Conditional Use Permit Renewal Application
Mid Michigan Materials
Vella Pit
Ann Arbor Township, Washtenaw County, Michigan

ORDINANCE TO AMEND CHAPTER 74, ZONING, ARTICLE V SUPPLEMENTARY DISTRICT REGULATIONS TO ADOPT MINERAL MINING CODE SECTION 74-592a and REPEAL SECTION 74-592.

(a) PURPOSE AND AUTHORITY

(1) **Exportation of Non-Metallic Minerals and Importation of Fill Materials**. The Township recognizes that sand, gravel and other non-metallic minerals within the Township's boundaries are nonrenewable natural resources necessary and beneficial to the welfare of its inhabitants and the surrounding region. To provide for utilization of these resources in a manner compatible with nearby residential uses, to protect human health and the environment, and to ensure complete reclamation for another land use at the conclusion of the extraction operation, it is necessary to regulate and provide procedures and standards for extraction of non-metallic minerals and for the reclamation of the land at the conclusion of the operation. These regulations are required because extraction operations and related activities, such as the importation of fill material, can cause unique and substantial impacts upon the environment and the welfare of adjacent properties and the community as a whole. They can disrupt the environment, impair water quality and quantity, cause noise and dust nuisances, damage roads and create conditions dangerous to Township residents.

(2) **Preservation of Wetlands, Water Bodies and Groundwater**. Wetlands are indispensable and fragile natural resources that provide many public benefits, including maintenance of water quality through nutrient cycling and sediment trapping, and by serving as biological and chemical oxidation basins; flood and storm water runoff control through temporary water storage; groundwater recharge; and by providing open space, passive outdoor recreation opportunities, and fish and wildlife habitat. Preservation of Township wetlands, water bodies, aquifers and ground water in a natural condition is necessary to maintain hydrological, economic, recreational, and aesthetic natural resource values for existing and future Township residents.

(3) **Applicability**. Subject to compliance with all other applicable statutes, ordinances, rules and regulations, this Ordinance does not apply to the following activities:

a. Ordinary and necessary grading of land for the tilling and cultivation of soils for the growing of crops and trees.

b. Ordinary and necessary grading or excavation for construction of buildings, structures or related septic systems pursuant to all required permits from the Township and any other governmental authority having jurisdiction over such activities.

c. Ordinary and necessary grading, excavation, or maintenance within a public right-of-way by any governmental authority having jurisdiction over that public right-of-way road or drainage easement.

d. Remediation of environmental contamination.

e. Construction of solid waste disposal facilities in accordance with Michigan Department of Environment, Great Lakes and Energy (EGLE) permits.

(c) CONDITIONAL USE PERMIT REQUIRED.

Mineral mining shall require a conditional use permit, as described in Chapter 74, Article II, Division 3, as amended.

(d) REQUIRED INFORMATION.

(1) **Comprehensive Plan**. The applicant shall submit a comprehensive plan that provides the following information:

a. All information required under Chapter 74, Article II, Division 3, Conditional Use Permits, and Chapter 74, Article II, Division 4, Site Plan Review.

An updated (2025) site plan is included as Figure 1 in this application.

Information previously provided as part of the initial Conditional Use Permit and Site Plan Application dated February 2020 (the "2020 CUP Application") is included as Attachment A.

Additional information regarding current site conditions and reclamation plans is available in the Joint Permit Application for Inland Lakes and Streams, Great Lakes, Wetlands, Floodplains, Dams, Environmental Areas, High Risk Erosion Areas, and Critical Dune Areas submitted to the Michigan Department of Environment, Great Lakes, and Energy on November 29, 2023, and revised September 27, 2024 (the "ILS Permit Application"). Relevant figures from the ILS Permit Application are included as Attachment B.

Hydrogeological information is available in the Report on Vella Pit Hydrogeological Investigation, Revised September 2024, 2984 Earhart Road, Ann Arbor Township, Michigan dated September 27, 2024 (the "Hydrogeological Investigation Report"), which was included as an appendix to the ILS Permit Application. The Hydrogeological Investigation Report is included as Attachment C.

b. **Property Use Plan**. A property use plan that provides the following information:

1. Boundary lines of the property; dimensions and bearings of the property lines, correlated with the legal description;

See Figure 1 of the 2020 CUP Application.

2. Aerial photo, showing property and adjacent areas, location and outline of wooded areas, streams, marshes, and other natural features;

See Figure 2A of the 2020 CUP Application and Figure 1.

