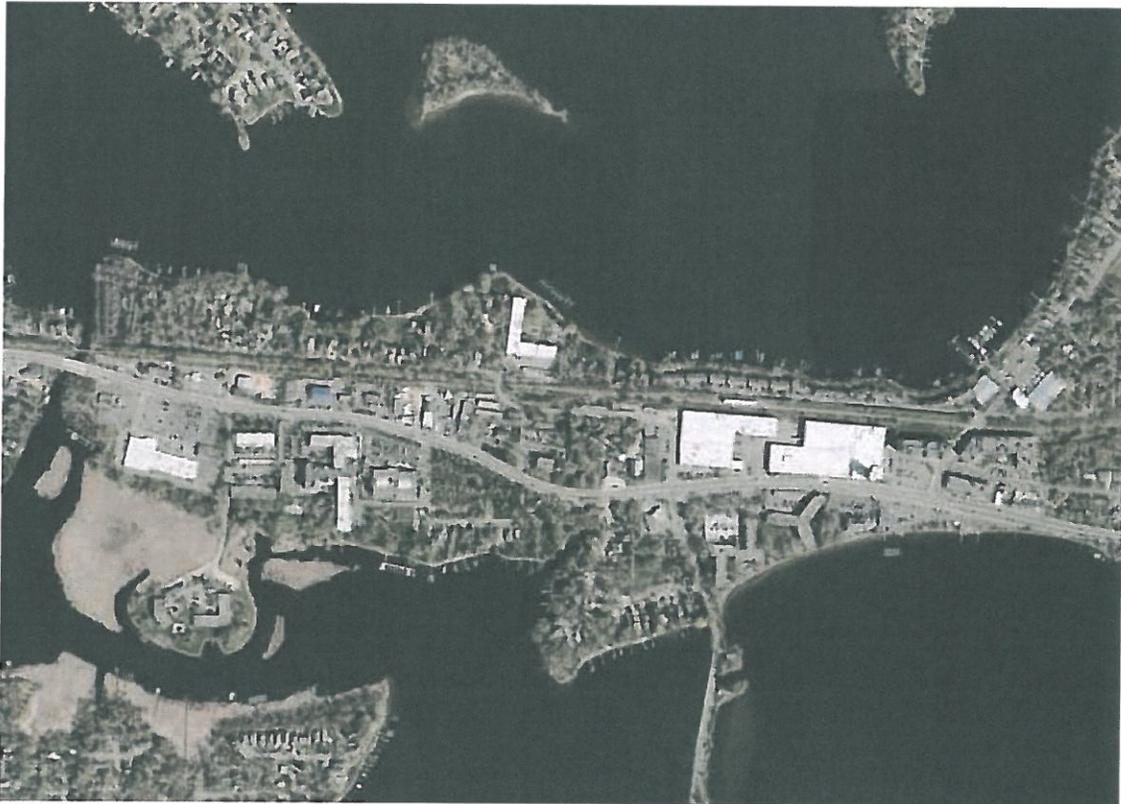


# Limited Environmental Site Assessment Spring Park Wells Site Assessment Project, Spring Park, Minnesota





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June 19, 2014

Mr. Kevin Mustonen  
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RE: Limited Environmental Site Assessment – Spring Park Wells Site Assessment;  
AECOM Project 60305958

Dear Mr. Mustonen,

AECOM Technical Services, Inc. (AECOM) has completed a Limited Environmental Site Assessment for the Spring Park Wells. The assessment was based on a desk-top hydrogeologic review and a historical background evaluation for sites that have/had a potential to manage chlorinated volatile organic compounds (VOCs). Chlorinated VOCs are the contaminants of concern (COC) for this assessment since they have been detected in the City's water at low concentrations. A total of 19 Environmental Sites with a potential to impact the City of Spring Park municipal well field with COCs were identified.

Based on this review the following conclusions were reached:

- Five sites were identified with a known release of COCs to the environment
- Three sites (one former manufacturing facility and two dry cleaners) were rated as having a high potential to release COCs into the environment.
- Eleven sites, former filling stations, machine shops and etc., were rated with a medium potential to release COCs.

The geologic assessment did not identify a pathway that made the wells vulnerable to surface releases of COC from the Environmental Sites. Recommendations for further actions were made to determine the source of impacts to the municipal well field.

If you have any questions regarding this report, please feel free to contact us.

Respectfully,

Craig B. Larson, PG  
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cc: Richard Jolley, MPCA  
Encs.

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## Executive Summary

The Limited Environmental Site Assessment (ESA) was performed to identify Environmental Sites with the potential to impact the City of Spring Park municipal well field. Trichloroethylene (TCE) has been identified in water samples from the municipal distribution system at the water treatment plant since 2004. Water samples from two of the three municipal wells (Wells #1 and #2) have had identifications of TCE since 2008. None of the identified concentrations in the water system or individual wells have exceeded the applicable USEPA Maximum Contaminant Level (MCL). TCE is a volatile organic compound (VOC) commonly used as a solvent in commercial and industrial operations such as metal degreasing and dry cleaning.

The results of the Limited ESA identified 19 Environmental Sites with potential for release of VOC solvents to the environment within an approximately one-half mile radius of the municipal well field. The identified sites included manufacturing facilities, dry cleaners, automobile repair stations and machine shops that formerly operated within the study area.

Two former manufacturing facilities (Advance Manufacturing and JR Clark Company) operated in the City from at least the late 1940s until the 1970s and functioned prior to the installation of municipal water and sewer in 1963-1964. Both manufacturing facilities included paint booth areas. Industrial painting operations commonly used chlorinated solvents for cleaning operations. The facilities were located approximately 1,000 feet east of the municipal well field. Both facilities had groundwater wells. A septic system was documented at the JR Clark Company.

TCE impacted groundwater is currently being remediated in the vicinity of the former Advance manufacturing plant. No known solvent impacts have been identified for the JR Clark Company manufacturing facility now occupied by the Tonka Business Center. Both of the sites are located hydrogeologically downgradient of the Spring Park municipal well field based on regional data.

Three former dry cleaner businesses were identified within the study area. The former Marina Center, located approximately 2300 feet west of the municipal well field, is a known solvent release site. The horizontal extent of solvent impacts appears to be limited to the release site. Regal Cleaners operated at 4500 Shoreline Drive in the 1990s on property located approximately 1300 feet west of the municipal well field. A dry cleaner operated at 4008 Shoreline Drive located approximately 2,200 feet east of the municipal well field. Neither the former Regal Cleaners site nor the former dry cleaner at 4008 Shoreline Drive are identified release sites. The dry cleaner sites are rated as having high potential to release VOCs.

A historical gas station at 4332 Shoreline Drive was identified adjacent to the south side of the municipal well field. A Phase II Environmental Site Assessment (ESA) of the property identified a low concentration of one VOC in groundwater at the site. Historical evidence of outside storage of barrels at the property was identified. No soil borings for the Phase II ESA were conducted in the barrel storage area. Potential exists that release of solvents could have occurred. This site was rated with medium potential to release VOCs. The analytical results associated with the Phase II ESA did not indicate the presence of TCE in groundwater.

Six additional former filling stations, an existing filling station, three former machine shops and a former paint store were identified in the study area. These facilities were rated as having medium potential to release VOCs.

No direct pathway for TCE migration to the well field has been identified; however, the presence of the TCE in the wells indicates that a source and pathway are present. Possible pathways could include movement of dense phase non-aqueous phase liquid (DNAPL), a direct conduit to deeper aquifers such as an incorrectly sealed well, movement of contaminants along a preferred pathway such as a utility corridor or other subsurface feature. Finally, groundwater contamination could be present in the shallow aquifer and being introduced to the well from a damaged well casing.

AECOM has made the following recommendations for further actions:

- Develop a work plan to investigate groundwater quality in the unconsolidated deposits in the vicinity of the well field. The investigation may include installation of soil vapor probes, temporary shallow monitoring wells, and deep monitoring wells. Development of a discrete depth groundwater sampling program may also be considered.
- Consideration should be given to inspecting the integrity of the municipal well casings with video and other appropriate downhole logging methods.
- Conduct a Phase II Environmental Site Assessment at the Former Factory Site/JR Clark Co (Site10). This site is of special concern since this assessment identified the possible presence of septic tanks in use during a period in which COCs could have been used at the site. The timeframe pre-dates RCRA regulations mandating appropriate storage and disposal of hazardous wastes. A historical photograph from 1969 shows numerous barrels stored outdoors without secondary containment.
- Sealing methods protective of the environment should be confirmed for deep wells within the study area to determine if they present a pathway for groundwater contamination to migrate to deeper aquifers. The following wells were noted as a concern:
  - Three wells associated with the JR Clark are of particular concern due the high potential for COCs to be present in the vicinity of these wells.
  - A domestic well, identified original owner Anna Trap, should be confirmed to be inactive and properly sealed.
  - Records are unclear if the wells associated with former Norling's Landscaping location are presently active. If any of these wells are inactive, they should be sealed.
  - Records are unclear if the Boomerang Laboratories wells are currently being used. If these wells are inactive, they should be sealed.

Prior to sealing the wells, groundwater samples should be collected for analysis of COCs if possible. The appropriateness of a casing evaluation should also be considered. Finally, it should be noted that no single up-to-date data source has been identified for well sealing records. Therefore, the status of the wells within the study area is not known with certainty.

- Groundwater samples for analysis of the COCs should be collected from the wells associated with Norling's Landscaping, both locations, and Boomerang Laboratories, if they are not sealed.

## 1.0 Introduction

AECOM has completed the Limited Environmental Site Assessment (ESA) of the Spring Park Wells Site Assessment project area in Spring Park, Minnesota (the project). Low levels of chlorinated volatile organic compounds (VOCs) have been detected in two of the three municipal wells. The project included the identification of properties (Environmental Sites) within the study area using environmental databases and other historical information. The Environmental Sites were assessed to determine if environmental conditions exist that could impact the Spring Park municipal wells. This work is being conducted since the Minnesota Pollution Control Agency (MPCA) is interested in identifying a possible source(s) of the VOC contamination.

### 1.1 Scope and Methods of Work

The Spring Park study area stretches approximately one-half mile to the east and west of the Spring Park municipal well field, see Figures 1 and 2 in Appendix A. The scope of work was conducted to identify known and potential Environmental Sites within the study area. In addition, a desktop hydrogeologic assessment was conducted to determine possible pathways for the Environmental Sites to impact the wells. The ESA is limited to interpretation of potential for identified Environmental Sites to impact the Spring Park municipal well field with contaminants of concern (COCs). The COCs for this project are chlorinated VOCs, particularly trichloroethylene (TCE).

Environmental Sites were identified through review of various information sources including an environmental database search; review of historical information including Sanborn Fire Insurance Maps, aerial photographs, city directories, topographic maps; City of Spring Park and MPCA files; and, a site reconnaissance. Identified environmental sites, as listed in environmental databases or interpreted from historical information, were plotted on a map of the area (Figures 1 and 2, Appendix A). Primary sources of geologic information reviewed included Hennepin County Hydrogeologic Atlas (MGS, 1989), Minnesota Department of Health (MDH) County Well Index (CWI) (MDH, 2014a), various environmental investigations conducted for the MPCA, and the Wellhead Protection Plan for the City of Spring Park (MDH, 2010).

Environmental Sites were evaluated for potential to impact the municipal well field based on the assumption that COCs were stored or used at the sites. Environmental Sites with limited potential for storage or use of the COCs were not included in the list prepared for this report of Environmental Sites with potential for environmental impact to the City of Spring Park municipal well field.

Environmental sites were rated as having a known release or a high, medium, or low potential to release COCs to the environment. The rating system was based on the type of environmental database listing for an identified site and potential for historical uses of COCs at a property. The ratings are described below:

- Known – Release of COC to the environment documented.
- High - Active and inactive MPCA Voluntary Investigation and Cleanup (VIC) and Minnesota Environmental Response and Liability Act (MERLA, State Superfund) sites, active and inactive dump sites, active leaking underground storage tank (LUST) sites and dry cleaner sites with a potential to manage COCs.

- Medium - Closed LUST sites, machine shops, and sites where vehicle repair or body work activities could have occurred where COCs have a potential to have been managed.
- Low - Hazardous waste generators such as small quantity generators of hazardous waste and residences with heating oil tanks that typically would not manage COCs.

This ranking system does not address the potential for the site to impact the well field based on hydrogeologic conditions.

## **1.2 Resources**

The following information resources were used to conduct this assessment. The data were used to prepare a summary for each of the Environmental Sites, which is included as Appendix B.

### **1.2.1 Environmental Database Report**

Environmental Data Resources Inc. (EDR) prepared an EDR Radius Map™ Report (EDR Report) centered on the location of the City of Spring Park municipal wells. The EDR Report identified properties listed on various environmental registries located within specified distances of the project area polygon. The EDR Report is included as Appendix C.

### **1.2.2 Aerial Photographs**

Aerial photographs from 1937, 1953, 1960, 1964, 1971, 1972, 1978, 1984, 1987, 1991, 1997, 2005, 2006, 2008, 2009 and 2010 were obtained from EDR. The EDR aerial photographs are found in Appendix D.

### **1.2.3 Sanborn Fire Insurance Maps**

Sanborn Fire Insurance Maps for the years 1950, 1952, 1963 and 1966 were obtained from EDR. The Sanborn Fire Insurance Maps are found in Appendix E.

### **1.2.4 City Directories**

EDR provided city directory searches between the dates of 1996 and 2013 in approximately 5 year intervals. The city directory report is found in Appendix F.

### **1.2.5 Historical Topographic Maps**

EDR provided historical topographic maps for the project area for the years 1905, 1958 and 1993. Adjoining topographic maps for the years 1958, 1972, 1975, 1993 and 1997 were also provided. The topographic maps are found in Appendix G.

### **1.2.6 Environmental Site Property Identification**

An aerial image obtained from Microsoft Bing Maps™ was used as a base map to illustrate the locations of Environmental Sites identified in the EDR Report and interpreted from the other sources of information. An aerial image of individual properties as displayed on the Geographic Information System (GIS) portion of the Hennepin County website was inserted on the environmental summaries prepared for each site. Additional images from Sanborn Fire Insurance Maps were used to further illustrate some identified environmental sites.

### **1.2.7 Site Reconnaissance**

A reconnaissance of the study area was performed on November 8, 2013, by Gary Rathbun of AECOM's Minneapolis office, to confirm the locations of identified Environmental Sites, note possible conditions of environmental concern and identify current property uses.

### **1.2.8 Spring Park Staff Interviews/File Review**

Two City of Spring Park staffers were interviewed regarding environmental concerns within the study area. Ms. Wendy Lewin, City Clerk, and Mr. D.J. Goman, City Utility Superintendent, were interviewed in person on November 8, 2013. Ms. Lewin is a long time resident of Spring Park. Mr. Goman has been employed by the City since 1986. Mr. Goman's father was also the Utility Superintendent for the City of Spring Park.

AECOM searched the city files for select properties in the vicinity of the site that had a potential to release to the environment. For each property the city maintains a "property jacket". The jackets contain miscellaneous information on the site that includes newspaper articles, general correspondence between the city and the property owner, information provided to the city by other state agencies (i.e., MPCA, MDH, etc.), and complaint files.

Properties were selected based on the file review and interviews with the City. The files reviewed included: 4008 Shoreline Drive, 4050 Shoreline Drive, 4144 Shoreline Drive, 4332 Shoreline Drive, 4388 Shoreline Drive, 4519 Shoreline Drive, 4029 Sunset Drive, 4061 Sunset Drive, 4071 Sunset Drive, 4145/4057 Sunset Drive, 4080 Sunset Drive, 4102 Spring Street and JR Clarke. Information obtained from the interviews and file reviews was used throughout this report.

