Submittal Document II.D. Hydrogeological and Environmental Assessment Report, prepared by Hydro-Logic Associates Inc., dated October 26, 2015

HYDROGEOLOGICAL and ENVIRONMENTAL ASSESSMENT REPORT

Prepared For:

D-BAR-A PROJECT
METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN

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HYDRO-LOGIC PROJECT NO. 04-206

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Hydrogeological and Environmental Assessment Report (the Report), is to present the results and conclusions of a geologic, hydrogeologic, and environmental investigation recently completed as a part of the D-bar-A Project specific to the D-bar-A Ranch and the Guy Parcel (collectively the Project Site), both located within Metamora Township, Lapeer County, Michigan. This investigation was completed on behalf of American Aggregates of Michigan (AAOM) who intends to submit a permit request to Metamora Township to conduct aggregates (sand and gravel) extraction activities on the Project Site.

In addition, this Report will provide professional opinions and recommendations as to anticipate a potential impact to the Project Site based on the proposed aggregates extraction activities, and to adequately monitor and protect the ground water and surface water conditions across the Project Site.

Specific goals of this hydrogeological and environmental assessment investigation include the following:

- Confirm the geology of the Project Site and the immediately surrounding area;
- Evaluate and establish baseline hydrogeological conditions and characteristics for the Project Site and the surrounding area;
- Assess the general ground water quality of the local water-bearing (aquifer) units;
- Provide professional opinions regarding any anticipated potential impact to the Project Site and the surrounding area as a direct result of the aggregates extraction activities proposed by AAOM;
- Recommend an annual work plan to collect the data necessary to adequately monitor, evaluate, and protect the ground water and surface water quality of the Project Site.

Hydro-Logic Associates, Inc. (Hydro-Logic), a professional environmental consulting firm, prepared the Report following the review and evaluation of information pertaining to the Project Site and the surrounding area as obtained from and provided by the U.S. Environmental Protection Agency (EPA), the Michigan Department of Environmental Quality (MDEQ), the Lapeer County Environmental Health Department (LCEHD), and AAOM. Mark R. Zayatz, a Certified Professional Geologist with over 25 years of experience with sand and gravel, and crushed aggregates mining operations, prepared this Report. Refer to Appendix A for a Summary of Qualifications.

1.2 Project Site Location and Site Description

The D-bar-A Ranch and the Guy Parcel, two adjacent parcels collectively referred to as the Project Site, encompass approximately 570-acres and 154-acres (724-acres total), respectively.

The Project Site is specifically located within Sections # 2, 3, 11, and 12 of Metamora Township, north of Dryden Road, west of Wilder Road, and south of Sutton Road. Refer to Figure 1: Project Site Location Map.

The Project Site is bordered to the north by the active D-bar-A Ranch, and beyond by rural residential and agricultural properties; to the east and south by rural residential and agricultural properties, and by an active sand and gravel extraction operation owned and operated by the Lapeer County Road Commission; and to the west by additional rural residential and agricultural properties, and beyond by the former Metamora Landfill, and another active sand and gravel extraction operation owned and operated by John R. Sand & Gravel.

It is our observation that sand and gravel extraction operations are currently active and have been active in the immediate area of the Project Site for many years. This observation is confirmed by available historic aerial photographs of the Project Site area provided for the years 1941, 1957, 1964, 1972, 1982, and 1992. Refer to Appendix B.

The north-central to eastern portion of the Project Site can generally be described as gently rolling with ground surface elevations ranging from 960 to 1,025 feet above mean sea level (MSL). The western and south-central portion of the Project Site can best be described as moderately to steeply rolling with ground surface elevations ranging from 1,020 to 1,150 feet above MSL. Refer to Figure 2: Project Site Topographic Map.

One significant surface water body, Beaver Lake, which has an approximate surface water elevation of 970 feet above MSL, is observed on the Project Site. Beaver Lake was created when an approximate 20-foot high earthen dam was constructed across a somewhat narrow, low spot on an unnamed tributary to the South Branch of the Flint River, within the central portion of the D-bar-A Ranch. The height of the lake is mechanically controlled by a manually operated flood-gate. A significant wetlands area is observed upgradient of Beaver Lake. Refer to Figure 1.

1.3 General Project Description

In general, AAOM proposes to conduct aggregates (sand and gravel) extraction and processing activities on the Project Site. This specifically includes the removal and processing of sand and gravel contained within natural glacial deposits located above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site. Following processing, the aggregates resources will be temporarily stockpiled on the Project Site awaiting transportation to a job site.

2.0 PROJECT BACKGROUND and PRELIMINARY INFORMATION

Hydro-Logic provides the following project background and preliminary information regarding the Project Site and the surrounding area:

- Section 2.1 Regional and General Geology
- Section 2.2 Regional and General Hydrogeology
- Section 2.3 Local Drinking Water Supply Well Survey
- Section 2.4 Existing Surface Water Features
- Section 2.5 Proposed Ground Water Production Well(s)
- Section 2.6 The Former Metamora Landfill
- Section 2.7 Case Histories Regarding Other AAOM Aggregates Extraction Operations
- Section 2.8 Additional Background Information

2.1 Regional and General Geology

According to available private-use water supply well records, including the geologic information obtained from the MDEQ Wellogic database, the upper unconsolidated regional geology within this portion of Lapeer County consists of non-sorted, glacial debris including sandy clay loam, sandy loam, loamy sand, and thick Pleistocene-age deposits of fine to coarse sand with abundant gravel, cobbles, and occasional boulders.

Discontinuous intermixed lenses of silty clay to sandy clay, up to 10-feet thick, are not uncommon within the deposits of sand and gravel.

The material occurs in somewhat narrow linear belts of hummocky relief, which identify a stagnant location of the ice-sheet margin, and include end moraine and ground moraine type deposits. Thickness of these deposits can exceed 100 feet (Farrand, 1982). The area is also commonly marked by numerous ice-block depressions also known as kettle holes, and if filled with water kettle lakes.

The described upper unconsolidated glacial deposits in this portion of Lapeer County overlies the Marshall Sandstone which consists of one or more stratigraphically continuous, permeable sandstones. The permeable sandstones of the Marshall Sandstone comprise the Marshall aquifer system (Apple and Reeves, 2007).

According to general soil boring information provided by AAOM, the surficial geology of the Project Site consists of a surficial layer of loamy to clayey material, ranging in thickness from 0 to 18 feet, overlying a thick glacial deposit of unconsolidated sand and gravel, ranging in thickness from 60 to 100 feet, or more. This sand and gravel deposit is observed to contain some intermixed layers of more silty to clayey material, and is at times, observed to be underlain by a thick deposit of gray clayey till.

2.2 Regional and General Hydrogeology

According to available private-use water supply well records, including the hydrogeologic information obtained from the MDEQ Wellogic database, the hydrogeology of the Project Site and surrounding area is comprised of three (3) or more unconsolidated glacial-drift ground water aquifer systems. This can include a surficial ground water aquifer system that is somewhat discontinuous, relatively thin, and generally encountered at elevations greater than 1,000 feet MSL. An intermediate, much thicker, unconsolidated ground water aquifer system is expected to be encountered between elevations of 900 to 990 feet above MSL. Lastly, the deepest unconsolidated ground water aquifer system is encountered just above the bedrock at an elevation of approximately 800 to 840 feet above MSL.

The unconsolidated glacial-drift ground water aquifer systems in this portion of Lapeer County overlie the permeable Marshall Sandstone bedrock aquifer system (Apple and Reeves, 2007). The permeable sandstone members of the Marshall Sandstone comprise the Marshall aquifer system. The Marshall aquifer ranges in thickness from 75 feet to greater than 200 feet thick, and can yield great quantities of fresh water in Lapeer County (Westjohn and Weaver, 1996).

According to the MDEQ and the LCEHD the unconsolidated glacial-drift ground water aquifer systems and the Marshall Sandstone bedrock aquifer system are in direct communication with one another and together provide all of the water resources for this portion of Lapeer County.

Preliminary observations suggest that the flow of surface and ground water across the Project Site are to the north and northeast in the general direction of the South Branch of the Flint River.

It is anticipated that all aggregates extraction and mining activities proposed by AAOM will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site.

2.3 Local Drinking Water Supply Well Survey

According to the LCEHD, the ground water within the local unconsolidated glacial-drift ground water aquifer systems and the Marshall Sandstone bedrock aquifer system are both generally considered to be potable and of good quality. However, the ground water is usually hard and may contain concentrations of total iron and/or total arsenic exceeding the MDEQ drinking water criteria. This can be typical for aquifer systems within Southeast Michigan.

To better understand the local drinking water supply for the Project Site and the immediate Project Site area, Hydro-Logic completed an evaluation of all the available water well records, available within the MDEQ-Wellogic database, as of August 06, 2015, for the following large area:

- Metamora Township, Sections # 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24
  (123 total well records)
- Lapeer Township, Sections # 33, 34, 35, 36
  (26 total well records)
- Dryden Township, Sections # 6, 7, 18
  (25 total well records)

This included an evaluation of all the available water well records for the above-referenced (174) drinking water supply wells located closest to the Project Site, including all (21) wells identified on the D-bar-A Ranch (Sections # 2, 3, 11, and 12 of Metamora Township). Refer to Figure 1 and Figure 2.

The results confirmed that approximately 40% of the private-use water supply wells in the Project Site area have been completed in the unconsolidated glacial-drift ground water aquifer, with the remaining 60% completed within the Marshall Sandstone bedrock aquifer. The average total depth of supply wells constructed in the glacial-drift aquifer was approximately 110 to 130 feet below ground surface (BGS); the average total depth of the bedrock wells was approximately 250 to 270 feet BGS; and the average total depth of a bedrock well in Metamora Township was approximately 300 feet BGS. Refer to Appendix C: Local Water Well Survey Summary.

The well logs also identified that the nearest Type I Public (Community) Water Supply Well within the Project Site area is owned, operated by, and located within the Village of Metamora. This information was confirmed by the Lapeer County Environmental Health Department (LCEHD). The Village of Metamora wellfield is located a minimum of 6,500 feet to the west of the westernmost Project Site Boundary.

Given the distance of the off-site private-use water supply wells and the nearest Type I Public (Community) water supply well to the proposed sand and gravel extraction activities, and the fact that the proposed aggregates extraction activities will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site, these off-site wells will not be affected.

2.4 Existing Surface Water Features

One significant surface water body, Beaver Lake, which has an approximate surface water elevation of 970 feet above MSL, is observed on the Project Site. Beaver Lake is a man-made lake that was created when an approximate 20-foot high earthen dam was constructed across a somewhat narrow, low spot on an unnamed tributary to the South Branch of the Flint River, within the central portion of the D-bar-A Ranch.

In addition, both regulated and unregulated wetlands occur on the Project Site, as determined through detailed field studies documented in the Biological Resource Assessment completed for the Project Site. When comparing the surface water elevations of the identified wetlands to the approximate ground water elevations encountered across the Project Site as determined by this study, we conclude that both perched wetlands and ground water fed wetlands exist. Refer to Figure 3: Project Site Wetlands Map.

According to AAOM, existing surface water features on the Project Site (lakes, ponds, regulated wetlands, and streams) will not be diverted or directly impacted as a part of the planned aggregates extraction and production activities.

2.5 Proposed Ground Water Production Well(s)

All wash water to be utilized on the Project Site, which is necessary for the production of some aggregates products, will be obtained from proposed on-site ground water production well(s) to be permitted, installed, tested, and approved, with oversight provided by both the MDEQ and the LCEHD, as required. In addition, wash water obtained from these production well(s) will be recycled through a series of on-site closed-loop settling ponds to minimize the amount of water required to be produced from these well(s).

All proposed ground water production well(s) will be located at the greatest reasonable distance from any identified private-use water supply wells in the area and from the former Metamora Landfill (discussed in Section 2.6). Specifically, it is estimated that any on-site production well will be located a minimum of 500 feet from any residential well and greater than approximately 5,000 feet from the former Metamora Landfill.

It is anticipated that the proposed production well(s) will draw water from the local bedrock aquifer to meet projected use rates of the aggregates processing facility. The bedrock aquifer does not feed any nearby surface water features, therefore, the production well(s) will not utilize water meant for these features.

In summary, it is the professional opinion of Hydro-Logic that the "quality and quantity" of residential drinking water wells and surface water features on the Project Site or within the surrounding Project Site area will not be impacted by the projected installation and use of the on-Site ground water production well(s).

2.6 The Former Metamora Landfill

The former Metamora Landfill is a current MDEQ Part 201 and EPA listed environmentally contaminated site located approximately 1,500 to 2,000 feet to the west of the nearest (westernmost) Project Site Boundary. This privately-owned property operated from 1966 to 1980 and consisted of a 25-acre landfill and two drum disposal areas. Both soil and ground water contamination has been identified on this property. The reported cleanup progress to date (1986-1994) included the excavation and incineration of the two drum disposal areas and the capping of the entire 25-acre landfill.

According to information obtained from the MDEQ, the EPA, and the LCEHD, the encountered unconsolidated glacial-drift ground water aquifer system(s) and the Marshall Sandstone bedrock aquifer system in the immediate area of the Metamora Landfill have been affected. The unconsolidated aquifer system(s) appear to exhibit the greatest impact.

Ground water flow has been determined to be in a northerly direction in the immediate area of the former landfill, which has caused the known ground water contamination to migrate off-site and affect private-use water supply wells located to the north of the former landfill. Routine ground water monitoring activities continue to be conducted on the former landfill site and on the affected off-site residential properties, on behalf of the EPA and the MDEQ. The cleanup and capping activities completed to date, and natural attenuation (natural degradation of the known contaminants) has been identified by the EPA as a final remedy for the former Metamora Landfill site.

2.7 Case Histories Regarding Other AAOM Aggregates Extraction Operations

For several years AAOM has authorized an independent evaluation of ground water and surface water conditions at many of its larger active aggregates extraction operations within Michigan. This includes the installation of ground water monitoring wells and the collection and analysis of ground water and surface water quality samples. These properties continue to be routinely monitored, sampled, and (re)evaluated over the duration of the mining operations. The oldest of these, the Highland Township Property, has been monitored, sampled, and evaluated continuously since 1996. This property and two (2) other similar active aggregates

(sand and gravel) extraction properties, all still being operated by AAOM and other companies owned by the Edw. C. Levy Co., are briefly discussed below:

2.7.1 Highland Township Property, Michigan

In May-June 1992, before any aggregates extraction activities had taken place, nineteen (19) ground water monitoring wells were installed across the Highland Township Property. The wells were surveyed, ground water elevations were measured, and ground water samples were collected and submitted for laboratory analysis of common ground water quality parameters. These activities were completed to establish a pre-mining baseline for the property. The Highland property is similar to the proposed mining at the Project Site in scale, proximity to wetlands, and extractive and processing techniques and equipment.

The baseline Hydrogeological Report for the Highland property was completed in January 1993. This report discussed geological and hydrogeological conditions, and established a method to evaluate seasonal fluctuations in ground water elevations across the property and to monitor ground water quality, over the life of the mining permit. This report was submitted to Highland Township and to the MDEQ for review and comments.

Aggregates extraction activities began on the Highland property in 1996. Sand and gravel extraction has been performed both above and below the observed ground water table. The collection of approximately monthly ground water elevations from each of the monitoring wells was also initiated at that time. Hydro-Logic began the annual collection of ground water samples from prescribed wells in the Fall of 1996 and this has continued as aggregates extraction activities continued across the property from 1996 through today. An Annual Ground Water Monitoring Report is completed at the end of each year and this annual report continues to be submitted to Highland Township and to the MDEQ.

In summary, the successive ground water quality analytical results, when compared to the baseline and annual data obtained from the Highland property since 1992, do not reflect any significant differences attributable to the operation of the property as an aggregates extraction facility. In addition, the observed ground water elevation fluctuations, which are limited in scope, are predominantly the result of documented regional rainfall patterns, not the result of the aggregates extraction activities. Lastly, these annual reports conclude that ground water conditions across the property were adequately being monitored and that the ground water on, and adjacent to, the property has not been impacted by the aggregates extraction activities conducted. No adverse or disputed findings were ever identified or reported by Highland Township, the township engineering consultant, or the MDEQ.

2.7.2 Hartland Township Property, Michigan

In May 1998, three (3) ground water monitoring wells were installed at the Hartland Township Property. Wells were surveyed, ground water elevations were measured, and ground water samples were collected and submitted for laboratory analysis of common ground water quality parameters. These activities were completed to establish a pre-mining baseline for the property. The Hartland property is similar to the proposed mining at the Project Site in extractive and processing techniques and equipment.

The baseline Hydrogeological Report for the Hartland property was completed in December 2000. This report discussed geological and hydrogeological conditions, and established a method to evaluate seasonal fluctuations in ground water elevations across the property and to monitor ground water quality, over the life of the mining permit. This report was submitted to Hartland Township for review and comments.

Aggregates extraction activities began on the Hartland property in 1998. Sand and gravel extraction has been performed both above and below the observed ground water table. The collection of approximately quarterly ground water elevations from each of the monitoring wells was also initiated at that time. Hydro-Logic began the annual collection of ground water samples from prescribed wells in May 1998 and this has continued as

aggregates extraction activities continued across the property from 1998 through today. In February 2013, three (3) additional ground water monitoring wells were installed to extend coverage across the property. An Annual Ground Water Monitoring Report is completed at the end of each year and this annual report continues to be submitted to Hartland Township.

In summary, the successive ground water quality analytical results, when compared to the baseline and annual data obtained from the Hartland property since 1998, do not reflect any significant differences attributable to the operation of the property as an aggregates extraction facility. In addition, the observed ground water elevation fluctuations, which are limited in scope, are predominantly the result of documented regional rainfall patterns, not the result of the aggregates extraction activities. Lastly, these annual reports conclude that ground water conditions across the property were adequately being monitored and that the ground water on, and adjacent to, the property has not been impacted by the aggregates extraction activities conducted. No adverse or disputed findings were ever identified or reported by Hartland Township or its environmental engineer.

2.7.3 Freedom Township Property, Michigan

In January and October 2004, before any aggregates extraction activities had taken place, four (4) ground water monitoring wells were installed across the Freedom Township Property. Wells were surveyed, ground water elevations were measured, and ground water samples were collected and submitted for laboratory analysis of common ground water quality parameters. These activities were completed to establish a pre-mining baseline for the property. The Freedom property is similar to the proposed mining at the Project Site in ground surface elevation relief, proximity to wetlands, and extractive and processing techniques and equipment.

The baseline Hydrogeological Report for the Freedom property was completed in July 2004. This report discussed geological and hydrogeological conditions, and established a method to evaluate seasonal fluctuations in ground water elevations across the property and to monitor ground water quality, over the life of the mining permit. This report was submitted to Freedom Township for review and comments.

Aggregates extraction activities began on the Freedom property in 2004. Sand and gravel extraction has been performed above the observed ground water table. The collection of approximately monthly ground water elevations from each of the monitoring wells was also initiated at that time. Hydro-Logic began the annual collection of ground water samples from prescribed wells in January 2004 and this has continued as aggregates extraction activities continued across the property from 2004 through today. In August 2005, one (1) additional ground water monitoring well was added to extend coverage across the property. An Annual Ground Water Monitoring Report is completed at the end of each year and this annual report continues to be submitted to Freedom Township.

In summary, the successive ground water quality analytical results, when compared to the baseline and annual data obtained from the Freedom property since 2004, do not reflect any significant differences attributable to the operation of the property as an aggregates extraction facility. In addition, the observed ground water elevation fluctuations, which are limited in scope, are predominantly the result of documented regional rainfall patterns, not the result of the aggregates extraction activities. Lastly, these annual reports conclude that ground water conditions across the property were adequately being monitored and that the ground water on, and adjacent to, the property has not been impacted by the aggregates extraction activities conducted. No adverse or disputed findings were ever identified or reported by Freedom Township or its environmental consultant.

Each of the three (3) properties (Highland, Hartland, and Freedom) are comparable to the Project Site. Each provide substantial, long-term evidence that mining activities like those proposed can be accomplished with no measurable impact to the elevation, quantity, and quality of the ground water at a site.

2.8 Additional Background Information

During the preparation of this report, Hydro-Logic consulted available published information regarding ground water, surface water, and soil conditions in Lapeer County including the following:

- **Soil Survey of Lapeer County, Michigan**, U.S. Department of Agriculture, Soil Conservation Service, dated January 1972;
- **Quaternary Geology of Michigan**, prepared by the State of Michigan, Department of Natural Resources, Geological Survey, dated 1982;
- **Bedrock Geology of Michigan**, prepared by the State of Michigan, Department of Natural Resources, Geological Survey, dated 1987;
- **Arsenic in Ground Water in Lapeer County, Michigan**, prepared by the U.S. Geological Survey, dated October 2000;and
- **Five-Year Review Report for Metamora Landfill Superfund Site, Village of Metamora, Lapeer County, Michigan**, prepared by the U.S. EPA, Region 5, Chicago, Illinois, dated September 18, 2014.

