.

On September 20, 1991, Warzyn conducted preliminary field activities including the collection of soil samples during the installation of two groundwater monitoring wells at the site (refer to Figure 2 for location). On October 1, 1991, the groundwater monitoring wells were sampled and the samples submitted to Warzyn's Analytical Services Laboratory (WDNR Certified Laboratory ID#113138300) in Madison, Wisconsin for analysis.

As shown in Appendix A, the soil sample results from the 2.5 to 5.5 foot (B1-S2) and 16.0 to 18.0 foot (B1-S7) depth intervals had detectable levels of chlorobenzene (25 µg/kg), cis-1,2-dichloroethene (2,800 µg/kg), trans-1,2-dichloroethene (26 µg/kg), tetrachloroethene (37,000 to 140,000 µg/kg), trichloroethene (420 to 30,000 µg/kg) and vinyl chloride (31 µg/kg).

As shown in Appendix B, the groundwater sample from monitoring well B1 had detectable levels of chlorobenzene (2.0 µg/L), 1,1-dichloroethene (1.8 µg/L), cis-1,2-dichloroethane (1.3 µg/L), tetrachloroethene (14,000 µg/L), toluene (16 µg/L), trichloroethene (220 µg/L), and vinyl chloride (11 µg/L). The levels of several of these compounds exceed the enforcement standards for groundwater quality as specified in s.NR 140.10 Wis. Adm. Code, including: cis-1,2-dichloroethene (100 µg/L), tetrachloroethene (1 µg/L), trichloroethene (5 µg/L), and vinyl chloride (0.2 µg/L).

TOPOGRAPHY, GEOLOGY, AND HYDROGEOLOGY OF PROPERTY AND SURROUNDING VICINITY

REGIONAL INFORMATION REVIEW

According to the Southeastern Wisconsin Regional Planning Commission (SEWRPC) publication, *A Solid Waste Management Plan for Milwaukee County, Wisconsin (July 1987)* the subject property is located on a glacial ground moraine. The surface topography in the vicinity of the subject property is gently sloping to the east towards Lincoln Creek, which is located approximately 950 feet to the east-southeast. Well logs available from the WDNR-Southeast District Office for the Southwest and Northwest Quarters of Section 35 and Southeast and Northeast Quarters of Section 36 of Township 8 North, Range 21 East (approximately 0.5 mile radius from the subject property) indicate that unconsolidated glacial sediments consisting of primarily clay extend from near ground surface to maximum depths of 65 to 170 feet, where bedrock was encountered. According to the SEWRPC publication, the surface of the bedrock in the vicinity of the subject property is composed of dolomite, some limestone, and shale of the Milwaukee Formation of Devonian Age.

A hardpan layer, ranging in thickness from 5 to 20 feet, was noted above the bedrock in 11 of the 21 well logs reviewed. The term "hardpan" is an unofficial descriptive term used inconsistently by well drillers to describe material difficult to drill through and is generally considered to be a glacial till consisting of sand to boulder size particles in a matrix of fine sand to clay.

The U.S. Department of Agriculture publication, *Soil Survey of Milwaukee and Waukesha Counties, Wisconsin (July 1971)* indicated surficial soil in the vicinity of the subject property is of the Ozaukee-Morley-Mequon Association. These types of soils are classified as well-drained to somewhat poorly-drained soils that have a subsoil of silty clay loam and silty clay. These types of soils are formed in thin layers of silty clay loam glacial till on moraines.

According to the U.S. Department of the Interior publication, *Groundwater Conditions in the Milwaukee-Waukesha Area, Wisconsin (1953)* three primary aquifers are located in the vicinity of the subject property. The shallowest aquifer consists of permeable sand and gravel units within the unconsolidated glacial sediments and is generally referred to as the sand and gravel aquifer. The low-permeability clay and silt deposits (glacial till) that comprise much of the unconsolidated glacial sediments are generally not considered aquifer materials because they do not provide adequate amounts of water to supply wells. The sand and gravel aquifer is generally hydraulically connected to the underlying Niagara aquifer, which consists of dolomite, shale and limestone of the Devonian age Milwaukee Formation and Silurian age Niagara Formation. This aquifer is the primary aquifer used in the Milwaukee vicinity for private domestic, commercial and some industrial wells. Underlying the Niagara aquifer is the Ordovician age Maquoketa shale, which is an aquitard between the Niagara aquifer and the underlying sandstone aquifer. The sandstone aquifer consists of Cambrian and Ordovician age sandstone and dolomite and is used for some high capacity commercial or industrial wells in the Milwaukee area.

According to the SEWRPC publication, the depth to seasonal high groundwater in the unconsolidated soils in the vicinity of the subject property was estimated to be about 10 to 30 feet in 1976. Based on a review of regional topographic maps, it appears shallow groundwater flow likely would be in a east-southeasterly direction towards Lincoln Creek, which is located approximately 950 feet to the east-southeast (Figure 1). However, localized conditions may affect the depth to groundwater and flow direction at the property. Flow direction in the deeper Niagara bedrock and sandstone aquifers likely trends in an easterly direction.

During this investigation, no evidence was noted that suggests operations at the property have impacted either the Niagara or sandstone aquifers. Well logs suggest 65 to 170 feet of clay soils overlie the Niagara aquifer at the property. This thick layer of clay would tend to minimize the potential for contaminants to migrate to either the Niagara or sandstone aquifer.