### **1.2.9 Environmental/Geology Reports**

The geology and hydrogeology of Spring Park was assessed using regional geologic and hydrogeologic studies and local studies including well head protection information for the City's municipal wells (MDH, 2010) and site-specific environmental reports submitted to the MPCA, or other environmental regulatory agencies.

### **1.2.10 Well Survey**

A well survey was conducted using the Minnesota Department of Health CWI on line web tool (MDH, 2014a). An area of approximately one half mile of the municipal well field was selected. The CWI includes all wells registered with the MDH and includes production wells, domestic wells and monitoring wells. The CWI is not considered an accurate resource for well sealing records, although some wells are noted as being abandoned, and includes active, inactive and sealed wells. A map showing the field verified wells, tabulated summary of the wells and well logs are included in Appendix H. Additional well information was provided by the Spring Park and the MPCA.

## 2.0 Spring Park Wells

### 2.1 Municipal Well Field

The City of Spring Park operates three bedrock wells for their municipal water supply. The location of the wells is shown on Figures 1 and 2, Appendix A. Copies of the municipal well logs are included in Appendix I. TCE has been identified in water samples from the municipal distribution system at the water treatment plant since 2004. Water samples from two of the three municipal wells (wells #1 and #2) have had identifications of TCE since 2008. Low levels of one of its degradation byproducts, cis-1,2-dichloroethylene (DCE) (up to 3.1 µg/L), have been detected. Trace levels (<1 µg/L) of perchloroethylene (PCE), toluene and xylenes have also been detected infrequently (MDH, 2014b).

None of the VOC concentrations in the water system have exceeded their applicable USEPA Maximum Contaminant Level (MCL), which is 5 µg/L for TCE. The contaminant TCE has exceeded the MDH health-based value (HBV) for drinking water of 0.4 ug/L, which is not legally enforceable for public water supplies (MDH, 2014b).

Table 1 provides a summary of each of the wells and selected TCE concentrations observed in each of the wells:

**Table 1  
Spring Park Municipal Well Summary**

Well #	MDH Unique Well Number	Year Drilled	Depth to Bedrock (ft-bgs)	Casing Depth (ft-bgs)	Well Depth (ft-bgs)	Aquifer <sup>1</sup>	Transmissivities <sup>2</sup> (ft <sup>2</sup> /day)	TCE concentration and date sampled (µg/L) <sup>3</sup>
1	224642	1964	275	418	640	Franconia-Mt. Simon	820	1.9 - 4/2/08 2.0 - 3/11/09 3.0 - 7/27/09 1.9 - 12/7/09 3.5 - 5/1/13
2	224643	1964	273	341	391	Jordan	3,560	3.3 - 4/2/08 3.7 - 3/11/09 4.1 - 7/27/09 3.9 - 12/7/09 5.0 - 5/1/13
3	165595	1980	235	660	790	Mt. Simon	2,140	<1.0 - 4/2/08 <1.0 - 3/11/09 < 0.1 - 5/1/13

1 – Aquifer as designated by the City of Spring Park Wellhead Protection Plan.  
2 – Transmissivity values estimated from specific capacity tests at the time of well installation. Values for Well 1 estimated using the properties for the FIG Aquifer.  
ft-bgs – Feet below ground surface  
µg/L – micrograms per liter or parts per billion (ppb)

Quarterly pumping rates since 2003 are provided in Appendix J. The pumping rates show that the city utilizes all three wells and has pumped an average of approximately 75,000,000 gallons per year over the last 11 years, with the highest use during the third (summer) quarter.

## 2.2 Other Wells

Review of the CWI data base (MDH, 2014a) and discussions with the City of Spring Park and MDH indicate that there are two property owners, Boomerang Laboratories and Norling's Lake Minnetonka Landscaping, that potentially have active pumping wells within the City of Spring Park.

Boomerang Laboratories has two industrial wells located at their property at 4164 Shoreline Drive, which is also the location of the Former Factory (JR Clark Co - Environmental Site 10). Two wells are listed in CWI (MDH unique well numbers 776886 and 776887) as industrial wells. The status of the Boomerang Laboratories' wells is currently unknown and the Minnesota DNR and the city of Spring Park have no information to indicate these wells are currently in use. The logs for both wells are identical and indicate the wells were installed in 2010, are completed in unconsolidated glacial deposits, and are screened from 196 to 208 feet below ground surface (bgs). The well logs indicate that bentonite was used to grout the wells from the surface to 50 feet bgs and that natural fill was used from 50 feet to 196 feet bgs.

Norling's Lake Minnetonka Landscapes has a well that is apparently in use for irrigation purposes. The CWI lists the well (MDH unique well 737568) as located at 4316 Shoreline Drive, which is in the immediate vicinity of the municipal wells. The well was installed to a depth of 178 feet bgs into unconsolidated glacial deposits in 2007. The CWI index also has wells listed for George Norling and Norling Landscaping at its former location, 4113 Sunset Drive (MDH unique well numbers 481867 and 644884). Both wells at this location were screened into glacial deposits from a depth of 160 to 165 feet bgs. Well 481867 was installed in May 1993 and Well 644884 was installed in May 2001. The CWI lists both wells as active, but since Norling is no longer operating at this address, it is unlikely that these wells are in use at the present time. It is unclear if the wells have been sealed. The well logs indicate bentonite seal was used to a depth of 30 feet bgs.

The CWI also lists a domestic well (Anna Trapp, MDH unique well 205633) at 13 Warren Avenue, Spring Park that was drilled to a depth of 181 feet bgs. No sealing records were found for this well and the City is not aware of it being used.

The CWI also lists two industrial/commercial wells for the JR Clark Company (MDH Unique Well Numbers 239174 and 239175) and two for Advance Machine (MDH Unique Well Numbers 242366 and 255159). However, review of the location of well 255159 indicates it was located on the JR Clark Company property and may have been misidentified on the CWI database as belonging to Advance Machine.

The JR Clark Company wells (MDH unique well number 239174 and 239175) drew water from the glacial deposits and were drilled to depths of 214 and 173 feet bgs, respectively. The wells were completed in 1947 and 1952. The wells are assumed to be inactive since JR Clark Company is no longer extant, but are listed on the CWI database as active. Well 255159 was drilled to 320 feet bgs and was gamma logged by the MGS in 2000 (MDH, 2014a). No well construction details are available for this well but logging by the MGS indicates it was drilled into the Jordan Sandstone. The CWI database lists this well as inactive. No sealing records were located for any of the JR Clark Company wells.

The Advance Machine well (MDH Unique Well Number 242366) was drilled to a depth of 583 feet bgs and was an open hole well that intercepted the St. Lawrence, Franconia and Ironton-Galesville

Formations according to gamma logging conducted by the MGS in 1989 (MDH, 2014a). The log notes that the well is to be abandoned. Interviews with the MPCA have indicated that the well was sealed and sampled prior to sealing and did not show impacts with respect to TCE.

The CWI lists several shallow monitoring wells, remediation wells and vapor monitoring wells. In general these wells are relatively shallow and meet MDH monitoring well installation standards and therefore are not a concern with respect to a potential contaminant transfer pathway to impact the municipal well field.

## 3.0 Geology and Hydrogeology

The geology and hydrogeology of Spring Park was assessed using regional geologic studies and local studies including well head protection information for the City's municipal wells and site-specific environmental reports submitted to the MPCA, or other environmental regulatory agencies, and the CWI. Information provided by the City of Spring Park was also used in this assessment.

### 3.1 Regional geology and hydrogeology

The regional geology of Spring Park consists of surficial glacial deposits overlying Paleozoic sedimentary formations. The topography of the area is flat to rolling and at an approximate elevation of 950 feet above mean sea level (msl). The glacial deposits generally consist of sand and clay layers to the bedrock surface that occurs at approximately 275 feet below ground surface (bgs) based on drilling records for the three City of Spring Park municipal wells.

The surficial geology consists of the Des Moines Lobe and Grantsburg Sublobe deposits of the Twin Cities Formation. The deposits of the Twin Cities Formation have been described as loamy till, sandy till, ice contract deposits, and peat. County-wide geologic mapping of Spring Park indicate the uppermost glacial deposits in the vicinity of the Spring Park municipal wells are loamy till (MGS, 1989).

The water table occurs within the glacial deposits at relatively shallow depth and transmits water to regional discharge areas including the Minnesota, Crow and Mississippi Rivers. The water table aquifer recharges underlying aquifers in areas where the glacial deposits are not confining. The hydrogeologic properties of the glacial deposits are complex and can vary significantly over short distances. The Prairie du Chien Group, which directly underlies the glacial deposits where present, is considered a regional aquatard and would also restrict recharge to underlying aquifers. The water table aquifer is used for domestic wells and irrigation in Hennepin County. Locally the water table aquifer may have adequate yield for development of municipal wells (MGS, 1989).

Based on regional geologic studies of Hennepin County, the bedrock geology of Spring Park is, in descending order, the Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Franconia Formation, Ironton/Galesville, Eau Claire and Mt. Simon (MGS, 1989). Regional mapping indicates that the Prairie du Chien Group and Jordan Sandstone are not always present in Spring Park due to erosional processes.

The MGS has also gamma-logged select wells in the study area that include the three Spring Park water supply wells and a bedrock well associated with the former Advance Machine Company. A cross section showing the bedrock stratigraphy has been prepared based on the MGS's interpretation of the gamma logs. The locations of the wells used to create the cross section are shown in Figure 3 and the cross section is provided Figure 4 of Appendix A.

Following is a summary of the bedrock formations:

- The Prairie du Chien Group is primarily dolomite and contains fractures, joints and solution cavities that control the flow of water through it. It is commonly grouped as a single aquifer with the underlying Jordan aquifer. Regional mapping indicates that the Prairie du Chien Group is present only in the western part of the City of Spring Park; however, boring log interpretation by the MGS denotes a 59 foot section of the Prairie Du Chien as present east of

the site (MDH unique well 242366, Advance Machine). Boring logs from the Spring Park municipal wells indicate that that Jordan is the uppermost bedrock formation at the well field.

- The Jordan aquifer, which is approximately 70 feet thick in the vicinity of the well field, is comprised of medium to coarse grained quartzose sandstone over massively bedded fine-grained sandstone. This formation is hydraulically connected to the overlying glacial deposits where the Prairie du Chien is absent. Regionally, groundwater flow in this aquifer is toward the south-southeast, discharging to the Mississippi River (MDH, 2010). Spring Park Well 2, which draws from the Jordan Aquifer, has a derived hydraulic conductivity of 30.2 feet per day (ft/day) (MDH, 2010).
- The St. Lawrence Formation is approximately 50 feet thick in the vicinity of the well field and is comprised of a dolomitic siltstone and shale. The St. Lawrence Formation acts as an aquatard limiting infiltration to the underlying Franconia Formation.
- The Franconia, Ironton and Galesville Formations are considered distinct bedrock formations, but are considered a single hydrogeologic formation (FIG Aquifer). The Franconia Formation is comprised of fine-grained sandstone and shale and is estimated to be approximately 110 feet thick (MDH, 2010). The Ironton and Galesville are both comprised of sandstone with varied grain size. The Ironton and Galesville Formations have a combined thickness of approximately 45 feet in the vicinity of the well field. Interbedded shales have been identified within the Galesville Formation.
- The FIG Aquifer is underlain by the Eau Claire Formation, which grades to glauconitic fine-grained sandstone and is approximately 70 feet thick in the area of Spring Park. This formation hydraulically separates the FIG aquifer from the underlying Mt. Simon Sandstone.
- The Mt. Simon consists of coarse sandstone beds interbedded with layers of fine sandstone and shale and is estimated to be approximately 170 feet thick. The Mt. Simon sandstone and the underlying Hinckley sandstone are generally classified as a single aquifer. Regionally, groundwater appears to flow to the east-southeast in this aquifer (MDH, 2010). Spring Park Well 1 is open across the FIG Aquifer to the upper 20 feet of the Mt. Simon Aquifer. The hydraulic conductivity for this well was estimated at 6.3 ft/day, assuming a majority of the water is pumped from the FIG Aquifer (MDH, 2010).

The ability of the confining units to restrict groundwater movement can be compromised by faults, fractures, or other structures. A fracture trace analysis and seismic survey conducted for the former Nilfisk-Advance Machine Company Site (Nilfisk-Advance Site) suggested the presence of a northeast-southwest trending graben (Wenck, 2002). [Note: The Nilfisk-Advance Machine Company is enrolled in the MPCA Superfund Program as Site ID# SR197 Minnetonka Lakeshore Advance Machine and was formerly enrolled in the Voluntary Investigation and Cleanup Program as Site ID# VP 5201.]

A graben is a geologic feature characterized by the downward movement of the geologic unit bounded by two faults and was interpreted based on a fracture trace study. The seismic reflection survey did not provide results at adequate depth to delineate the bedrock surface (Wenck, 2002). If present, this feature could alter the connectivity of the bedrock aquifers if the displacement is significant.

## 3.2 Site Geology and Hydrogeology

### 3.2.1 Bedrock

Limited geologic bedrock studies have been identified for the City of Spring Park. Therefore, the local bedrock geologic and hydrogeologic conditions are primarily based on information available from the Spring Park Wellhead Protection Plan (MDH, 2010), boring logs obtainable from the CWI and municipal well logs provided by the City of Spring Park.

The construction of the wells are depicted on the cross-section provided in Figure 4, Appendix A, showing their relationship to the bedrock stratigraphy. The bedrock descriptions are based on gamma log interpretation by the MGS.

Review of the boring logs, Appendix I, show that the bedrock geology is comprised of sandstone with varied amounts of shale, which is consistent with the Paleozoic deposits encountered, but there was poor correlation for the stratigraphic descriptions between the individual well logs. The lack of correlation is attributed to inconsistent logging descriptions recorded at the time of drilling. The well log for Well 3, which was drilled to a total depth of 790 feet bgs, provides no descriptive information after 640 feet bgs.

The general observations are made for each of the well logs:

Well 1: The driller's log indicates the upper bedrock portion of this well (275 to 322 feet bgs) is a mixture of shale and sandstone. Similar to Well 2, sandstone is present from 322 to 395 feet bgs. However, geologic interpretation by the MGS indicate the sandstone is present to a depth of only 348 feet bgs and that the termination of the sandstone is representative of the base of the Jordan. The well casing is terminated at 418 feet bgs, indicating the well is sealed below the Jordan Aquifer into the FIG Aquifer. This well has been interpreted to also intercept the Mt. Simon (MDH, 2010).

Well 2: The driller's log for Well 2 provides the least detail of the well logs. The log indicates a mixture of sandstone and shale from 273 to 331 feet bgs, clean sandstone from 331 to 384 feet bgs, and shaley sandstone to the boring termination depth of 391 feet bgs. The MGS interpretation of this well log indicates that sandstone is the primary bedrock lithology for the entire length underlying the glacial deposits (273 to 391 feet bgs) and identified the entire section as the Jordan Formation. This would imply that the Jordan extends at least 43 feet deeper than it does in near-by Well 1 and that it is also thicker. Based on regional stratigraphy, a change of this magnitude seems unlikely over this short of a distance.