3.0 HYDROGEOLOGICAL ASSESSMENT WORK PLAN

Following the review of available Project Site-specific project background and preliminary information provided in Section 2.0, and in consideration of the results for ongoing monitoring and evaluation of ground water and surface water conditions at several active aggregates extraction properties operated by AAOM across Southeast Michigan, Hydro-Logic recommended the completion of a Work Plan to collect baseline data, and establish and document the site-specific geological and hydrogeological characteristics for the Project Site and for the immediately surrounding area.

This Work Plan, which was recently completed, documents conditions across the Project Site prior to the occurrence of any proposed aggregates extraction activities, and specifically included the following activities:

- The review and evaluation of all of the **soil boring data** collected on the Project Site by AAOM in 2002. This included a total of (37) soil borings on the D-bar-A Ranch and (18) additional soil borings on the Guy Parcel. This information and data was used to identify the most appropriate locations to place additional borings to best characterize the general geology and hydrogeology across the Project Site.

- Between July 6-21, 2015, Hydro-Logic directed the advancement of nine (9) **soil borings** (BSA 1-15MW through BSA 9-15MW) within and immediately adjacent to the proposed aggregates extraction area on the Project Site. The borings were located to encompass the entire perimeter of the Project Site. The soil borings were completed under the direction of a Hydro-Logic professional geologist. Refer to Figure 4: Soil Boring / Monitoring Well Location Map.

  The soil borings were advanced by Cascade Drilling, L.P., utilizing current standard 4" x 6" sonic drilling techniques. Specifically, an all terrain vehicle mounted drilling rig equipped with a 6-inch diameter, vibrating, outside borehole casing was utilized in the advancement of each boring. Soil samples were collected continuously using a 10-foot long, 4-inch diameter, vibrating, sampling barrel. Discrete samples were collected at each 10-foot sampling interval. A sonic drilling rig was used to ensure the best recovery of soil samples on a Project Site that was known to have significant quantities of sand and gravel, and could include cobble and boulder size material.

Each soil boring was advanced to a depth slightly beyond the first encountered (non-perched) soil-ground water interface to better investigate the saturated interval of the uppermost unconsolidated glacial-drift ground water aquifer system. The total depth of the soil borings ranged from 45 to 176 feet below ground surface. The total depth of the completed soil borings was so varied due to the great variations in topographic conditions (gently to steeply rolling) encountered across the Project Site. Refer to Figure 2.

Every soil sample was evaluated in the field by Hydro-Logic and AAOM for the purpose of characterizing geological and hydrogeological conditions across the Project Site. Soil boring logs were completed for each boring and are included in Appendix D: Hydro-Logic Soil Boring Logs.

- Each of the nine (9) soil borings were completed as a **ground water monitoring well** (BSA 1-15MW through BSA 9-15MW), according to current MDEQ protocol by a registered Michigan well driller. Each well was screened to encounter the uppermost unconsolidated glacial-drift ground water aquifer (non-perched) system. The total depth of the completed wells ranged from 20 to 176 feet BGS, dependent on topography.

  Each monitoring well was constructed of 2-inch diameter, Schedule 40, flush jointed, and threaded, PVC riser. The well screen was either 10-foot or 20-foot in length, factory slotted PVC, with a 0.010-inch slot (10-slot) size. Coarse silica sand was placed in the annular space of each well to a minimum depth of approximately 3-feet above the top of the well screen. A bentonite (granules) seal was placed above the sand pack and hydrated in place. A bentonite-slurry was then placed above the bentonite seal, to seal the remainder of the annular space to within a few feet of the ground surface. Each well was then equipped with a water-tight cap and completed with a locking, above ground well casing of steel-construction, set in concrete, and locked. Following the completion, each well was developed by submersible pump to remove all fine sediments, as possible. Well construction details are included in Appendix D.

- A **horizontal and vertical survey** of each of the nine (9) ground water monitoring wells was completed by AAOM utilizing a common U.S.G.S. datum. The vertical survey of the ground surface and the top-of-casing at each well location was surveyed to be accurate to 0.01 feet.

- On July 24, 2015, Hydro-Logic collected the initial **static ground water elevations** for the nine (9) ground water monitoring wells across the Project Site. The depth to ground water across the Project Site ranged from approximately 14 to 158 feet below surveyed top-of-casing. Refer to Table 1: Ground Water Elevation Data.

  Depth to ground water measurements were collected using an electronic sounding device which alerts the user when an attached probe makes contact with water. The device was lowered down into each monitoring well until it indicated that the water surface had been encountered. The distance between the top of the PVC well riser (top-of-casing) and the ground water surface was read from the incremented probe line. All measurements were recorded to the nearest 0.01 feet.

- On August 5 and 6, 2015, Hydro-Logic collected a representative **ground water sample** from each of the nine (9) monitoring wells. Each of the wells was purged prior to sampling, and a ground water sample was collected utilizing a submersible low-flow well pump. Ground water samples were collected according to typical MDEQ protocol, placed in laboratory prepared containers, stored on ice, and transported under proper chain-of-custody documentation to Brighton Analytical, L.L.C., an independent analytical laboratory. Based on our professional experience, the ground water samples were analyzed for the following contaminant and water quality parameters utilizing MDEQ approved methodologies:

Full-scan (MDEQ recommended) volatile organic compounds (VOCs)
1,4-Dioxane
Ethane, Ethylene, Methane

Total Metals
- arsenic
- calcium
- copper
- iron
- magnesium
- manganese
- sodium

Inorganic Parameters
- ammonia
- chloride
- hardness
- nitrate
- nitrite
- pH
- sulfates

4.0 HYDROGEOLOGICAL INVESTIGATION RESULTS

4.1 Project Site Geology

The topography of the Project Site generally consists of a hummocky ridge line that was formed as part of a regional glacial end moraine and glacial outwash deposit, which comprises the rolling hills within this portion of Lapeer County. The portion of this glacial depositional feature located on the Project Site is characterized by large thicknesses of sand and gravel with intermixed layers and lenses of sandy silts to clays. A large valley is observed to bisect the Project Site separating a high ridge and hills in the west, from more rolling hills to the east.

According to general soil boring information previously provided by AAOM, and confirmed by the soil boring activities completed in 2015 by Hydro-Logic, the surficial geology of the Project Site consists of an upper layer of loamy to clayey material, ranging in thickness from 0 to 18 feet, overlying a thick glacial deposit of unconsolidated sand and gravel, ranging in thickness from 60 to 100 feet, or more. This sand and gravel deposit will contain some intermixed layers of silty to clayey material, and is at times, observed to be underlain by a thick deposit of gray clayey till. Refer to Figure 5 for a generalized geological cross-section from west to east across the Project Site.

4.2 Project Site Hydrogeology

Project Site investigation activities presented within this section were completed to determine specific hydrogeologic characteristics of the Project Site and the immediate Project Site area, and include the following:

- Section 4.2.1 Encountered Ground Water Conditions
- Section 4.2.2 Ground Water Elevation Data
- Section 4.2.3 Aquifer Characteristics
- Section 4.2.4 Existing Surface Water Features

4.2.1 Encountered Ground Water Conditions

Each of the nine (9) soil borings advanced across the Project Site by Hydro-Logic was completed as a 2-inch diameter, PVC ground water monitoring well, equipped with either a 10-foot or 20-foot length well screen. Each well (BSA 1-15MW through BSA 9-15MW) was specifically screened to encounter the uppermost unconsolidated glacial-drift ground water aquifer (non-perched) system. The total depth of the completed wells ranged from 20 to 176 feet BGS, dependent upon topography. Each well has been secured with a protective steel casing and a lock. Also refer to Section 3.0.

The horizontal placement of these wells was chosen to best allow representative monitoring of ground water conditions within and immediately adjacent to the proposed aggregates extraction area on the Project Site. The borings were located to encompass the entire perimeter of the Project Site; the purpose being that any change in ground water elevations or conditions that might occur within the aggregates extraction area should be detected in these monitoring wells before being observed off-site.

The general geology of the first encountered, saturated, unconsolidated ground water aquifer system consists of fine-grained to coarse-grained, slightly silty sand, with variable amounts (5 to 40%) of gravel. On occasion, the saturated unit was observed to grade from a very fine-grained slightly silty sand to a sandy silt. The total thickness of this aquifer system has not been determined, and it appears to be unconfined. Refer to Table 1 and Appendix D.

4.2.2 Ground Water Elevation Data

A horizontal and vertical survey of each of the nine (9) ground water monitoring wells (BSA 1-15MW through BSA 9-15MW) was completed across the Project Site. The vertical survey of the ground surface and the top-of-casing at each well location was surveyed to be accurate to 0.01 feet. This data would be used to determine the predominant horizontal direction and gradient of ground water flow.

On July 24, 2015, Hydro-Logic collected the initial static ground water elevations from the nine (9) ground water monitoring wells. The uppermost unconsolidated glacial-drift ground water aquifer system was encountered at approximately 1,000 feet above MSL in the southwestern corner of the Project Site and at approximately 930 feet above MSL in the northeastern corner. Therefore the general ground water flow direction across the Project Site is determined to be to the north-northeast. Refer to Figure 6: Ground Water Flow Map (July 24, 2015), for approximate ground water contours across the Project Site. Refer to Table 1.

Subsequent static ground water elevations will be collected and recorded from each of the monitoring wells on a quarterly basis (January, April, July, October) for the duration of the mining permit. This information will be used to provide a record of the natural and seasonal ground water fluctuations across the Project Site.

Given that the aggregates extraction and mining activities proposed by AAOM will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site, and our firm's nearly 20 year monitoring of mining activity on comparable properties, we do not anticipate any significant change in ground water elevations as a result of the proposed mining activities.

4.2.3 Aquifer Characteristics

The horizontal gradient of ground water flow, calculated using the static water level data collected in July 2015 from wells BSA 9-15MW and BSA 6-15MW, was approximately 0.014 ft/ft; and from wells BSA 1-15MW and BSA 8-15MW, was approximately 0.008 ft/ft to the north-northeast.

An estimate of hydraulic conductivity for the fine-grained to coarse-grained, slightly silty sand, with variable amounts of gravel penetrated by these wells range from approximately 10 to 100 ft/day, according to data published by Freeze and Cherry, 1979.

Assuming an average hydraulic conductivity value of 40 ft/day, an average hydraulic gradient of 0.011 ft/ft, and an average effective soil porosity for slightly silty sand of 0.27; the average linear ground water velocity for the fine-grained to coarse-grained, slightly silty sand, with variable amounts of gravel identified beneath the Project Site was calculated to be approximately 1.6 ft/day. The flow velocity value represents an advective (gravity flow) rate of typical unconsolidated sediments encountered at the Project Site.

4.2.4 Existing Surface Water Features

One significant surface water body, Beaver Lake, is observed on the Project Site. Beaver Lake is a man-made lake that was created when an approximate 20-foot high earthen dam was constructed across a somewhat narrow, low spot on an unnamed tributary to the South Branch of the Flint River. Beaver Lake has an approximate surface water elevation of 970 feet above MSL. Given the surface water elevation of the lake, the approximate site-specific ground water contours provided in Figure 6, the measured ground water elevation (948.71 feet above MSL) in adjacent monitoring well BSA 7-15MW, and the soils geology encountered in soil boring / well BSA 7-15MW; we conclude that Beaver Lake is primarily ground water fed.

In addition, both regulated and unregulated wetlands occur on the Project Site, as determined through detailed field studies documented in the Biological Resource Assessment completed. When comparing the surface water elevations of the wetlands to the approximate ground water elevations encountered across the Project Site as contoured within Figure 6, we conclude that both perched wetlands and ground water fed wetlands exist. Refer to Figure 3.

Given that (1) the aggregates extraction and mining activities proposed by AAOM will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site; (2) existing surface water features (lakes, ponds, regulated wetlands, and streams) will not be diverted or directly impacted as a part or result of these proposed activities; and (3) available stormwater runoff and surface water will not be diverted away from the Project Site or utilized for aggregates production activities; the volume of water available to recharge the ground water aquifer is anticipated to remain approximately the same and therefore the ground water fed lakes, wetlands, and streams will not be affected.

4.3 Baseline Ground Water Quality

On August 5-6, 2015, Hydro-Logic collected a representative ground water sample from each of the nine (9) monitoring wells located across the Project Site, to be submitted for laboratory analysis. The ground water samples were collected to (1) establish a baseline for typical ground water quality conditions across the Project Site and (2) to investigate for the potential of the former Metamora Landfill to have had any impact to the ground water conditions or quality at the Project Site.

Each well was purged prior to sampling, and a ground water sample was collected utilizing a submersible low-flow well pump. Ground water samples were collected according to typical MDEQ protocol, and transported to Brighton Analytical, L.L.C., for analysis.

Based on our professional experience, the ground water samples were analyzed for full-scan volatile organic compounds (VOCs); 1,4-Dioxane; ethane, ethene, and methane; total metals (arsenic, calcium, copper, iron, magnesium, manganese, and sodium); and inorganic parameters (ammonia, chloride, hardness, nitrate, nitrite, pH, and sulfates); utilizing MDEQ approved methodologies and as specified in the hydrogeological assessment Work Plan. Refer to Section 3.0.

Ground water samples were analyzed according to the current MDEQ method detection limits (MDLs) and compared to the current MDEQ Part 201 Generic Residential Drinking Water Criteria (RDWC) and the Groundwater Surface Water Interface Criteria (GSIC), as appropriate (December 2013). Refer to Figure 4;

Table 2: Baseline Ground Water Analytical Results Summary; and Appendix E for complete analytical methods, MDEQ MDLs, and results.

The analytical results for ground water samples collected August 5-6, 2015, are summarized as follows:

- The total arsenic analytical result in a ground water sample collected from well BSA 3-15MW slightly exceeded the RDWC and the GSIC. Analytical results in several wells exceed the total iron and/or the total manganese RDWC. However, it is our experience that these total metals results are typical for Southeast Michigan ground water. No other total metals analytical results exceed the RDWC or the GSIC.

- No inorganic parameter analytical results were detected to exceed the RDWC or the GSIC in any of the ground water samples collected.

- No VOCs were detected to exceed the RDWC or the GSIC in any of the ground water samples collected. A total of 70 VOCs parameters (the typical MDEQ list of VOCs) were analyzed for in each sample.

- Ethane and/or methane were detected in ground water samples collected from monitoring wells BSA 2-15MW, BSA 3-15MW, BSA 7-15MW, and BSA 8-15MW, only. The detected results were well below MDEQ Criteria. These parameters were analyzed to investigate for the potential of the former Metamora Landfill to have had any impact to the ground water conditions or quality at the Project Site.

- Very low concentrations of 1,4-Dioxane were detected in ground water samples collected from monitoring wells BSA 6-15MW and BSA 9-15MW, only. The detected results do not exceed the RDWC or the GSIC. These parameters were analyzed to investigate for the potential of the former Metamora Landfill to have had any impact to the ground water conditions or quality at the Project Site.

On September 2, 2015, Hydro-Logic (re)collected a representative ground water sample from each of the nine (9) monitoring wells located across the Project Site and from the private-use water supply well at Trout Lake Lodge, and submitted for laboratory analysis. These ground water samples were collected to confirm the previously collected analytical results. Ground water samples were analyzed for 1,4-Dioxane; ethane, ethene, and methane; only. As before, each well was purged prior to sampling, and a ground water sample was collected utilizing a submersible low-flow well pump. Ground water samples were collected according to typical MDEQ protocol, and transported to Brighton Analytical, L.L.C., for analysis.

The analytical results for ground water samples collected September 2, 2015, confirm the August 2015 sampling results for the nine (9) ground water monitoring wells and establish a baseline ground water result for the Trout Lake Lodge well. Refer to Figure 4; Table 2; and Appendix E for complete analytical methods, MDEQ MDLs, and results.

5.0 SUMMARY and CONCLUSIONS

Following the review of available project background information, and in consideration of the results for ongoing monitoring and evaluation of ground water and surface water conditions at several active aggregates extraction properties operated by AAOM across Southeast Michigan, Hydro-Logic recommended the completion of a Work Plan to collect baseline data, and establish and document the site-specific geological and hydrogeological characteristics for the Project Site and for the immediately surrounding area. This recommended Work Plan was recently completed and the necessary background information as well as the observations, results, and conclusions of the Work Plan are summarized as follows:

- The Project Site is bordered to the north by the active D-bar-A Ranch, and beyond by rural residential and agricultural properties; to the east and south by rural residential and agricultural properties, and by an active sand and gravel extraction operation owned and operated by the Lapeer County Road Commission; and to the west by additional rural residential and agricultural properties, and beyond by the former Metamora Landfill, and another active sand and gravel extraction operation owned and operated by John R. Sand & Gravel.

- Historic aerial photographs confirm that sand and gravel extraction operations are currently active and have been active in the immediate area of the Project Site for many years.

- The north-central to eastern portion of the Project Site can generally be described as gently rolling with ground surface elevations ranging from 960 to 1,025 feet above MSL. The western and south-central portion of the Project Site can best be described as moderately to steeply rolling with ground surface elevations ranging from 1,020 to 1,150 feet above MSL.

- One significant surface water body, Beaver Lake, is observed on the Project Site. Beaver Lake is man-made, and appears to be primarily ground water fed. The height of the lake is controlled by a flood-gate.

  Both regulated and unregulated wetlands occur on the Project Site. When comparing the surface water elevations of the wetlands to the approximate ground water elevations encountered across the Project Site, we conclude that both perched wetlands and ground water fed wetlands exist.

  Given that (1) the proposed aggregates extraction activities will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site; (2) existing surface water features (lakes, ponds, regulated wetlands, and streams) will not be diverted or directly impacted as a part or result of these proposed activities; and (3) available stormwater runoff and surface water will not be diverted away from the Project Site or utilized for aggregates production activities; the volume of water available to recharge the ground water aquifer is anticipated to remain approximately the same and therefore the ground water fed lakes, wetlands, and streams will not be affected.

- The Project Site and surrounding area is comprised of three (3) or more unconsolidated glacial-drift ground water aquifer systems. The unconsolidated glacial-drift aquifer system(s) overlie the Marshall Sandstone bedrock aquifer system. All of these aquifer systems are in direct communication with one another and together provide all of the water resources for this portion of Lapeer County.

  Approximately 40% of the private-use water supply wells in the Project Site area have been completed in the unconsolidated glacial-drift aquifer system (average depth of 110-130 feet BGS or deeper); the remaining 60% is completed in the bedrock aquifer system (average depth of approximately 300 feet BGS).

  The nearest Type I Public (Community) Water Supply Well is located within the Village of Metamora, at a distance approximately 6,500 feet to the west of the westernmost Project Site Boundary.

  Given the distance of the private-use water supply wells and the nearest Type I Public water supply well to the proposed sand and gravel extraction activities, and the fact that these proposed activities will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site, these off-site wells will not be affected.

- The former Metamora Landfill, located approximately 1,500 to 2,000 feet west of the nearest Project Site Boundary, is a listed contaminated site. Both contaminated soil and ground water has been identified, defined, and is being monitored. Contaminated ground water from this former landfill has affected privately-owned residential water supply wells located to its north. Given the distance to the Project Site, and the fact that the proposed aggregates extraction activities will occur above the uppermost unconsolidated glacial-drift ground water aquifer system identified, we conclude that the proposed mining activities should not exacerbate the environmental impact being monitored by the EPA and the MDEQ at the former Metamora Landfill.

- For several years AAOM has authorized an independent evaluation of ground water and surface water conditions at many of its larger active aggregates extraction operations within Michigan. This includes the installation of ground water monitoring wells and the collection and analysis of ground water and surface water quality samples. These properties continue to be routinely monitored, sampled, and (re)evaluated over the duration of the mining operations. Annual reports are submitted to the townships and to the regulators. In summary, the succession of annual ground water quality reports completed for these mining properties provide the substantial, long-term evidence that mining activities like those proposed can be accomplished with no measurable impact to the elevation, quantity, and quality of the ground water at a site.

- In July 2015, nine (9) soil borings (BSA 1-15MW through BSA 9-15MW) were advanced within and immediately adjacent to the proposed aggregates extraction area on the Project Site. The borings were located to encompass the entire perimeter of the Project Site. The total depth of the soil borings ranged from 45 to 176 feet BGS, dependent on topography. Each boring was completed as a ground water monitoring well. Each well was screened to encounter the uppermost unconsolidated glacial-drift ground water aquifer system. The total depths of the completed wells ranged from 20 to 176 feet BGS.

- The surficial geology of the Project Site consists of an upper layer of loamy to clayey material, ranging in thickness from 0 to 18 feet, overlying a thick glacial deposit of unconsolidated sand and gravel, ranging in thickness from 60-100 feet, or more. The sand and gravel deposit will contain some intermixed layers of silty to clayey material, and is at times, observed to be underlain by a thick deposit of gray clayey till.

- The nine (9) ground water monitoring wells were used to define and evaluate the uppermost unconsolidated glacial-drift ground water aquifer system identified across the Project Site. The total thickness of this aquifer system in this area has not been determined, and the aquifer system appears to be unconfined. The depth to ground water across the Project Site ranges from approximately 14 to 158 feet below surveyed top-of-casing.