According to the logs reviewed for wells in the vicinity of the subject property (approximately 0.5 mile radius), 14 of the 21 wells were cased to a depth of at least 80 feet. Five of the well logs did not contain sufficient information to determine the depth of casing. However, these 5 wells penetrated into the dolomite bedrock to depths ranging from 96 to 310 feet. Thus, it appears likely these 5 wells would also be cased to a significant depth. The remaining two wells appear to be cased to 41 and 64 feet (depth where bedrock was encountered at both wells).

It was noted during the well log review that 19 of the 21 wells indicated use for residential purposes. However, because the wells are located in a developed area of the City of Milwaukee (with municipal water supplies available), it is likely these wells are no longer in use as a drinking water source. Another well was listed as being for a County Park (completion date November 1941). It is not known if this well is still in use, but it was cased into bedrock at 111 feet. The remaining well is listed as being for a tavern (completion date February 1938). It is not known if this well is still in use, but the well was completed to a depth of 310 feet (depth of casing not indicated).

PHASE II ESA FIELD INVESTIGATION

On September 20, 1991, two groundwater monitoring wells were installed (i.e., MW1 and MW2) at the property by Warzyn as a part of a Phase II Environmental Site Assessment. Copies of the soil boring logs and well construction and development forms can be found in Appendix C.

Fill material was encountered in both borings ranging from ground surface to a maximum depth of approximately 7.0 feet. The upper portions of the fill materials consisted of brown, fine to medium sand with some gravel (ranging from ground surface to 5.0 feet). Fill material beneath the sand in MW1 (ranging in depth from 5.0 to 7.0 feet) consisted of brown to grayish black lean clay, with a trace fine to medium sand and gravel. Beneath the fill material was a layer of stiff, mottled lean clay, with little fine to medium sand and trace gravel which extended to a maximum depth of 21.0 feet. Beneath the brown clay layer, a grayish brown lean clay, with little fine to medium sand and trace gravel, extended to the bottom soil borings at 25.5 feet.

Water levels measured during the time of drilling were at 4.0 feet below ground surface (bgs) in MW1 and dry for MW2. MW2 was measured five hours after drilling and was again dry.

On September 27, 1991, the groundwater monitoring wells were developed with a bailer. Prior to development, measured water levels were 6.31 feet bgs in MW1 and 19.57 feet bgs in MW2. On September 30, 1991, the groundwater monitoring wells were purged prior to sampling. The measured water levels prior to sample development were 18.61 feet bgs in MW1 and 20.02 feet bgs in MW2. On October 1, 1991, the groundwater monitoring wells were sampled. The measured water levels prior to sampling were 22.62 feet bgs in MW1 and 22.07 feet bgs in MW2.

These water level measurements indicate the monitoring wells have not fully stabilized. During the remedial investigation Warzyn will attempt to obtain consistent water level measurement from these wells and the proposed wells, in order to evaluate the direction of groundwater flow at the property.

PROPOSAL FOR REMEDIAL INVESTIGATION

Warzyn has developed this work plan to describe the field activities to be conducted during the remedial investigation portion of the closure plan. The purpose of the remedial investigation will be to determine the horizontal and vertical extent of contamination in soil and groundwater and evaluate need for remediation and potential remedial options to meet closure performance standards in accordance with NR 685.05. In addition, Warzyn will develop and implement a health and safety plan for the following field activities.

SOIL BORINGS, SAMPLING AND FIELD SCREENING

Warzyn will conduct a total of four soil borings (i.e., B3, B4, B5 and B6). Soil borings have been selected as an investigation method over a soil gas survey so that quantitative analytical results can be obtained. The proposed locations of the borings are shown on Figure 2. Additional soil borings may be conducted to the north and west if field observations during the soil borings (i.e., elevated PID readings) indicate an extended area of soil contamination laterally.

A truck-mounted rotary drill rig will be used to complete the borings. Soil samples will be collected using a hollow-stem auger (HSA) and split-spoon sampling. The samples will be collected every 2.5 feet to a maximum depth of 25 feet, in accordance with ASTM:D 1586-84 methods. As samples are obtained in the field, they will be visually classified by a Warzyn geologist in accordance with ASTM:D 2487-84 and ASTM:D 2488 methods. Representative portions of the samples will be returned to the laboratory for further examination and verification. Sample lithology will be recorded using the Unified Soil Classification System. Soil boring logs (WDNR Form 4400-122) documenting soil types and subsurface conditions will be completed by a Warzyn geologist and included in the project report.

The soil samples from each sampled interval will be split into several glass sample jars, including a four-ounce jar sealed with aluminum foil for headspace

screening and an eight-ounce jar for laboratory analysis. The soil samples in the four-ounce jars will be approximately one-half full.

The split spoon sampler will be cleaned between samples to minimize cross-contamination. The cleaning procedures will consist of a soap and water wash, with tap water and distilled water rinses. To avoid cross-contamination between soil borings, drilling augers and sampling equipment will be steam-cleaned between holes. If a boring is not converted into a groundwater monitoring well, it will be abandoned with bentonite slurry in accordance with the abandonment requirements of s.NR 141.25 Wis. Adm. Code. The abandonment will be documented on WDNR Form 3300-5B. Soil borings spoils will be placed into 55-gallon steel drums. Contaminated soil boring spoils (i.e., detectable levels of chlorinated solvents) will be disposed of as hazardous waste (i.e. F002), in accordance with Chapter NR 600 to 685 Wis. Adm. Code.