Well 3: The driller's log for this well indicates the stratigraphy is primarily dominated by a mixture of shale and shaley sandstone from the base of the glacial deposits (235 feet bgs) to 505 feet bgs. A sandstone was present from 505 to 595 feet bgs that is underlain by shale to the end of boring. The MGS interpreted that the Eau Claire formation was encountered at a depth of 554 feet bgs and continued to the top of the Mt. Simon at 622 feet bgs. The casing extends to a depth 660 feet indicating the well is cased below the FIG Aquifer and draws water from the Mt. Simon/Hinckley Aquifer. The log indicates that Mid Proterozoic sedimentary rocks, described as red clastics and shale, were encountered at the boring termination.

In general, the well logs indicate the presence of fine-grained shale deposits inter-mixed with coarser grained sandstone in the upper portions of the bedrock (i.e. Jordan Formation) and throughout the stratigraphic column. In the absence of secondary porosity features, the presence of the fine-grained deposits would restrict the vertical migration of contaminants.

A hydrogeologic study of the bedrock aquifers utilized by the City of Spring Park municipal wells (i.e., Jordan and FIG and Mt. Simon/Hinkley Aquifers) was performed by the MDH to establish a Wellhead Protection Plan (MDH, 2010). The Wellhead Protection Plan delineates a Wellhead Protection Area (WHPA), a Drinking Water Supply Management Area (DWSMA) and assesses the vulnerability of the of the public water supply wells.

The WHPA was determined using an existing regional MODFLOW model developed for the Metropolitan Council. Inputs to the model included data collected from the municipal wells, the CWI database, and regional geologic mapping.

The WHPA was established for a 10-year time of travel to characterize groundwater movement in the aquifers and a 1-year time of travel was also used to define the emergency response area. These areas are shown in Figure 5, Appendix A.

The MDH concluded the vulnerability of the DWSMA, shown on Figure 5, is moderate. This determination was based on the following conclusions:

- The aquifers exhibit moderate geologic sensitivity throughout the DWSMA and are not isolated from the direct vertical recharge of surface water.
- The presence of solvents in Well 1 and Well 2 at trace levels indicate the Jordan and FIG Aquifers contain water that has been impacted by human activities.

The DMSMA boundaries are used in this limited ESA as a general tool to assess sites within a regional hydrogeologic context. Since the DWSMA is primarily based on regional hydrogeologic studies, it is not appropriate to use the DWSMA for the exclusion of Environmental Sites from further consideration.

### 3.2.2 Glacial Deposits

The glacial geology and hydrogeology of Spring Park has been characterized in association with several environmental investigations conducted for the MPCA. In general, the investigations are relatively shallow and do not extend very far past the water table, which occurs at a depth of approximately 20 feet bgs in the project area. Information for the glacial geology at greater depth can be found on wells logs obtained from the CWI database. However, the logs often do not provide stratigraphic descriptions above the bedrock and commonly lump all the unconsolidated deposits as a single unit (i.e., glacial drift, till).

Three relatively deep boring logs are available to access the subsurface geologic environment. These include Spring Park Municipal Well 3, Boomerang Laboratories (MDH Unique Well Number 776886), Norling Landscape (MDH Unique Well Number 776886) and JR Clark (MDH Unique Well Number 239174). Copies of the MDH logs are provided in Appendices H and I and the dominant soil description provided on the boring logs above the bedrock interface are summarized on Table 2.

**Table 2**  
**Dominant Glacial Stratigraphy with Depth<sup>1</sup>**

<b>Depth (feet bgs)</b>	<b>Spring Park Well 3 (165595)</b>	<b>Boomerang Laboratories Well 2 (776887)</b>	<b>Norling Landscape (644884)</b>	<b>JR Clark Company No 1 (239174)</b>
0-25	Clay	Clay	Clay with Sand	Clay
25-50	Sandy Binder	Clay	Clay with Sand	Sand
50-75	Sandy Binder	Clay	Clay with Gravel	Sand
75-100	Sandy Clay	Clay (sand 90- 100)	Clay with Gravel	Sand
100-125	Sandy Clay	Clay/Sand	Clay with Gravel	Sand
125-150	Clay	Clay/Sand	Clay with Gravel	Clay
150-175	Fine Sand	Clay/Sand	Sand and Gravel (EOB 165 feet)	Clay
175-200	Fine Sand	Clay/Sand		Sand
200-225	Fine Sand	Sand Gravel (EOB 208 feet)		Sand (Shale encountered at 213 feet)
225-250	Pack Gravel (Bedrock 235 ft)			

1 – The soils descriptions represent the dominant soil description for the 25 foot depth interval included on the Table. Actual boring logs are included in Appendices H and I.

The descriptions of the glacial materials available from the logs are very general, but tend to show that the upper 150 feet are comprised primarily of a mixture of sand and clay units and become sandier at depth, except for the JR Clark well, which indicated sand from 22 to 125 feet bgs. At depths greater than 175 feet all well logs indicated the presence of sand. The logs indicate a gravel layer is present at the top of the bedrock surface in three of the four logs.

The most extensive near-surface assessment of the geology and hydrogeology is associated with the investigation and remediation of a chlorinated solvent release from the Nilfisk-Advance Site. A Remedial Investigation (RI) was completed in December 2002 (Wenck, 2002). Groundwater assessment and remedial activities are on-going at the Nilfisk-Advance Site. The Nilfisk-Advance Site is located approximately 1,500 feet east-northeast, downgradient, of the Spring Park municipal wells (identified as Site 11 on Figure 2, Appendix A).

Environmental investigations for the Nilfisk-Advance Site describe the near surficial geology as glacial deposits that include a sandy unit, varying from 15 to more than 75 feet in thickness, which overlies a clay layer. The top of the clay layer (as described by Wenck and referred to as the basal clay) is

highly irregular, with up to 60 feet of difference in elevation. The thickness of the underlying clay layer is not defined, but is greater than 9 feet thick based on the available boring data (Wenck, 2002).

The depth to the water table in the vicinity of the Spring Park municipal wells is approximately 20 feet bgs. The groundwater flow is influenced by Lake Minnetonka. During most periods, the groundwater is expected to discharge to Lake Minnetonka. However, groundwater flow from the Nilfisk-Advance Site indicates that flow reversals can occur with changes in lake level (Wenck, 2002). Since the site is located on an isthmus between two bays of the Lake, a groundwater divide is likely present within the study area. Horizontal gradients at the Nilfisk-Advance Site are relatively flat 0.0008 ft/ft and steepen at the lake boundary, especially when lake level fluctuations were observed. The vertical gradient at the Nilfisk-Advance Site (head difference divided by vertical distance between well screen centers) ranged from 0.0012 to 0.0080 feet per foot, with a downward flow indicated. A generalized hydraulic conductivity for the sand unit present at the Nilfisk-Advance Site was estimated at 10 ft/day (Wenck, 2002).

A Phase II Environmental Site Assessment was prepared at the Former Connor's Car Wash Site (ProSource, 2004). The ESA was associated with the purchase of the property by Norling's Lake Minnetonka Landscapes. The Connors Car Wash Site is located approximately 100 feet south of the Spring Park municipal wells (identified as Site 8 on Figures 1 and 2, Appendix A). The maximum boring depth associated with the assessment was to 36 feet bgs. The soils in this boring were characterized as fill to 8 feet bgs followed by fine-grained light-brown sand from 8 to 22 feet bgs, light-brown silt with sand seams from 22 to 28 feet bgs, and fine- to medium-grained sand to the boring termination depth at 36 feet bgs.

## 4.0 Discussion

### 4.1 Environmental Sites

Nineteen (19) Environmental Sites were identified in the EDR Report database and EDR historical reports. Listed sites and their environmental database descriptions are summarized in Table 3, below. Details regarding the environmental sites are included in the Environmental Summaries found in Appendix B. The locations of the Environmental Sites are shown on Figures 1 and 2, Appendix A.

Following is a summary of selected Environmental Sites that have managed COCs that have released to the environment or are considered to have a high potential to release COCs to the environment.

- Marina Center (Former Regal Cleaning Center) (Site Number 3): A dry cleaner was formerly located in the Marina Center, which is a strip mall building. An environmental investigation of the property identified PCE in soil and groundwater (Vieau Associates Inc., 2002). Investigations at the Site were performed in coordination with the VIC Program as Site VP16080. Groundwater samples from temporary wells had PCE concentrations as high as 8,100 µg/L and TCE as high as 33 µg/L. Vieau Associates concluded that the off-site migration of chlorinated solvents associated with the release had not likely occurred and recommended no further action for the property. The site status is currently inactive.
- Former Dry Cleaner (Site Number 5): This site is presently an automobile dealer (Spring Park Auto Sales), but was formerly a dry cleaner. No environmental investigations had been conducted at this site. As a former dry cleaning facility, chlorinated solvents may have been managed at this location.
- Former Gas Station (Spring Park Car Wash) (Site 8): A Phase II Environmental Assessment identified 1,2-dichloroethane (DCA) in groundwater at 3.6 µg/L. No other chlorinated volatile organic compounds were encountered (ProSource Technologies Inc, 2004). The investigation was performed in coordination with the MPCA VIC Program as site VP1997011 and is currently inactive. A historic photograph indicates that drums were stored outdoors without secondary containment. There are no documented releases from the drums and their contents are unknown.
- Former Factory (JR Clark Co) (Site 10): This site is currently the Tonka Business Center and has been leased by several businesses and is comprised of two buildings. The JR Clark Company occupied the site from at least the 1940s into the 1970s. JR Clark Company was a manufacturer of ironing boards and metal carts. Historical Sanborn Fire Maps indicates a machine shop and painting area with "over dip tanks" and painting booths. A historical photograph from 1969 shows numerous barrels stored outdoors without secondary containment. Correspondence indicates that septic tanks were located in a park south of the facility across Highway 51. Due to the known use of this site for manufacturing of metal products and documented painting activities, there is a high likelihood that chlorinated solvents were used at this facility during a time when their use was essentially unregulated. The septic system would provide a direct release mechanism to the environment if it was used for the disposal of COCs.

- Former Manufacturing Facility (Minnetonka Lakeshore Advance Machine) (Site 11): The Nilfisk-Advance Machine Company is enrolled in the MPCA Superfund Program as Site ID# SR197 Minnetonka Lakeshore Advance Machine and was formerly enrolled in the Voluntary Investigation and Cleanup Program as Site ID# VP 5201. Nilfisk-Advance formerly occupied a strip of land on the north side of West Arm Drive and manufactured floor cleaning equipment. Nilfisk-Advance moved their operation in 1987 and most of the buildings were demolished in 1989 for residential development. During demolition, several USTs were removed. During an UST investigation, TCE was detected in groundwater.

During operations Nilfisk-Advance received citations for improper storage of hazardous materials and two managers were jailed for not complying with Hennepin County waste generator requirements. In 1985 Hennepin County identified 60 drums of hazardous waste stored on a loading dock and during closure of the facility five drums of waste were identified on a loading dock with evidence of spillage (Dorsey and Whitney, 1995).

During a recent Groundwater Profiling Assessment (Wenck, 2013), TCE was encountered at 18,100 µg/L in a discrete groundwater sample from 29 to 32 feet bgs. Groundwater monitoring and remediation is on-going at this Site. A map showing the monitoring locations and summary of the monitoring results are included in Appendix K. In general the concentrations of TCE are declining, which is attributed to the pump and treat system. The MPCA has estimated that approximately 1,125 pounds of TCE have been removed from the site since 2004 (MPCA, 2014).

A health consultation of the Environmental Site by the MDH concluded that "Although the known areas of groundwater contamination associated with the former Advance Machine Site are located outside of the City wells capture zone, the full extent of the TCE plume beneath Lake Minnetonka has not been defined and the site cannot yet be ruled out as a possible source [for impacts to the municipal well field] (MDH, 2014b, page 9)."

- Former Gas Station (Lakeville Lofts) (Site 12): A Phase I Environmental Site Assessment for development of the property as condominiums identified a former gas station and an off-site source of chlorinated solvents. A subsequent Phase II Assessment identified petroleum impacts to soil and low concentrations of chlorinated solvents in groundwater. The Site was entered into the VIC program as site VP19600 and polyaromatic hydrocarbons (PAHs) contaminated soils were removed and institutional controls for the groundwater were enacted. The maximum value of chlorinated VOCs in groundwater was TCE at 340 µg/L and cis-1,2-DCA at 41 µg/L. The site is currently inactive and a No Association Letter from the MPCA VIC program was requested for the groundwater impacts.
- Former Gas Station (Norling Nursery) (Site 18): This site was developed for use as residential condominiums and offices. Prior to development, the site was entered into the VIC Program as site VP19710 since the site had soil impacted with PAHs, chromium, and arsenic and groundwater impacted with petroleum and TCE (MPCA, 2006). Contaminated soils were excavated and disposed of off-site. The site is currently inactive and an on-site source of TCE was not identified.
- Former Dry Cleaner (Site 19): The EDR radius map indicates a Historic Dry Cleaner at this site, which is currently a restaurant and offices. There are no known records of an environmental investigation at this site.

## 4.2 Contaminant Transfer

Spills and leaks of chlorinated solvents have caused widespread subsurface contamination in the environment.

Chlorinated solvents are dense non-aqueous phase liquids (DNAPL), and if present at sufficient concentration, will sink in the aquifer and form pools atop lower permeability formations that can result in complex dispersal and plume patterns. In the dissolved phase, TCE is relatively mobile and is transferred downgradient with the groundwater from the source area. Under proper conditions, biodegradation and volatilization can contribute to the removal of TCE from the impacted aquifer.

Under reducing conditions, aquifer microorganisms can dechlorinate the solvents to less chlorinated daughter products. Complete reduction to ethane is possible, but dechlorination usually does not proceed past DCE and vinyl chloride VC in most groundwater systems (USGS, 2014). Possible sources of both TCE and PCE have been identified in the project area. TCE may be present as a daughter product of PCE.

Table 3 Environmental Sites						
Site Number	Name	Address	Listing/Source	Potential to Release COCs <sup>1</sup>	Principle Chemicals of Concern	Relationship to Well Field
1	Historical Gas Station	4694 West Arm Road	EDR Historical Auto Stations	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair.	2,500 feet west/northwest of well field
2	Historical Gas Station	4700 Shoreline Drive	EDR Historical Auto Stations	medium	Petroleum products primary concern. Presently auto repair facility that may use solvents for parts cleaning.	2,500 feet west of well field
3	Marina Center (Former Regal Cleaning Center)	4659-4787 Shoreline Drive	EDR Historical Cleaners, RCRA CESQG, WIMN	Known release of PCE	PCE (TCE breakdown product)	2,300 feet west of the well field
4	Historical Gas Station	4534 Shoreline Drive	Historical Auto Station	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair.	1,500 feet west of the well field
5	Former dry cleaner	4500 Shoreline Drive	City of Spring Park personnel	high	Dry cleaner likely managed PCE, and possibly TCE. TCE is a breakdown product of PCE.	1,300 feet west of well field.
6	Historical Gas Station	4444 Shoreline Drive	Historical Auto Station, RCRA NonGen	medium	Petroleum products primary concern. Presently auto repair facility that may use solvents for parts cleaning. Site historically used for auto painting.	600 feet west of well field.
7	Historical Gas Station	4388 Shoreline Drive	EDR Historical Auto Station	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair.	600 feet west of well field.
8	Historical Gas Station (Spring Park Car Wash)	4332 Shoreline Drive	LUST, UST, SRS, MN LS, WIMN	Known release of 1,2 DCA in groundwater	Petroleum USTs on site. Outdoor storage of drums identified. Drum contents unknown.	Adjacent to well field.
9	Gas Station (Shoreline BP)	4311 Shoreline Drive	LUST, UST, WIMN	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair.	Adjacent to well field.