3. Existing site improvements such as buildings, drives, wells, and drain fields;

Existing site improvements are shown in Figure 1 and in Figures 2A and 3A of the 2020 CUP Application. Existing wells are shown in Sheet C-104 of the ILS Permit Application figures.

4. Existing topography at contour intervals of two feet;

Existing topography is shown in Figure 1.

5. Location and description of soil types;

See Figure 2A of the 2020 CUP Application.

6. Tree areas and other natural features to be retained, and/or impacted;

See Figure 2B of the 2020 CUP Application.

7. Location and width of driveways from the site and sight distances on public roads at intersections with these driveways;

See Figure 2A of the 2020 CUP Application.

8. Extent of future mining areas and depth thereof;

See Figure 2 for the final planned extent of mining and Figure 3 for the planned phasing and sequence of mining to reach the final extent.

9. Location and nature of structures, including pipes for water movement, and stationary equipment to be located on the site during mining operations; these structures shall also be shown on preliminary and final site plans;

See Sheet C-100 of the ILS Permit Application.

10. An estimate of the kind and amount of material to be withdrawn from the site and the expected termination date of mining operations;

Aggregate material will not differ from what was historically mined: coarse to fine sand with varying amounts of gravel and silt. The estimated quantity to be withdrawn from the site under this Conditional Use Permit (CUP) renewal application is approximately 2,186,100 tons, based on a calculation of 31.23 acres x 35 feet of average reserve depth x 2,000 tons per foot per acre. The anticipated additional duration of mining planned under this CUP renewal application is approximately 6 years, with 1.5 years of reclamation following the completion of mining.

11. Description of all operations to be conducted on the premises, including the phasing of such operations, such as, but not limited to, loading and unloading, excavating, crushing, sorting, and washing operations, and the type, size, power source and nature of equipment to be used with each operation;

Overburden, non-targeted material considered not economically viable, overlays the desirable material. Overburden is removed with excavators and articulating haul trucks to be placed as reclamation material or, if desired, sold. Material (e.g. aggregate) is excavated with an extended boom excavator and/or a front-end loader, or a dredge. Following excavation, the ore is transported to a hopper, a type of vessel that aids in channeling unconsolidated material towards a conveyor belt. Conveyor systems are varying lengths and widths depending on the specific needs during the life of mine; material conveyed is screened through various large sieves. Screened fine aggregate is washed of clay and silt, and sorted through a secondary screening process. Screened and/or washed material is stockpiled based on grain size. Front-end loaders scoop and load articulating haul trucks or an over-the-road haul truck.

12. Description of pollution and erosion control measures;

An erosion control plan is included as Attachment D. The site's Pollution Incident Prevention Plan is included as Attachment E.

During operations, use of modern, maintained machinery and vehicles meeting applicable emissions performance standard will be utilized. Use of dust abatement techniques, such as water, and moderating operations during adverse weather conditions on unpaved and unvegetated surface will reduce potential airborne dust.

Fuel and maintenance chemical storage, like those stored in an automotive repair shop, will be enclosed to minimize potential to impact the environment. Use of recycled wash water and reclaimed surface water will minimize withdrawal and consumption of groundwater.

13. Certified statement by a qualified engineer, with supporting data and analyses, concerning expected impact on the water table and water supply wells in the vicinity of the site; and

Expected impacts on the water table and water supply wells in the vicinity of the site are evaluated in the Hydrogeologic Investigation Report, including supporting data and analyses.

The current and future mine operation does not include groundwater pumping to facilitate dewatering. The operation pumps water from existing mine pits to use in the washing operation, but that water is returned to the pond in a closed loop system.

Based on this closed-loop configuration and the data and analyses provided in the Hydrogeologic Investigation Report, the current and future mining operations are not expected to have a negative impact on the water table or surrounding water supply wells.

14. Map showing truck transportation routes to and from the site.

The existing truck haul route within the Township is Earhart Road south to Plymouth Road. This route will remain the same for future mining operations.

c. **Market Analysis**. The applicant shall submit a report prepared by a geologist or other experts with credentials satisfactory to the Township Board to demonstrate that the natural resources to be extracted are valuable, and the applicant can receive revenue and reasonably expect to profit from the proposed mineral mining operation. The applicant shall also provide documentation to demonstrate that there is a need for the natural resources to be mined by either the applicant or in the market served by the applicant.