An HNu Systems Model 101 photoionization detector (PID) will be used to screen soil samples for the presence of volatile organic compounds (VOCs). Specifically, a 10.2 eV lamp will be used with the PID to screen the soils. This lamp has been selected based upon the ionization potential of tetrachloroethane (9.32 eV) and trichloroethene (9.47 eV). The PID will be calibrated daily with 52.1 ppm isobutylene gas in accordance with Warzyn's written instrument operating procedure. The four-ounce sample jars will be allowed to warm to approximately 70°F for a minimum of 30 minutes. The selection of soil samples for analysis will be based upon this PID screening, along with the visual evidence of potential contamination (i.e., stained soils). Two soil samples from each boring exhibiting the highest PID reading (if present), or where the boring intersects the groundwater table will be collected. The samples will be submitted for VOC analysis at Warzyn's Technical Services Laboratory in Madison, Wisconsin (WDNR Certification ID# 113138300).

The VOC analysis will utilize U.S. EPA Method 8010 and 8020 in SW-846, *Test Methods for Evaluating Solid Waste, September 1986*. The analytical detection limit for the tetrachloroethene and trichloroethene is 5 µg/kg.

GROUNDWATER MONITORING WELL INSTALLATION AND MONITORING

Warzyn will install and develop three groundwater monitoring wells which will be co-located at the soil boring locations (B3, B4, B6 as depicted in Figure 2). Well construction, development and sampling will meet the requirements outlined in Chapter NR 141 Wis. Adm. Code and in accordance with Warzyn's standard protocol (Appendix D). The well construction will be documented on WDNR

Form 4400-113A, while the development will be documented on WDNR Form 4400-113B. Each well will be constructed such that the well screen intersects the water table during seasonal fluctuations. In addition, well construction materials will be steam-cleaned prior to installation to avoid cross-contamination. The monitoring wells will be installed with flush-mounted protective covers and surface-sealed with concrete.

Two rounds of groundwater samples will be collected from the new and previously existing monitoring wells. The new wells will be developed as specified in NR 141 Wis. Adm. Code. Because the subsoils at the property consist of lean clay, the wells will not yield a continuous 5 to 10 well volumes, but instead will be bailed until further yield cannot be achieved. The wells will be allowed to stabilize (recharge) prior to sampling so the collected sample is representative of groundwater at that location. Prior to sample collection, wells will be purged by removing a maximum of 3 to 5 well volumes, or until further yield cannot be achieved. Purging and sample collection will be accomplished by using a stainless steel bailer. The purged groundwater will be containerized into 55-gallon drums. The two rounds of groundwater samples will be taken at least 30 days apart.

To avoid cross-contamination during groundwater sampling, the bailer will be decontaminated between wells using a trisodium phosphate (TSP) wash and triple distilled water rinse. A field blank, bailer blank, and duplicate will be collected to document the quality control (QC) of the sampling. The collected groundwater samples will be analyzed for VOCs. The VOC analysis will utilize U.S. EPA Method 8010/8020 in SW 846, *Test Methods for Evaluating Solid Waste, November 1986*. The analytical detection limit for tetrachloroethene and trichloroethene is 1.0 µg/L.

The soil and groundwater sample containers will be clearly marked using an indelible marking pen indicating the sample date, location, and identification number. The sample will be cooled to 4°C and shipped for analysis to Warzyn's Technical Services Laboratory using chain-of-custody procedures.

The top of each monitoring well will be surveyed and referenced to mean sea level using an off-site benchmark for determining future groundwater elevations. A survey map of the well locations will be included with the report. In addition, the survey group will indicate the presence of underground and aboveground utilities present at the subject property. The water levels in each well will be measured prior to sampling. In addition, three separate rounds of water levels will be measured in each well. However, because of the low permeability of the lean clays at the subject property, the measured water levels may not fully stabilize to accurately predict the direction of groundwater flow at the property. Therefore,

this data will be used to develop a preliminary water table contour map of the property.

REMEDIAL ACTION CLOSURE PLAN

Upon completion of the remedial investigation, Warzyn will prepare a Remedial Action Closure Plan describing the subsurface soil and groundwater sampling program, and findings obtained. Analytical results will be summarized in table form and will be discussed regarding potential environmental impact (e.g., groundwater standards in Chapter NR 140 Wis. Adm. Code). Conclusions will be given regarding the subsurface condition of the property through geologic cross-sections, boring logs, well construction maps, and water table maps. The Remedial Action Closure Plan will discuss recommendations for additional investigations and/or remedial alternatives. The remedial action alternatives will be discussed in regards to managing soils and groundwater disposal, the potential problems with the structural integrity of the building, and cost and schedule of the closure activities. Prior to the selection and implementation of a remedial action closure plan (if necessary) the appropriate clean up goals for the property will be discussed with the WDNR.

WORK SCHEDULE

As indicated in Table 1, Warzyn has developed a work schedule for implementation of the Remedial Action Closure Plan and the development of the Remedial Action Closure Plan. However, the work schedule does not include time frames for the implementation of any remedial action alternatives, since such alternatives have not been evaluated and selected. The work schedule will be implemented once this Remedial Action Closure Plan has been approved by the WDNR.