10	Former Factory (JR Clark Co)	4144 Shoreline Drive	RCRA-CESQG, UST, AST, RCRA NonGen, WIMN, Former factory – Sanborn Map	high	Evidence of paint booth and outdoor storage of drums of unknown contents suggest solvents may have been managed.	1,000 feet east of well field. Potential for release via drain field.		
11	Former Manufacturing Facility (Minnetonka Lakeshore – Advance Machine)	4080 Sunset Drive & 4125-4129 Sunset Drive	SHWS, RCRA-SQG, LUST, UST, VIC, SRS, MN LS, WIMN, MANIFEST	Known release of TCE	Known release of TCE to soil and groundwater. Groundwater remediation on-going.	1,000 feet east/northeast of municipal well field.		
12	Lakeview Lofts (former filling station)	4102 – 4136 Spring Street	BROWNFIELDS, RCRA NonGen, MN LS, WIMN, VIC	Known release of TCE (possible off-site source)	Petroleum impacts remediated from site. COCs present from off-site source.	1,600 feet east of the well field.		
13	Historical Gas Station	4138 Shoreline Drive	Filling station, auto sales, 1950 and 1952 Sanborn Maps	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair (also used for boat repair).	1,600 feet east of the well field.		
14	Former Machine Shop	4029 Sunset Drive (approx.)	Sanborn Maps 1950, 1952, 1963	medium	Petroleum products primary concern. Potential to have managed solvents for auto repair.	2,500 feet east/northeast of well field.		
15	Former Paint Store	2283 Lilac Drive (approx.)	1963 and 1966 Sanborn Maps	medium	Possible use/sale of solvents.	2,400 feet east/northeast of the well field.		
16	Former Machine Shop	4061 Sunset Drive (approx.)	1963 and 1966 Sanborn Maps	medium	Possible use/sale of solvents	2,300 feet north/northeast of the well field.		
17	Former Machine Shop	4071 Sunset Drive (approx.)	1950, 1952, 1963, 1966 Sanborn Maps	medium	Possible use/sale of solvents	2,100 feet east/northeast of well field.		
18	Historical Gas Station Norling Nursery	4113 Sunset Drive	VIC, SRS, MN LS, WIMN Filling station – 1950, 1952 and 1963 Sanborn Maps; auto repair 1966 Sanborn Map	Known release of TCE (possible off-site source)	PAHs and metals impacted soil excavated from site. DRO and TCE impacted groundwater treated during dewatering. Source of TCE could be off-site.	1,800 feet east of the well field.		
19	Former Dry Cleaner	4008 Shoreline Drive	EDR Historical Drycleaner	high	Dry cleaner likely managed PCE, and possibly TCE. TCE is a breakdown product of PCE.	2,200 feet east of the well field.		

**Table 3  
Environmental Sites (Cont.)**

<p><b>Acronyms:</b>  AST – Aboveground Storage Tank  COCs – Chemicals of Concern (defined as chlorinated solvents)  DCA - Dichloroethane  Financial Assurance – Financial Assurance Information Listing, Minnesota Pollution Control Agency  FINDS – Facility Index System  LUST – Leaking Underground Storage Tank site  MANIFEST – Hazardous Waste Manifest Data MPCA  MNL S – Minnesota List of Sites  PCE – Perchloroethene  RCRA-CESQG – Conditionally Exempt Small Quantity Generator of Hazardous Waste  RCRA NonGen – Non Generator of Hazardous Waste  RCRA SQG – Small Quantity Generator of Hazardous Waste  SRS – Site Remediation Section of Minnesota Pollution Control Agency  TCE - Trichloroethene  UST – Underground Storage Tank  VIC – Minnesota Pollution Control Agency Voluntary Investigation and Cleanup program  WIMN – What's In My Backyard, Minnesota Pollution Control Agency</p> <p>1 – Ranking established for the potential to release COCs to the environment.  Only environmental sites with potential for impact by COCs to the study area were included in Table 1. Listed sites outside the study area of approximately a one-half mile radius of the municipal well field were not included in the review.</p>
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## 5.0 Conclusions and Recommendations

### 5.1 Conclusions

A total of nineteen Environmental Sites were identified within a one-half mile radius of the Spring Park municipal well field by this Limited ESA. Each of the Environmental Sites was assessed for their potential to release COCs (see Table 3). The following conclusions were made for the sites:

- Two former manufacturing facilities (Former Factory Site/JR Clark Co, Site10, and Nilfisk-Advance, Site 11), which included painting operations, have high potential to have released COCs to the environment or have a known release. The former Nilfisk Advance manufacturing facility is known to have released TCE to the environment. The release is currently being remediated. No known release has been identified from the other Former Factory/JR Clark Co Site. However, a potential exists that a release to the subsurface could have occurred through undocumented spills and/or a former septic system(s) that served the facility.

Both of the sites are located downgradient of the Spring Park municipal well field and outside of the WHPA established for the bedrock aquifers utilized by the City. Since the DWSMA is primarily based on regional hydrogeologic studies, it is not appropriate to use the DWSMA for the exclusion of environmental sites from further consideration. Therefore, while a direct hydrogeologic pathway has not been identified for these two sites to impact the Spring Park wells, they cannot be ruled out as possible sources of the COCs detected in the well field. Further, a health evaluation by the MDH concluded that the full extent of the Nilfisk-Advance plume has not been defined under Lake Minnetonka and therefore cannot be ruled out as a possible source [for impacts to the municipal well field] (MDH, 2014b)

- Three former dry cleaners (Sites 3, 5 and 16) within the study area and a former filling station (Site 8) located adjacent to the south side of the municipal well field have high potential to release chlorinated solvents to the environment. A release of dry cleaning fluid was identified at the former Marina Center (Site 3). The horizontal extent of the release appeared to be limited to the release site, but the vertical extent of the release is unknown. Whether releases of COCs have occurred at the other former dry cleaner sites or the former filling station is unknown.

All three dry cleaners are located well outside of the WHPA. Typically dry cleaners used PCE rather than TCE, which is supported by the groundwater analytical data from the former Regal Cleaning Center site. When TCE was detected, it was found at one to two orders of magnitude lower than the PCE concentration, suggesting it is a daughter product. The former fueling station is located within the WHPA, but the analytical results associated with the Phase II ESA did not indicate the presence of TCE in groundwater.

- Former filling stations, an existing filling station, machine shops, a former paint store and a known VIC release site were rated as having a medium potential to release COCs to the environment based on available information and interpretation of past uses. Sites 6, 7 and 9 are within the Spring Park WHPA.

Hydrogeologic conditions at the site (i.e., over 200 feet of glacial material and several identified low permeability clay layers) would reduce the potential for the contaminants to reach the bedrock aquifers. A basal clay was identified by Wenck (2002) at the Nilfisk-Advance Site that was interpreted to be continuous at this site and a barrier for downward migration of TCE. Glacial deposits vary significantly over relatively short distances and the continuity of the basal clay between the Nilfisk-Advance Site and the well field is unknown.

No direct pathway for TCE migration to the well field has been identified; however, the presence of the TCE in the wells indicates that a source and pathway are present. Possible pathways could include movement of DNAPL, a direct conduit to deeper aquifers such as an incorrectly sealed well, movement of contaminants along a preferred pathway such as a utility corridor or other subsurface feature. Finally, groundwater contamination could be present in the shallow aquifer and being introduced to the well from a damaged casing.

## 5.2 Recommendations

Additional information is required to determine the source of TCE in the municipal wells. Based on the results of this assessment AECOM makes the following recommendations for further actions:

- Develop a work plan to investigate groundwater quality in the unconsolidated deposits in the vicinity of the well field. The investigation may include installation of soil vapor probes, temporary shallow monitoring wells and deep monitoring wells. Development of a discrete depth groundwater sampling program may also be considered.
- Conduct a Phase II Environmental Site Assessment at the Former Factory Site/JR Clark Co (Site10). This site is of special concern since this assessment identified the possible presence of septic tanks in use during a period in which COCs could have been used at the site. The timeframe pre-dates RCRA regulations mandating appropriate storage and disposal of hazardous wastes. A historical photograph from 1969 shows numerous barrels stored outdoors without secondary containment.
- Sealing methods protective of the environment should be confirmed for deep wells within the study area to determine if they present a pathway for groundwater contamination to migrate to deeper aquifers. The following wells were noted as a concern:
  - Wells associated with the JR Clark Company (MDH unique well 239174, 239175 and 255159) are of particular concern due the high potential for COCs to be present in the vicinity of these wells.
  - The Anna Trap domestic well (MDH unique well number 205633) should be confirmed to be inactive and properly sealed if appropriate.
  - Records are unclear if the wells associated with former Norling's Landscaping location (MDH Unique wells 481867 and 644884) are presently active. If any of these wells are inactive, they should be sealed.
  - Records are unclear if the Boomerang Laboratories wells (MDH Unique Well 776886 and 776887) are currently being used. If these wells are inactive, they should be sealed. Well construction methods for these wells (natural fill used as grout for 50 to 196 feet bgs) are of special concern if TCE is present in this vicinity.

Prior to sealing the wells, groundwater samples should be collected if possible and analyzed for the COCs.

The appropriateness of a well casing evaluation, which may include televising and/or other downhole logging techniques, should be also be assessed prior to abandonment. It should be noted that no single up-to-date data source has been identified for well sealing records. Therefore, the sealing status of the wells within the study area is not known with certainty.

- Groundwater samples for TCE analysis should be collected from the wells associated with Norling's Landscaping (MDH unique wells 481867, 644884 and 737568) and Boomerang Laboratories (776886 and 776887).

The approximate locations of the wells cited above are shown in Figure 6. The collected information should be used to determine the need for the installation of a bedrock well(s) to determine the source of TCE impacting the municipal well field.

## 6.0 Qualifications

The evaluations and recommendations presented in this report were developed from consideration of the project characteristics and an interpretation of available geologic and hydrogeologic information. AECOM professional services have been performed, findings obtained, and recommendations prepared in accordance with generally accepted engineering and hydrogeological principles and practices. No other warranty, either expressed or implied, is made. AECOM assumes no responsibility for data or interpretations made by others. AECOM accepts no responsibility for application or interpretation of the results by anyone other than the client.