  On July 24, 2015, the initial round of static ground water elevations were collected from these nine (9) monitoring wells. This data confirmed that the uppermost unconsolidated glacial-drift ground water aquifer system is encountered at approximately 1,000 feet above MSL in the southwestern corner of the Project Site and at approximately 930 feet above MSL in the northeastern corner. Therefore the general ground water flow direction across the Project Site is to the north-northeast.

- On August 5-6, 2015, a representative ground water sample was collected from each of the nine (9) monitoring wells located across the Project Site, and submitted for laboratory analysis. The ground water samples were collected to (1) establish a baseline for typical ground water quality conditions across the Project Site and (2) to investigate for the potential of the former Metamora Landfill to have had any impact to the ground water conditions or quality. Each of the ground water samples were analyzed for the comprehensive list of water quality parameters identified within the Hydrogeological Assessment Work Plan.

Ground water analytical results indicated that (1) although total arsenic, total iron and/or total manganese results exceeded the MDEQ Criteria in a few samples, the detected concentrations are typical for Southeast Michigan ground water; (2) no inorganic parameters or VOCs (typical MDEQ list) were detected to exceed the MDEQ Criteria; (3) although ethane and/or methane were detected in a few of the monitoring wells, the concentrations did not exceed MDEQ Criteria; and (4) very low concentrations of 1,4-dioxane were detected in two monitoring wells. Although the detected 1,4-dioxane concentrations do not exceed the MDEQ Criteria, it should continue to be monitored as this parameter is associated with the former Metamora Landfill.

On September 2, 2015, Hydro-Logic (re)collected a representative ground water sample from each of the nine (9) monitoring wells located across the Project Site and from the private-use water supply well at Trout Lake Lodge, and submitted for laboratory analysis. These samples were collected to confirm the August 2015 results. Ground water samples were analyzed for 1,4-Dioxane; ethane, ethene, and methane; only. The analytical results for these ground water samples confirm the August 2015 sampling results and establish a baseline ground water result for the Trout Lake Lodge well.

In conclusion, it is the professional opinion of Hydro-Logic that the above-referenced investigation activities adequately establish baseline data and document the general geological, hydrogeological, and environmental conditions and characteristics of the Project Site.

6.0 ANTICIPATED IMPACTS

None.

Given the information presented in this report and Hydro-Logic's nearly 20 year monitoring of mining activities on comparable properties, it remains our professional opinion that well-maintained and operated aggregates extraction and mining operations rarely, if ever, impact ground water "quality or quantity" at a site or within the surrounding site area.

7.0 RECOMMENDATIONS

To ensure that the ground water and surface water resources on the Project Site, and the local privately-owned or publicly-owned water supply wells will be adequately monitored and protected during the operation of a typical aggregates extraction and mining operation, Hydro-Logic recommends that AAOM complete the following activities for the duration of the active mining operations:

(1) Collect quarterly static ground water measurements for each of the nine (9) ground water monitoring wells. The measurements should be collected in January, April, July, and October of each year. This information will provide a record of the natural and seasonal ground water variations and fluctuations across the Project Site.

(2) Collect annual (September or October) ground water quality assessment samples from each of the nine (9) ground water monitoring wells for the duration of the active mining operations. The ground water samples should be collected as described in Section 3.0 of this report and submitted to an independent laboratory for analysis of the parameters specified in Section 3.0.

(3) Complete an Annual Ground Water Monitoring Report, evaluating and discussing the above-referenced information and data, and submit to Metamora Township, the LCEHD, and the MDEQ (each December).

8.0 GENERAL REMARKS

The conclusions and recommendations contained in this report represent the professional opinions of Hydro-Logic. These opinions are based on our professional experience and information currently available, and are developed in accordance with currently acceptable geological, hydrogeological, and environmental consulting practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by **HYDRO-LOGIC ASSOCIATES, INC.**

Mark R. Zayatz, M.S.
Certified Professional Geologist
Principal Senior Project Manager

OCT. 26, 2015
Date

MRZ/dmz

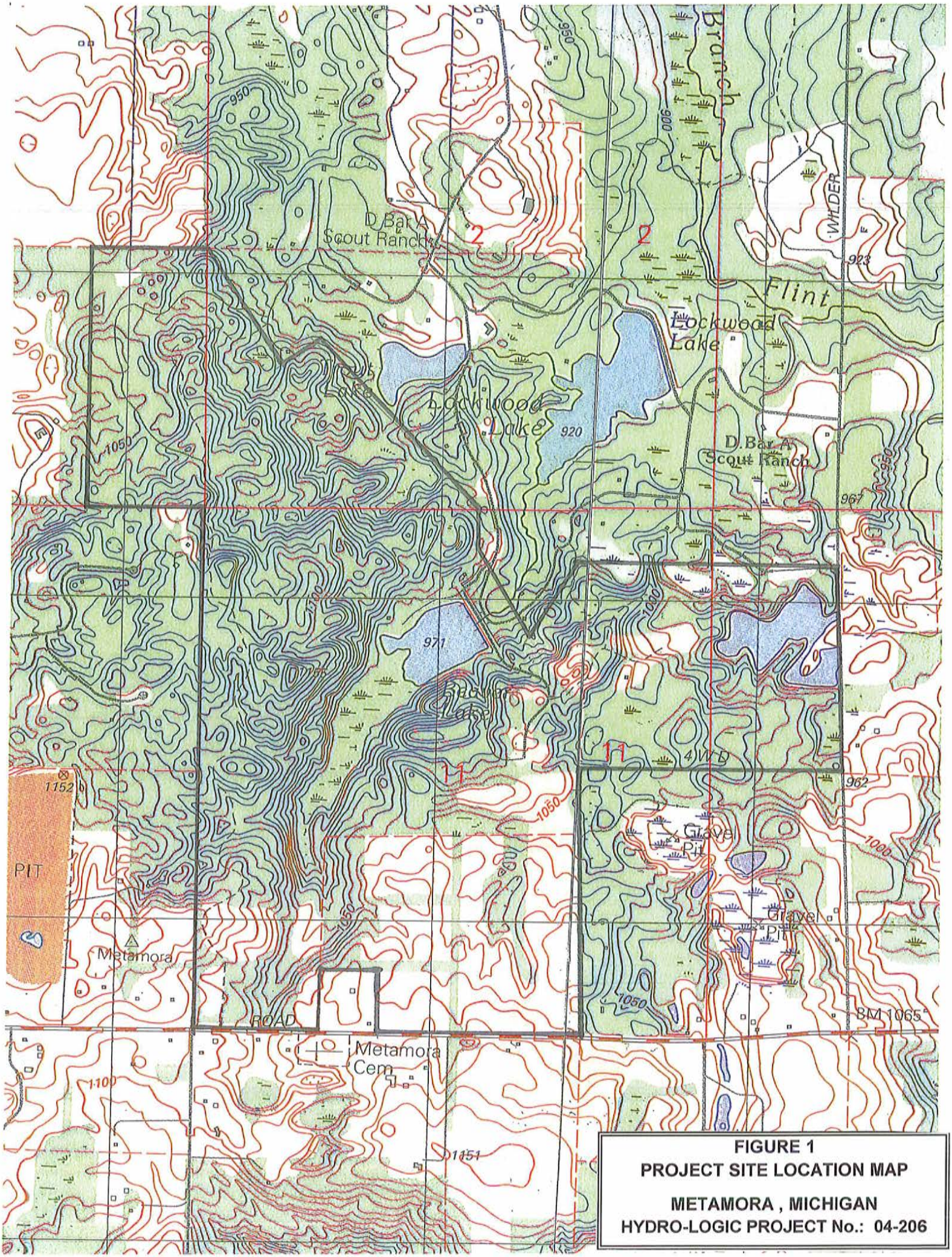


FIGURE 1
PROJECT SITE LOCATION MAP

METAMORA , MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

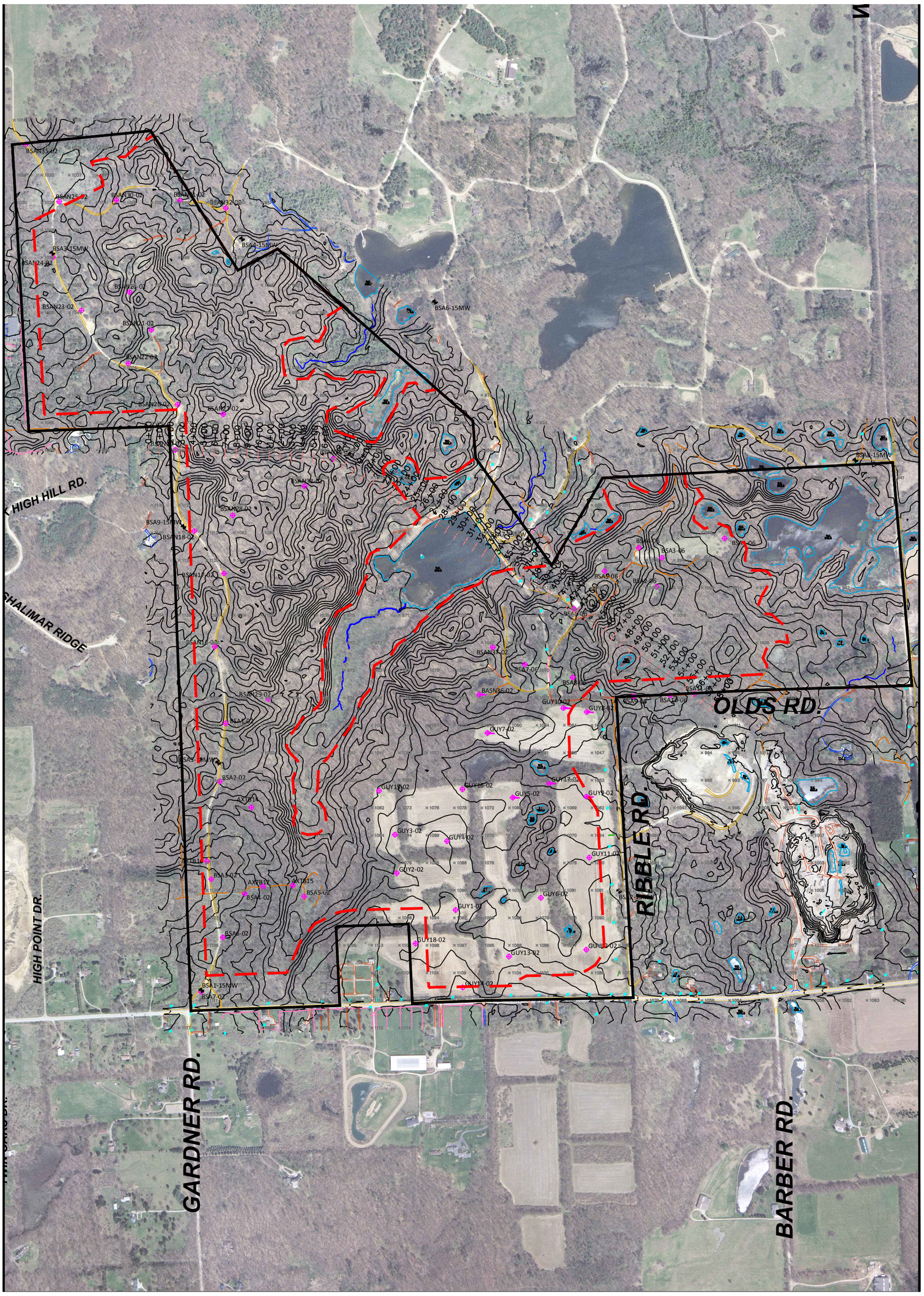


FIGURE 2
PROJECT SITE TOPOGRAPHIC MAP
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

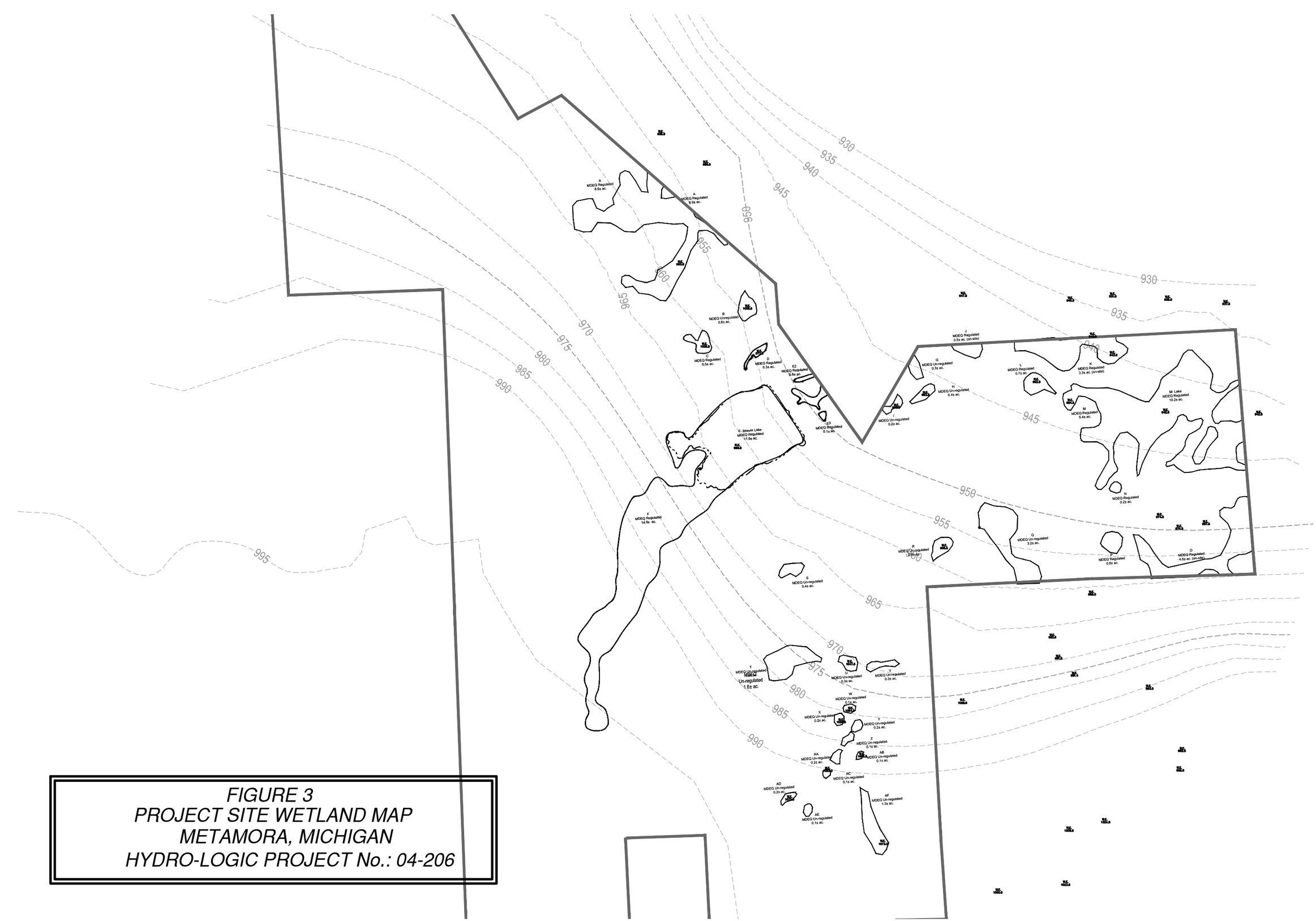


FIGURE 3
PROJECT SITE WETLAND MAP
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

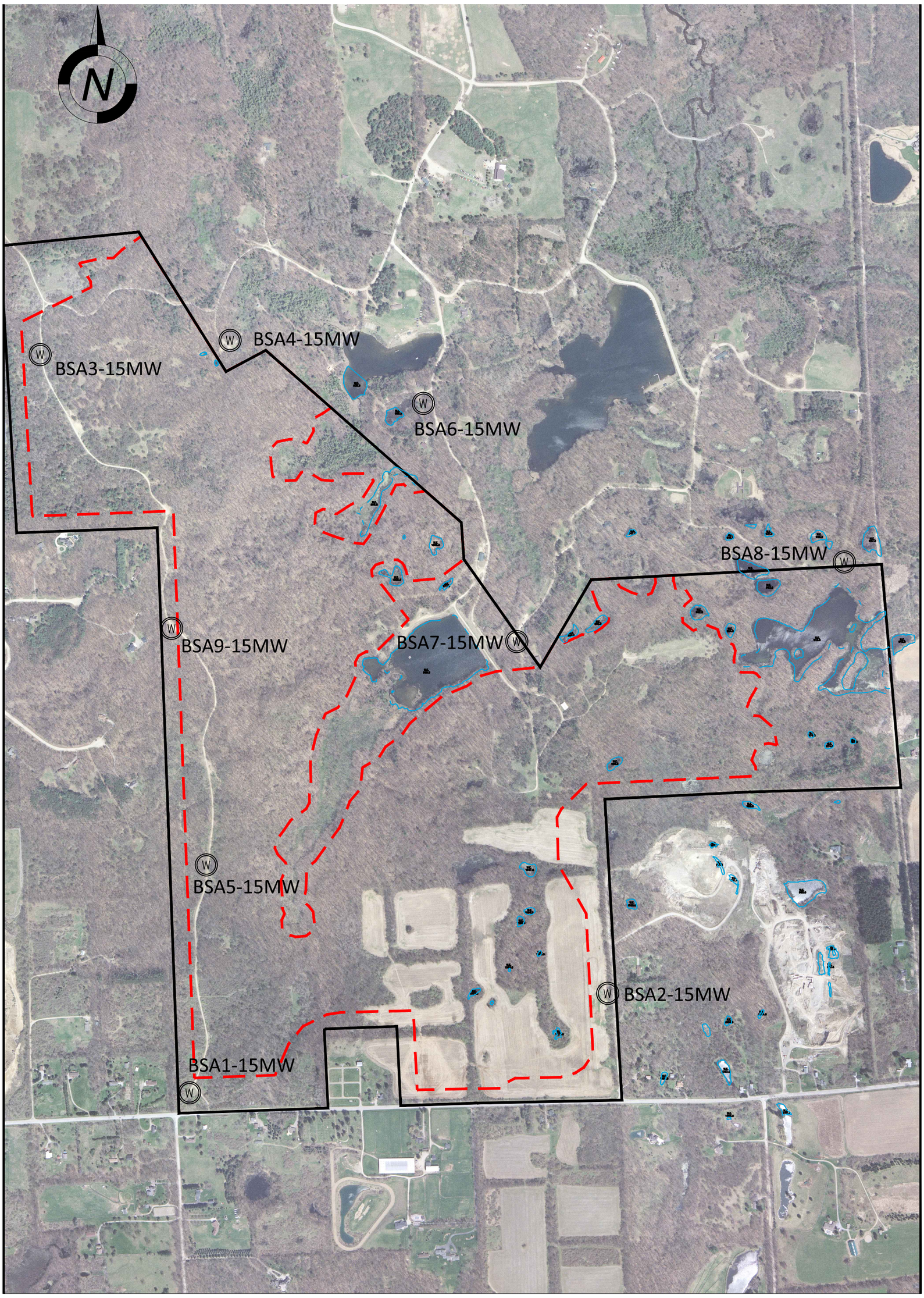


FIGURE 4
SOIL BORING / MONITOR WELL LOCATION MAP
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

800 400 0 800 2400

SCALE 1" = 800'

West to East

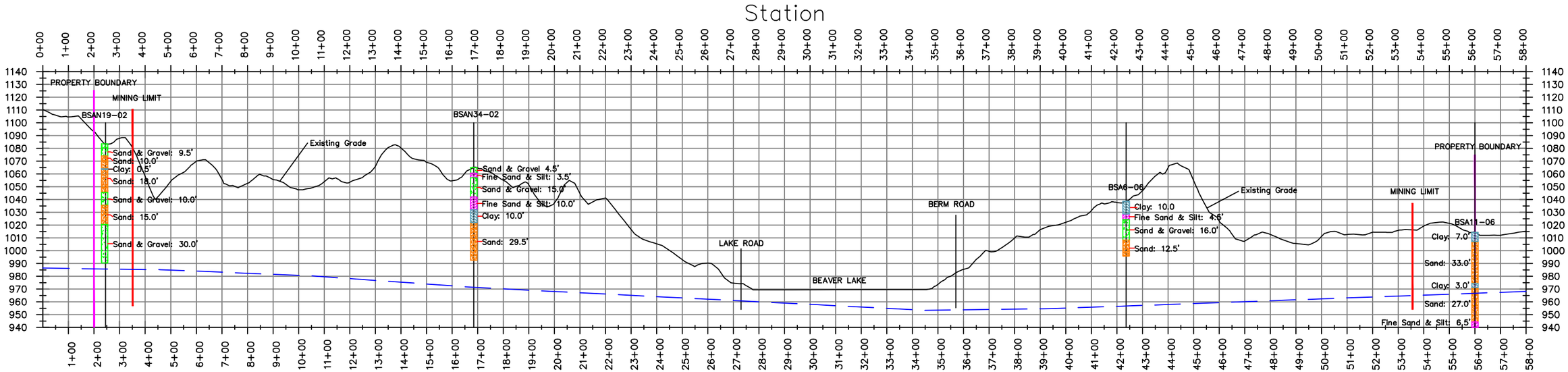


FIGURE 5
GEOLOGIC CROSS-SECTION
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