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TABLE 1

WORK SCHEDULE

REMEDIAL INVESTIGATION CLOSURE PLAN
 ESTATE OF AARON L. TILTON
 3217 WEST VILLARD AVENUE
 MILWAUKEE, WISCONSIN

TASK	DAYS												
	01	10	20	30	40	50	60	70	80	90	100	110	120
TASK 1: Soil Borings, Sampling, and Field Screening		_____											
TASK 2: Groundwater Monitoring Well Installation and Development		_____											
TASK 3: Groundwater Sampling and Analysis				_____									
TASK 4: Groundwater Elevations				_____									
TASK 5: Remedial Action Closure Plan										_____			
TASK 6: Meetings													
Kick-off	*												
Post Remedial Investigation													*

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Legend: * Meeting

Management Review
Other

Technical Review
Project Manager

Graphic Standards
Lead Professional

QUALITY CONTROL

T7N T8N



QUADRANGLE LOCATION



SCALE IN FEET

FIGURE 1

NOTES

BASE MAP DEVELOPED FROM THE MILWAUKEE, WISCONSIN 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1958, PHOTOREVISED 1971.

WARZYN INC.

Developed By:	Drawn By: CCM
Approved By: <i>[Signature]</i>	Date: 5/21/92
Reference:	
Revisions:	

SITE LOCATION MAP

REMEDIAL INVESTIGATION CLOSURE PLAN
ESTATE OF AARON L. TILTON
3217 WEST VILLARD AVENUE
MILWAUKEE, WISCONSIN

Drawing Number
2733701 **A1**



APPENDIX A

CHAIN-OF-CUSTODY AND
ANALYTICAL RESULTS FOR SOIL SAMPLES



CHAIN OF CUSTODY RECORD

PROJ. NO. 27337-01		PROJECT NAME Villar & Phase II				NO. OF CON- TAINERS	<div style="border: 1px solid black; padding: 5px; transform: rotate(-45deg); display: inline-block;"> VOCs 601/802 8010/8020 </div>					REMARKS Soil
LOCATION: Milwaukee, WI		SAMPLERS: (Signature) Kenneth R. Kuehn 105 9/20/91										
LAB NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
3337001	9/20/91	12:40		X	B1-S2	1x802	X					
1002	9/20/91	14:10		X	B1-S7	1x802	X					
V-003	9/20/91	12:00		X	B2-S7	1x802	X					
	9/20/91			X	Temperature Blank	1x402						
Relinquished by: (Signature) Kenneth R. Kuehn 105		Date / Time 9/20/91 15:50	Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Date / Time	Received by: (Signature)				
Relinquished by: (Signature) <i>[Signature]</i>		Date / Time 9/20/91 16:45	Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Date / Time	Received by: (Signature)				
Relinquished by: (Signature)		Date / Time	Received for Laboratory by: (Signature) <i>[Signature]</i>		Date / Time 9-23-91 9:40 AM							
Remarks Shipped Federal Express on 9/20/91 to Warzyn in Madison WI under chain-of-custody Seal # 90-009251					PROJECT MANAGER: Kevin D. Shaver							
<i>Substrate, seal on ice seal fed exp</i>												

LABORATORY RESULTS VOLATILE ORGANIC REPORT

Project: Villard Phase II

Project #: 27337.01

Location: Milwaukee, Wisconsin

Date Sampled: 9/20/91

Compound	Reporting Limits (ug/kg)	3337-001 <u>B1-S2</u>	3337-002 <u>B1-S7</u>	3337-003 <u>B2-S7</u>
Benzene	5.0	<5.0	<5.0	<5.0
Bromodichloromethane	5.0	<5.0	<5.0	<5.0
Bromoform	5.0	<5.0	<5.0	<5.0
Bromomethane	10	<10	<10	<10
Carbon tetrachloride	5.0	<5.0	<5.0	<5.0
Chlorobenzene	5.0	<5.0	25	<5.0
Chlorodibromomethane	5.0	<5.0	<250 (a)	<5.0
Chloroethane	10	<10	<10	<10
2-Chloroethylvinyl ether	50	<50	<50	<50
Chloroform	5.0	<5.0	<5.0	<5.0
Chloromethane	10	<10	<10	<10
1,2-Dichlorobenzene	5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	5.0	2800	<20 (a)	<5.0
trans-1,2-Dichloroethene	5.0	26	<5.0	<5.0
1,2-Dichloropropane	5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	5.0	<5.0	<5.0	<5.0
Ethylbenzene	5.0	<5.0	<5.0	<5.0
Methylene chloride	15	<15	<15	<15
1,1,2,2-Tetrachloroethane	5.0	<5.0	<5.0	<5.0
Tetrachloroethene	5.0	37000	140000	<5.0
Toluene	5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	5.0	<5.0	<5.0	<5.0
Trichloroethene	5.0	3000	420 (b)	<5.0
Trichlorofluoromethane	5.0	<5.0	<5.0	<5.0
Vinyl chloride	5.0	31	<5.0	<5.0
m and p-Xylene	10	<10	<10	<10
o-Xylene	5.0	<5.0	<5.0	<5.0

(a) Elevated quantitation limit necessary to overcome interference.

(b) Result should be considered estimated, concentration exceeds working calibration range.

Solids are analyzed on an "as received" or wet weight basis.

Method Reference: SW846, "Test Methods for Evaluating Solid Waste", November 1986. Method 8010/8020.