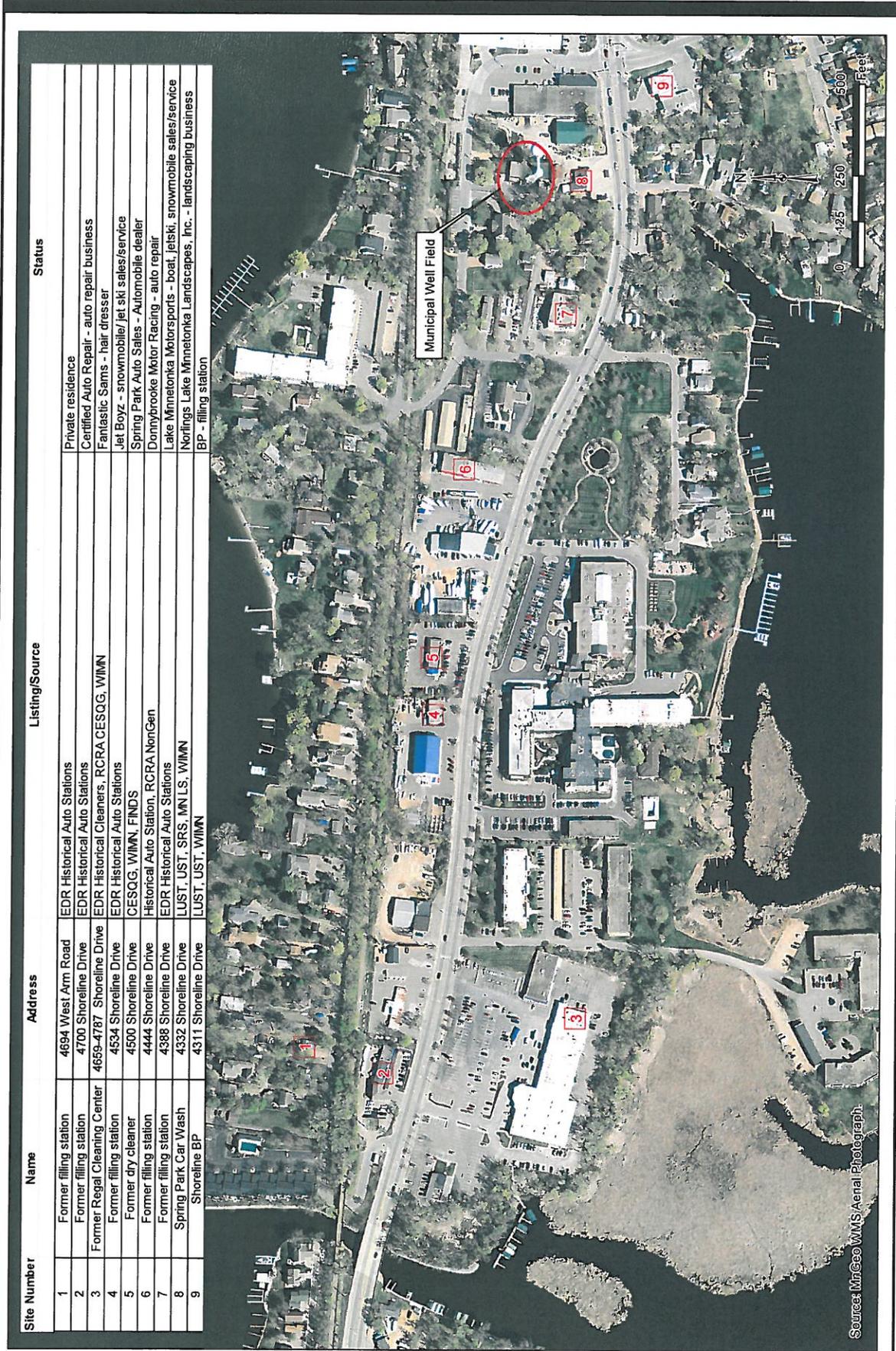
## 7.0 References

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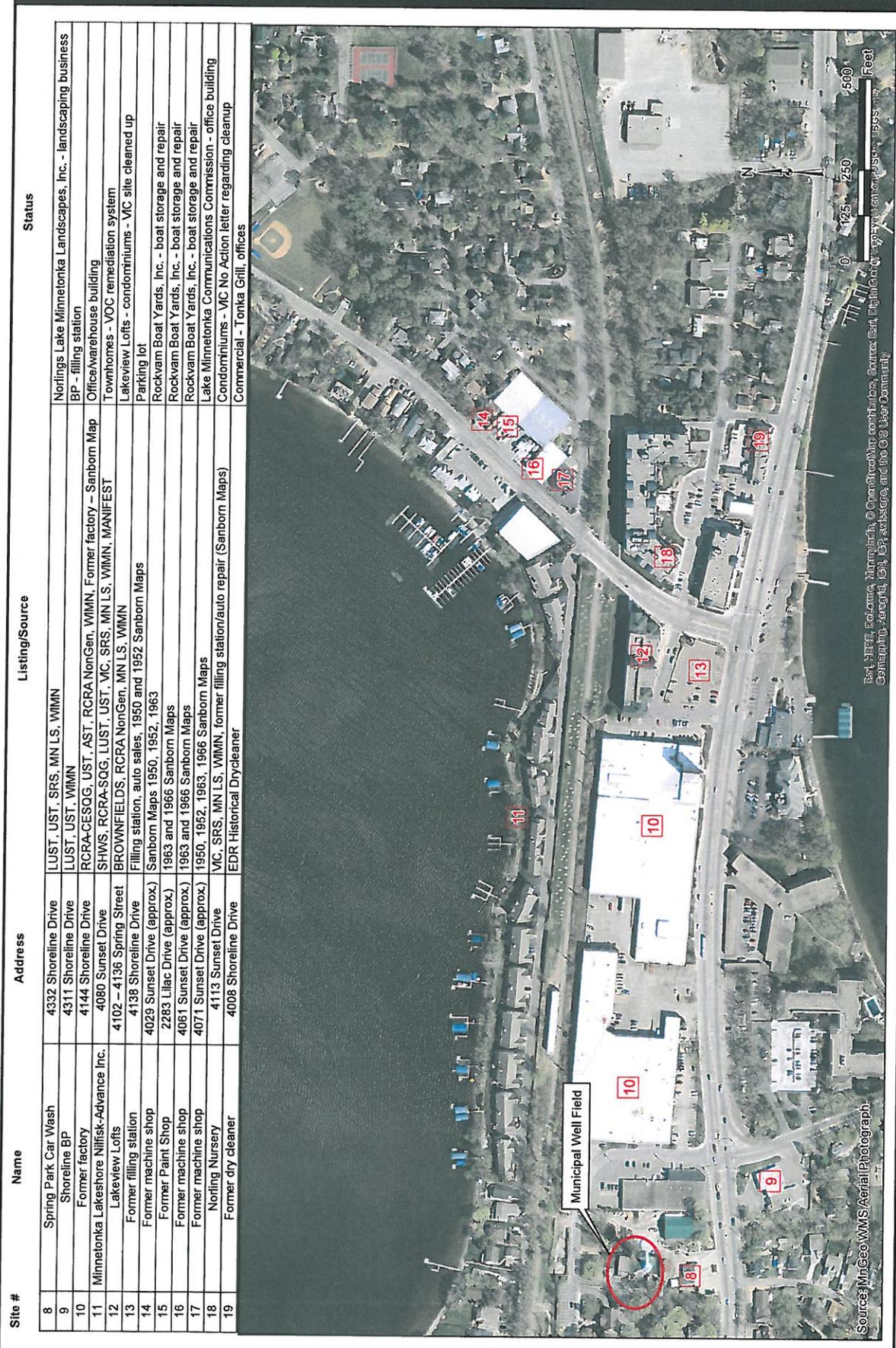
## **Appendix A**

### **Figures**

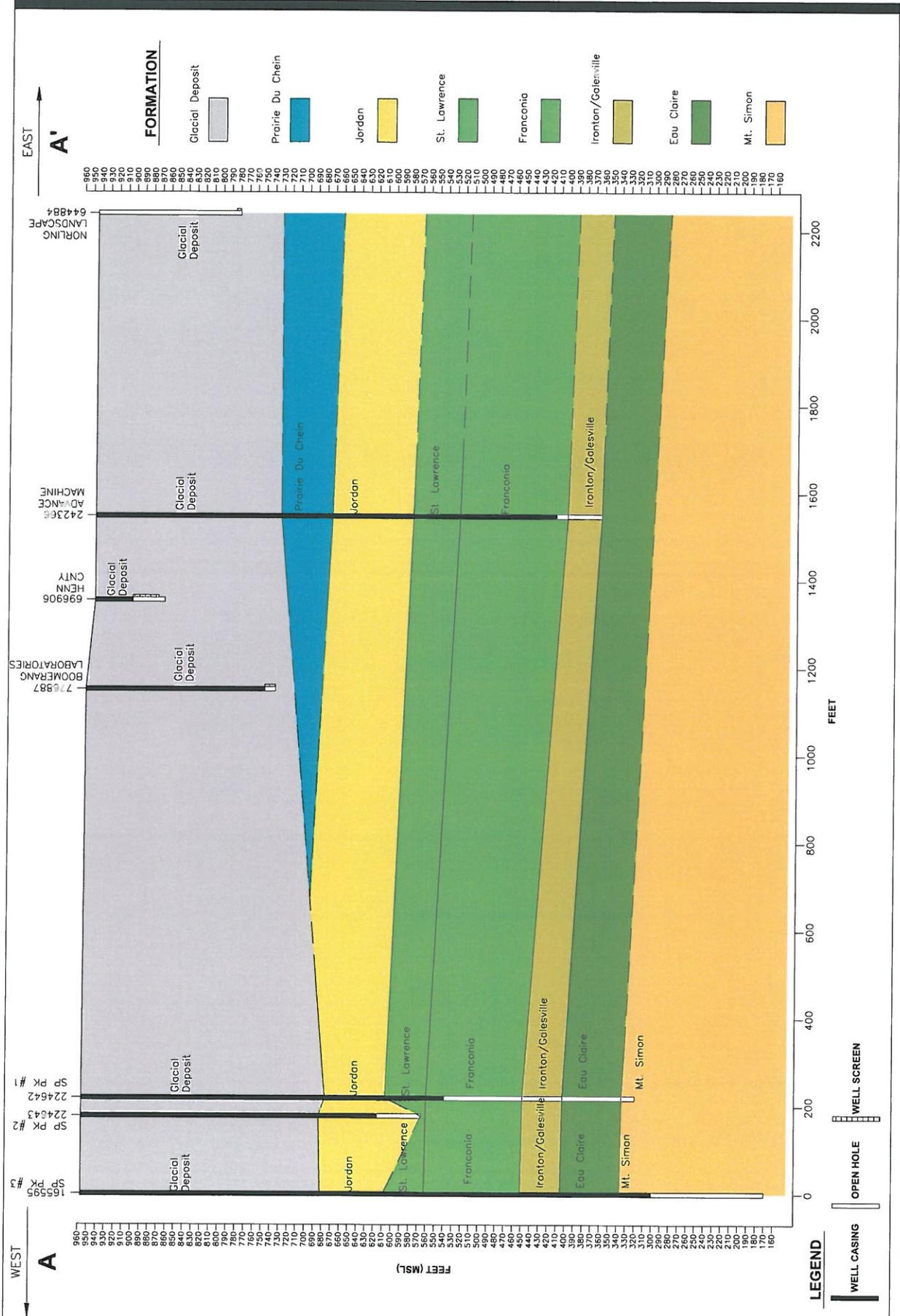
Figure 1



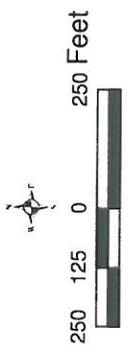
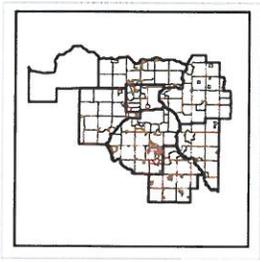
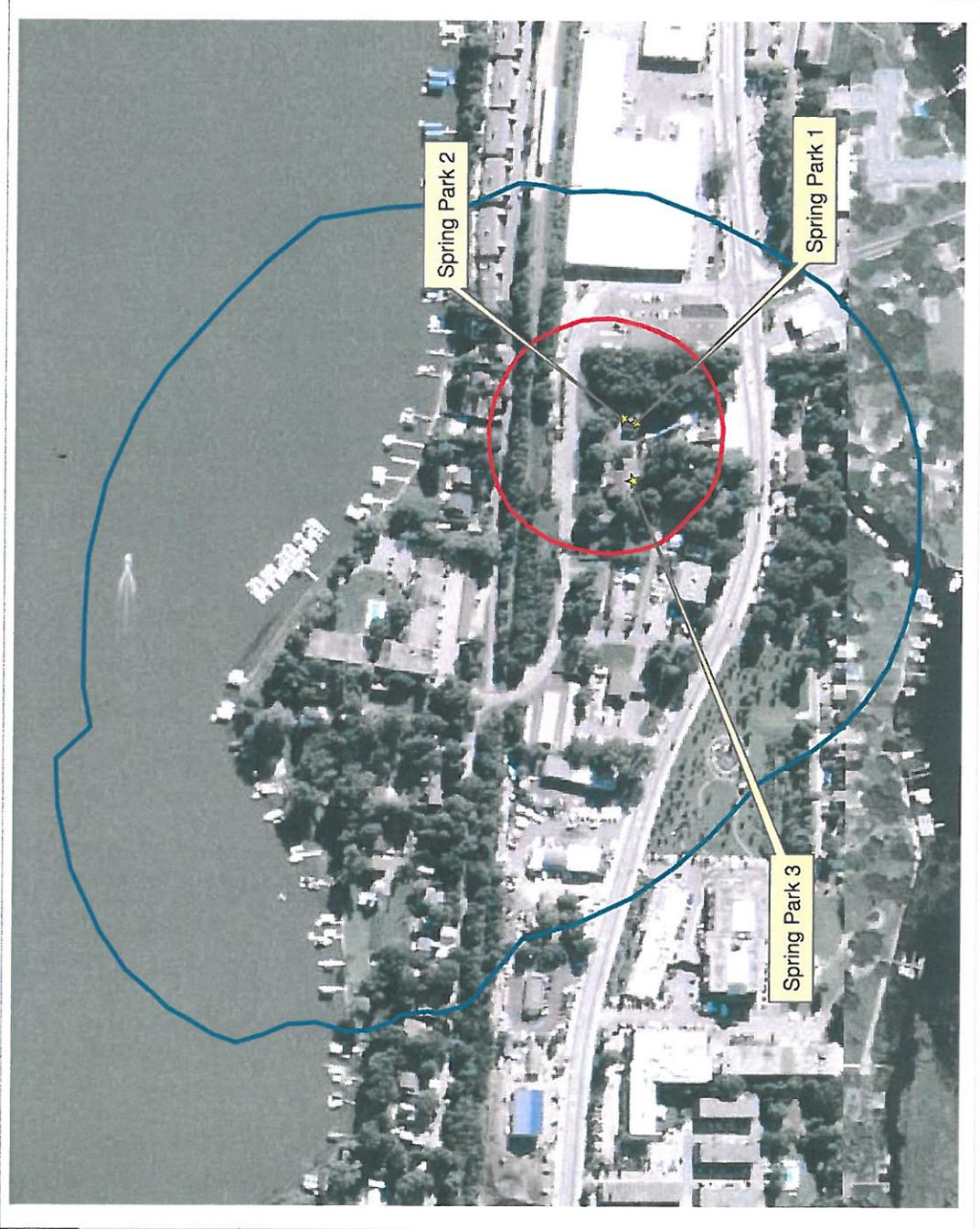
Site Number	Name	Address	Listing/Source	Status
1	Former filling station	4694 West Arm Road	EDR Historical Auto Stations	Private residence
2	Former filling station	4700 Shoreline Drive	EDR Historical Auto Stations	Certified Auto Repair - auto repair business
3	Former Regal Cleaning Center	4659-4787 Shoreline Drive	EDR Historical Cleaners, RCRA, CESQG, WIMN	Fantastic Sams - hair dresser
4	Former filling station	4534 Shoreline Drive	EDR Historical Auto Stations	Jet Boyz - snowmobile/jet ski sales/service
5	Former dry cleaner	4500 Shoreline Drive	CESQG, WIMN, FINDS	Spring Park Auto Sales - Automobile dealer
6	Former filling station	4444 Shoreline Drive	Historical Auto Station, RCRA NonGen	Donnybrooke Motor Racing - auto repair
7	Former filling station	4388 Shoreline Drive	EDR Historical Auto Stations	Lake Minnetonka Motorsports - boat, jetski, snowmobile sales/service
8	Spring Park Car Wash	4332 Shoreline Drive	LUST, UST, SRS, MN LS, WIMN	Norflings Lake Minnetonka Landscapes, Inc. - landscaping business
9	Shoreline BP	4311 Shoreline Drive	LUST, UST, WIMN	BP - filling station







Source: MDH 2010



Emergency Response Area  
Composite WHPA



Selected Well Locations

## **Appendix B**

### **Environmental Sites Summaries**



## Environmental Summary – Spring Park Wells Site Assessment Site #1 – Historical Gas Station

Site Address: 4694 West Arm Road

Project No. 60305958

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**Current Use** – Private residence

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); possible solvent use for automobile repair.

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a Historic Auto Station site.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – A possible residential house and garage were on the property on the 1937 through 1984 aerial photographs. A possible commercial building approximately the same size as the garage was adjacent to the southeast corner of garage on the 1987, 1991 and 1997 aerial photographs. Trees obscured observations of the property on the 2005 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – The property address of 4694 West Arm Road was not listed in the 1996 city directory. Jenny Gray was listed at the address in the 2007 and 2013 city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station facility is located approximately 2500 feet west/northwest of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #2 – Historical Gas Station

Site Address: 4700 Shoreline Drive

Project No. 60305958

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**Current Use** – Automobile repair facility (Certified Auto Repair)

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); possible solvent use for automobile repair.

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a Historic Auto Station site.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 through 1978 aerial photographs. A building approximately one-half the size that exists today was on the east central part of the property on the 1984 aerial photograph. The building was expanded to the west on the 1987 aerial photograph. Another expansion to the west was observed on the 2008 aerial photograph. The 2010 aerial photograph showed the building in the same apparent configuration as exists today. Multiple automobiles were observed parked on the property on several of the aerial photographs.

**Prior Occupants from City Directory Listings** – The property address, 4700 Shoreline Drive, was not listed in the 1996 city directory provided by EDR. Certified Auto Repair was listed at the address in the 2007 and 2013 city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station/auto repair facility is located approximately 2500 feet west of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #3 – Marina Center

Site Address: 4659-4787 Shoreline Drive

Project No. 60305958



**Current Use** – Hair dressing salon (Fantastic Sams)

**Environmental Concerns** – Former dry cleaner in east end of strip mall building: known perchloroethylene release site

**Environmental Database Information** – EDR Radius Map™ Report lists the property as an Institutional Control site, a Voluntary Investigation and Cleanup site, a Site Remediation Section site, a Minnesota List of Sites site, a What's In My Neighborhood site and a Historical Cleaners site (listed as Regal Cleaning Center at 4669 Shoreline Drive).

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage for the property was not available.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 through 1964 aerial photographs. Possible single family houses were on the south central part of the property on these aerial photographs. A commercial building(s) was on the property on the 1971 through 2010 aerial photographs in similar configuration to that which exists today.

**Prior Occupants from City Directory Listings** – The property address was not listed in the 1996 city directory. Hair Graphics Salon was listed at 4663 Shoreline Drive, the former location of the dry cleaner, in the 2007 city directory. Fantastic Sams (beauty salon) was listed at the address in the 2013 city directory.

**MPCA File Review** – Phase II Investigations of the Marina Center property identified perchloroethylene (PCE) in soil and groundwater near the east end of the strip mall building in the vicinity of the former dry cleaner business. The former dry cleaner occupied the building from at least 1977 to the mid 1990s. The





## Environmental Summary – Spring Park Wells Site Assessment Site #4 – Historical Gas Station

Site Address: 4534 Shoreline Drive

Project No. 60305958

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**Current Use** – Motor sports sales/repair facility (Jet Boyz)

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); possible solvent use for vehicle repair.