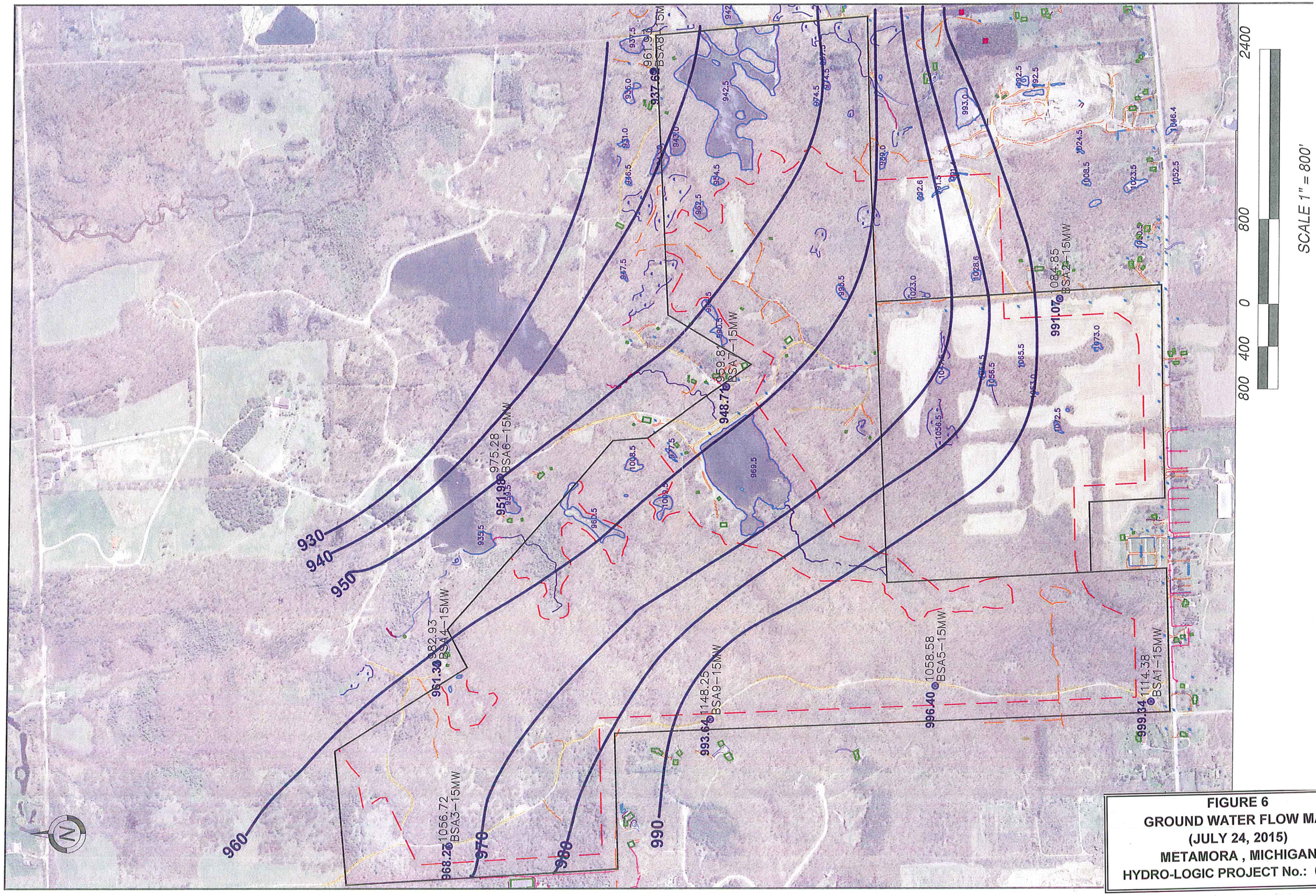


FIGURE 6
GROUND WATER FLOW MAP
(JULY 24, 2015)
METAMORA , MICHIGAN
HYDRO-LOGIC PROJECT No.: 04-206

TABLE 1
GROUND WATER ELEVATION DATA
D-BAR-A RANCH PROPERTY and GUY PARCEL
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No. 04-206

WELL ID	SCREENED INTERVAL (FEET BGS)	TOTAL DEPTH (FEET)	GROUND SURFACE ELEVATION (FEET ABOVE MSL)	TOC ELEVATION (FEET ABOVE MSL)	MEASUREMENT DATE	WATER LEVEL MEASUREMENT (FEET BELOW TOC)	WATER TABLE ELEVATION (FEET ABOVE MSL)
BSA1-15MW	115-135	135	1114.38	1117.44	07/24/15	118.10	999.34
BSA2-15MW	110-130	130	1084.85	1087.75	07/24/15	96.68	991.07
BSA3-15MW	126-146	146	1056.72	1059.84	07/24/15	91.57	968.27
BSA4-15MW	37-57	57	982.93	985.93	07/24/15	24.60	961.33
BSA5-15MW	55-75	75	1058.58	1061.87	07/24/15	65.47	996.40
BSA6-15MW	35-55	55	975.28	978.03	07/24/15	26.05	951.98
BSA7-15MW	10-20	20	959.81	962.61	07/24/15	13.90	948.71
BSA8-15MW	28-48	48	961.93	964.95	07/24/15	27.33	937.62
BSA9-15MW	156-176	176	1148.25	1151.44	07/24/15	157.80	993.64

Notes:
BGS = Below Ground Surface; MSL = Mean Sea Level; TOC = Top of Casing

TABLE 2
BASELINE GROUND WATER ANALYTICAL RESULTS SUMMARY
D-BAR-A RANCH PROPERTY and GUY PARCEL
METAMORA, MICHIGAN
HYDRO-LOGIC PROJECT No. 04-206

SAMPLE ID	BSA1 -15MW	BSA1 -15MW	BSA2 -15MW	BSA2 -15MW	BSA3 -15MW	BSA3 -15MW	BSA4 -15MW	BSA4 -15MW	BSA5 -15MW	BSA5 -15MW	BSA6 -15MW	BSA6 -15MW	BSA7 -15MW	BSA7 -15MW	BSA8 -15MW	BSA8 -15MW	BSA9 -15MW	BSA9 -15MW	TROUT LAKE LODGE	*MDEQ RESIDENTIAL DRINKING WATER CRITERIA*	*MDEQ GROUNDWATER SURFACE WATER INTERFACE CRITERIA*
SAMPLE DATE	08/05/15	09/02/15 [a]	08/06/15	09/02/15 [a]	08/05/15	09/02/15 [a]	08/06/15	09/02/15 [a]	08/05/15	09/02/15 [a]	08/05/15	09/02/15 [a]	08/05/15	09/02/15 [a]	08/06/15	09/02/15 [a]	08/05/15	09/02/15 [a]	09/02/15 [a]		
TOTAL METALS (ug/L)																					
Hardness by Calculation	340,000		280,000		770,000		2,900,000		500,000		340,000		610,000		280,000		450,000			---	---
Arsenic	ND		2		12		ND		ND		5		7		2		ND			10	10
Calcium	86,000		68,000		180,000		69,000		120,000		79,000		150,000		70,000		98,000			---	---
Copper	ND		ND		16		ND		ND		ND		17		ND		ND			1,000	---
Iron	1,800		1,400		17,000		300		90		330		16,000		630		370			300	NA
Magnesium	30,000		27,000		77,000		28,000		47,000		34,000		55,000		25,000		49,000			4.0E+5	NA
Manganese	150		90		570		100		110		ND		1,100		220		430			50	---
Sodium	27,000		7,000		5,000		2,000		4,000		5,000		8,000		3,000		19,000			2.3E+5	NA
INORGANICS (ug/L)																					
Ammonia	ND		ND		ND		ND		ND		ND		390		ND		ND			10,000	---
Chloride	69,000		35,000		11,000		11,000		17,000		11,000		5,000		9,000		38,000			2.5E+5	---
Nitrate	1,800		ND		ND		60		ND		ND		ND		ND		ND			10,000	ID
Nitrite	ND		ND		ND		ND		ND		ND		ND		ND		ND			1,000	NA
pH (S.I.)	6.5		6.9		7.1		7.1		7.0		7.1		7.2		7.3		7.1			6.5 to 8.5	6.5 to 9.0
Sulfates	19,000		47,000		50,000		36,000		19,000		35,000		19,000		12,000		34,000			2.5E+5	NA
VOLATILES (ug/L)																					
Ethane	ND	ND	4	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
Ethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
Methane	ND	ND	11	5	2	ND	ND	ND	ND	ND	ND	ND	7	2	3	7	ND	2	8	ID	NA
VOLATILES (ug/L) *	ND		ND		ND		ND		ND		ND				ND		ND				
Chloroform													1							80	350
VOLATILES (ug/L)																					
1,4-Dioxane (SIM)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	2	ND	ND	ND	ND	23	23	ND	85	2,800

Notes:
ug/L = micrograms per liter; ND = Not detected at or above method detection limits; NA = Not Available; ID = Insufficient Data
a = Samples collected on this date were for confirmatory purposes only and were sampled for Ethane, Ethene, Methane, and 1,4-Dioxane (SIM) only.
* = All parameters are non detect except those listed. (A total of 70 parameters were analyzed.)

PROFESSIONAL PROFILE

MARK R. ZAYATZ, M.S., CPG, CUSTP
PRINCIPAL SENIOR PROJECT GEOLOGIST

EXPERIENCE SUMMARY:

Mr. Zayatz has a masters degree in geology, is a Certified Professional Geologist (CPG) and Hydrogeologist, a Certified Underground Storage Tank Professional (CUSTP), and is the Principal / Vice President for Hydro-Logic Associates, Inc. (Hydro-Logic). He is the technical operations manager for the Brighton, Michigan office of Hydro-Logic. He has over 25 years experience as a consulting geologist, hydrogeologist, client manager, and project manager, for contaminant investigation and remediation projects, water resource evaluation, land use planning and development, due-diligence, municipal or private water supply development, wastewater treatment, storm water evaluation, and pollution prevention projects. His professional experience ranges from the mining industry, the petroleum industry, land use management, forest products, industrial manufacturing and gases, site development, the insurance industry, as well as public municipalities and entities.

His specific areas of consulting expertise include the general aspects of geology and hydrogeology; investigation and remediation of environmental contamination at industrial sites; leaking above ground or underground chemical storage tank sites; site evaluation, mine planning, and permit compliance monitoring; water resource evaluation and development; due-diligence investigation; baseline environmental assessment evaluations; brownfield evaluation and cleanup; risk-based corrective action (RBCA) evaluation and management; spill prevention audits and plans; regulatory compliance audits; special land use permitting issues; hazardous waste management; environmental site assessments; storm water site assessment and permitting; a senior technical resource; and expert testimony.

Mr. Zayatz has the necessary experience to provide a site-specific contaminant investigation, environmental site assessment, water resource evaluation, brownfield evaluation, due-diligence investigation, and risk assessment or compliance audit for most environmental related projects. In addition, he possesses experience in current geologic and hydrogeologic principles; most current remedial engineering technologies; drilling and sampling operations; "hardrock" and aggregate mining operations; surface and subsurface structural geology; RBCA assessment; and project regulatory closure.

EDUCATION AND PROFESSIONAL DEVELOPMENT:

EPA Risk Management Program
EPA / MDEQ Managing Chemical Risk Seminar
MDEQ P.A. 451 Part 201 MDEQ Workshops and Seminars
MDEQ P.A. 451 Part 213 MDEQ Workshops and Seminars
Project Management Training
Risk-Based Corrective Action (RBCA)
EPA / MDEQ Sampling Strategies and Statistical Applications Seminar
MDEQ Subdivision Rules Workshop
OSHA and MSHA Training and Experience

M.S., Geology, University of Alaska, Fairbanks - 1984
B.A., Geology, State University College of New York at Buffalo - 1981

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS:

CPG - American Institute of Professional Geologists
CPG - State of Alaska
CPG - State of Indiana
CPG - State of Pennsylvania
CUSTP - Certified Underground Storage Tank Professional
Member, American Institute of Professional Geologists, Michigan
Member, American Association of Petroleum Geologists
Member, A.A.P.G. Division of Environmental Geoscientists
Member, National Water Well Association and Association of Ground Water Scientists and Engineers

REPRESENTATIVE PROJECT EXPERIENCE:

SOIL AND GROUND WATER INVESTIGATION AND REMEDIATION

- **Petroleum, Mining Industry, Forest Products, and Insurance Industry Clients - Numerous States:** Client manager, project manager, project hydrogeologist, peer consultant, or senior technical consultant on over 200 soil and ground water site investigation projects in over 20 states. Many of these sites involved either leaking above ground or underground chemical storage tanks or contamination associated with industrial sites. Activities included the investigation, remediation, and safe regulatory closure of sites with the potential to contaminate public or private drinking water supplies. Remediation technologies utilized included air sparging, soil vapor extraction, in-situ passive and active bioremediation, pump and treat, bio-piling, and "point-source" excavation. Evaluated and remediated sites following state-specific closure requirements.

- **Mining Industry Clients - Numerous States:** Senior technical consultant involving typical contaminant investigation and remediation of current and former mining site properties prior to operation activities or redevelopment of the site.

- **Municipal Clients - Michigan:** Senior technical consultant involving soil, ground water, and surface water contaminant investigation and remediation of contaminated properties prior to redevelopment.

- **Forest Products and Mining Industry Clients - Michigan:** Client manager or project manager for the investigation, containment, and disposal of EPA listed hazardous and non-hazardous wastes. Directed all site investigation and permitting activities, including proper health and safety precautions, and coordinated proper disposal of the material.

- **Petroleum, Manufacturing, Mining, and Insurance Industry Clients - Numerous States:** Client manager, project manager, project hydrogeologist, or senior technical consultant for RBCA project evaluations. Completed tasks include the evaluation of identified site contaminants and on-site and off-site receptors, calculation of risk-based cleanup criteria for the site which would be protective of off-site properties and the identification of compliance monitoring points and a monitoring program which would be acceptable to the state regulatory agency.

- **Property Development Clients - Numerous States:** Senior technical consultant involving contaminant investigation and remediation for brownfield and other properties being developed as commercial sites. The potential for impact to on-site drinking water was investigated.

- **Insurance Industry Clients - Michigan:** Senior technical consultant providing project peer review and oversight for activities proposed by other consultants.

PROPERTY TRANSACTION ASSESSMENT

- **Attorneys, Lending Institutions, Developers and Builders, and Industrial Clients - Numerous States:** Client manager, senior technical advisor, or project manager for over 250 phase I or II environmental site assessments in over 25 states. Projects were completed according to the ASTM standard.

- **Mining Industry Clients - Numerous States:** Client manager, senior technical advisor, or project manager for over 100 pre-purchase Phase I and II Environmental Site Assessments at sand & gravel, limestone, and "hardrock" mining operations with and without asphalt and concrete plants, in over 10 states. Projects were completed according to the ASTM standard and the scope was modified in many cases according to the clients needs. State specific regulations were followed. Recommendations for addition work, cleanup, and compliance costs were estimated and provided to the client, as requested.

- **Manufacturing and Industrial Clients - Numerous States:** Client manager, senior technical advisor, or project manager for over 25 pre-purchase due-diligence investigations in over 10 states, covering over 50 project sites. Projects were completed according to the ASTM standard and the scope was modified in many cases according to the clients needs. State specific regulations were also followed.

- **Developers and Builders, and Commercial Clients - Michigan:** Client manager, senior technical advisor, or project manager for pre-purchase "baseline environmental assessments" (BEAs) and brownfield site assessments in Michigan. Projects were completed according to the Michigan Department of Environmental Quality (MDEQ) standard.

WATER SUPPLY EVALUATION AND DEVELOPMENT

- **Residential, Commercial, Industrial, and Recreational Development Clients - Michigan:** Project manager, project hydrogeologist, or senior technical consultant for over 25 private or municipal water supply projects. Met all applicable federal, state, and local health department project requirements, including the completion of a Wellhead Protection Area Delineation, as necessary. Directed site investigation and background activities necessary to evaluate, make recommendations, design and complete water supply well field sites. Provided necessary data, project findings, and professional opinions to all regulating agencies.

- **Residential and Commercial Development Clients - Michigan:** Project manager, project hydrogeologist, or senior technical consultant for the evaluation of development sites thought to have its water supply impacted by off-site contaminated properties. Directed site investigation and background activities necessary to evaluate the issues and provide professional opinions.

MINE PERMITTING, DEVELOPMENT AND COMPLIANCE

- **Mining Industry Clients - Michigan:** Project geologist, hydrogeologist, or senior technical consultant assisting clients in the evaluation and permitting or (re)permitting of existing and potential new mining sites. Included the completion of an overall environmental site assessment, provide recommendations and completed the necessary field activities to establish baseline soil and ground water conditions (pre-mining), provided a geological / hydrogeological work plan to monitor and evaluate current site conditions (post initiation of mining), preparation and submittal of annual ground water monitoring and compliance reports, and presentation, public hearing, regulatory discussion, and meeting support.

STORM WATER SITE EVALUATION

- **Residential, Commercial, and Industrial Clients - Numerous States:** Project manager, project hydrogeologist, or senior technical consultant for over 150 private, commercial or industrial storm water site assessment projects for sites in over 40 states. Met all applicable federal, state, and local health department project requirements. Site investigation and sampling, regulatory advice, review and assistance with state-specific storm water permits, Notice of Intents (NOIs), and Storm Water Pollution Prevention Plans (SWPPP) were completed, as necessary.

REGULATORY COMPLIANCE

- **Manufacturing Industry and Forest Products Clients - Numerous States:** Client manager, project manager and team member performing regulatory compliance audits for corrugated box plants, air separation, industrial gases, metal coatings facilities. Included investigation of air emissions, waste water, storm water, spill prevention, hazardous waste disposition, underground and above ground storage tanks, system and operations permitting issues, and industrial process management. Cost-saving, process improvement, and waste minimization ideas were discussed.

- **Manufacturing, Forest Products, and Mining Industry Clients - Numerous States:** Project management and coordination of, and participation in, the assessment and completion of an air emissions inventory for the facility. Air issues were identified and classified according to state-specific and federal Title V requirements.

- **Petroleum Industry Client - Michigan:** Project manager and team member performing a pre-purchase assessment and a regulatory compliance review for a gas fractionation and storage, pipeline, and terminal facility. Issues that were investigated included air emissions, waste water, storm water, hazardous waste disposition, underground and above ground storage tanks, regulatory permitting issues, and industrial process management.

- **Manufacturing, Forest Products, and Mining Industry Clients - Numerous States:** Project manager and team member performing the assessment and completion of over 150 individual Storm Water Pollution Prevention Plans (SWPPP) and / or Spill Prevention and Countermeasure Control (SPCC) Plans for sites in over 40 states. Assisted the facility in corrective action measures, as necessary.

WASTEWATER TREATMENT PLANT SITE EVALUATION AND DEVELOPMENT

- **Residential and Commercial Development Clients - Michigan:** Project manager, project hydrogeologist, or senior technical consultant for private or municipal wastewater treatment plant or individual septic development projects. The largest project investigated will be able to provide service to the population of an entire Michigan Township. Met all applicable federal, state, and local health department project requirements. Provided necessary data, project findings, and professional opinions to all regulating agencies.