The market analysis conducted and previously provided by Mid Michigan Materials is included as Appendix F of the 2020 CUP Application.

d. **Reserve/Exploration map**. A Reserve/Exploration map and cross sections shall be prepared by an engineer or geologist and certified to the Township as true and accurate showing the extent, location and nature of all subsurface materials on the proposed extraction site on a topographic map including:

1. Estimated areal extent of deposit limits of materials to be mined;

See Sheet C-105 of the ILS Permit Application for the extent of reserves evaluated for that application. However, the planned maximum extent of mining is shown on Figure 2.

2. Depth and lowest elevations of exploration (e.g., drill holes) and the claimed deposit of materials to be extracted from the site;

The extent and depth of potential extraction evaluated for the ILS Permit Application are shown in Sheet C-105 of the ILS Permit Application. Exploration drill holes are shown in the cross sections provided as Figures 5A through 5E of the Hydrogeologic Investigation Report. However, the planned horizontal and vertical extent of mining is shown on Figure 2.

3. Groundwater elevations;

The Hydrogeologic Investigation Report includes figures and tables indicating measured groundwater elevations from 2023-2024 and modeled future groundwater elevations. See Figures 5A through 5E, Figures 6A through 6E, and Figures 7A through 7G of that report.

4. Estimated quantity of reserves;

The estimated quantity to be withdrawn from the site under this CUP renewal application is approximately 2,186,100 tons.

5. Depth and estimated quantity of topsoil to be stripped;

Based on the site investigation and geologic cross sections shown in the Hydrogeologic Investigation Report, the combined thickness of topsoil and overburden within the planned extent of mining ranges from approximately 0 feet to 50 feet.

6. Depth, lower elevations and estimated quantity of overburden to be stripped; and

Based on the site investigation and geologic cross sections shown in the Hydrogeologic Investigation Report, the combined thickness of topsoil and overburden within the planned extent of mining ranges from approximately 0 feet to 50 feet.

7. Ten (10) foot contour intervals indicating the anticipated vertical and horizontal extent of excavation below the existing surface elevations.

See Sheet C-105 of the ILS Permit Application for the potential excavation extent evaluated for the ILS Permit Application. However, Figure 2 shows the planned vertical and horizontal extent of excavation.

e. **Site Natural Features Inventory Map**. The Applicant shall provide a map and associated narrative describing the location and type of natural features on or adjacent to the site, including wetlands, watercourses, 100-year floodplains, woodlands, landmark trees, steep slopes, endangered species habitat as identified by the Michigan Department of Natural Resources, and groundwater recharge areas. This map shall be consistent with that required for the preliminary site plan pursuant to Section 74-175.

Site plans showing natural features were previously provided as part of the 2020 CUP Application (see Figure 2).

An Environmental Impact Analysis providing additional information pertaining to site natural features is included as Attachment F.

f. **Hydrogeological Work Plan and Pre-study Meeting**. Prior to commencement of the hydrogeological study required in subsection g. below, a hydrogeological work plan shall be prepared and submitted to the Township to communicate aspects of the hydrogeological study. A pre-study meeting shall be held with the Applicant and the Township and relevant consultants to discuss the work plan and the parameters of the proposed hydrogeological study. The hydrogeological work plan shall contain:

1. A brief assessment of geology and existing hydrogeological data within one (1) mile of the proposed mining site. This may be based upon readily available literature and online references;
2. Identify applicable permits required from the United States, State of Michigan, County or other governmental entity, and any applications, correspondence or conversations pertaining to the same;
3. A description of the proposed drilling methodology and monitoring well installation methods to evaluate groundwater presence and flow direction;
4. A table summarizing the number of proposed soil borings and monitoring wells, the likely depth of drilling, along with corresponding rationale;
5. A table summarizing the number of surface water gauging locations;
6. A map or description showing the proposed surface water gauging, soil boring, and monitoring well locations;
7. A map showing the property boundary and the conceptual or anticipated direction of groundwater flow;

8. A table summarizing the frequency to collect water level and quality measurements;
9. A description of proposed monitoring well construction; and
10. A description of the survey methodology for determining groundwater and surface water elevations.