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a Historic Auto Station site.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The property appeared to be in residential use on the 1937 through 1964 aerial photographs. The property was in apparent commercial use in the 1971 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – The property address, 4534 Shoreline Drive, was not listed in the 1996 city directory provided by EDR. Jet Boyz was listed at the address in the 2007 and 2013 city directories. Automotive Solutions (repair) and Jet Boyz were listed in the 2007 directory.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station/auto repair facility is located approximately 1500 feet west of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #5 – Former Dry Cleaner

Site Address: 4500 Shoreline Drive

Project No. 60305958

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**Current Use** – Automobile dealer (Spring Park Auto Sales)

**Environmental Concerns** – Former dry cleaner – solvent use

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a CESQG with “no violations found” site for the former Regal Cleaning Center. The property was also listed as a WIMN site and a FINDS site which are associated with the CESQG site listing.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The property appeared to be in residential use on the 1937 through 1964 aerial photographs. The property was in apparent commercial use in the 1971 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Regal Cleaning was listed at the property address in the 1996 city directory. Spring Park Auto Sales was listed at the property address in the 2007 and 2013 city directories.

**Potential for Environmental Impact** – High potential to impact the municipal well field is anticipated due to use of solvents by a dry cleaner business. The former dry cleaner facility is located approximately 1300 feet west of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #6 – Historical Gas Station

Site Address: 4444 Shoreline Drive

Project No. 60305958

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**Current Use** – Automobile repair facility (Donnybrook Motor Racing)

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); possible solvent use for automobile repair.

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a Historic Auto Station site, an aboveground storage tank site under Westonka Firestone for an active 250 gallon used oil AST, a non-generator of hazardous waste under Donnybrook Motor Racing with “no violations found” and as a What’s In My Neighborhood site.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The north central part of the property appeared to be occupied by a building associated with a farmstead on the 1937 and 1953 aerial photographs. Gravel drive areas appeared to be around the building on the property on the 1960, 1964 and 1971 aerial photographs. The building was not present on the 1972 aerial photograph. A building (the southern one-half of the existing building) was on the south part of the property with multiple vehicles parked along the west boundary on the 1978, 1984, 1987, 1991 aerial photographs. The northern part of the building was on the 1997 aerial photograph and multiple vehicles were parked along the west property boundary. Similar conditions were observed on the 2005, 2006, 2008 and 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Dock and Lift Services was listed at 4444 Shoreline Drive in the 1996 city directory. Donnybrook Auto Service and Donnybrook Racing were listed in the 2007 city directory. Botanize Inc. (landscape contractors) and World Ferrari (auto body repair and painting) were listed at the address in the 2013 city directory.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station facility is located approximately 600 feet west of the well field.

## Environmental Summary – Spring Park Wells Site Assessment Site #7 – Historical Gas Station

Site Address: 4388 Shoreline Drive

Project No. 60305958

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**Current Use** – Lake Minnetonka Motorsports

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); possible solvent use for automobile repair.

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a Historic Auto Station site, a conditionally exempt small generator of hazardous waste under Lake Minnetonka Motorsports with “no violations found” and What’s In My Neighborhood.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 aerial photograph. Single family houses appeared to occupy the property on the 1953, 1960, 1964, 1971, 1972, 1978, 1987 and 1991 aerial photographs. A building with the same configuration as exists today was on the 1997, 2005, 2006, 2008, 2009 and 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Autotech Distributing was listed at 4388 Shoreline Drive in the 1996 city directory. Autotech Distributing, DSV Construction (excavating), Farm Bureau Financial Services and Lake Minnetonka Motorsports were listed in the 2007 city directory. Lake Minnetonka Motorsports was listed in the 2013 city directory.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station is located approximately 400 feet west of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #8 – Historical Gas Station (Spring Park Car Wash)

Site Address: 4332 Shoreline Drive

Project No. 60305958

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**Current Use** – Landscaping business (Norling Lake Minnetonka Landscape)

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs).

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a leaking underground storage tank site (Spring Park Car Wash: LUST site closed in 2002), an underground storage tank site (two 3000 gallon gasoline and one 4000 gallon gasoline USTs listed as removed), Voluntary Investigation and Cleanup (VIC) site, Site Remediation Section site, Minnesota List of Sites (MN LS) and What's In My Neighborhood (WIMN), (Connor's Car Wash as name for the MN LS and MIMN listings).

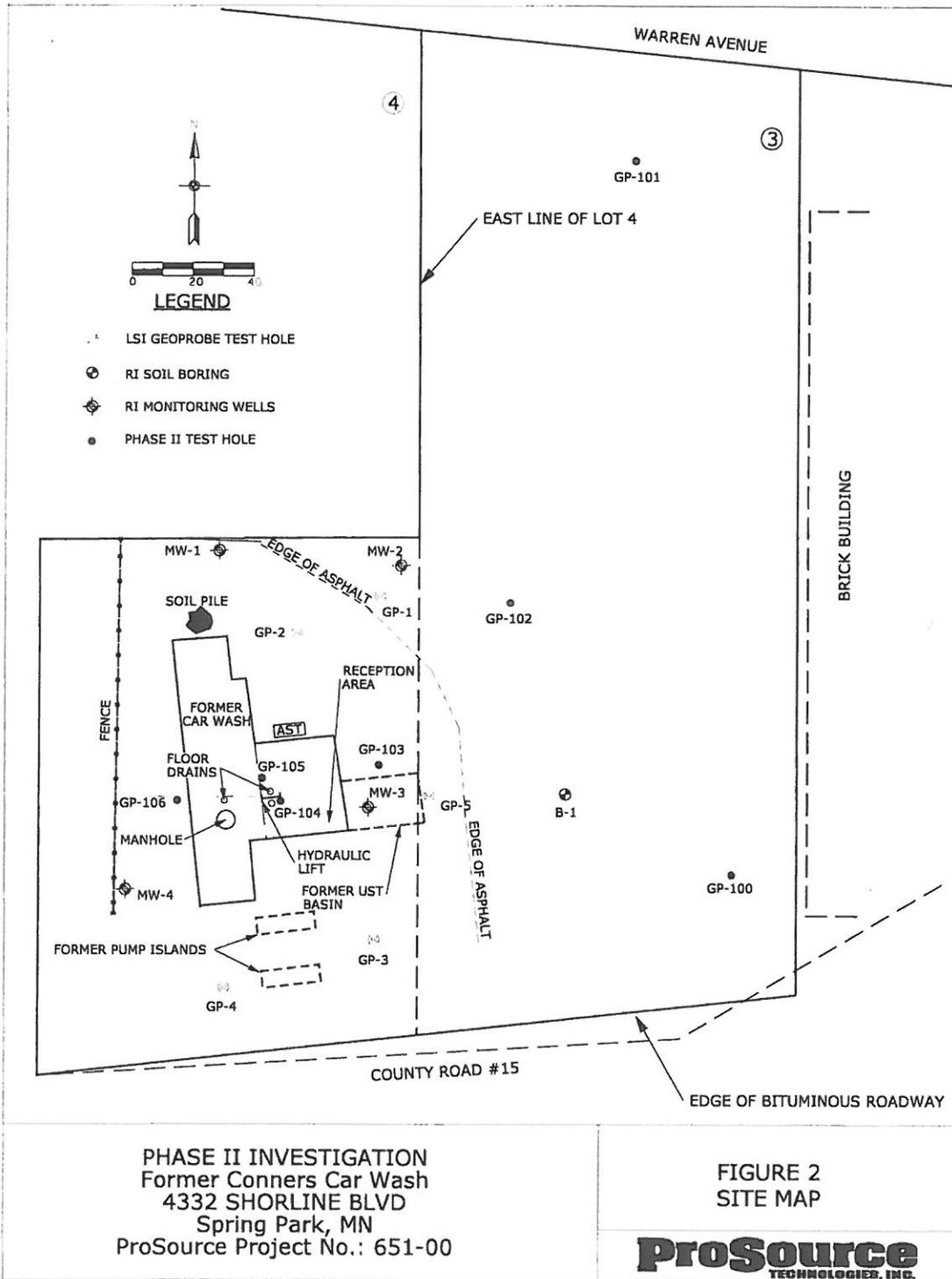
**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the area of the property.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 and 1953 aerial photographs. A building with a smaller footprint than exists today but with the same location and orientation on the property was on the 1960 and 1964 aerial photographs. An addition to the northwest corner of the building was on the 1971 aerial photograph. The driveway configuration was typical of a filling station for access and egress. The 1972, 1978, 1984, 1987, 1991 and 1997 aerial photographs were similar to the 1971 aerial photographs. The property was not shown on the 2005 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Spring Park Car Wash was at 4332 Shoreline Drive in the 1996 city directory. The address was not listed in the 2007 and 2013 city directories.

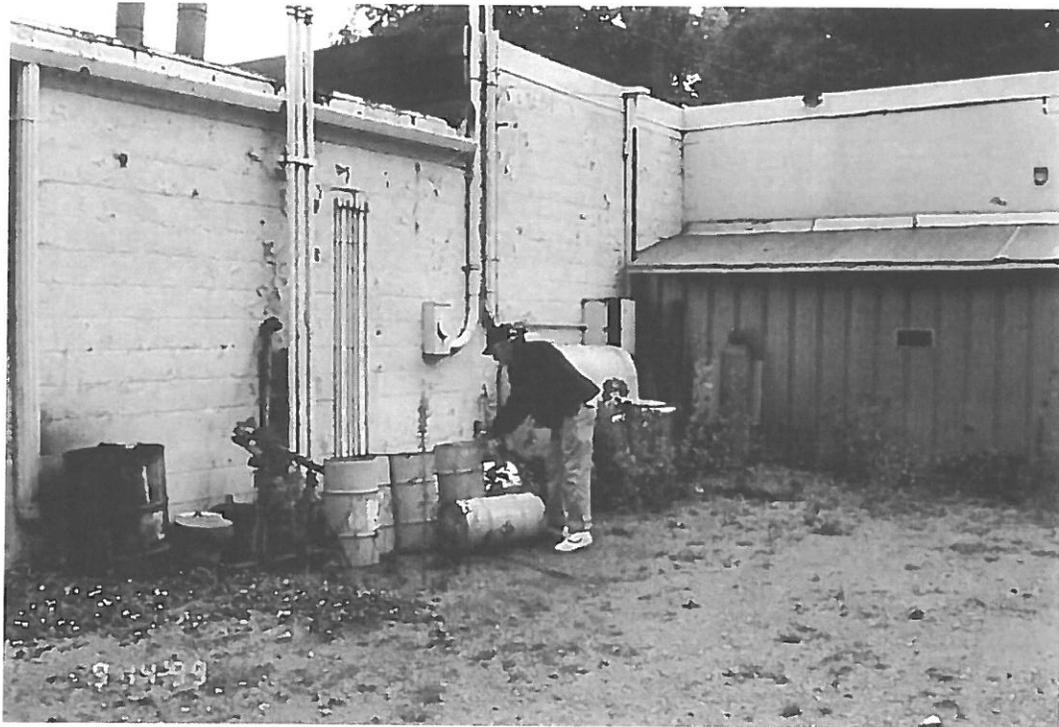


**Review of MPCA File Information – Known release.** A Phase II Environmental Site Assessment (ESA) (Prosource Technologies, Inc. dated November 12, 2004) identified 1,2-dichloroethane (1,2-DCA) in groundwater samples obtained from one soil probe and one groundwater monitoring well (soil probe GP-100 and monitoring well MW-2, (see Figure 2 from the Phase II ESA report below) at concentrations below the Minnesota Department of Health drinking water Health Risk Limit of 4 micrograms per liter. No other chlorinated volatile organic compounds were identified by the Phase II ESA. The compound 1,2-DCA was used as a lead scavenger in leaded gasoline.



**Review of City of Spring Park Files –** A photograph taken in 1999 (see below) of outside storage of barrels indicates potential for release of hazardous materials to the environment. No soil borings conducted for the Phase II ESA (see above) were performed in the area of the barrels. Whether a

release of solvents occurred from the barrels or possible previous spills adjacent to the building in the area of the barrels is unknown.



**Potential for Environmental Impact** – High potential to impact the municipal well field is anticipated. Although no extensive contamination by VOCs was identified by the Phase II ESA conducted on the site, potential exists that solvents could have been released in areas where soil borings were not performed. The property is located adjacent to the south side of the municipal well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #9–Gas Station (Shoreline BP)

Site Address: 4311 Shoreline Drive

Project No. 60305958



**Current Use** – Filling station (Shoreline BP)

**Environmental Concerns** –Gas station – petroleum products in former underground storage tanks (USTs); possible former use of solvents for automobile repair

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a leaking underground storage tank site (LUST sites closed in 2001 and 2010), an underground storage tank site (USTs listed as removed included two 10,000 gallon gasoline, 8,000 gallon diesel, 1,000 gallon fuel oil and 560 gallon used oil; active USTs include 10,000 gallon gasoline, two 8,000 gallon gasoline and 6,000 gallon diesel), What's In My Neighborhood site and Historical Auto Station site listed as Spring Park Station.

**Sanborn Fire Insurance Map Interpretations** – Sanborn Fire Insurance Map coverage was not available for the property area.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 aerial photograph. A possible residential house was on the property on the 1953, 1960 and 1964 aerial photographs. A filling station was on the 1978 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Shoreline Spur and H&R Block were at 4311 Shoreline Drive in the 1997 city directory. The property address was not listed in the 2007 city directory. Shoreline BP was listed in the 2013 city directory.

**Potential for Environmental Impact** – Medium potential to impact the project is anticipated. According to Mr. D.J. Goman, Utility Superintendent for the City of Spring Park, one of the monitoring wells associated with the LUST site was located on city property adjacent to the municipal well field. Mr. Goman indicated groundwater flow direction was found to be to the south, away from the municipal well field. The site is not co-listed for release of solvents.



# AECOM

Pop-Top Products were listed at 4144 Shoreline Drive in the 1996 city directory, Interactive Communication, Merry Maids and Snap Fitness 24 7 were listed at the address in the 2007 city directory. Canvasback Cargo Liners was listed at 4144 Shoreline Drive in the 2013 city directory.

**Review of City Files** - A photograph from 1969 shows outside storage of barrels at the facility, see below. The outside storage of barrels indicated potential for release of hazardous materials.

A letter from the City of Spring Park to the J.R. Clark company president noted that septic tanks located in a park south of the facility across County Highway 15 (Shoreline Drive) had not yet been decommissioned. Potential exists that solvents could have been released to the subsurface environment through the septic tank infiltration system prior to the existence of public sewer. The public sanitary sewer collection system in Spring Park was installed in 1963.

**Potential for Environmental Impact** – High potential to impact the municipal well field is anticipated. Paint booths and a machine shop in the former J.R. Clark factory likely used solvents. Solvents could have been released to the environment through spills in the outside barrel storage area, discharge through the septic system, leaking sewer pipes below the facility or drainage pits in the facility, or other means. The site is located approximately 1,000 feet east of the municipal well field.



5/14/69

FROM APARTMENT WINDOWS above or car windows approaching from either direction, the J. R. Clark Co. roadside storage area in Spring Park is less than beautiful. Removal of the junk, or orderly storage, at least, would undoubtedly find favor with the company's friends and neighbors.

January 15, 1970

Mr. Thomas Mulleney, President  
J. R. Clark Co.  
Spring Park, Minn.

Dear Sir:

This will supplement our December 15, 1969 letter, which it is understood was routed to Mr. Jack Kloster of your company and may not have been brought to your attention. Accordingly copies of previous correspondence are enclosed for your information.