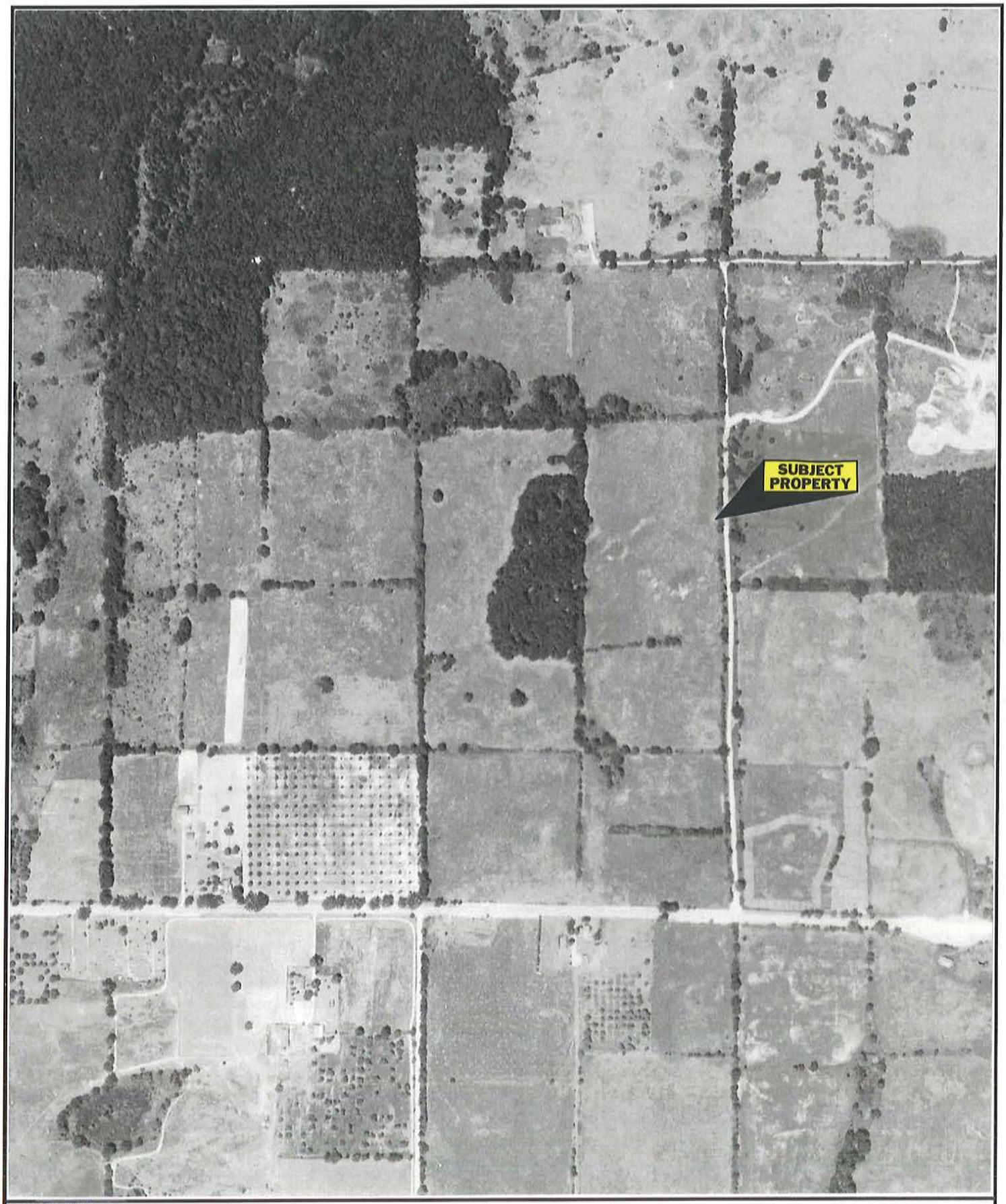
STORAGE TANK MANAGEMENT AND CLEANUP

- **Insurance Industry and Private Residential Clients - Michigan:** Project manager for the assessment, remediation, and regulatory closure of petroleum product spills that resulted in contaminated soils and materials, and petroleum hydrocarbon vapors both inside and outside of private residences. Emergency response activities were performed at all residences.

- **Residential, Commercial, and Industrial Clients - Numerous States:** Project manager for the assessment, removal, remediation, and regulatory closure of out-of-service underground and aboveground storage tanks.

EXPERT WITNESS AND TESTIMONY

- **Industrial Clients and Attorneys - Michigan:** Expert testimony and project support as a technical resource and / or as an expert witness during pre-litigation meetings, public hearings, and trial. The senior professionals at Hydro-Logic can technically support the project through both the collection of meaningful data and public presentation of the findings.



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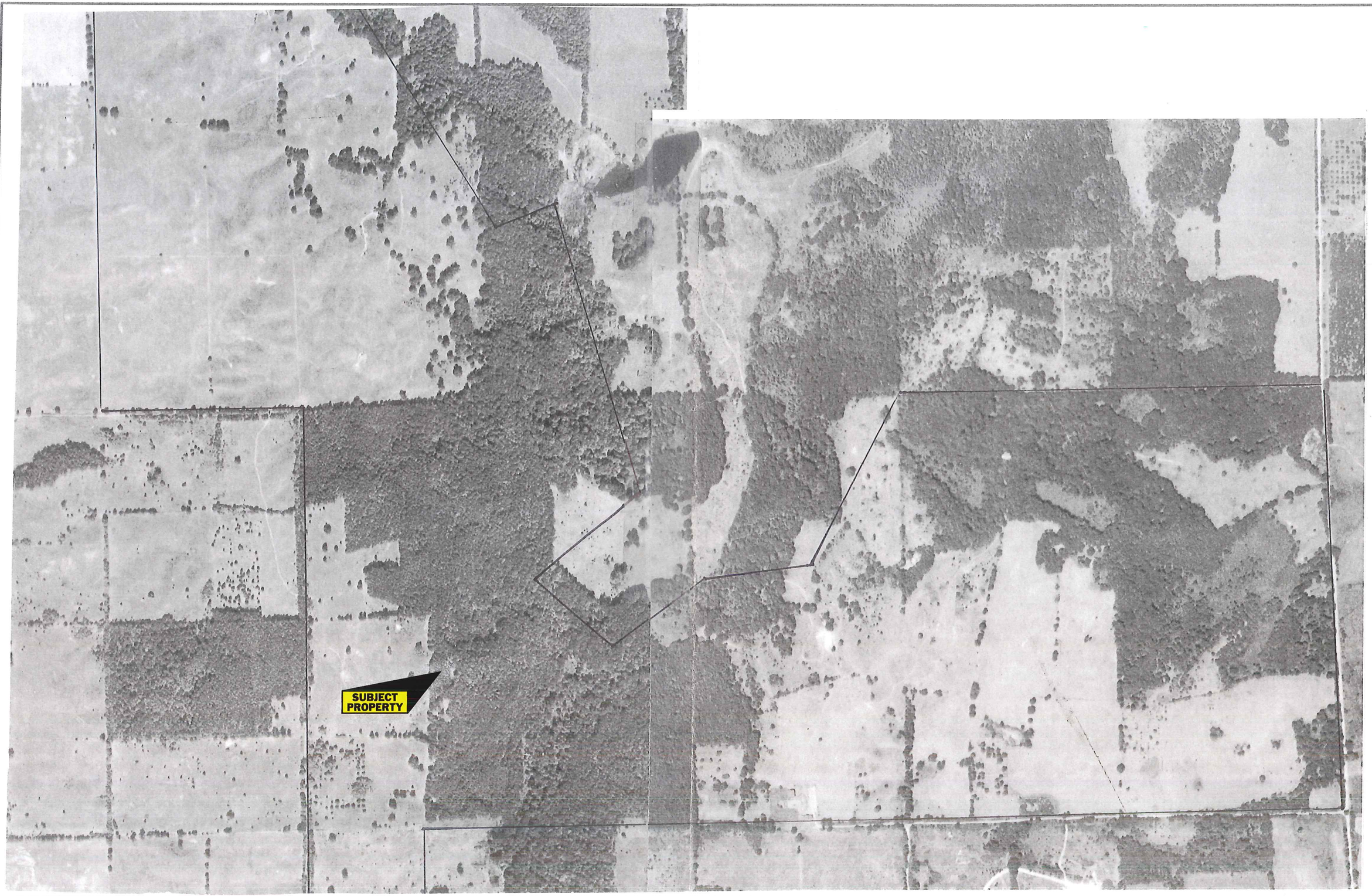
1941 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN



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1941 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

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1957 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN

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1957 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

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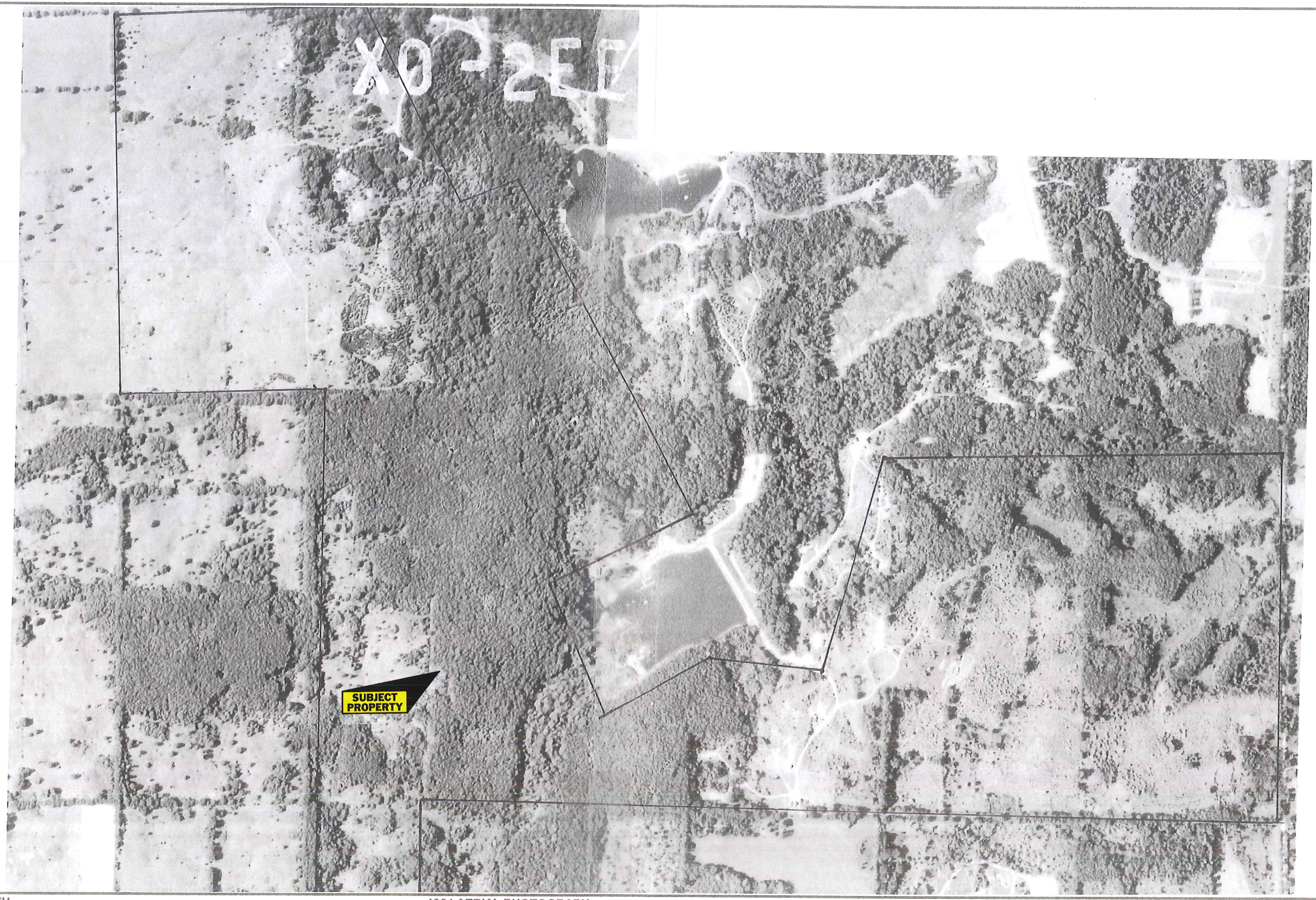
1964 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN



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1964 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

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1972 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN

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1972 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

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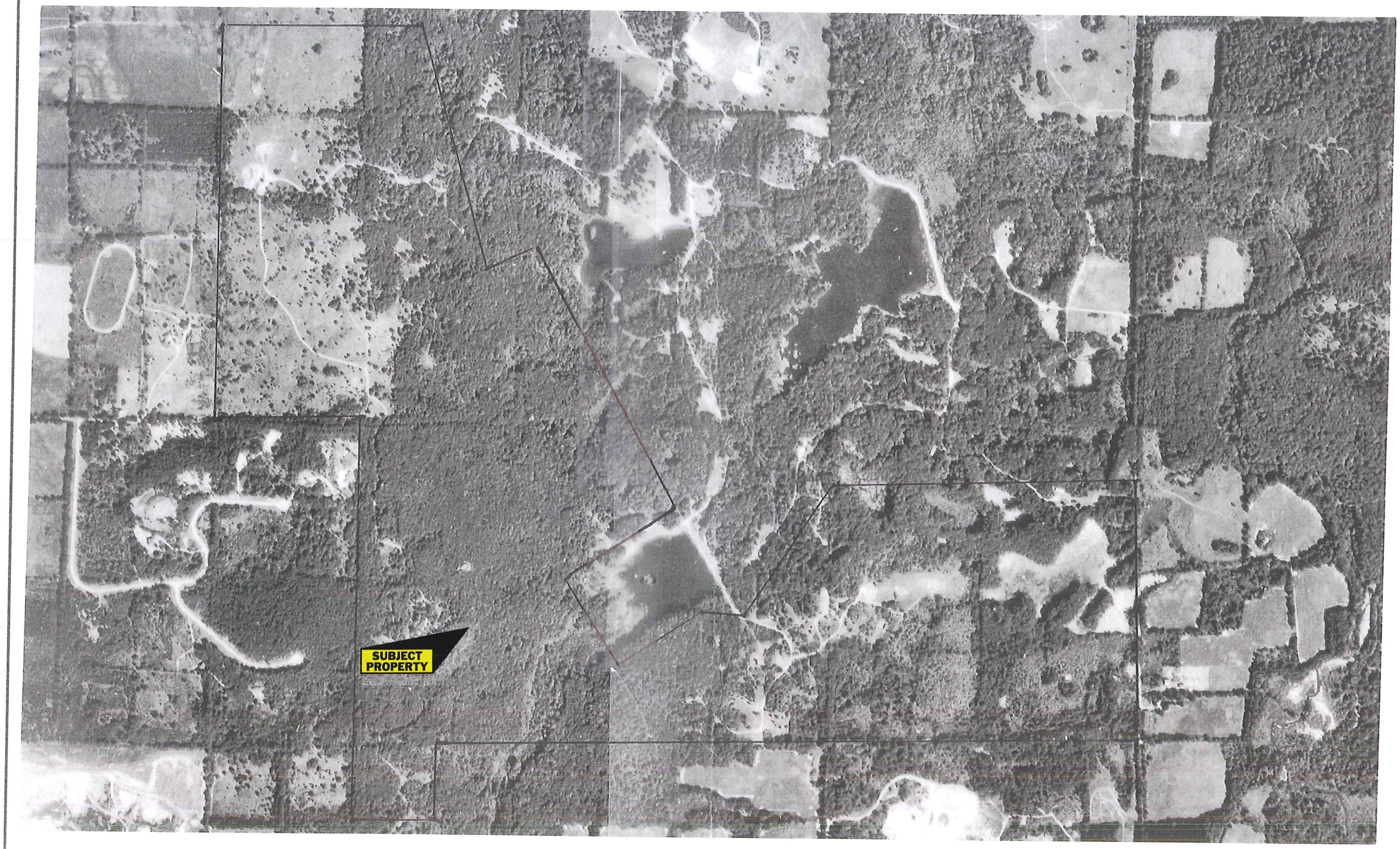
1982 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN



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1982 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

NORTH

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1992 AERIAL PHOTOGRAPH
METAMORA, MICHIGAN

NORTH

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1992 AERIAL PHOTOGRAPH
METAMORA & THORNVILLE, MICHIGAN

Approximate Site Boundary

WELL LOG RESEACH using Wellogic completed on August 06, 2015

METAMORA TOWNSHIP, LAPEER COUNTY, MI - 112 WELLS

WELL #	SECTION	USE	WELL DEPTH - FEET	MATERIAL	
1	4	HOUSEHOLD	57	GRAVEL COARSE	
2	3	HOUSEHOLD	75	GRAVEL	
3	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 5
4	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 6
5	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 11
6	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 8
7	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 9
8	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 10
9	4	TYPE II PUBLIC		NO WELL LOG	DA SCOUT RANCH WELL 14
10	2	TYPE II PUBLIC	220	SANDSTONE	DA SCOUT RANCH
11	4	TYPE II PUBLIC	200	SANDSTONE	DA SCOUT RANCH
12	4	TYPE II PUBLIC	225	BLUE SANDSTONE & SHALE	DA SCOUT RANCH
13	4	TYPE II PUBLIC	200	SANDSTONE	DA SCOUT RANCH
14	2	TYPE II PUBLIC	185	SANDSTONE	DA SCOUT RANCH
15	2	TYPE II PUBLIC	260	SANDSTONE	DA SCOUT RANCH
16	2	TYPE II PUBLIC	155	SANDSTONE	DA SCOUT RANCH
17	2	TYPE II PUBLIC	180	SANDSTONE	DA SCOUT RANCH
18	4	TYPE II PUBLIC		NO WELL LOG	D-A SCOUT RANCH CUB SCOUT B
19	4	TYPE II PUBLIC		NO WELL LOG	D-A SCOUT RANCH CUB SCOUT A
20	4	TYPE II PUBLIC		NO WELL LOG	D-A SCOUT RANCH-WELL 3 CEDARS
21	1	HOUSEHOLD	170	SANDSTONE	
22	1	HOUSEHOLD	230	SANDSTONE	
23	2	TYPE II PUBLIC	180	SANDSTONE	DETROIT AREA BOY SCOUTS
24	1	HOUSEHOLD	241	WHITE SANDSTONE	
25	3	HOUSEHOLD	300	SANDSTONE	
26	4	HOUSEHOLD	200	SANDSTONE	
27	4	TYPE II PUBLIC	302	SANDSTONE COARSE	DETROIT AREA BOY SCOUTS
28	1	HOUSEHOLD	300	SANDSTONE	
29	4	HOUSEHOLD	200	SANDSTONE	
30	4	HOUSEHOLD	200	SANDSTONE	
31	2	TYPE II PUBLIC	240	SANDSTONE	DBARA SCOUT RANCH
32	4	HOUSEHOLD	140	GRAY SHALE & SANDSTONE	
33	9	TEST WELL	160	CLAY	VILLAGE OF METAMORA
34	9	TYPE I PUBLIC	145	BLUE CLAY	VILLAGE OF METAMORA
35	10	HOUSEHOLD	280	SANDSTONE	
36	9	HOUSEHOLD	310	SANDSTONE	
37	9	HOUSEHOLD	300	SANDSTONE	
38	9	HOUSEHOLD	84	GRAVEL	
39	9	HOUSEHOLD	93	GRAVEL	
40	10	TYPE II PUBLIC	380	SANDSTONE	LITTLE MIRACLES DAY CARE
41	10	HOUSEHOLD	300	SANDSTONE	
42	9	HOUSEHOLD	88	GRAVEL	
43	10	IRRIGATION	375	SANDSTONE	
44	12	HOUSEHOLD	321	SANDSTONE & SHALE	
45	12	HOUSEHOLD	126	SAND	
46	12	HOUSEHOLD	153	CLAY	
47	11	HOUSEHOLD	300	SANDSTONE	
48	11	HOUSEHOLD	300	SANDSTONE	
49	9	HOUSEHOLD	280	SANDSTONE	
50	9	HOUSEHOLD	97	SAND	
51	9	HOUSEHOLD	86	GRAVEL	
52	10	HOUSEHOLD	300	SANDSTONE	
53	10	HOUSEHOLD	381	SANDSTONE & SHALE	
54	9	HOUSEHOLD	340	SANDSTONE	
55	9	HOUSEHOLD	320	SANDSTONE	
56	9	HOUSEHOLD	320	SANDSTONE	
57	9	HOUSEHOLD	320	SANDSTONE	
58	9	HOUSEHOLD	381	SANDSTONE & SHALE	
59	9	HOUSEHOLD	301	SANDSTONE & SHALE	
60	9	HOUSEHOLD	335	SANDSTONE	
61	11	HOUSEHOLD	370	SANDSTONE	
62	9	HOUSEHOLD	80	SAND	
63	9	HOUSEHOLD	122	GRAY SAND	
64	9	HOUSEHOLD	132	GRAVEL	
65	10	HOUSEHOLD	320	SANDSTONE	
66	9	HOUSEHOLD	261	SANDSTONE	
67	9	TYPE I PUBLIC		NO WELL LOG	VILLAGE OF METAMORA
68	9	TEST WELL	170	CLAY	VILLAGE OF METAMORA
69	15	HOUSEHOLD	450	SANDSTONE	
70	15	HOUSEHOLD	401	SANDSTONE & SHALE	
71	16	HOUSEHOLD	300	SANDSTONE	
72	15	HOUSEHOLD	401	SANDSTONE & SHALE	
73	16	HOUSEHOLD	123	SAND & GRAVEL	
74	14	IRRIGATION	147	SAND & GRAVEL	
75	13	HOUSEHOLD	94	GRAVEL	
76	16	HOUSEHOLD	362	SANDSTONE & SHALE	
77	15	HOUSEHOLD	124	SAND FINE	
78	16	HOUSEHOLD	400	SANDSTONE	
79	16	HOUSEHOLD	380	SANDSTONE	
80	15	HOUSEHOLD	360	SANDSTONE	
81	13	HOUSEHOLD	174	GRAVEL FINE	
82	16	HOUSEHOLD	260	WHITE SANDSTONE	
83	16	HOUSEHOLD	350	SANDSTONE	
84	16	HOUSEHOLD	168	GRAVEL	
85	16	HOUSEHOLD	320	SANDSTONE	
86	16	HOUSEHOLD	180	GRAVEL COARSE	
87	15	HOUSEHOLD	301	SANDSTONE & SHALE	
88	14	HOUSEHOLD	360	SANDSTONE	
89	14	HOUSEHOLD	300	SANDSTONE	

WELL LOG RESEACH using Wellogic completed on August 06, 2015 (cont.)