A work plan and pre-study meeting are not applicable to this CUP renewal application, as a hydrogeologic study has already been conducted and reviewed by the Township and its consultants prior to this application.

g. **Hydrogeological Study**. A hydrogeological study shall be prepared by a certified professional geologist or professional engineer who specializes in hydrogeology and who certifies the accuracy of the contents and findings of the study. The Planning Commission may have the study reviewed by the Township's consultant at the Applicant's expense. The hydrogeological study is intended to document the hydrogeological conditions on site and within the influence of the site and assess any impact the proposed mining operation may have on the water resources of the Township (both on and off-site). The applicant's consultant shall provide a report addressing the following minimum hydrogeological data and evaluation requirements (the hydrogeological report shall be a "stand alone" document). Some of the following information may be reduced at the discretion of the Township based upon the evaluation of the hydrogeological work plan described in subsection f.

The Hydrogeological Investigation Report has been reviewed by the Township's consultant and the Michigan Department of Environment, Great Lakes, and Energy.

1. **Site and Mineral Mining Operation Description**.

i. Site location map(s) showing the regional setting. At a minimum, the map should cover an area with a two-mile radius measured in all directions from the center of the property. Depending on specific conditions for a particular site the Township may require an increase in the geographic area covered by this map. The site location map must show the following features:

(1) Township name;

See Figure 1 of the Hydrogeological Investigation Report.

(2) Township and range numbers;

See Figure 1 of the Hydrogeological Investigation Report.

(3) Scale and north arrow;

See Figure 1 of the Hydrogeological Investigation Report.

(4) Section lines and numbers;

See Figure 1 of the Hydrogeological Investigation Report.

(5) Highways and roads;

See Figure 1 of the Hydrogeological Investigation Report.

(6) Location of existing lakes, streams, drainage ditches, surface impoundments and wetlands within the geographic area covered by this map;

See Figures 1 and 2 of the Hydrogeological Investigation Report.

(7) Boundaries for the property where the proposed mineral mining operation will occur;

See Figure 1 of the Hydrogeological Investigation Report.

(8) Proposed limits of excavation;

See Figure 1 of the Hydrogeological Investigation Report for the extent of potential excavation evaluated for the ILS Permit Application. However, the planned extent of excavation is shown in Figure 2.

(9) Location and identification of any previous soil borings and wells, including abandoned and destroyed wells, and surface water monitoring points.

See Figure 4 of the Hydrogeological Investigation Report.

ii. A detailed site map that covers an area that extends at least two thousand (2,000') feet beyond the property boundaries of the permit applicant. This map must depict:

(1) Scale and north arrow;

See Sheet C-103 of the ILS Permit Application.

(2) Applicant's property boundaries;

See Sheet C-103 of the ILS Permit Application.

(3) Boundaries and owner names for all adjoining land parcels;

See Sheet C-103 of the ILS Permit Application and the ownership information previously provided in Figure 1 of the 2020 CUP Application.

(4) Based on available public information, provide the location of all existing lakes, streams, drainage ditches, and wetlands on-site and within two thousand (2,000') feet of the property boundaries;

See Sheet C-103 of the ILS Permit Application.

(5) Based on available public information, provide water surface elevation for all existing lakes, streams, drainage ditches, and wetlands located on-site and within two thousand (2,000') feet of the property boundaries.

See Sheet C-100 of the ILS Permit Application.

(6) Wetlands expected to be impacted by the extraction operation;

Wetlands are not expected to be impacted by the extraction operation. Further discussion on wetlands is included in the Hydrogeologic Investigation Report and the Environmental Impact Analysis.

(7) Boundaries of proposed extraction area; and

See Sheet C-105 of the ILS Permit Application for the extent of potential excavation evaluated for the ILS Permit Application. However, the planned extent of excavation is shown in Figure 2.

(8) Land surface elevations for the property shown by appropriately selected contour intervals.

See Figure 1 for existing conditions.

iii. Describe the existing land use, site conditions and the basic scope of the operation.

See Sections 2.1 through 2.3 of the Hydrogeologic Investigation Report.

2. **Field Investigations**.

   i. Test borings must be drilled to determine the subsurface geology. A minimum of four (4) test borings shall be located outside the perimeter of the proposed Mineral Mining Operation. At least one boring shall be near the center of the proposed Extraction Area. These borings must be drilled to a depth sufficient to ascertain the geology of the aquifer systems that could be impacted by the Mineral Mining Operation. The locations of these borings must be clearly shown and labeled on the detailed site map. Descriptive logs for each boring should be prepared by a geologist using the Unified Soil Classification System ("USCS") to describe the different layers. Boring logs must contain the following minimum information:

      (1) Boring name;

      (2) Land surface elevation;

      (3) Depth of boring;

      (4) Description of different layers encountered to the bottom of the boring;

      (5) Construction details;

      (6) Depth to water.