Ck'd: *[Signature]* App'd: *[Signature]*
 Date Issued: 10/15/91

APPENDIX B

CHAIN-OF-CUSTODY AND
ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES



CHAIN OF CUSTODY RECORD

PROJ. NO. 27337.01		PROJECT NAME Shop Rite Food Store				NO. OF CON- TAINERS	Volatile organic compounds (VOC)					REMARKS SW
LOCATION: Milwaukee, WI												
SAMPLERS: (Signature) Kenneth R. Kueh												
LAB NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
3407-001	10/1/91	7:15 AM		X	well B1 (groundwater)	2	/				* Vials preserved w/ HCl	
1-003	10/1/91	7:25 AM		X	Barter Blank	2	/					
1-002	10/1/91	7:35 AM		X	well B2 (groundwater)	2	/					
Relinquished by: (Signature) Kenneth R. Kueh			Date / Time 10/1/91 8:30 AM		Received by: (Signature)			Relinquished by: (Signature)		Date / Time		Received by: (Signature)
Relinquished by: (Signature)			Date / Time		Received by: (Signature)			Relinquished by: (Signature)		Date / Time		Received by: (Signature)
Relinquished by: (Signature)			Date / Time		Received for Laboratory by: (Signature) D. J. [Signature]			Date / Time 10-2-91 10:00 AM				
Remarks						PROJECT MANAGER: Kevin Shaver.						
Shipped via Badger Bus on 10/1/91 under chain of custody seals # 90004195 90004198 Shipped, sealed on ice reed Badger												

LABORATORY RESULTS VOLATILE ORGANIC REPORT

Project: Shop Rite Food Store

Project #: 27337.01

Location: Milwaukee, Wisconsin

Date Sampled: 10/1/91

<u>Compound</u>	<u>Reporting Limits (ug/L)</u>	<u>3407-001 Well B1 (Groundwater)</u>	<u>3407-002 Well B2 (Groundwater)</u>	<u>3407-003 Bailer Blank</u>
Benzene	1.0	<1.0	<1.0	<1.0
Bromodichloromethane	1.0	<1.0	<1.0	<1.0
Bromoform	1.0	<1.0	<1.0	<1.0
Bromomethane	2.0	<2.0	<2.0	<2.0
Carbon tetrachloride	1.0	<1.0	<1.0	<1.0
Chlorobenzene	1.0	2.0	<1.0	<1.0
Chlorodibromomethane	1.0	<250 (a)	<1.0	<1.0
Chloroethane	2.0	<2.0	<2.0	<2.0
2-Chloroethylvinyl ether	10	<10	<10	<10
Chloroform	1.0	<1.0	<1.0	<1.0
Chloromethane	2.0	<2.0	<2.0	<2.0
1,2-Dichlorobenzene	1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	1.0	1.8	<1.0	<1.0
cis-1,2-Dichloroethene	1.0	560	<1.0	<1.0
trans-1,2-Dichloroethene	1.0	5.8	<1.0	<1.0
1,2-Dichloropropane	1.0	1.3	<1.0	<1.0
cis-1,3-Dichloropropene	1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	1.0	<1.0	<1.0	<1.0
Ethylbenzene	1.0	<1.0	<1.0	<1.0
Methylene chloride	3.0	<3.0	<3.0	<3.0
1,1,2,2-Tetrachloroethane	1.0	<1.0	<1.0	<1.0
Tetrachloroethene	1.0	14000	<1.0	<1.0
Toluene	1.0	16	<1.0	<1.0
1,1,1-Trichloroethane	1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	1.0	<1.0	<1.0	<1.0
Trichloroethene	1.0	220	<1.0	<1.0
Trichlorofluoromethane	1.0	<1.0	<1.0	<1.0
Vinyl chloride	1.0	11	<1.0	<1.0
m and p-Xylene	2.0	<2.0	<2.0	<2.0
o-Xylene	1.0	<1.0	<1.0	<1.0

(a) Elevated quantitation limit necessary to overcome interference.

Method Reference: EPA-600, "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewaters", July 1982. Method 601/602.

Ck'd: *aw* App'd: *666*
 Date Issued: 10/16/91

APPENDIX C

SOIL BORING LOGS, WELL CONSTRUCTION AND
DEVELOPMENT FORMS FOR MW1 AND MW2

Facility/Project Name ESTATE OF AARON L. TILTON		License/Permit/Monitoring Number 27337.01	Boring Number MW1	
Boring Drilled By (Firm name and name of crew chief) J&J Soil Testing Ltd., Eugene Lehman		Date Drilling Started 9/20/91	Date Drilling Completed 9/20/91	Drilling Method Rotary HSA
DNR Facility Well No.	WI Unique Well No.	Common Well Name MW1	Final Static Water Level ____ Feet MSL	Surface Elevation ____ Feet MSL
Boring Location State Plane _____ N, _____ E S/C/N Lat _____ NW 1/4 of SW 1/4 of Section 36, T 8 N, R 21 E/W Long _____		Local Grid Location (if applicable) ____ Feet <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W		
County Milwaukee		DNR County Code 41	Civil Town/City/or Village City of Milwaukee	