METAMORA TOWNSHIP, LAPEER COUNTY, MI - 112 WELLS (cont.)

90	16	HOUSEHOLD	360	SHALE & SANDSTONE SANDY	
91	16	HOUSEHOLD	301	SANDSTONE & SHALE	
92	16	HOUSEHOLD	301	SANDSTONE & SHALE	
93	14	HOUSEHOLD	156	GRAVEL DRY	
94	14	HOUSEHOLD	441	SANDSTONE	
95	13	HOUSEHOLD	96	GRAY SAND FINE TO MEDIUM	
96	14	HOUSEHOLD	252	GRAVEL	
97	13	HOUSEHOLD	77	SAND	
98	15	HOUSEHOLD	380	SANDSTONE	
99	13	HOUSEHOLD	96	SAND	
100	13	HOUSEHOLD	100	GRAVEL & SAND	
101	13	HOUSEHOLD	96	GRAVEL	
102	15	HOUSEHOLD	220	SAND	
103	16	HOUSEHOLD	152	GRAY SAND	
104	24	HOUSEHOLD	68	SAND MEDIUM	
105	21	HOUSEHOLD	108	GRAVEL FINE	
106	22	HOUSEHOLD	60	CLAY	
107	21	HOUSEHOLD	115	SAND	
108	22	HOUSEHOLD	124	GRAVEL FINE	
109	22	HOUSEHOLD	60	GRAVEL & SAND COARSE	
110	21	HOUSEHOLD	175	GRAVEL	
111	22	HOUSEHOLD	98	SAND	
112	24	HOUSEHOLD	86	GRAY SAND & STONES MED FINE	
113	21	HOUSEHOLD	180	GRAVEL	
114	21	HOUSEHOLD	360	SANDSTONE	
115	21	HOUSEHOLD	130	GRAVEL	
116	21	HOUSEHOLD	361	SANDSTONE & SHALE	
117	21	HOUSEHOLD	380	SANDSTONE	
118	24	HOUSEHOLD	167	GRAVEL	
119	24	HOUSEHOLD	148	GRAVEL FINE	
120	24	HOUSEHOLD	80	SAND	
121	24	HOUSEHOLD	208	SAND FINE	
122	24	HOUSEHOLD	268	GRAVEL	
123	21	HOUSEHOLD	158	GRAVEL	

LAPEER TOWNSHIP, LAPEER COUNTY, MI - (TOWNSHIP NORTH OF METAMORA) - 26 WELLS

WELL #	SECTION	USE	WELL DEPTH - FEET	MATERIAL	
124	36	HOUSEHOLD	145	SANDSTONE	
125	33	HOUSEHOLD	160	SANDSTONE	
126	36	HOUSEHOLD	161	SANDSTONE	
127	36	HOUSEHOLD	200	SANDSTONE	
128	34	TYPE II PUBLIC	100	GRAVEL	HUNTERS CREEK CONF CENTER
129	34	TYPE II PUBLIC	100	GRAVEL COARSE	HUNTERS CREEK CONF CENTER
130	34	TYPE II PUBLIC	100	GRAVEL COARSE	
131	36	HOUSEHOLD	180	BROWN LIMESTONE	
132	35	HOUSEHOLD	110	SANDSTONE	
133	35	HOUSEHOLD	110	SANDSTONE	
134	35	TYPE II PUBLIC	221	SHALE & SANDSTONE	THE DAILEY COMPANY
135	34	HOUSEHOLD	150	SANDSTONE	
136	33	HOUSEHOLD	161	SANDSTONE	
137	35	TYPE II PUBLIC	221	SHALE & SANDSTONE	THE DAILEY COMPANY
138	33	HOUSEHOLD	200	SANDSTONE	
139	33	HOUSEHOLD	180	SANDSTONE	
140	36	HOUSEHOLD	240	SAND & STONE	
141	33	IRRIGATION	180	SANDSTONE	
142	33	HOUSEHOLD	220	SANDSTONE	
143	34	HOUSEHOLD	180	SANDSTONE	
144	33	HOUSEHOLD	160	SANDSTONE	
145	36	HOUSEHOLD	208	SANDSTONE	
146	33	IRRIGATION	180	SANDSTONE	
147	33	HOUSEHOLD	160	SANDSTONE	
148	36	OTHER	180	SANDSTONE	
149	36	HOUSEHOLD	140	SANDSTONE	

DRYDEN TOWNSHIP, LAPEER COUNTY, MI - (TOWNSHIP EAST OF METAMORA) - 25 WELLS

150	6	HOUSEHOLD	180	SHALE & SANDSTONE SANDY	
151	18	HOUSEHOLD	55	GRAVEL	
152	18	TYPE II PUBLIC	55	GRANITE	THORNVILLE BAPTIST CHURCH
153	6	HOUSEHOLD	124	GRAVEL	
154	18	HOUSEHOLD	70	BLACK & WHITE GRAVEL COARSE	
155	6	HOUSEHOLD	280	SANDSTONE	
156	7	HOUSEHOLD	260	SANDSTONE	
157	7	HOUSEHOLD	150	GRAVEL	
158	6	HOUSEHOLD	104	GRAVEL FINE	
159	6	HOUSEHOLD	250	SANDSTONE	
160	6	HOUSEHOLD	241	SANDSTONE & SHALE	
161	6	HOUSEHOLD	135	SAND & GRAVEL	
162	7	HOUSEHOLD	184	SAND & GRAVEL	
163	6	HOUSEHOLD	320	SANDSTONE	
164	6	HOUSEHOLD	241	SANDSTONE & SHALE	
165	6	HOUSEHOLD	280	BLACK SHALE	
166	18	HOUSEHOLD	168	GRAVEL	
167	18	HOUSEHOLD	140	GRAVEL	
168	6	HOUSEHOLD	240	SANDSTONE	
169	7	HOUSEHOLD	100	GRAVEL	
170	7	HOUSEHOLD	102	SAND MEDIUM	
171	6	HOUSEHOLD	135	GRAVEL	
172	18	HOUSEHOLD	94	GRAY SAND & STONES MED TO COARSE	
173	18	HOUSEHOLD	73	GRAVEL	
174	6	HOUSEHOLD	275	SANDSTONE & SHALE	

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 1-15MW	**PAGE** 1 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/07/15	**FINISH:** 07/10/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMMPLER	BCLOWNTS	SIAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
					5	0-2' TOPSOIL 2-14' BROWN SILTY CLAY WITH 5% GRAVEL; MOIST	
					10		10
					15	14-35.5' GRAYISH-BROWN MEDIUM GRAIN TO COARSE GRAIN SAND WITH 10-15% GRAVEL TO 2"; DRY	
					20		20
					25		
					30		30
					35	35.5-39.5' MEDIUM BROWN SILTY CLAY; DRY	
					40	39.5-48' GRAYISH-BROWN MEDIUM GRAIN TO COARSE GRAIN SAND WITH 15-20% GRAVEL; DRY	40
					45		
					50	48-92' SAND AND GRAVEL TO 3"; 20%+ GRAVEL; APPROX. 5-8% SILT; DENSE; DRY	50
					55		
					60		60
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 1-15MW	**PAGE** 2 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/07/15	**FINISH:** 07/10/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SAMPLE NUMBER	BLOWS/6"	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
SCREENED 115-135'					70 75 80 85 90 95 100 105 110 115 120 125 130 135	92-107' HARD PAN TILL WITH GRAVEL; DENSE; DRY 107-118' SAND AND GRAVEL TO 3"; 20% GRAVEL; APPROX. 5-8% SILT; DRY @ 117' WET 118-137' LIGHT BROWN MEDIUM GRAIN TO COARSE GRAIN SAND WITH <5% GRAVEL; WET 137' E.O.B.	

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-1-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/07/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground: 3.0 ft.

B. Diameter of Well Casing: 2.0 in.

C. Surface Seal Bottom: 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 104.0 ft.

F. Fine Sand Top ___ ft.

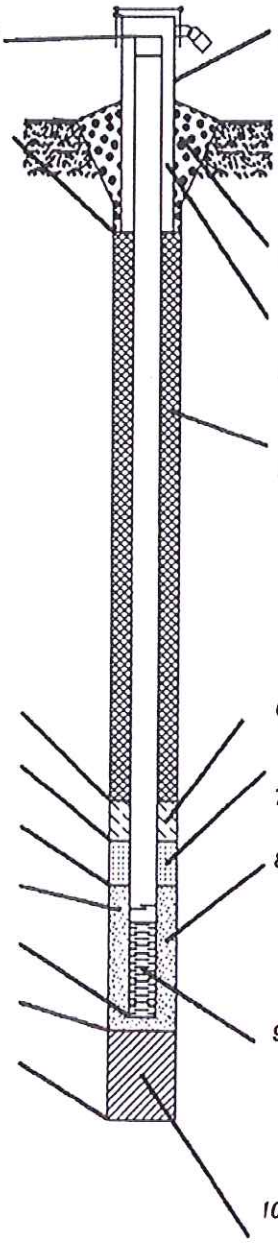
G. Filter Pack Top 112.0 ft.

H. Screen Joint Top 115.0 ft.

I. Well Bottom 135.0 ft.

J. Filter Pack Bottom 135.0 ft.

K. Borehole Bottom 137.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. 4.0 in.
b. Length 5.0 ft.
c. Material
- X Steel
- ___ Other ___

d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
[redacted]
Flint, MI. 48507
Phone (810) 877.7176
Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION GUY PARCEL METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 2-15MW	**PAGE** 1 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: J. ROBERTS	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/20/15	**FINISH:** 07/21/15
LAND OWNER: AMERICAN AGGREGATES OF MICHIGAN	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLER	BLOWCOUNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
					5	0-2' BROWN TOPSOIL; MOIST TO WET 2-16' MEDIUM BROWN SILTY CLAY; TRACE SAND WITH GRAVEL TO 4"; DRY TO SLIGHTLY MOIST	
10					10		10
					15		
						16-61' REDISH BROWN SILTY VERY FINE GRAIN TO COARSE GRAIN SAND WITH 30-40% GRAVEL; SOME COBBLES; GRADATION SANDY TO GRAVELLY; DRY	
20					20		20
					25		
30					30		30
					35		
40					40		40
					45		
50					50		50
					55	@ 56-76' BOULDERS	
60					60		60
					65	61-66' LIGHT GRAY VERY FINE GRAIN TO MEDIUM GRAIN SLIGHTLY SILTY SAND WITH 5-10% GRAVEL; DRY 66-76' LIGHT GRAY TO MEDIUM BROWN SLIGHTLY SILTY SAND AND	

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION GUY PARCEL METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 2-15MW	**PAGE** 2 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: J. ROBERTS	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/20/15	**FINISH:** 07/21/15
LAND OWNER: AMERICAN AGGREGATES OF MICHIGAN	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAYPLE	SAUMPLER	BOUNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					70	GRAVEL WITH COBBLES AND BOULDERS; DRY	
					75	76-79' MEDIUM YELLOW TO LIGHT YELLOW VERY FINE GRAIN SILTY SAND; DRY	
					80	79-85' LIGHT GRAY VERY FINE GRAIN TO FINE GRAIN SLIGHTLY SILTY SAND WITH COBBLES; DRY	
					85	85-86' MEDIUM BROWN MEDIUM GRAIN TO COARSE GRAIN SAND WITH <5% GRAVEL; PERCHED?	
					90	86-91' MEDIUM BROWN VERY FINE GRAIN SANDY SILT; COHESIVE; MOIST	
					95	91-96' GRAYISH BROWN VERY FINE GRAIN TO FINE GRAIN SILTY SAND WITH <5% GRAVEL; DRY	
SCREENED 110-130'					100	96-105' MEDIUM GRAY SLIGHTLY SILTY CLAY; MOIST TO WET; WET @ 100'	
					105	105-131' MEDIUM GRAY FINE GRAIN SAND WITH TRACE SILT; WITH 12-18' CLAYEY STRINGERS WITH 0-5% GRAVEL; WET	
					110		
					115		
					120		
					125		
					130	131-136'+ MEDIUM GRAY SANDY SILT WITH SOME CLAY; WET	
					135	136' E.O.B.	

70 / 80 / 90 / 100 / 110 / 120 / 130 — 70 / 80 / 90 / 100 / 110 / 120 / 130

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-2-15-MW
Driller JOHN ROBERTS
Helper RODNEY ADKINSON, SHANE HIX
Date Installed 07/21/15

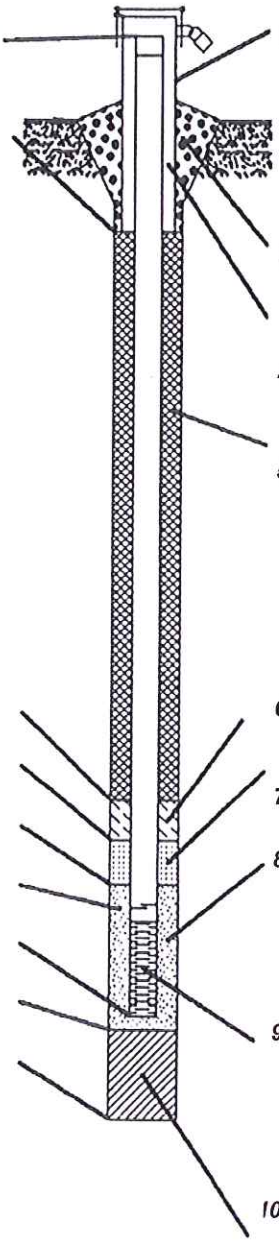
Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___



E. Bentonite Seal Top 88.0 ft.

F. Fine Sand Top 0.0 ft.

G. Filter Pack Top 108.0 ft.

H. Screen Joint Top 110.0 ft.

I. Well Bottom 130.0 ft.

J. Filter Pack Bottom 132.0 ft.

K. Borehole Bottom 136.0 ft.

1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 5.0 ft.
- c. Material
  - X Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- ___ None
- X Other bentonite

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
Flint, MI. 48507
Phone (810) 877.7176
Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 3-15MW	**PAGE** 1 OF 3
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/09/15	**FINISH:** 07/09/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** B. REYNOLDS	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BLOWNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
						0-1' TOPSOIL	
						1-2.5' SANDY CLAY LOAM	
					5	2.5-5' CLAY LOAM	
						5-8' LOAMY SAND	
						8-9' CLAY LOAM	
10					10	9-23' FINE GRAIN SAND WITH 10-15% GRAVEL	10
					15	@ 14' CLAY SEAM	
20					20		20
						23-26' WHITE FINE GRAIN SAND	
					25	26-31' SANDY CLAY LOAM	
30					30		30
						31-36' FINE GRAIN SAND	
					35	36-38' SANDY CLAY LOAM WITH GRAVEL	
40					40	38-42' FINE GRAIN SAND	40
						42-45' SANDY CLAY LOAM TO SILTY CLAY LOAM	
					45	45-58' MEDIUM GRAIN SAND WITH <5% GRAVEL; GRAVEL TO 1"	
50					50		50
					55		
60					60	58-90' FINE TO MEDIUM GRAIN SAND	60
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

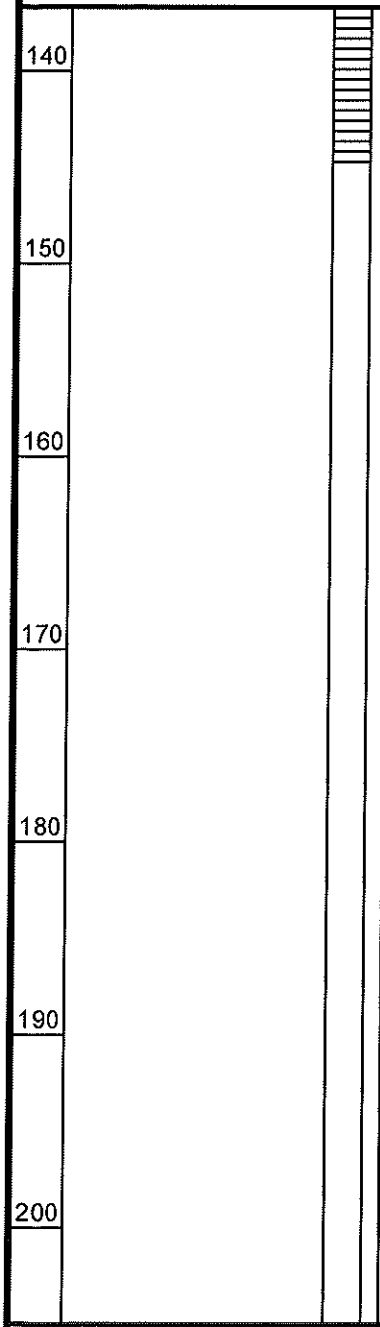
PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 3-15MW	**PAGE** 2 OF 3
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/09/15	**FINISH:** 07/09/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** B. REYNOLDS	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SAMPLER	BOUNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					70		
					75		
					80		
					85		
					90	90-94' SILTY SAND TO SILTY CLAY; MOIST TO WET?	
					95	94-96' GRAY CLAY LOAM	
						96-146' GRAY FINE GRAIN SILTY SAND	
					100		
					105		
					110		
					115		
					120		
SCREENED 126-146'					125		
					130	@128' WET	
					135		

COMMENTS:	WELL DETAILS:	
E.O.B. = End of Boring	**Well Diameter:** Inches **Borehole Diameter:** Inches **Well Material:** **Screen Length:** Feet Slot	*HYDRO-LOGIC ASSOCIATES, INC.* *BRIGHTON, MICHIGAN*

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION	WELL NUMBER: BSA 3-15MW	PAGE 3 OF 3
D-BAR-A RANCH	CONTRACTOR:	DRILLING
METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	CASCADE DRILLING, L.P.	METHOD: SONIC
	DRILLER: C. BARDEN	DRILL RIG: TC600
PROJECT NUMBER: 04-206	START: 07/09/15	FINISH: 07/09/15
LAND OWNER: BOY SCOUTS OF AMERICA	LOGGED BY: B. REYNOLDS	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAY PE SAMPLE	SN AU MM PB LE ER SAMPLE NUMBER	BC OU NT S BOWN	SI AN MT PL E (ft) SAMPLE	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					140 145 150 155 160 165 170 175 180 185 190 195 200	146-166' FINE GRAIN SILTY SAND 166' E.O.B.	

150
160
170
180
190
200

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-3-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/09/15

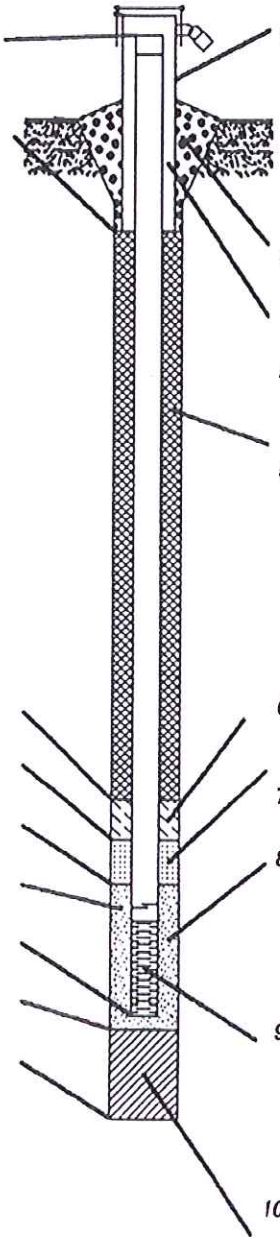
Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___



E. Bentonite Seal Top 119.0 ft.

F. Fine Sand Top ___ ft.

G. Filter Pack Top 124.0 ft.

H. Screen Joint Top 126.0 ft.

I. Well Bottom 146.0 ft.

J. Filter Pack Bottom 148.0 ft.

K. Borehole Bottom 166.0 ft.

1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 5.0 ft.
- c. Material
  - X Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- \ None
- x Other bentonite chip

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
[redacted]
Flint, MI. 48507
Phone (810) 877.7176
Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 4-15MW	**PAGE** 1 OF 1
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/16/15	**FINISH:** 07/16/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BCLOWS	SIANMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
					5	0-0.5' TOPSOIL 0.5-10' ORANGE BROWN VERY SILTY SAND WITH 10-15% GRAVEL; DRY	
10					10	10-16' MEDIUM BROWN SILTY SAND WITH 5-10% GRAVEL; DRY	10
					15		
20					20	16-20' MEDIUM BROWN SILTY CLAY; SOME SAND; WITH 1-2% GRAVEL; MOIST 20-35' MEDIUM GRAY SILTY, SANDY, CLAY; INCREASING SAND CONTENT WITH DEPTH; MOIST TO WET?	20
					25		
30					30		30
					35		
SCREENED 37-57'						35-40' BROWN-GRAY DIRTY SILTY SAND WITH 1% GRAVEL; WET; WATER @ 35'	
40					40		40
					45	40-57' MEDIUM BROWN SLIGHTLY SILTY COARSE GRAIN TO VERY COARSE GRAIN SAND AND +20% GRAVEL WITH SEAMS OF GRAVEL UP TO 50% GRAVEL TO 4" DIAMETER PEASTONE TO BIRD'S EYE; WET	
50					50		50
					55		
60					60	57' E.O.B.	60
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-4-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/16/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 29.0 ft.