Test boring logs and additional Information regarding test borings are provided in the Hydrogeologic Investigation Report (see Section 3 and Appendices F and G of that report). Test boring locations are shown on Figure 4 of the Hydrogeologic Investigation Report.

   ii. Permanent monitoring wells shall be installed on site near the perimeter of the site and outside of any proposed excavation or construction. If more than one aquifer is encountered in the test borings, separate monitoring wells must be screened in each aquifer to determine the vertical head gradient between aquifers, groundwater flow direction, and water quality in each aquifer, and to calculate the impacts from lowering the head in one aquifer and raising the head in the other aquifer. The monitoring well construction logs shall be included in the report appendix. Monitoring wells shall be constructed to requirements of the United States EPA, EGLE and Washtenaw County Environmental Health. Applicant shall not abandon or remove permanent monitoring wells without the prior approval of the Township. The groundwater monitoring system shall consist of a sufficient number of wells at appropriate locations and depths to collect groundwater samples that provide the required information. Such monitoring system shall accurately measure the quality and levels of background groundwater that has not been affected by mining. Such monitoring system shall also accurately measure the quality and levels of groundwater passing the downgradient boundary of the property which ensures detection of groundwater contamination or changes in water chemistry in the subject aquifer and other aquifers potentially affected by the Mineral Mining Operation. In addition, the monitoring system must include a minimum of one upgradient (highest groundwater elevation on site) and three downgradient (lowest groundwater elevation on site) monitoring wells; however, additional monitoring wells must be installed as necessary to accurately represent the quality of background groundwater and the quality of groundwater leaving the property boundary.

Monitoring well construction logs and additional Information regarding monitoring wells are provided in the Hydrogeologic Investigation Report (see Section 3 and Appendix F of that report).

iii. Water levels and water quality in the monitor wells and on-site wetlands, streams, and lakes shall be measured. All static water levels shall be related to a common USGS datum and elevations shown on a map and in a report table. Water quality parameters shall be collected in accordance with the process outlined in the baseline water quality section below.

Monitoring well and surface water gauge locations are shown on Figure 4 of the Hydrogeologic Investigation Report. Groundwater potentiometric surface and surface water elevation measurements are shown on Figures 6A through 6E of the Hydrogeologic Investigation Report. Water quality parameters are not applicable to this CUP renewal application.

3. **Baseline Water Quality**.

i. Groundwater Monitor Wells. All monitor wells shall be sampled and analyzed in accordance with EGLE sampling and analysis protocols prior to commencing extraction operations to establish background groundwater quality. A minimum of two (2) sampling events are required (four or more are preferred), one event during a high groundwater elevation period and the other during a low groundwater elevation period. All laboratory testing shall be conducted in conformance with the most sensitive current applicable U.S. Environmental Protection Agency Test Method available, and data shall be compared to EGLE Generic Residential Cleanup Criteria and Screening Levels promulgated or issued under Part 201 of the Michigan Natural Resources and Environmental Protection Act, MCL 324.20101 et seq., as amended. Testing shall include the following indicator parameters:

(1) static water level elevation;

(2) groundwater temperature;

(3) specific conductance;

(4) pH;

(5) dissolved oxygen;

(6) redox potential;

(7) total dissolved solids (TDS);

(8) The concentrations of each the following: chloride, sodium, calcium, sulfate, bicarbonate, magnesium, manganese, iron, potassium, phosphorus, and nitrate nitrogen;

(9) Resource Conservation and Recovery Act (RCRA) metals, and

(10) total petroleum hydrocarbons (TPH);

(11) If TPH is detected, then the following testing is also required:

(a) Polycyclic aromatic hydrocarbons (PAH)

(b) Volatile organic compounds (VOCs) and Semi- volatile organic compounds (SVOCs)

(c) Methyl tert-butyl ether (MTBE)

Baseline water quality sampling and analysis is not applicable to this CUP renewal application.

ii. Surface Water. After conferring with the applicant's consultant, the Township's consultant shall determine, the number, type and location of surface water samples

necessary to identify potential surface water impacts from extraction operations. Each river, stream and other readily flowing body of water shall be sampled in locations, subject to obtaining rights of access, to be determined in consultation with the Township's consultant for the following parameters:

(1) water elevation;

(2) base/bed elevation;

(3) pH;

(4) conductivity;

(5) total dissolved solids (TDS); and

(6) total suspended solids (TSS).