Sample Number	Length Recovered (in.)	Blow Counts	Depth in Ft	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					ROD/Comments			
									Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200				
				5" ASPHALT.													
1	14	11		FILL: 4" Brown Fine to Medium Sand, Some Gravel.				70.0									SS
2	18	0		12" Brown Fine to Medium Sand, Trace Gravel. Black Fine to Medium Sand, Trace Gravel and Cinders.				105.0									SS
			5	Note: Water Observed at 4.0 Feet Above Clay Layer.													
3	20	5		FILL: Brown Lean Clay, Trace Fine to Medium Sand and Gravel.				50.0									SS
				Note: Grading into Grayish Black in Color. Organic Wood Pieces Noted at 5.0 Feet.													SS
4	24	16		Stiff Brown Mottled Lean CLAY, Little Fine to Medium Sand, Trace Gravel (CL).				100.0									SS
5	24	23						7.5									SS
6	24	17						200.0									SS
7	24	14						500.0									SS
8	24	15						450.0									SS
9	15	15		Grayish Brown Lean CLAY, Little Fine to Medium Sand, Trace Gravel (CL).				12.0									SS
10	24	10						7.0									SS
			25	End of Boring at 25.5 Feet.													

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] / Firm **WARZYN INC.**

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Facility/Project Name ESTATE OF AARON L. TILTON		License/Permit/Monitoring Number 27337.01	Boring Number MW2	
Boring Drilled By (Firm name and name of crew chief) J&J Soil Testing Ltd., Eugene Lehman		Date Drilling Started 9/20/91	Date Drilling Completed 9/20/91	Drilling Method Rotary HSA
DNR Facility Well No.	WI Unique Well No.	Common Well Name MW2	Final Static Water Level ____ Feet MSL	Surface Elevation ____ Feet MSL
Boring Location State Plane _____ N, _____ E S/C/N		Local Grid Location (if applicable)		Borehole Diameter 2 1/4 inches

State Plane **NW** 1/4 of **SW** 1/4 of Section **36**, T **8** N, R **21** **(E/W)** Long _____ Feet N E
 S W

County **Milwaukee** DNR County Code **41** Civil Town/City/or Village **City of Milwaukee**

Sample Number	Length Recovered (in.)	Blow Counts	Depth in Ft	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					ROD/Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200		
1	10	10	5 10 15 20 25	4" ASPHALT. FILL: 8" Brown Fine to Medium Sand, Some Gravel. Brown to Black Lean Clay, Little Fine to Medium Sand, Trace Gravel.				0.2						SS	
2	20	16		Stiff Brown Mottled Lean CLAY, Little Fine to Medium Sand, Trace Gravel (CL).				ND							SS
3	24	28						ND							SS
4	24	25						ND							SS
5	24	16		NOTE: Becoming Less Stiff at Approximately 11.0 Feet.				0.2							SS
6	24	14						ND							SS
7	24	14		Grayish Brown Lean CLAY, Little Fine to Medium Sand, Trace Gravel (CL).				0.4							SS
8	24	12		Note: Thin Gray Silt Seams Noted From 18.5 to 25.5 Feet.				0.2							SS
9	24	11						0.2							SS
10	24	14						0.2							SS
				End of Boring at 25.5 Feet. ND = Nondetect.											

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ / Firm **WARZYN INC.**

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Facility/Project Name Shop Rite Supermarket	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S _____ ft. <input type="checkbox"/> E <input type="checkbox"/> W _____	Well Name BTMW1
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number _____ DNR Well Number _____
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed 09/20/91 m m d d y y
Distance Well Is From Waste/Source Boundary NA ft.	Section Location of Waste/Source NW 1/4 of SE 1/4 of Sec. 36, T. 8 N, R. 21 E, W.	Well Installed By: (Person's Name and Firm) Kenneth R Kuehn Warzyn, Inc.
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input checked="" type="checkbox"/> Not Known	

A. Protective pipe, top elevation NA ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation NA ft. MSL	2. Protective cover pipe Flushmount Cover a. Inside diameter: .8.1 in. b. Length: 12.0 ft. c. Material: Aluminum Steel <input type="checkbox"/> 04 Other <input checked="" type="checkbox"/>
C. Land surface elevation 0000.0 ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom 1.8 ft. MSL or _____	3. Surface seal: Bentonite <input type="checkbox"/> 30 Concrete <input checked="" type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input checked="" type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	4. Material between well casing and protective pipe Flushmount Cover Bentonite <input type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Sand Other <input checked="" type="checkbox"/>
13. Sieve analysis, attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: (chips) a. Granular Bentonite <input checked="" type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> 31 d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. 3 Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input checked="" type="checkbox"/> 08
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input checked="" type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. Bentonite Chips Other <input checked="" type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input checked="" type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. Red Flint Sands and Gravels #45/55 b. Volume added 2 ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe NA	8. Filter pack material: Manufacturer, product name and mesh size a. Red Flint Sands and Gravels #30 b. Volume added 6 ft ³
17. Source of water (attach analysis): NA	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top _____ ft. MSL or 1.5 ft.	10. Screen material: Flush Threaded PVC (40) a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top _____ ft. MSL or 11.0 ft.	b. Manufacturer Timco
G. Filter pack, top _____ ft. MSL or 13.5 ft.	c. Slot size: 0.010 in.
H. Screen joint, top _____ ft. MSL or 15.0 ft.	d. Slotted length: 10.0 ft.
I. Well bottom _____ ft. MSL or 25.0 ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
J. Filter pack, bottom _____ ft. MSL or 25.5 ft.	
K. Borehole, bottom _____ ft. MSL or 25.5 ft.	
L. Borehole, diameter .62 in.	
M. O.D. well casing 2.25 in.	
N. I.D. well casing 2.00 in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature **Kenneth R Kuehn** Firm **Warzyn, Inc**