F. Fine Sand Top ___ ft.

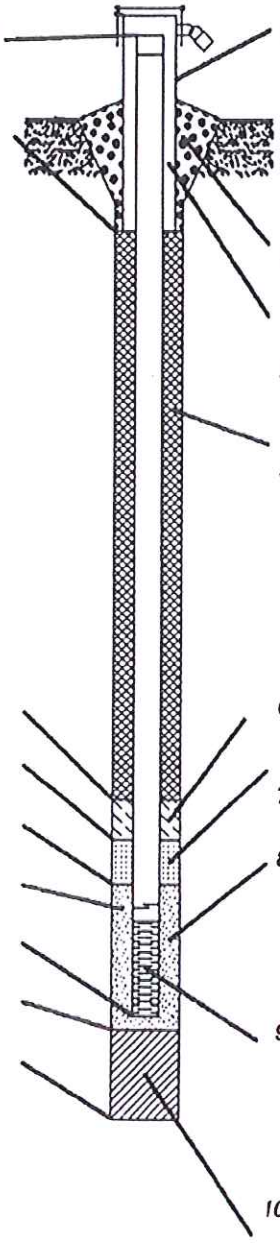
G. Filter Pack Top 35.0 ft.

H. Screen Joint Top 37.0 ft.

I. Well Bottom 57.0 ft.

J. Filter Pack Bottom 57.0 ft.

K. Borehole Bottom 57.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. 4.0 in.
b. Length 5.0 ft.
c. Material
- X Steel
- ___ Other ___

d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- \ None
- x Other bentonite chip

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
[redacted]
Flint, MI. 48507
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ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 5-15MW	**PAGE** 1 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/06/15	**FINISH:** 07/06/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMMPLE	BCLOWNTS	SIANMTPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
						0-2' BROWN SANDY CLAY WITH GRAVEL; WET	
					5	2-6' BROWN SANDY CLAY TO CLAYEY SAND WITH GRAVEL; MOIST	
10					10	10	
					15	6-12.5' BROWN SLIGHTLY SANDY CLAY WITH GRAVEL; MOIST	
20					20	12.5-32.5' GRAY CLAY WITH GRAVEL (TILL); SAND CONTENT INCREASES TO 20%; MOIST	20
					25		
30					30	30	
						32.5-33' BROWN SILTY CLAY WITH GRAVEL; DRY	
					35	33-46' YELLOWISH BROWN FINE GRAIN SAND WITH 5-10% GRAVEL; GRAVEL TO 2"; DRY	
40					40	40	
					45		
						46-48' INTERMIXED SAND, SILT, AND GRAY CLAY SEAMS WITH GRAVEL; DRY	
50					50	48-53' LIGHT BROWN SILTY VERY FINE GRAIN TO FINE GRAIN SAND WITH 5% GRAVEL; DRY	50
					55	53-55' GRAY SILTY SAND WITH 15-20% GRAVEL; DRY	
	SCREENED 55-75'					55-61' MEDIUM BROWN SILTY SAND AND 5-10% GRAVEL WITH <5% GRAY CLAY; DRY	
60					60		60
					65	61-75' MEDIUM BROWN SLIGHTLY SILTY FINE GRAIN TO COARSE GRAIN SAND AND 10-20% GRAVEL; WET @ 61'	

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 5-15MW	**PAGE** 2 OF 2
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/06/15	**FINISH:** 07/06/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE TYPE	SAMPLE NUMBER	BLOWN COUNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					70 75 80 85 90 95 100 105 110 115 120 125 130 135	@ 75' + WET 75' E.O.B.	

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-154152
Location METAMORA,MI

Well Name BSA-5-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/06/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 48.0 ft.

F. Fine Sand Top ___ ft.

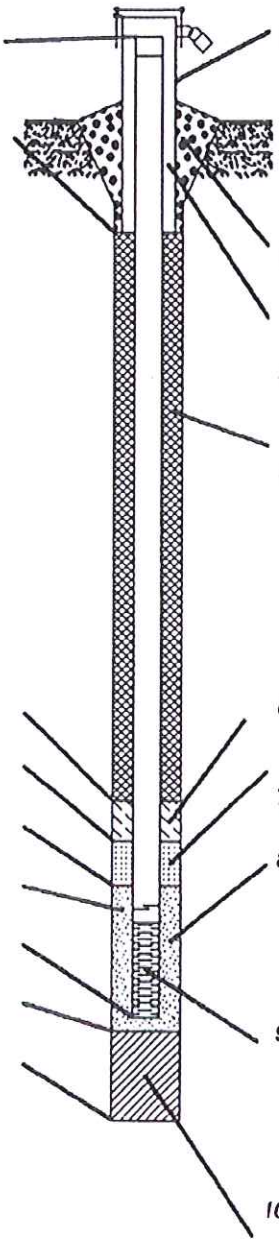
G. Filter Pack Top 52.0 ft.

H. Screen Joint Top 55.0 ft.

I. Well Bottom 75.0 ft.

J. Filter Pack Bottom 75.0 ft.

K. Borehole Bottom 75.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 5.0 ft.
- c. Material
  - X Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
Flint, MI. 48507
Phone (810) 877.7176
Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 6-15MW	**PAGE** 1 OF 1
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/16/15	**FINISH:** 07/16/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BOLOWN	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
						0-0.5' TOPSOIL	
						0.5-5' ORANGE BROWN SILTY VERY FINE GRAIN SANDY LOAM WITH ORGANICS AND TRACE GRAVEL; DRY	
					5		
10					10	5-9' GRAY BROWN CLAY WITH TRACE GRAVEL; MOIST	10
					15	9-17' MEDIUM GRAY BROWN VERY FINE GRAIN TO FINE GRAIN SILTY CLAY SAND WITH TRACE GRAVEL; DRY	
20					20		20
						17-22' MEDIUM BROWN SILTY VERY FINE GRAIN SAND; WET @ 18'?	
					25	22-25' MEDIUM GRAY PLASTIC, DENSE SANDY CLAY; MOIST	
						25-28' MEDIUM BROWN SILTY VERY FINE GRAIN SAND; WET	
30					30		30
						28-35' MEDIUM GRAY PLASTIC, DENSE SANDY CLAY; MOIST	
					35		
SCREENED 35-55'						35-38' MEDIUM BROWN MEDIUM GRAIN TO VERY COARSE GRAIN SILTY SAND WITH 10% GRAVEL; WET	
40					40		40
					45	38-55' LIGHT GRAY GRADING TO BLACK GRADING TO RUSTY BROWN FINE GRAIN TO VERY COARSE GRAIN SILTY SAND WITH 30-35% GRAVEL; GRADING TO VERY COARSE GRAIN SAND AND GRAVEL WITH GRAVEL SEAMS OF 60%; GRAVEL TO 2.5"	
50					50		50
					55		
						55' E.O.B.	
60					60		60
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-6-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/16/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 27.0 ft.

F. Fine Sand Top ___ ft.

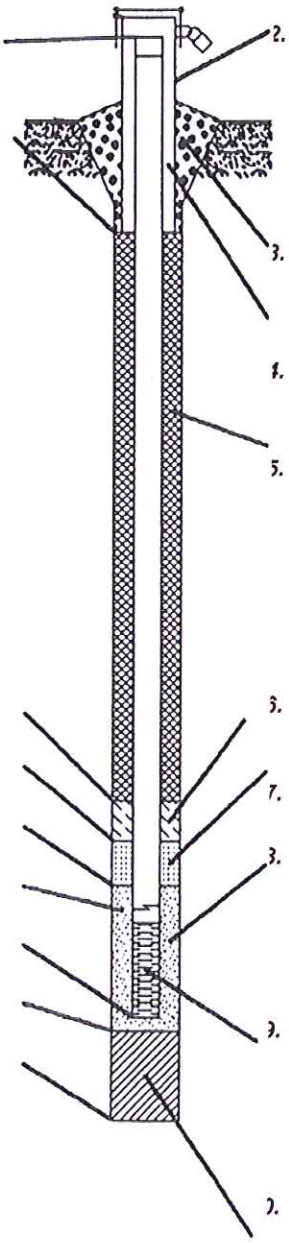
G. Filter Pack Top 33.0 ft.

H. Screen Joint Top 35.0 ft.

I. Well Bottom 55.0 ft.

J. Filter Pack Bottom 55.0 ft.

K. Borehole Bottom 55.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. 4.0 in.
b. Length 5.0 ft.
c. Material
- X Steel
- ___ Other ___

d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- \ None
- x Other bentonite chip

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
[redacted]
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Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 7-15MW	**PAGE** 1 OF 1
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/17/15	**FINISH:** 07/17/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SAMPLE NUMBER	BLOWNTS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
SCREENED 10-20'					5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65	0-0.5' TOPSOIL; MOIST 0.5-9' MEDIUM ORANGE BROWN, SILTY MEDIUM GRAIN SAND WITH 5-10% GRAVEL 9-16' MEDIUM BROWN,SILTY VERY FINE GRAIN TO FINE GRAIN SAND WITH <5% GRAVEL; WET @ 12' 16-45' MEDIUM GRAY CLAY WITH 2-3% GRAVEL; GLACIAL TILL 45' E.O.B.	10, 20, 30, 40, 50, 60

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-7-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/16/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground: 3.0 ft.

B. Diameter of Well Casing: 2.0 in.

C. Surface Seal Bottom: 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 2.0 ft.

F. Fine Sand Top ___ ft.

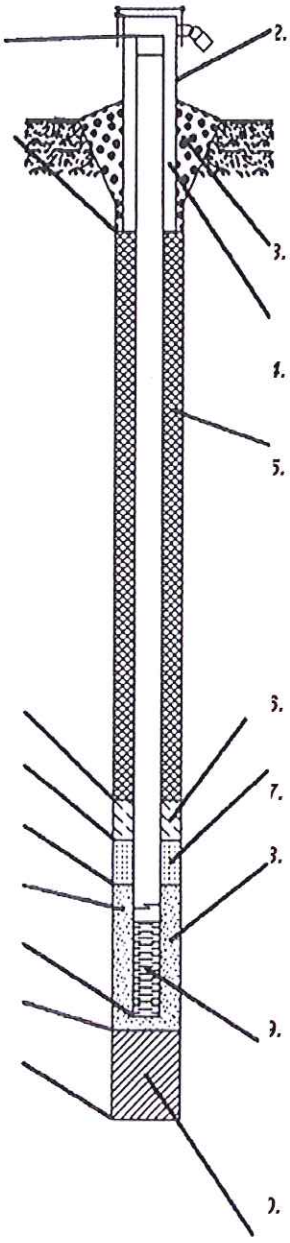
G. Filter Pack Top 8.0 ft.

H. Screen Joint Top 10.0 ft.

I. Well Bottom 20.0 ft.

J. Filter Pack Bottom 22.0 ft.

K. Borehole Bottom 45.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 5.0 ft.
- c. Material
  - X Steel
  - ___ Other ___
- d. Bumper Post ___ qty
  - ___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
- Type: X Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 10.0 ft.

10. Backfill Material: (Below filter pack)
- \ None
- x Other bentonite chip

CASCADE DRILLING, L.P.
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Fax (810) 877.7156

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 8-15MW	**PAGE** 1 OF 1
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/17/15	**FINISH:** 07/17/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BCLOWN	SIAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
SCREENED 28-48'					5	0-1' TOPSOIL 1-4' ORANGE BROWN TO MEDIUM BROWN SLIGHTLY SANDY CLAY WITH <1% FINE GRAIN GRAVEL; MOIST TO WET	
					10	4-11' MEDIUM BROWN SILTY VERY FINE GRAIN TO FINE GRAIN SAND WITH 2-3% GRAVEL; DRY TO MOIST	
					15	11-18' MEDIUM TO DARK BROWN SILTY SAND WITH 10-15% GRAVEL	
					20	18-20' LIGHT BROWN CLAYEY SILT WITH TRACE SAND; WET	
					25	20-23' MEDIUM GRAY CLAY WITH TRACE SAND; MOIST	
					30	23-25' MEDIUM BROWN SANDY SILT WITH TRACE GRAVEL; MOIST 25-26' LIGHT GRAY TO BROWN SLIGHTLY SANDY CLAY WITH TRACE GRAVEL; MOIST	
					35	26-28' MEDIUM BROWN MEDIUM GRAIN SAND AND 5-10% GRAVEL; DRY	
					40	28-30' LIGHT BROWN VERY FINE GRAIN SANDY SILT WITH TRACE GRAVEL; WATER @ APPROX. 30'; WET	
					45	30-35' SAND, GRAVEL, SILT, CLAY GRADATIONAL INTERFACE; WET 35-44' MEDIUM BROWN TO GRAY TO RUSTY MEDIUM GRAIN TO VERY COARSE GRAIN SAND AND 10-15% GRAVEL; WET	
					50	44-46' GRAYISH BROWN FINE GRAIN TO MEDIUM GRAIN SAND WITH TRACE GRAVEL; WET	
					55	46' E.O.B.	
					60		
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name: H L A,INC
Job Number: 119-15-4152
Location: METAMORA,MI

Well Name: BSA-8-15-MW
Driller: CHRIS BARDEN
Helper: STEVE GROSS,RODNEY ADKINSON
Date Installed: 07/17/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground: 3.0 ft.

B. Diameter of Well Casing: 2.0 in.

C. Surface Seal Bottom: 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top: 20.0 ft.

F. Fine Sand Top: ___ ft.

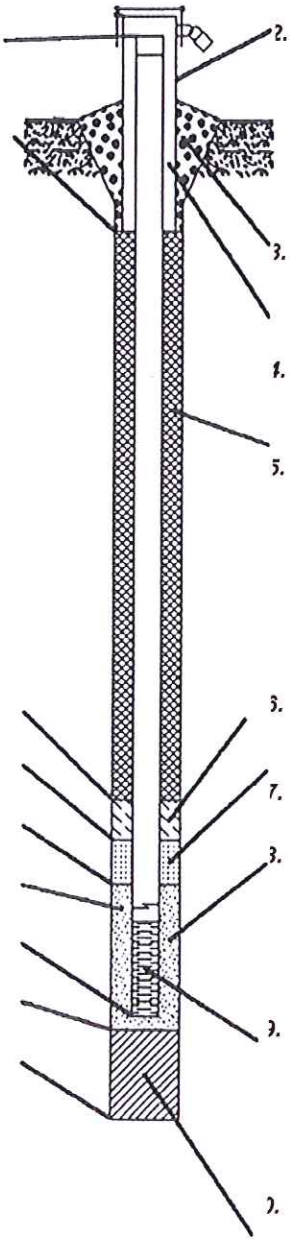
G. Filter Pack Top: 26.0 ft.

H. Screen Joint Top: 28.0 ft.

I. Well Bottom: 48.0 ft.

J. Filter Pack Bottom: 48.0 ft.

K. Borehole Bottom: 48.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover:
   a. Inside diam. 4.0 in.
   b. Length 5.0 ft.
   c. Material
      - X Steel
      - ___ Other ___
   d. Bumper Post ___ qty
      ___ 3" ___ 4"

3. Surface Seal:
   - ___ Bentonite
   - X Concrete
   - ___ Other ___

4. Material between Casing and Protop:
   - ___ Bentonite
   - X Other SAND

5. Annular Space Seal:
   - ___ Granular Bentonite
   - X Bentonite Slurry
   - ___ Cement-Bentonite Grout
   - ___ Other ___

   How Installed:
   - X Gravity
   - ___ Tremie Pumped

6. Bentonite Seal:
   - X Granules
   - ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
   Type: X Factory Cut / ___ Continuous Slot
   Slot Size: 0.010 in.
   Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
    - \ None
    - x Other bentonite chip

CASCADE DRILLING, L.P.
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ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 9-15MW	**PAGE** 1 OF 3
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/08/15	**FINISH:** 07/08/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLER	BCLOWNTS	SIAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					0		
						0-2' BROWN TOPSOIL; WET AT TOP	
						2-3' REDDISH BROWN, TRANSITIONAL TOPSOIL WITH 5-10% GRAVEL; DRY	
					5		
						3-14' MEDIUM YELLOW, FINE GRAIN TO MEDIUM GRAIN SILTY SAND WITH 5-10% GRAVEL; DRY	
10					10	10	
					15	14-26' LIGHT YELLOW, VERY FINE GRAIN TO FINE GRAIN SILTY SAND WITH <5% GRAVEL; MOIST @ 16-17.5'	
20					20	20	
					25		
						26-28' DARK BROWN TO LIGHT YELLOW SILTY SAND WITH 5-10% GRAVEL; MOIST TO DRY	
30					30	30	
						28-46' HARD PAN TILL WITH GRAVEL; DENSE; DRY	
					35		
40					40	40	
					45		
						46-49' MEDIUM BROWN, SANDY CLAY; MOIST	
50					50	50	
						49-56' LIGHT YELLOW TO LIGHT BROWN SILTY SAND AND 10-15% GRAVEL; DRY TO SLIGHTLY MOIST	
					55		
						56-58' MEDIUM BROWN, SILTY SAND WITH 10-15% GRAVEL;DRY	
60					60	60	
						58-96' LIGHT YELLOW VERY FINE GRAIN TO MEDIUM GRAIN SLIGHTLY SILTY "BEACH" SAND WITH <5% GRAVEL; DRY	
					65		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 9-15MW	**PAGE** 2 OF 3
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/08/15	**FINISH:** 07/08/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BCLOWS	SAMPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
					70		
					75		
					80		
					85		
					90		
					95		
					100	96-169' MEDIUM BROWN, MEDIUM GRAIN TO VERY COARSE GRAIN SILTY SAND AND +20-25% GRAVEL; 15% SILT; 50% RECOVERY @ 96-106'; DRY	
					105		
					110	@106-116' 20% RECOVERY; PUSHING BIG COBBLE OR BOULDERS; SAND SIZE IS GRADATIONAL THROUGHOUT INTERVAL; GRAVEL PERCENTAGE IS GRADATIONAL THROUGHOUT INTERVAL	
					115		
					120		
					125		
					130		
					135		

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:

Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

ABOVE GROUND WELL LOG / WELL CONSTRUCTION DETAILS

PROJECT NAME / LOCATION D-BAR-A RANCH METAMORA TOWNSHIP, LAPEER COUNTY, MICHIGAN	**WELL NUMBER:** BSA 9-15MW	**PAGE** 3 OF 3
	CONTRACTOR: CASCADE DRILLING, L.P.	**DRILLING METHOD:** SONIC
	DRILLER: C. BARDEN	**DRILL RIG:** TC600
PROJECT NUMBER: 04-206	**START:** 07/08/15	**FINISH:** 07/08/15
LAND OWNER: BOY SCOUTS OF AMERICA	**LOGGED BY:** M. ZAYATZ	

WELL CONSTRUCTION DETAILS *SEE THE FOLLOWING WELL CONSTRUCTION REPORT COMPLETED BY CASCADE*	STAMPLE	SNAMPLE	BCLOWS	SIANMTPLE (ft)	DEPTH (ft)	GEOLOGIC DESCRIPTIONS, MATERIALS, CONDITIONS AND NOTES	OVM FIELD SCREEN UNITS: ppm
SCREENED 156-176'					140 145 150 155 160 165 170 175 180 185 190 195 200	@ 160' WET 169-176' LIGHT BROWN VERY FINE GRAIN TO FINE GRAIN SILTY SAND WITH <5% GRAVEL; WET 176' E.O.B.	

COMMENTS:
E.O.B. = End of Boring

WELL DETAILS:
Well Diameter: Inches
Borehole Diameter: Inches
Well Material:
Screen Length: Feet Slot

HYDRO-LOGIC ASSOCIATES, INC.
BRIGHTON, MICHIGAN

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

Well Construction Report

Job Name H L A,INC
Job Number 119-15-4152
Location METAMORA,MI

Well Name BSA-9-15-MW
Driller CHRIS BARDEN
Helper STEVE GROSS,RODNEY ADKINSON
Date Installed 07/08/15

Type of Well:
- X Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 3.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 1.0 ft.