(7) RCRA metals;

(8) total petroleum hydrocarbons (TPH);

(9) If TPH is detected, then the following testing is also required:

(a) PAHs;

(b) VOCs and SVOCs

(c) MTBE.

Baseline water quality sampling and analysis is not applicable to this CUP Renewal application.

4. **Site Characterization**.

i. Site conceptual model (written and illustrative) showing conceptual groundwater flow at the site shall be provided for each aquifer within the extraction zone or potentially affected by the extraction operation. The following site characterization data shall be provided:

A site conceptual model describing observed site geology and hydrogeologic conditions is provided in the Hydrogeologic Investigation Report.

(1) Description of Geologic Units. The composition, structure and distribution of each layer, and the range of variation in each including the soil or rock description and classification;

(a) A map showing the location of geologic cross-sections;

See Figure 5 of the Hydrogeologic Investigation Report.

(b) Multiple geologic cross-sections passing through the proposed Extraction Operation and all areas of concern (e.g., wetlands, streams, lakes, residential wells, etc.) to a distance of approximately two miles from the center of the site. On these cross-sections, show the following information:

a. Vertical and horizontal scale;

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

b. Existing land surface elevations;

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

c. Boundaries and depth of any proposed excavation;

See Figures 5A through 5E of the Hydrogeologic Investigation Report. Depth of final proposed excavation is shown on Sheet C-105 of the ILS Permit Application.

d. Well locations and logs used to prepare the cross-sections;

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

e. Thickness and extent of the subsurface geologic strata;

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

f. Location and depth of all water supply wells, wetlands, streams, and lakes falling on and near the cross-section; and

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

g. Static water level elevations.

See Figures 5A through 5E of the Hydrogeologic Investigation Report.

(2) Description of Hydrogeologic Units. Descriptions of the hydrogeologic units within the saturated zone including their thickness, hydraulic properties, such as transmissivity and storage coefficient or specific yield; descriptions of the role of each as confining beds, aquifers, or perched saturated zones; and their actual or potential use as water supply

(a) Brief discussion of the regional and local hydrogeology.

Descriptions of regional and local hydrogeology are provided in the Hydrogeologic Investigation Report (see Section 2).

(b) A contour map of the water table elevations, including water-level elevation measurements from on-site wetlands, streams, and lakes and that depicts the site boundaries.

Groundwater potentiometric surface and surface water elevation measurements are shown on Figures 6A through 6E of the Hydrogeologic Investigation Report.

(c) Description of the Flow System. Description of the groundwater flow system, illustrated with potentiometric contour lines and streamlines on appropriate plans, and specifically describing the following and discussing their significance with respect to groundwater:

a. Direction and rates of groundwater movement within the identified hydrogeologic units, including the vertical components of flow. Seasonal or other temporal fluctuations in potentiometric head. The change in recharge rates that will occur due to the presence of the proposed mining operation, or for renewal plans the change in recharge rates that may have occurred

The groundwater flow system is discussed in the Hydrogeologic Investigation Report (see Section 4.2.3). As discussed in Section 2.9 of the Hydrogeologic Investigation Report, removal of the clay overburden has likely created or expanded the aquifer recharge area at the site, enhancing recharge to the aquifer relative to conditions that existed prior to mining.

b. The role of confining beds with regard to limiting downward or upward movement of groundwater.

Review of regional and site geologic data provided in the Hydrogeologic Investigation Report indicates that confining units include: 1) a surficial clay/till unit that is present above the shallow aquifer at the site, except where clay has been removed for mining and other limited areas documented in that report, and 2) a thick lower clay/till unit that separates the shallow aquifer from the lower (> 200-foot deep) aquifer. See Section 2 and Section 4.1 of the Hydrogeologic Investigation Report.

(d) Tabulate and summarize water quality data with tools such as tables that highlight detection of organic compounds and graphics such as piper and stiff diagrams that highlight the distribution of cations and anions. Analytes shall be compared to water quality standards.

Water quality sampling and analysis are not applicable to this CUP renewal application.

(e) The applicant shall provide a numerical model of the area within a radius of two-miles from the site if deemed necessary by Township consultants, or Planning Commission, based on the nature of proposed operations, the potential for contamination, or known or anticipated declines in water levels. The parameters of the numerical model shall be agreed to by the Township.

A numerical model is provided in the Hydrogeologic Investigation Report, including documentation of model development, calibration, and evaluation of modeling results including simulated future conditions.