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 143, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route to: Solid Waste Haz. Waste Wastewater
Env. Response & Repair Underground Tanks Other

Facility/Project Name <u>Shop Rite Supermarket</u>	County Name <u>Milwaukee</u>	Well Name <u>B1</u>
Facility License, Permit or Monitoring Number _____	County Code _____	Wis. Unique Well Number _____
		DNR Well Number _____

1. Can this well be purged dry? Yes No
2. Well development method
- 41 surged with bailer and bailed
 - 61 surged with bailer and pumped
 - 42 surged with block and bailed
 - 62 surged with block and pumped
 - 70 surged with block, bailed and pumped
 - 20 compressed air
 - 10 bailed only
 - 51 pumped only
 - 50 pumped slowly
 - Other _____
3. Time spent developing well 39 min.
4. Depth of well (from top of well casing) 24.7 ft.
5. Inside diameter of well 6.20 in.
6. Volume of water in filter pack and well casing 18.4 gal.
7. Volume of water removed from well 9.0 gal.
8. Volume of water added (if any) NA gal.
9. Source of water added NA
10. Analysis performed on water added? Yes No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. <u>6.31</u> ft.	<u>24.37</u> ft.
Date	b. <u>09/22/91</u> m m d d y y	<u>09/22/91</u> m m d d y y
Time	c. <u>1:03</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.	<u>1:42</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.
12. Sediment in well bottom	<u>2.4</u> inches	<u>00.0</u> inches
13. Water clarity	Clear <input type="checkbox"/> 10 Turbid <input checked="" type="checkbox"/> 15 (Describe) <u>Brown in Color with many fines (silt). No odor or sheen observed.</u>	Clear <input type="checkbox"/> 20 Turbid <input checked="" type="checkbox"/> 25 (Describe) <u>Brown in Color with many fines (silt). No odor or sheen observed.</u>
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	_____ mg/l	_____ mg/l
15. COD	_____ mg/l	_____ mg/l

16. Additional comments on development:

Well developed by: Person's Name and Firm

Name: Kenneth R Kuehn
Firm: Warzgn Inc.

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kenneth R Kuehn
Print Initials: KR K
Firm: Warzgn, Inc.

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

Facility/Project Name <u>Shop Rite Supermarket</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>B2 MW2</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number _____ DNR Well Number _____
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source <u>NE 1/4 of SE 1/4 of Sec. 36, T. 8 N, R. 21</u> <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Date Well Installed <u>09/20/91</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>NA</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input checked="" type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Kenneth R Kuehw</u> <u>Warzyn, Inc.</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

A. Protective pipe, top elevation <u>NA</u> ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>NA</u> ft. MSL	2. Protective cover pipe : <u>Flushmount Cover</u> a. Inside diameter: <u>8.1 in.</u> b. Length: <u>12.0 ft.</u> c. Material: <u>Aluminum</u> Steel <input type="checkbox"/> 04 Other <input checked="" type="checkbox"/> d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
C. Land surface elevation <u>0000.0</u> ft. MSL	3. Surface seal: Bentonite <input type="checkbox"/> 30 Concrete <input checked="" type="checkbox"/> 01 Other <input type="checkbox"/>
D. Surface seal, bottom _____ ft. MSL or <u>1.8</u> ft.	4. Material between well casing and protective cover pipe <u>Flushmount Cover</u> : Bentonite <input type="checkbox"/> 30 Annular space seal <input type="checkbox"/> <u>Sand</u> Other <input checked="" type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input checked="" type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	5. Annular space seal: a. Granular <u>Bentonite Chips</u> <input checked="" type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> 31 d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. <u>1.5</u> Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input checked="" type="checkbox"/> 08 <u>Chips</u>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Bentonite seal: a. Bentonite chips <input checked="" type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. <u>Bentonite chips</u> Other <input checked="" type="checkbox"/>
14. Drilling method used: Rotary <input type="checkbox"/> 50, Hollow Stem Auger <input checked="" type="checkbox"/> 41, Other <input type="checkbox"/>	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint Sands and Gravels #45/55</u> b. Volume added <u>0.5</u> ft ³
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input checked="" type="checkbox"/> 99	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint Sands and Gravels #30</u> b. Volume added <u>3</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe <u>NA</u>	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>NA</u>	10. Screen material: <u>Flush threaded Pvc (40)</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
E. Bentonite seal, top _____ ft. MSL or <u>1.5</u> ft.	b. Manufacturer <u>Timco</u> c. Slot size: <u>0.010 in.</u> d. Slotted length: <u>10.0 ft.</u>
F. Fine sand, top _____ ft. MSL or <u>11.0</u> ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
G. Filter pack, top _____ ft. MSL or <u>13.0</u> ft.	
H. Screen joint, top _____ ft. MSL or <u>15.0</u> ft.	
I. Well bottom _____ ft. MSL or <u>25.0</u> ft.	
J. Filter pack, bottom _____ ft. MSL or <u>25.5</u> ft.	
K. Borehole, bottom _____ ft. MSL or <u>25.5</u> ft.	
L. Borehole, diameter <u>6.2</u> in.	
M. O.D. well casing <u>2.25</u> in.	
N. I.D. well casing <u>2.00</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature Kenneth R Kuehw Firm Warzyn, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats. and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route to: Solid Waste Haz. Waste Wastewater
Env. Response & Repair Underground Tanks Other