Several other matters have since arisen which will be taken into consideration at the meeting scheduled for February 2, 1970, viz.:

1. The Hennepin County Highway Department has twice, after considerable urging by the village, provided painted crosswalk areas on CSAH 15, Shoreline Drive. These crosswalks are provided for the safety of your personnel, but go unheeded despite remonstrances by the police department. Flagrant disregard contributes to an already deplorable traffic situation. *(Company to discuss with village)*
2. Winter drainage from an as yet unlocated source in, or on the building down the easterly driveway and across Spring Street, which when it freezes constitutes a public hazard. This is a matter of long standing and remains uncorrected. *Mrs. Feb. 20, 1967*
3. Drainage of coolant waters from various production machines through a culvert leading directly to West Arm Bay, Lake Minnetonka. Innumerable complaints are received from boaters about the color of the water expelled from this source. The effluent has been tested in the past by the Conservation Department and found to be acceptable, but whether or not it will be so found under the new water purity standards is doubtful. To say the least, this situation, in the face of sorely needed anti-pollution activities, is difficult to explain to the public.

-2-

Mr. Thomas Mullansy, J. R. Clark Co.

January 15, 1970

4. Septic tanks situated in the park property on the south side of CSAH 15 have not been filled with granular material to the best of our knowledge. This matter was held in abeyance pending the outcome of company plans for utilization of these as holding tanks for pre treatment of effluent from a proposed nickel, chrome and zinc plating operation in the plant. Since this has not materialized within a reasonable time from the inception of the request (July 22, 1965) it is assumed that this project has been abandoned. Therefore, the company is in violation of Ordinance No. 32, Chapter II, Section 1:06.

Your attendance at the February 2 meeting will be appreciated.

Yours very truly,

VILLAGE OF SPRING PARK

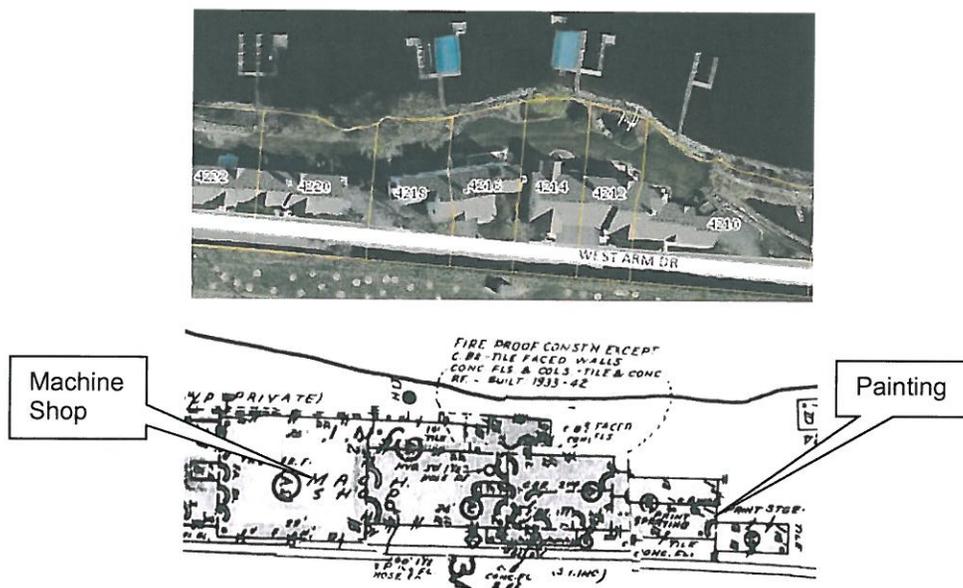
E. G. PATTERSON  
Village Clerk

Encl:  
Let. 12/15/69  
Let. 1/13/70  
Res. No. 68-12  
Clip Mtk. Sun 7/24/69

## Environmental Summary – Spring Park Wells Site Assessment Site #11 – Former Manufacturing Facility (Minnetonka Lakeshore Advance Machine)

Site Address: 4080 and 4125 – 4129 Sunset Drive (4218 – 4222 West Arm Drive)

Project No. 60305958



### Current Use – Townhomes

**Environmental Concerns** –Former manufacturing facility site with machine shop and painting facility. Release of chlorinated solvents documented with soil vapor impacts from impacted groundwater and soil to existing townhomes.

**Environmental Database Information** –EDR Radius Map™ Report lists the property as a small quantity generator of hazardous waste (Nilfisk-Advance Inc.) with “no violations found”, a leaking underground storage tank (LUST) site (LUST sites closed in 1989 and 1998), an underground storage tank site (Nilfisk-Advance Inc.: three removed fuel oil USTs of unknown size and one removed gasoline UST of unknown size), a Voluntary Investigation and Cleanup (VIC) site (Nilfisk-Advance Inc.), Site Remediation Section (SRS) site and Minnesota List of Sites (MN LS) for chlorinated volatile organic compounds identified in groundwater, Manifest site for disposal of carbon filter media associated with a VOC remediation system and What’s In My Neighborhood (WIMN) for multiple listings.

**Sanborn Fire Insurance Map Interpretations** – Paint spraying and paint storage areas were shown at the east end of the facility on the 1950 through 1966 Sanborn Maps. A machine shop was shown in the west central part of the facility building on the 1963 and 1966 Sanborn Maps.

**Aerial Photograph Interpretations** – Two industrial buildings with two smaller buildings were on the property on the 1937 aerial photograph. The eastern building was expanded to the east and west and buildings on the west were demolished/reconfigured on the 1953 aerial photograph. Building additions



were constructed on the east and west ends of the eastern building on the 1960 and 1964 aerial photographs and two small buildings were on the western portion of the property. Parking lots were on the west portion of the property beginning with the 1971 aerial photograph. The building was gone on the 1991 aerial photograph. Townhomes covered most of the property on the 1997 aerial photograph with infilling of the property with townhomes by the 2006 aerial photograph. The 2008 and 2010 aerial photographs showed building configurations similar to that which exist today.

**Prior Occupants from City Directory Listings** – Private individuals were listed at the property addresses in the 2007 and 2013 city directories. The site addresses were not listed in the 1996 city directory.

**Summary of MPCA File Information** – Nilfisk-Advance, Inc. (Advance) formerly occupied a strip of land on the north side of West Arm Drive adjacent to the West Arm of Lake Minnetonka. Advance manufactured floor cleaning equipment at the facility. The facility was decommissioned in 1987 after Advance moved operations to Plymouth, Minnesota. The property changed ownership in 1989 in anticipation of redevelopment. All but one building was demolished after the land sale. During demolition several underground storage tanks were removed. As part of the UST investigation, solvents including trichloroethene (TCE) were detected in groundwater. Construction of luxury townhomes started in 1994 on the property. Advance was notified of the TCE contamination by the MPCA after most of the townhomes were constructed. Since the notification in March, 1997 Advance has voluntarily investigated soil and groundwater contamination at the site.

During operations the company received citations for improper storage of hazardous materials and two managers were jailed for not complying with Hennepin County waste generator requirements. In 1985 Hennepin County identified 60 drums of hazardous waste stored on a loading dock and during closure of the facility five drums of waste were identified on a loading dock with evidence of spillage.

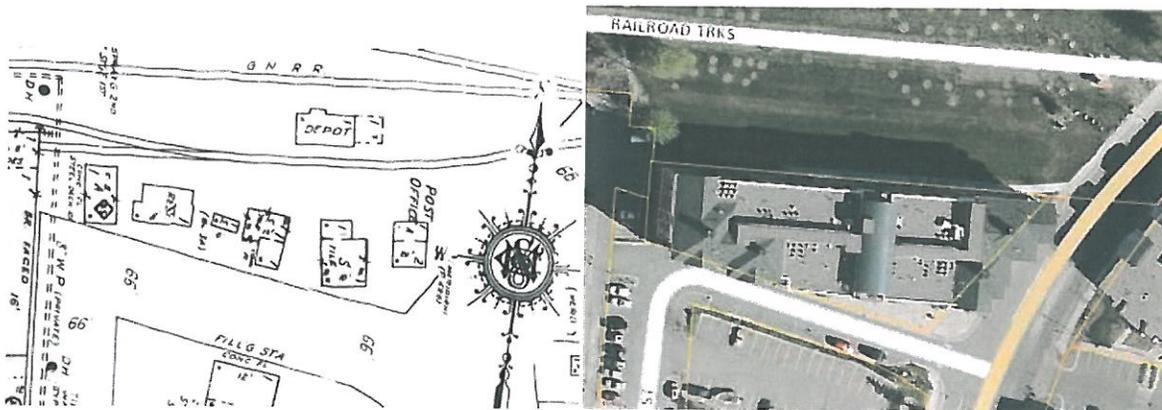
Advance installed a pump-and-treat cleanup remedy in 2004 which is still operational. Over 100 gallons of TCE have been removed from the groundwater since treatment began. Advance has also conducted soil vapor assessment of selected townhomes located over the TCE groundwater plume. TCE has affected air quality in some townhomes and remediation systems were installed.

**Potential for Environmental Impact** – High potential to impact the municipal well field is anticipated. Paint booths and a machine shop in the former Advance factory likely used solvents. Solvents could have been released to the environment through spills from an outside solvent tank storage area on the north side of the building, discharge through a former septic system, leaking sewer pipes below the facility or drainage pits in the facility, or other means. The site is located approximately 1,000 feet east/northeast of the municipal well field.

## Environmental Summary – Spring Park Wells Site Assessment Site #12 – Lakeview Lofts (former filling station)

Site Address: 4102 to 4136 Spring Street

Project No. 60305958



**Current Use** – Condominiums

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs); automobile repair

**Environmental Database Information** – EDR Radius Map™ Report lists the property as a leaking underground storage tank site (LUST site closure in 2005), an underground storage tank site as "Office Buildings" at 4120 to 4136 Spring Street (two removed gasoline USTs of unspecified capacity, one removed fuel oil UST of unspecified capacity, one removed 500 gallon gasoline UST and one removed 500 gallon fuel oil UST), a Financial Assurance site, a Brownfields site, a non-generator of hazardous waste with "no violations found", a Minnesota List of Sites site and a What's In My Neighborhood site. Lakeview Lofts is listed as an MPCA VIC Site (VP 19600).

**Sanborn Fire Insurance Map Interpretations** – A post office building was at the east end of the property and stores and a restaurant were also on the 1950 and 1952 Sanborn Maps. Stores and a restaurant were shown on the 1963 Sanborn Map. A tin shop was in the middle of the property on the 1966 Sanborn Map with a restaurant and stores on other areas.

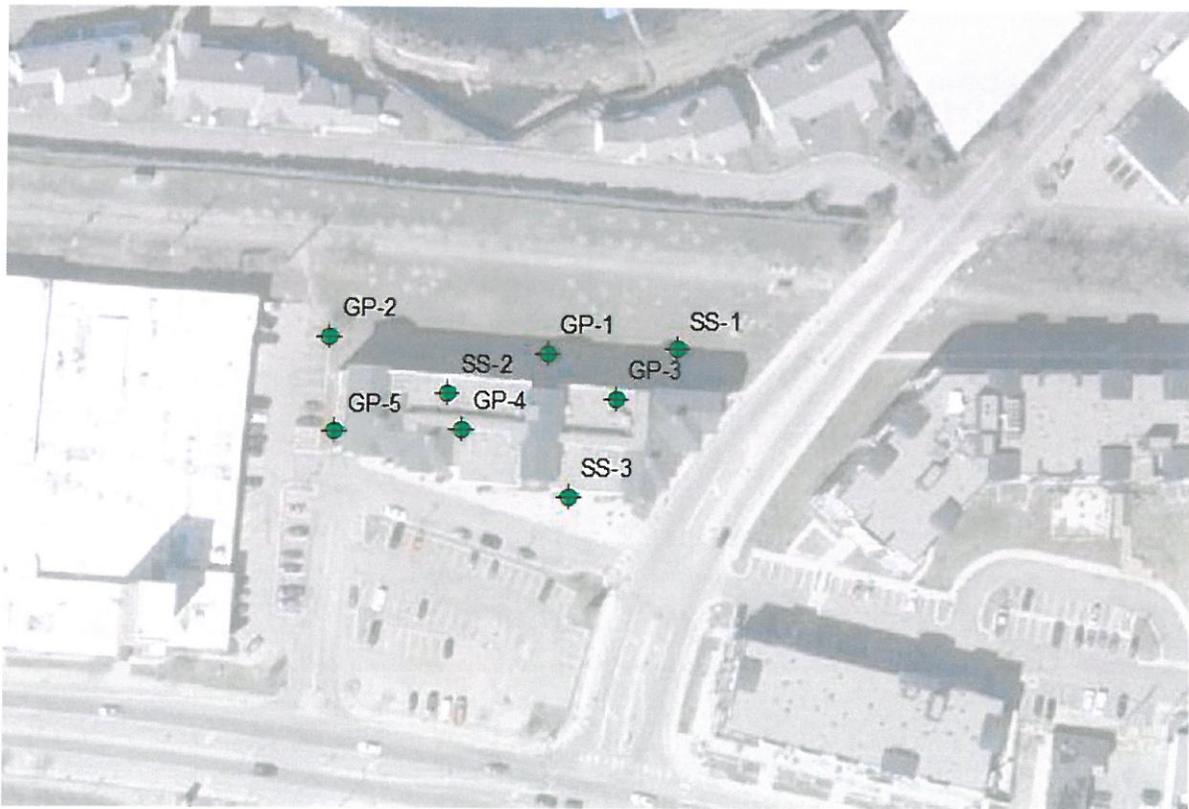
**Aerial Photograph Interpretations** – Commercial buildings were on the property in similar configuration to the Sanborn Map (above) on the 1937, 1953, 1960, 1964, 1971, 1972, 1978, 1984, 1987, 1991 and 1997 aerial photographs. A building in the same configuration as exists today was on the 2006 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – Swenson Electronics was listed at 4112 Springs Street, P C Shop was at 4114 Spring Street and Log Cabin Café was at 4136 Spring Street in the 1996 city directory. Zen Reflections Spa & Salon and several names of individuals were listed in the 2007 city directory. B&S Holdings Inc. and several names of individuals were listed in the 2013 city directories.

**City of Spring Park Interview** – The City of Spring Park Clerk indicated a laundry formerly occupied part of the property. The Clerk contacted a relative of the former laundry owner and confirmed that no dry cleaning occurred on the property.

**Summary of MPCA File Information** – A Phase I Environmental Site Assessments (ESA) identified potential environmental conditions including former property use for a filling station, fill pipes for USTs and a nearby Voluntary Investigation and Cleanup (VIC) site with groundwater impacted by chlorinated volatile organic compounds (VOCs) to the north/northeast of the property. A Phase II ESA conducted at the property identified limited petroleum impacts to soil and low concentrations of chlorinated solvents in groundwater from an apparent off-site source. The possible source was not identified. Site redevelopment was conducted under a Development Response Action Plan (DRAP). The DRAP Implementation Report indicated approximately 5,000 cubic yards of petroleum impacted soil was excavated and disposed of and a vapor barrier was installed below the constructed building. A No Association Letter from the MPCA VIC program was requested to address the identified groundwater impacts. A table summary and aerial photograph of the groundwater findings are Provided below:

VOC Compounds in Groundwater (µg/L)								
Compound	GP-1		GP-2		GP-3		GP-4	GP-5
	26-30 feet	46-50 feet	25-29 feet	45-49 feet	25-29 feet	45-49 feet	27-31 feet	21-25 feet
TCE	ND	36	31	340	ND	ND	7	ND
Cis-1,2-DCE	41	ND						
All Other VOCs	ND							

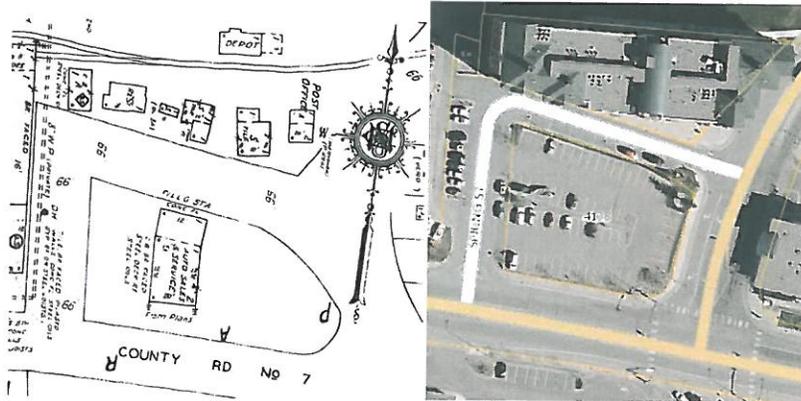


**Potential for Environmental Impact** – Known release of TCE; however, the low concentrations of chlorinated solvents in groundwater at the site area credited to an off-site source.