5. **Potential Environmental Impacts**. A narrative that documents existing site conditions and identifies potential short-term and long-term impacts on the Township water resources during and after the proposed Extraction Operations shall be provided. At a minimum, this section must contain the following elements:

   i. Description of present land use and the relationship of the site to surrounding properties. The site location map shall be used for this description.

   ii. Discussion of the proposed Extraction Operation and schedule, along with the intended future use of site. The topographic map showing proposed extent of the Extraction Operation and different phases, if applicable.

   iii. Water quality impacts on existing surface water and groundwater quality and quantity, and an analysis and conclusion discussing the expected impacts;

   iv. If applicable, prepare maps and cross-sections showing the nature and extent of the hydrogeologic impact(s), (e.g. water-level decline or increase).

   v. Elevations of groundwater (e.g. project water level decline/rise in each aquifer) and surface water bodies on and proximate to the site, considering both short-term and long- term potential impacts.

   vi. If the Mineral Mining Operation creates or enlarges an excavated lake, the evaporation impact shall be analyzed through a water budget analysis using EGLE ’s applicable guidance for how to perform this analysis.

An Environmental Impact Analysis is included as Attachment F.

6. **Additional Hydrogeological Data**. The Planning Commission may require additional data related to the site, including, but not limited to, the following:

    i. If the applicant is applying to dewater, the applicant shall provide a numerical model of the area within a radius of two-miles from the site to determine water-level decline over the life of the mine at various distances from the center of the Mineral Mining Operation. The parameters of the numerical model shall be agreed to with the Township.

The applicant is not applying to dewater in this CUP renewal application.

    ii. Surface Water Diversions. Additional investigations may be needed to demonstrate that no diversion of surface water will impact existing surface water bodies or wetlands located on-site or very near the proposed Mineral Mining Operation. Site operation, stockpiling, and reclamation plans must be evaluated for the potential to divert water toward an excavation and away from an existing surface water body or wetland.

The applicant is not applying to divert surface water in this CUP renewal application.

h. **Reclamation Lake Creation**. Where lakes are proposed as part of site reclamation a hydrogeological investigation, consistent with what is required under Part 301 of the Michigan Natural Resources and Environmental Protection Act, MCL 324.30101 et seq., as amended must be provided.

The Hydrogeological Investigation Report that was prepared to meet Part 301 requirements is provided as Attachment C.

i. **Transportation Routes**. The Township may, as a condition of the conditional use permit, designate which public roads within the Township that trucks or any other vehicle accessing the site may use. Any entrances and exits to and from the site shall be adjacent to all-season primary road, if possible. Transportation routes through the Township shall minimize truck traffic through residential areas. Trucks used to transfer the natural resources shall follow a route that poses the least interference with other traffic, minimizes traffic through residential areas, and uses public streets constructed for high volumes of heavy truck traffic. The applicant must submit a proposed transportation route plan including:

    1. The route to be used for the proposed operation, accompanied by a letter of preliminary comments from the road commission impacted by the transportation route.

The existing truck haul route within the Township is Earhart Road south to Plymouth Road. This route will remain the same for future mining operations. A letter of comments from the Washtenaw County Board of County Road Commissioners was previously provided as Appendix D of the 2020 CUP Application.

    2. A description of all proposed transportation routes to be used to transport natural resources from the mining area to all freeways or state trunk line highways proposed to transport natural resources to destinations, other than for local deliveries.

The existing truck haul route within the Township is Earhart Road south to Plymouth Road. This route will remain the same for future mining operations.

    3. Estimated type, size, number, and hourly count of trucks leaving the site daily, during peak season and annually;

Trucks typically include gravel trains and sometimes semi-trailer trucks. Trucks typically hold up to 48 tons of material, with some exceptions for specific truck types. The average truck count will not exceed 50 trucks per day based on a 5.5-day operating week, or 5 trucks per hour based on a typical 10-

hour day during peak season. Daily truck counts are typically lower in the first quarter of the year than in the remaining three quarters. MMM will inform customers, and will place signage on the exterior gate stating that trucks are not permitted to stage on Earhart Road. MMM employees will conduct traffic control as necessary to bring truck traffic from Earhart Road onto the mine property to prevent staging on the road.

j. **Mining Plan**. A mining plan shall be provided that contains the following:

1. Topographical map;

See Figure 1.