Facility/Project Name <u>Shop Rite Supermarket</u>	County Name <u>Milwaukee</u>	Well Name <u>B2</u>
Facility License, Permit or Monitoring Number _____	County Code _____	Wis. Unique Well Number _____
		DNR Well Number _____

1. Can this well be purged dry? Yes No
2. Well development method
- surged with bailer and bailed 41
 - surged with bailer and pumped 61
 - surged with block and bailed 42
 - surged with block and pumped 62
 - surged with block, bailed and pumped 70
 - compressed air 20
 - bailed only 10
 - pumped only 51
 - pumped slowly 50
 - Other _____
3. Time spent developing well 1.7 min.
4. Depth of well (from top of well casing) 23.5 ft.
5. Inside diameter of well 6.20 in.
6. Volume of water in filter pack and well casing 4.0 gal.
7. Volume of water removed from well 1.7 gal.
8. Volume of water added (if any) NA gal.
9. Source of water added NA
10. Analysis performed on water added? Yes No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. <u>19.57</u> ft.	<u>23.39</u> ft.
Date	b. <u>09/22/91</u> m m d d y y	<u>09/22/91</u> m m d d y y
Time	c. <u>7:38</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<u>8:05</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.
12. Sediment in well bottom	<u>00.0</u> inches	<u>00.0</u> inches
13. Water clarity	Clear <input type="checkbox"/> 10 Turbid <input checked="" type="checkbox"/> 15 (Describe) <u>Brown in Color with little fines (silt). No odor or sheen observed.</u>	Clear <input type="checkbox"/> 20 Turbid <input checked="" type="checkbox"/> 25 (Describe) <u>Brown in Color with little fines (silt). No odor or sheen observed.</u>
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	_____ mg/l	_____ mg/l
15. COD	_____ mg/l	_____ mg/l

16. Additional comments on development:

Well developed by: Person's Name and Firm

Name: Kenneth R Kuehn

Firm: Warzgn, Inc

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kenneth R Kuehn

Print Initials: KRK

Firm: Warzgn, Inc

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

APPENDIX D

PROTOCOL FOR INSTALLATION OF
GROUNDWATER MONITORING WELLS



APPENDIX D

PROTOCOL FOR INSTALLATION OF
GROUNDWATER MONITORING WELLS

Protocol for Groundwater Monitoring Well Installation and Sampling

Groundwater monitoring wells are installed using hollow stem auger (HSA) borings. Soil sampling is conducted during well installation, according to Warzyn's Subsurface Soil Sampling Protocol. The drilling and well installation are directed by Warzyn's Site Geologist, who logs geologic materials encountered during drilling, field screens auger cuttings and soil samples, and observes the drilling activities and supervises installation of groundwater monitoring wells.

Wells are constructed of 2-inch I.D. Schedule 40 flushjoint PVC riser pipe, above a 0.010-inch slot, flushjoint PVC screen. The annular space surrounding the screen is backfilled with silica sand filter pack to a height not less than 2 feet above the top of the well screen. A minimum of one foot of bentonite pellets or granular bentonite is placed above this backfill, to provide a low permeability seal at the ground surface. Well screens are positioned to monitor selected areas of the water column. In high traffic areas, a flushmount protective casing with a locking well cap is generally installed at the surface and secured with concrete. In low traffic areas, a "stick-up" locking protective casing and protective bumper posts are typically installed.

After installation, wells are developed using a stainless steel bailer by purging at least 5 to 10 well volumes of water from each well, or until the well water is visually clear. Wells are allowed to stabilize prior to sampling, to ensure the collected sample is representative of groundwater at the location. Prior to sample collection the wells are purged by removing a maximum of 3 to 5 well volumes, or until further yield cannot be achieved. Purging and sample collection is accomplished using a teflon or stainless steel bailer.

The bailer is decontaminated between wells using a tri-sodium phosphate (TSP) wash and triple distilled water rinse, as per U.S. EPA protocol. All samples are collected in laboratory glassware. All drilling equipment and tools are steam-cleaned prior to mobilization onto the site, between boreholes, and upon completion of the drilling program. Well materials are also steam-cleaned prior to installation.

In accordance with Warzyn's Site Safety Plan, a photoionization detector (PID) and explosimeter are used to monitor ambient air concentrations at the sampling locations. Personal protective equipment is utilized by site personnel during performance of sampling activities, as specified in the Site Safety Plan.

Groundwater samples are collected, placed in laboratory cleaned, glass jars and labeled, identifying sample number, location and date, and sampling personnel. Samples submitted for analysis are preserved on ice and shipped in a cooler overnight to Warzyn's analytical laboratory in Madison, Wisconsin. Warzyn standard chain of custody procedures are followed regarding shipment and receipt of samples. As part of the Quality Assurance/Quality Control (QA/QC) procedure for groundwater sampling, duplicate and trip blank samples may be collected and submitted for analyses. A duplicate consists of filling two sets of sample bottles using standard sampling equipment and procedures. A trip blank consists of two 40-ml vials prepared with distilled water and placed with the samples transported.

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