## Environmental Summary – Spring Park Wells Site Assessment Site #13 – Historical gas station

Site Address: 4138 Spring Street

Project No. 60305958



### Current Use – Parking lot

**Environmental Concerns** – Former gas station and automobile repair – petroleum products in former underground storage tanks (USTs) and possible solvent use for automobile repairs.

**Environmental Database Information** – EDR Radius Map™ Report had no listings for the subject property address.

**Sanborn Fire Insurance Map Interpretations** – A filling station with auto sales and service was shown on the 1950, 1952 and 1963 Sanborn maps. A boat sales and service facility was shown on the 1963 Sanborn Map.

**Aerial Photograph Interpretations** – The property was undeveloped on the 1937 aerial photograph. A building similar in configuration as shown on the Sanborn Map (above) was on the 1953, 1960, 1964 aerial photographs. Multiple vehicles, including apparent semi-trailers, were parked on the property around the building on the 1971 aerial photograph. Activities on the property appeared to decline on the 1972, 1978, 1984, 1987, 1991 aerial photographs. Activities appeared to increase (several parked vehicles) on the 1997 aerial photograph. A parking lot was on the property on the 2006, 2008, 2009 and 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – The address 4138 Spring Street was not listed in the city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former filling station/auto repair facility is located approximately 1600 feet east of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #14– Former Machine Shop

Site Address: 4029 Sunset Drive

Project No. 60305958



**Current Use** – Rockvam Boat Yards, Inc., pleasure boat sales, repair and storage

**Environmental Concerns** – Former machine shop: possible use of solvents

**Environmental Database Information** – EDR Radius Map™ Report lists the property as underground storage tank (UST) site with one removed 3000 gallon gasoline UST and two active 5000 gallon STI-P3 gasoline USTs, a Tier 2 site for gasoline storage, a What's In My Neighborhood (WIMN) site and a Financial Assurance site.

**Sanborn Fire Insurance Map Interpretations** – A machine shop was shown on the property on the 1950, 1952 and 1963 Sanborn maps.

**Aerial Photograph Interpretations** – The building configuration was consistent with the Sanborn Map depiction from 1937 until 1984 when the south approximately one-half of the existing building was present. An addition on the north side of the building was present on the 1997 aerial photograph which appears to be the present building configuration.

**Prior Occupants from City Directory Listings** – The address 4029 Sunset Drive was not listed in the city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former machine shop is located approximately 2500 feet east/northeast of the well field.

## Environmental Summary – Spring Park Wells Site Assessment Site #15 – Former Paint Store

Site Address: 2283 Lilac Road

Project No. 60305958



**Current Use** – Rockvam Boat Yards, Inc., pleasure boat sales, repair and storage

**Environmental Concerns** – Former paint shop: possible use of solvents

**Environmental Database Information** – EDR Radius Map™ Report lists the property as underground storage tank (UST) site with one removed 3000 gallon gasoline UST and two active 5000 gallon STI-P3 gasoline USTs, a Tier 2 site for gasoline storage, a What's In My Neighborhood (WIMN) site and a Financial Assurance site.

**Sanborn Fire Insurance Map Interpretations** – A paint shop was shown on the 1963 and 1966 Sanborn maps. A store was shown on the property on the 1950 and 1952 Sanborn Maps.

**Aerial Photograph Interpretations** – The building configuration was consistent with the Sanborn Map depiction from 1937 until 1984 when the south approximately one-half of the existing building was present. An addition on the north side of the building was present on the 1997 aerial photograph which appears to be the present building configuration.

**Prior Occupants from City Directory Listings** – The property address 2283 Lilac Road was not listed in the city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former paint store is located approximately 2400 feet east/northeast of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #16 – Former Machine Shop

Site Address: 4061 Sunset Drive

Project No. 60305958



**Current Use** – Rockvam Boat Yards, Inc., pleasure boat sales, repair and storage

**Environmental Concerns** – Former machine shop: possible use of solvents

**Environmental Database Information** – EDR Radius Map™ Report lists the property as underground storage tank (UST) site with one removed 3000 gallon gasoline UST and two active 5000 gallon STI-P3 gasoline USTs, a Tier 2 site for gasoline storage, a What's In My Neighborhood (WIMN) site and a Financial Assurance site.

**Sanborn Fire Insurance Map Interpretations** – A machine shop was shown on the property on the 1963 and 1966 Sanborn maps. A restaurant was shown at the location on the 1950 and 1952 Sanborn Maps.

**Aerial Photograph Interpretations** – The building configuration is consistent with the Sanborn Map depiction except additions were constructed to the east side of the building over time.

**Prior Occupants from City Directory Listings** – The city directories showed no listings for 4061 Sunset Drive. Rockvam Boat Yards currently occupies the property. Rockvam Boat Yards was listed at 4068 Sunset Drive located across the street from the property.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former machine shop is located approximately 2300 feet east/northeast of the well field.



## Environmental Summary – Spring Park Wells Site Assessment Site #17 – Former Machine Shop

Site Address: 4071 Sunset Drive

Project No. 60305958



**Current Use** – Lake Minnetonka Communications, public access television

**Environmental Concerns** – Former machine shop: possible use of solvents

**Environmental Database Information** – The property at 4071 Sunset Drive was not listed in the EDR Radius Map™ Report.

**Sanborn Fire Insurance Map Interpretations** – A machine shop was shown on the property on the 1950, 1952, 1963 and 1966 Sanborn maps, see above.

**Aerial Photograph Interpretations** – A square building occupying a similar footprint and orientation as the eastern part of the existing building today was observed on the 1937, 1953, 1960 and 1964 aerial photographs. Additions to the west side of the building appeared to have been constructed sometime before 1978. The building was present on the 1984 through 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – The property address 4071 Sunset Drive was not listed in the 1996 city directory. Lake Minnetonka Communications (cable television) was listed at the property address in the 2007 and 2013 city directories.

**Potential for Environmental Impact** – Medium potential to impact the municipal well field is anticipated. The former machine shop is located approximately 2100 feet east/northeast of the well field.

## Environmental Summary – Spring Park Wells Site Assessment Site #18 – Former Filling Station (Norling Nursery)

Site Address: 4100 Shoreline Drive

Project No. 60305958



**Current Use** – Condominiums and offices (The Mist)

**Environmental Concerns** – Former gas station – petroleum products in former underground storage tanks (USTs) and possible solvent use for automobile repairs.

**Environmental Database Information** – EDR Radius Map™ Report had no listings for the property address. However, the Minnetonka Mist Redevelopment closed leaking underground storage tank (LUST) site with the address of 4050 Shoreline Drive is located near the historical auto station on this property.

The Norling Nursery site at 4113 Sunset Drive was listed on the VIC, SRS, MN LS, WIMN databases in the EDR Radius Map™ Report.

**Sanborn Fire Insurance Map Interpretations** – A lumber business was on the north side of the property on the 1950, 1952, 1963 and 1966 Sanborn Maps. A filling station was shown on the south side of the property on the 1950, 1952 and 1963 Sanborn Maps. A filling station with automobile repair was shown on the 1966 Sanborn Map.

**Aerial Photograph Interpretations** – The property was undeveloped on its south side and appeared to have a farm building on its north side on the 1937 aerial photograph. A building with the same apparent configuration as shown on the Sanborn Map (above) was on the 1953, 1960, 1964, 1971, 1972, 1978, 1984, 1987, 1991 and 1997 aerial photographs. Vehicles surrounded the building on several of the aerial photographs. A building in the same apparent configuration as exists today was observed on the 2006, 2008, 2009 and 2010 aerial photographs.

**Prior Occupants from City Directory Listings** – The address 4100 Shoreline Drive was not listed in the 1996 city directory. JE Dunn Construction was listed at the address in the 2007 city directory. Solus Industries (project management) and several names of individuals were listed in the 2013 city directory.



**Review of MPCA File Information** – A MPCA “No Further Action Determination” letter (see below) summarized site conditions found at the Norling Nursery (Minnetonka Mist) Voluntary Investigation and Cleanup (VIC) site. A former filling station as well as other businesses were located on the property. Large amounts of impacted soil were excavated and disposed at landfills as part of site redevelopment. Groundwater containing trichloroethylene was collected during dewatering operations, treated and discharged to the storm water system.

**Potential for Environmental Impact** – Known release of TCE to groundwater; however, source could be from off-site. A No Further Action Determination letter issued for the VIC site indicates investigation/remediation was conducted to the satisfaction of MPCA requirements.

*jeanne***Minnesota Pollution Control Agency**520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-657-3864 | 651-282-5332 TTY | [www.pca.state.mn.us](http://www.pca.state.mn.us)

December 22, 2006

Ms. Patti St. Pierre  
The Mist Lofts, LLC  
7300 Metro Boulevard, Suite 585  
Edina, MN 55439

RE: Norling Nursery (Minnetonka Mist), 4113 Sunset Drive, Spring Park, Minnesota  
MPCA Project Number VP19710  
No Further Action Determination

Dear Ms. St. Pierre:

The Minnesota Pollution Control Agency (MPCA) staff in the Voluntary Investigation and Cleanup (VIC) Unit has been requested to provide a No Further Action Determination for releases identified at the Norling Nursery site, located at the address referenced above (the Site).

The Minnesota Pollution Control Agency (MPCA) staff in the Voluntary Investigation and Cleanup (VIC) Unit has reviewed the documents submitted for the Site. The Site was formerly occupied by commercial businesses, and three former railroad buildings used as office and warehouse space for a landscaping business. Site documents indicate that the Site has been occupied with several residential and commercial buildings since at least 1930; many buildings were demolished or removed from the Site at various times during the Site's history. Former Site uses consisted of the following: residences; hotel; filling station; restaurant; lumberyard; railroad buildings of unknown use; heating oil storage; radiator repair; and retail shops.

Phase II investigations identified the presence of polynuclear aromatic hydrocarbons (PAHs), chromium and arsenic at concentrations exceeding the MPCA residential soil reference values (SRVs) and/or soil leaching values (SLVs) in soil samples collected at the Site, and diesel range organics (DRO) and trichloroethylene (TCE) in the ground water. In 2005, excavations were conducted at the Site to remove known areas exceeding SRVs and SLVs. Approximately 833 tons of contaminated soil was excavated and disposed at the Onyx FCR Landfill in Buffalo, Minnesota. Final excavation confirmation samples did not exceed SRVs and SLVs. Approximately 62,000 cubic yards of soil was exported from the Site to MBE Dumpsite in Delano, Minnesota. The soils were sampled prior to export for RCRA metals, PAHs, volatile organic compounds (VOCs), DRO and gasoline range organics (GRO). Concentrations of metals were within background concentrations, and PAHs and VOCs were either below laboratory reporting limits or below SRVs and SLVs.

A ground water treatment system was required by the NPDES permit approved by the MPCA, to discharge ground water collected during Site dewatering activities to the storm sewer. Approximately 11.6 million gallons of ground water was discharged to the storm sewer. Ground water was pumped through an oil-water separator to remove TCE and DRO and through a weir tank to remove sediment. Effluent samples were below the permit criteria.

Ms. Patti St. Pierre  
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To address any potential TCE vapor migration from ground water into the buildings at the Site, vapor barriers, passive venting and garage ventilation systems were installed in each Site building. Stack emission samples were collected in November 2006. Concentrations of TCE and petroleum-VOCs were detected in the samples, indicating that these compounds were present in the passive venting system.

For the purposes of this letter, the identified release consists of TCE in ground water, and PAHs, chromium and arsenic in soil (Identified Release). Assistance for petroleum compounds may be obtained from one of the MPCA Petroleum Remediation Programs.

Based on a review of the information provided to the MPCA, the MPCA staff will not request The Mist Lofts, LLC, to conduct any further investigation or remediation of the Identified Release at the Site. Furthermore, the MPCA is issuing a determination to take no action under Minn. Stat. §§ 115B.01-115B.18, against The Mist Lofts, LLC with respect to the Identified Release. Specifically, the MPCA staff will not refer the Identified Release to the U.S. Environmental Protection Agency for inclusion on the Comprehensive Environmental Response, Compensation and Liability Information System list, to the State Site Assessment staff for preparation of a Hazard Ranking System score, or to the MPCA Commissioner for the placement of the Site on the Permanent List of Priorities.

This determination is subject to the following conditions:

- a copy of the affidavit, as recorded with Hennepin County, shall be submitted to the MPCA within thirty (30) days after the affidavit is officially recorded.

Please be advised that the determination made in this letter is subject to the disclaimers found in Attachment A and is contingent on compliance with the terms and conditions set forth herein, including the submittal of the copy of the recorded affidavit.

If you have any questions about the contents of this letter, please contact Patrice Jensen at (651) 296-7744 or John Betcher at (651) 296-7821.

Sincerely,



Barbara Jackson  
Supervisor  
Voluntary Investigation and Cleanup Unit  
Superfund Section  
Remediation Division

BJ/PJ:ls

Enclosures

cc: Dave Jaeger, Hennepin County Department of Environmental Services  
Ken Haberman, Landmark Environmental, LLC

ATTACHMENT A  
DISCLAIMERS

Norling Nursery  
MPCA Project Number 32VP19710

1. Reservation of Authorities

The MPCA Commissioner reserves the authority to take any appropriate actions with respect to any release, threatened release, or other conditions at the Site. The MPCA Commissioner also reserves the authority to take such actions if the voluntary party does not proceed in the manner described in this letter or if actions taken or omitted by the voluntary party with respect to the Site contribute to any release or threatened release, or creates an imminent and substantial danger to public health and welfare.

2. No MPCA Assumption of Liability

The MPCA, its Commissioner and staff do not assume any liability for any release, threatened release or other conditions at the Site or for any actions taken or omitted by the voluntary party with regard to the release, threatened release, or other conditions at the Site, whether the actions taken or omitted are in accordance with this letter or otherwise.

3. Letter Based on Current Information

All statements, conclusions and representations in this letter are based upon information known to the MPCA Commissioner and staff at the time this letter was issued. The MPCA Commissioner and staff reserve the authority to modify or rescind any such statement, conclusion or representation and to take any appropriate action under his authority if the MPCA Commissioner or staff acquires information after issuance of this letter that provides a basis for such modification or action.

4. Disclaimer Regarding Use or Development of the Property

The MPCA, its Commissioner and staff do not warrant that the Site is suitable or appropriate for any particular use.

5. Disclaimer Regarding Investigative or Response Action at the Property

Nothing in this letter is intended to authorize any response action under Minn. Stat. § 115B.17, subd. 12.