D. Well Casing: Flush Threaded PVC
- X Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 148.0 ft.

F. Fine Sand Top ___ ft.

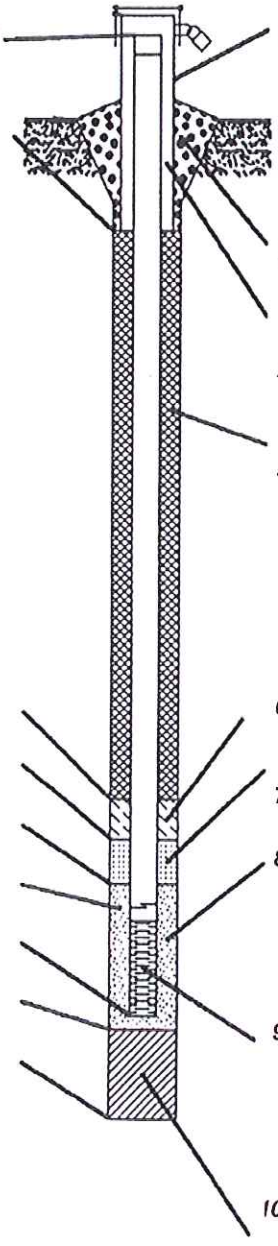
G. Filter Pack Top 154.0 ft.

H. Screen Joint Top 156.0 ft.

I. Well Bottom 176.0 ft.

J. Filter Pack Bottom 176.0 ft.

K. Borehole Bottom 176.0 ft.



1. Locking Cap? X Yes ___ No

2. Protective Cover: a. Inside diam. 4.0 in.
b. Length 5.0 ft.
c. Material
- X Steel
- ___ Other ___

d. Bumper Post ___ qty
___ 3" ___ 4"

3. Surface Seal:
- ___ Bentonite
- X Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- X Other SAND

5. Annular Space Seal:
- ___ Granular Bentonite
- X Bentonite Slurry
- ___ Cement-Bentonite Grout
- ___ Other ___

How Installed:
- X Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- X Granules
- ___ Pellets

7. Type of Fine Sand: ___

8. Type of Filter Pack: K&E #1

9. Screen Material:
Type:
- X Factory Cut
- ___ Continuous Slot

Slot Size: 0.010 in.
Length: 20.0 ft.

10. Backfill Material: (Below filter pack)
- X None
- ___ Other ___

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
Flint, MI. 48507
Phone (810) 877.7176
Fax (810) 877.7156

Brighton Analytical, L.L.C.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810) 229-7575 FAX: (810) 229-8650
e-mail: bai-brighton@sbcglobal.net

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

BA Report Number: **35527**
BA Sample ID: **CB08258**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA1-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**340000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**Not detected**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**86000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**1800**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**30000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**150**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**27000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/7/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**69000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**1800**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**6.5**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**19000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08258**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA1-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	**Not detected**	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08258**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA1-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08258**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA1-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 8/18/15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08259**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA2-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**280000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**2**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**68000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**1400**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**27000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**90**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**7000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**35000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**6.9**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**47000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**4**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**11**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08259**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA2-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromoform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	**Not detected**	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08259**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA2-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08259**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA2-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:
Date: 8.19.15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

BA Report Number: **35527**
BA Sample ID: **CB08260**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA3-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**770000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**12**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**180000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**16**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**17000**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**77000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**570**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**5000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**11000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.1**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**50000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**2**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

BA Report Number: **35527**
BA Sample ID: **CB08260**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA3-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	Not detected	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08260**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA3-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	Not detected	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	Not detected	ug/L	3	SW846 8260B	CW	8/12/2015

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To: Hydro-Logic Associates, Inc.
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Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

BA Report Number: **35527**
BA Sample ID: **CB08260**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA3-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: WH Ward
Date: 8/18/15

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Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08261**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA4-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**2900000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**Not detected**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**69000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**300**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**28000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**100**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**2000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**11000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**60**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.1**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**36000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
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Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
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Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08261**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA4-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	Not detected	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
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BA Report Number: **35527**
BA Sample ID: **CB08261**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA4-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08261**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA4-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 8-19-15

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08262**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA5-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	500000	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	Not detected	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	120000	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	Not detected	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	90	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	47000	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	110	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	4000	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	Digested			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	Not detected	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	17000	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	Not detected	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	Not detected	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	7.0	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	19000	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	Not detected	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	Not detected	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	Not detected	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	Not detected	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08262**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA5-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	**Not detected**	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08262**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA5-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	Not detected	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	Not detected	ug/L	3	SW846 8260B	CW	8/12/2015

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08262**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA5-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

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Date: 8/18/15

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08263**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA6-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**340000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**5**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**79000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**330**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**34000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**Not detected**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**5000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**11000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.1**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**35000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Report Date: 8/19/2015

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BA Report Number: **35527**
BA Sample ID: **CB08263**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA6-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromodichloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromoform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	Not detected	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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BA Report Number: **35527**
BA Sample ID: **CB08263**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA6-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
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Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08263**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA6-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**3**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015
1,4-Dioxane(SIM) (Recheck)						
1,4-Dioxane (SIM)	**4**	ug/L	1	EPA 1624(SIM)	CW	8/19/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 8.19.15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08264**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA7-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**610000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**7**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**150000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**17**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**16000**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**55000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**1100**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**8000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**390**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**5000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.2**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**19000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**7**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08264**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA7-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	1	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	Not detected	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08264**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA7-15MW**

Parameters	Results	Units	DL	Method Referenee	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/18/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08264**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA7-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Wftood
Date: 8/18/15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08265**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA8-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**280000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**2**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**70000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**630**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**25000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**220**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**3000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**9000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.3**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**12000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**3**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08265**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA8-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	**Not detected**	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08265**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA8-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015

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Sample Date: 8/6/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08265**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA8-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:
Date: 8-19-15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08266**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA9-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Total Metal Analysis						
Hardness by Calculation	**450000**	ug/L	5000	EPA 200.8 rev5.4	LT	8/15/2015
Total Arsenic	**Not detected**	ug/L	1	EPA 200.8 rev5.4	LT	8/15/2015
Total Calcium	**98000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Copper	**Not detected**	ug/L	4	EPA 200.8 rev5.4	LT	8/15/2015
Total Iron	**370**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Magnesium	**49000**	ug/L	100	EPA 200.8 rev5.4	LT	8/15/2015
Total Manganese	**430**	ug/L	20	EPA 200.8 rev5.4	LT	8/15/2015
Total Sodium	**19000**	ug/L	1000	EPA 200.8 rev5.4	LT	8/15/2015
Metal Water Total (digest)	**Digested**			3015	HD	8/12/2015
Inorganic Analysis						
Ammonia	**Not detected**	ug/L	10	SM4500 NH3G	RM	8/7/2015
Chloride	**38000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Nitrate	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
Nitrite	**Not detected**	ug/L	50	EPA 300.0R2.1	RM	8/6/2015
pH	**7.1**	S.I.		SW846 9040B	HD	8/11/2015
Sulfates	**34000**	ug/L	1000	EPA 300.0R2.1	RM	8/6/2015
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	8/11/2015
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08266**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA9-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Bromoform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	Not detected	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Diethyl ether	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015

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e-mail: bai-brighton@sbcglobal.net

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

BA Report Number: **35527**
BA Sample ID: **CB08266**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA9-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
4-Methyl-2-pentanone(MIBK)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	Not detected	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichloroethene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	Not detected	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	Not detected	ug/L	3	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/19/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08266**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA9-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**23**	ug/L	1	EPA 1624(SIM)	CW	8/7/2015
1,4-Dioxane(SIM) (Recheck)						
1,4-Dioxane (SIM)	**26**	ug/L	1	EPA 1624(SIM)	CW	8/19/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 8-19-15

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/13/2015

BA Report Number: **35527**
BA Sample ID: **CB08267**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trip Blank**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Acetone	**Not detected**	ug/L	20	SW846 8260B	CW	8/12/2015
Acrylonitrile	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromodichloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromoform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Bromomethane(Methyl Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
2-Butanone (MEK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Carbon disulfide	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Carbon tetrachloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloroform	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Chloromethane(Methyl Chloride)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
cis-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Cyclohexane	**Not detected**	ug/L	10	SW846 8260B	CW	8/12/2015
1,2-Dibromo-3-Chloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromochloromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dibromoethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dibromomethane(Methylene Bromide)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,4-Dichlorobenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Dichlorodifluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2-Dichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/13/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08267**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trip Blank**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Diethyl ether	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Diisopropyl Ether(DIPE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Ethyl benzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Ethyltertiarybutylether(ETBE)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Hexanone(Methyl Butyl Ketone)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Isopropylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl iodide(Iodomethane)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Methyl(tert)butyl ether(MTBE)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
4-Methyl-2-pentanone(MIBK)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Methylene chloride	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
2-Methylnaphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Naphthalene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
n-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
n-Propylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
p-Isopropyl Toluene(p-Cymene)	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
sec-Butylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Styrene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tertiary Butyl Alcohol(TBA)	**Not detected**	ug/L	50	SW846 8260B	CW	8/12/2015
tertiaryAmylmethylether(TAME)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
tertiaryButylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,1,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2,2-Tetrachloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrachloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Tetrahydrofuran(THF)	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
Toluene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,2-Dichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,3-Dichloropropene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
trans-1,4-Dichloro-2-butene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,2,4-Trichlorobenzene	**Not detected**	ug/L	5	SW846 8260B	CW	8/12/2015
1,1,1-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,1,2-Trichloroethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015

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e-mail: bai-brighton@sbcglobal.net

Sample Date: 8/5/2015
Submit Date: 8/6/2015
Report Date: 8/13/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35527**
BA Sample ID: **CB08267**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trip Blank**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Trichloroethene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Trichlorofluoromethane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trichloropropane	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,3-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,2,4-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
1,3,5-Trimethylbenzene	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Vinyl chloride	**Not detected**	ug/L	1	SW846 8260B	CW	8/12/2015
Xylenes(total)	**Not detected**	ug/L	3	SW846 8260B	CW	8/12/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Wood
Date: 8/18/15

Brighton Analytical, L.L.C.™

Email: bai-brighton@sbcglobal.net
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Brighton, MI 48114
Phone: 810-229-7575
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BA PROJECT #:

PAGE 1 OF 1

ABBREVIATIONS FOR MATRIX
S = Solid
L = Liquid
DW = Drinking H_2O
O = Oil
P = Wipe
A = Air (Tedlar Bag)
F = Filter
T = Tube
M = Misc.

PROJECT NAME: D-BRK-4 Bev Scott Ranch

PROJECT #: 04-206.04

PO #: (PLEASE NOTE IF DIFFERENT BILLING ADDRESS)

Sample collected by: B. Reynolds

REQUESTED TURNAROUND: (circle one)
Rush: 1 -3 business days (verify with lab & specify date needed)
1 Day = 2.5X Cost 2 Day = 2X Cost 3 Day = 1.5X Cost
Standard: 5 business days

If RUSH, approved by: _____

Brighton ID #	Sample Description	Sample Coll. Date	Sample Coll. Time	Container Type & Quantity: VOA'S (PRES) Y/N N/A	HDPE UNPRESERVED	HDPE HNO_3	HDPE H_2SO_4	HDPE NAOH	AMBER PRESERVED?	GLASS, NO PRESERVATIVE	STERILIZED BACTERIA	MEOH Preserved Y/N	Sample Matrix	Tested/Method: VOCs	1,4 Dioxane	Ethane, Ethylene, Methane	Total Metals, Mg, Ca, Fe, Mn, K	Ammonia, Chloride	Hardness, Nitrate, Nitrite	pH, Solids
1)	BSA1-15MW	8/5	10:15	4			1			2			L	X						X
2)	BSA2-15MW	8/6	11:40	4			1			2			L	X						X
3)	BSA3-15MW	8/5	1:50	4			1			2			L	X						X
4)	BSA4-15MW	8/6	9:35	4			1			2			L	X						X
5)	BSA5-15MW	8/5	11:30	4			1			2			L	X						X
6)	BSA6-15MW	8/5	3:40	4			1			2			L	X						X
7)	BSA7-15MW	8/5	2:50	4			1			2			L	X						X
8)	BSA8-15MW	8/6	10:25	4			1			2			L	X						X
9)	BSA9-15MW	8/5	2:15	4			1			2			L	X						X
10)	Trip Blank											1	L	X						

Special Instructions:

COMPANY/MAILING ADDRESS:
Hydro Geo Associates
7281 Grand River
Brighton, MI 48114
ATTN: JBrian Reynolds
PHONE: (810) 220-3302
FAX OR EMAIL: breynolds40@sbcglobal.net

Samples received within hold time? yes ☐ no ☐
Temperature of samples °C:
pHs verified in login? yes ☐ no ☐
Headspace/bubbles in VOA's? yes ☐ no ☐ n/a ☐
Sample containers and COC match? yes ☐ no ☐

BILLING ADDRESS (IF REQUIRED):

Drinking H_2O:
Fax to LCHD? yes ☐ no ☐
Chlorinated Water Supply? yes ☐ no ☐
AMT.: _____

MCL Failure: yes ☐ no ☐
Client Notified (date/time/initials): _____

Please fill out the Chain of Custody completely and review. Incorrect or incomplete information will result in a "hold" on all analyses.

Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:	Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:
1			8-6-15	4:25	3				
2					4				

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09282**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA1-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Mark M. Smith

Date: 15 Sept. 2015

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Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35839**
BA Sample ID: **CB09283**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA2-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**3**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**5**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 15 Sept 2015

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09284**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA3-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: [signature]

Date: 15 Sept 2015

Brighton Analytical L.L.C.™

Brighton Analytical, L.L.C.
2105 Pless Drive
Brighton, Michigan 48116
Phone: (810) 229-7575 FAX: (810) 229-8650
e-mail: bai-brighton@sbcglobal.net

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09285**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA4-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: [signature]

Date: 15 Sept 2015

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Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09286**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA5-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Stanley M. Smith

Date: 15 Sept 2015

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Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35839**
BA Sample ID: **CB09287**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA6-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**2**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Stanley M Smith

Date: 15 Sept 2015

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Sample Date: 9/2/2015
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Report Date: 9/15/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35839**
BA Sample ID: **CB09288**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA7-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**2**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Linda M. Smith
Date: 15 Sept 2015

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Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35839**
BA Sample ID: **CB09289**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA8-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**7**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 15 Sept 2015

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Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

BA Report Number: **35839**
BA Sample ID: **CB09290**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **BSA9-15MW**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**2**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**23**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Amber M Smith

Date: 15 Sept 2015

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To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09291**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trout Lake Lodge**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**8**	ug/L	2	RSKSOP-175	BY	9/9/2015
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Linda M. Smith
Date: 15 Sept 2015

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e-mail: bai-brighton@sbcglobal.net

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/10/2015

BA Report Number: **35839**
BA Sample ID: **CB09292**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trip Blank**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
Volatile Analysis						
Ethane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Ethene	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015
Methane	**Not detected**	ug/L	2	RSKSOP-175	BY	9/9/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by: Stanley M Smith

Date: 15 Sept 2015

Brighton Analytical L.L.C.™

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e-mail: bai-brighton@sbcglobal.net

To: Hydro-Logic Associates, Inc.
7281 Grand River Road
Brighton, MI 48114

Sample Date: 9/2/2015
Submit Date: 9/3/2015
Report Date: 9/15/2015

BA Report Number: **35839**
BA Sample ID: **CB09293**

Project Name: **D-BAR-A Boy Scout Ranch**
Project Number: **04-206.04**
Sample ID: **Trip Blank**

Parameters	Results	Units	DL	Method Reference	Analyst	Analysis Date
1,4-Dioxane(SIM)						
1,4-Dioxane (SIM)	**Not detected**	ug/L	1	EPA 1624(SIM)	CW	9/14/2015

DL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

Released by:

Date: 15 Sept 2015

Brighton Analytical, L.L.C.™

Email: bal-brighton@sbcglobal.net

2105 Pless Drive, Brighton, MI 48114 — Phone: 810-229-7575 — Fax: 810-229-8650

BA PROJECT #: 55839

ABBREVIATIONS FOR MATRIX
S = Solid
L = Liquid
DW = Drinking H_2O
O = Oil
P = Wipe
A = Air (Tedlar Bag)
F = Filter
T = Tube
M = Misc.

PROJECT NAME: D-BAR-A Boy Scout Ranch

PROJECT #: 04-206.04

PO #: (PLEASE NOTE IF DIFFERENT BILLING ADDRESS)

Sample collected by: B. Reynolds

REQUESTED TURNAROUND: (circle one)
Rush: 1-3 business days (verify with lab & specify date needed)
1 Day = 2.5X Cost 2 Day = 2X Cost 3 Day = 1.5X Cost
Standard: 5 business days

IF RUSH, approved by: _____

Analysis Requested/Method: 1,4 Dioxane; Ethane, Ethene, Methane

Brighton ID #	Sample Description	Sample Collection Date	Sample Collection Time	Container Type & Quantity: VOA's (PRESERVED? Y N N/A)	HDPE UNPRESERVED	HDPE HNO_3	HDPE H_2SO_4	HDPE NAOH	AMBER GLASS, NO PRESERVATIVE	STERILIZED BACTERIA	MEOH Preserved Y N	Sample Matrix	1,4 Dioxane	Ethane, Ethene, Methane
9282	BSA1-15MW	9/2/15	9:55	3					3			L	X	X
2) 83	BSA2-15MW		11:20	3					3			L	X	X
3) 84	BSA3-15MW		10:40	3					3			L	X	X
4) 85	BSA4-15MW		11:26	3					3			L	X	X
5) 86	BSA5-15MW		9:55	3					3			L	X	X
6) 87	BSA6-15MW		2:10	3					3			L	X	X
7) 88	BSA7-15MW		11:50	3					3			L	X	X
8) 89	BSA8-15MW		12:30	3					3			L	X	X
9) 90	BSA9-15MW		2:55	3					3			L	X	X
10) 91	Trout Lake Lodge		12:45	3					3			L	X	X

Special Instructions:

COMPANY/MAILING ADDRESS:
Hydro-Logic Associates
7281 Ground River
Brighton, MI 48114

ATTN: Brian Reynolds

PHONE: (810) 220-3202

FAX OR EMAIL: hydrologic@sbcglobal.net

Samples received within hold time? yes X no ☐

Temperature of samples °C: 4

pHs verified in login? yes ☐ no X

Headspace/bubbles in VOA's? yes ☐ no X n/a ☐

Sample containers and COC match? yes X no ☐

BILLING ADDRESS (IF REQUIRED)

Drinking H_2O:
Fax to LCHD? yes ☐ no ☐
Chlorinated Water Supply? yes ☐ no ☐
AMT.: _____

MCL Failure: yes ☐ no ☐
Client Notified (date/time/initials): _____

Please fill out the Chain of Custody completely and review. Incorrect or incomplete information will result in a "hold" on all analyses.

Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:	Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:
1		9-3-15	8:52						
2									

Brighton Analytical, L.L.C.™

Email: bal-brighton@sbcglobal.net

2105 Pless Drive
Brighton, MI 48114

Phone: 810-229-7575
Fax: 810-229-8650

BA PROJECT #: 35839

PAGE 2 OF 2

PROJECT NAME: D-BAR-A Boy Scout Ranch

PROJECT #: 04-206.04

PO #: (PLEASE NOTE IF DIFFERENT BILLING ADDRESS)

Sample collected by: B. Reynolds

REQUESTED TURNAROUND: (circle one)
Rush: 1-3 business days (verify with lab & specify date needed)
1 Day = 2.5X Cost 2 Day = 2X Cost 3 Day = 1.5X Cost
Standard: 5 business days

If RUSH, approved by: _____

ABBREVIATIONS FOR MATRIX
S = Solid
L = Liquid
DW = Drinking H_2O
O = Oil
P = Wipe
A = Air (Tedlar bag)
F = Filter
T = Tube
M = Misc.

Analysis Requested/Method

Brighton ID #	Sample Description	Sample Coll. Date	Sample Coll. Time	Container Type & Quantity: VOA'S (PRES? Y N N/A)	HDPE UNPRESERVED	HDPE HNO_3	HDPE H_2SO_4	HDPE NAOH	AMBER GLASS, NO PRESERVATIVE PRESERVED? Y N	STERILIZED BACTERIA	MEOH Preserved Y N	Sample Matrix	1,4 Dioxane	Ethane, Ethene, Methane
1) 09292	Trip Blank	9/3/15		1								T		X
2) 09293	Trip Blank	9/3/15							1			T	X	
3)														
4)														
5)														
6)														
7)														
8)														
9)														
10)														

COMPANY/MAILING ADDRESS:
Hydro-Logic Associates
7991 Grand River
Brighton, MI 48114

ATTN: Brian Reynolds

PHONE: (810) 220-3207

FAX OR EMAIL: hydro-logic@sbcglobal.net

Samples received within hold time? yes ☐ no ☐

Temperature of samples °C:

pHs verified in login? yes ☐ no ☐

Headspace/bubbles in VOA's? yes ☐ no ☐ n/a ☐

Sample containers and COC match? yes ☐ no ☐

BILLING ADDRESS (IF REQUIRED):

Drinking H_2O:
Fax to LCHD? yes ☐ no ☐
Chlorinated Water Supply? yes ☐ no ☐
AMT.: _____

MCL Failure: yes ☐ no ☐
Client Notified (date/time/initials): _____

Special Instructions:

Please fill out the Chain of Custody completely and review. Incorrect or incomplete information will result in a "hold" on all analyses.

Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:	Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:
1)			9-3-15	8:52					
2)									