2. Nature of operation, including:

i. Methods of excavating, including excavation equipment;

See description in response to item (d)(1)(b)(11).

ii. Methods of transporting material from mine site to processing plant, including earth handling equipment to be used on-site;

See description in response to item (d)(1)(b)(11).

iii. Types of processing activities, such as screening, washing, crushing, etc.;

See description in response to item (d)(1)(b)(11).

iv. Estimated quantity, use and disposal of material fines;

Fines are primarily captured and marketed. The site has an ultra fines recovery system. Fines not recovered and marketed are returned to the retention pond and will be used in site reclamation, as indicated in the 2020 CUP Application (see the conceptual reclamation plan in Figure 3B). Estimated quantities are not available but generation and management of fines is consistent with customary practices at comparable sites in Michigan.

v. Size of settling ponds;

See Sheet C-100 of the ILS Permit Application.

vi. Estimated annual production in tons;

Estimated annual production is approximately 275,000 to 400,000 tons.

vii. The contemplated phasing for the operations as well as a date for completing the mineral mining operation, such date to be based upon the estimated volume of material to be extracted and an average annual extraction rate; and

Conceptual phasing of mining and reclamation is shown on Figure 3. The anticipated additional duration of mining planned under this CUP renewal application is approximately 6 years, with reclamation following for 1.5 years. The proposed date for completion of mining is December 31, 2031, with reclamation to be completed by June 30, 2033.

viii. If the proposed extraction activity includes beneficiation or treatment of the extracted material, the application documents shall include specific plans depicting the methods, techniques, and manufacturer's material safety data sheets on all chemicals, or other additives that are not natural to the site, that will be utilized in the process. The operator shall also obtain all applicable state and federal permits prior to beginning the beneficiation process.

The proposed extraction activity does not include beneficiation or treatment of the extracted material.

k. **Noise control plan**. A noise control plan prepared by a qualified professional estimating the noise levels at the property boundaries containing the Mineral Mining Operation, at successive stages of the operation and along the transportation route shall be provided. See 74-592a(f)(15).

A noise control plan is included as Attachment G.

l. **Erosion control plan**. An erosion control plan shall be provided which provides a complete description of all the soil erosion measures, including (but not limited to) all erosion strategies and control measures such as silt fences, vegetation screens, sediment basins, and settling ponds; location of control measures particularly on bare surfaces including steep slopes; time schedule and installation description for each control measure; all temporary and permanent measures and maintenance of each. The plan shall conform to any and all requirements of soil erosion and sedimentation requirements promulgated by Federal, State and County government as well as the Township soil erosion and sedimentation requirements pursuant to Section 58-119. The applicant shall submit this plan to the appropriate County agency for approval. The plan approved by the Township shall be incorporated into the extraction permit issued under this Ordinance.

An erosion control plan is included as Attachment D.

m. **Pollution prevention plan**. A pollution control plan containing a complete description of proposed pollution prevention methods based on National Fire Protection Association, State of Michigan and Washtenaw County pollution prevention laws shall be provided. The plan must address all sediment, storm water and settling basins, as well as any probable impacts from processor activities or on-site fuel or chemical storage;

The site's Pollution Incident Prevention Plan is included as Attachment E.

n. **Lighting plan**. A lighting plan showing the location of exterior lighting on the site including a photometric plan shall be provided. Exterior lighting shall conform to Section 74-606 of this ordinance.

Consistent with the information provided for site plan review in the 2020 CUP Application, no changes are proposed to the lights and any new lights if deemed necessary for safety reasons will be installed where needed.

o. **Environmental impact analysis (EIA)**. Applicant shall prepare an environmental impact analysis addressing the impact the operation will have on the site's natural features, flora, fauna as well as impacts on human and natural environments on adjacent lands and along the transportation route. Applicant shall identify any mitigation measures needed to eliminate or minimize these impacts.

An Environmental Impact Analysis is included as Attachment F.

1. At a minimum the statement should address the following: noise; dust; mud; drainage; erosion; sedimentation; views of the mine site from adjacent roads and properties; wetlands; floodplains; special habitats; threatened or endangered species; areas and features of historic, archeological and natural significance; truck traffic and access to and from the site; traffic study; compatibility with adjacent land uses; impacts to residents adjacent to site and along transportation route; changes in social patterns and/or economic conditions of residents; and any additional items that the applicant, Planning Commission or Board of Trustees deems significant. This section is intended to provide an environmental impact analysis using the assembled data identified in the previous sections. The applicant should analyze how the various data interrelate and

how the proposed operation will affect the human and natural environments. Environmental impacts identified in the hydrogeological study should be incorporated into the EIA and related to the discussions of other impacts; although the hydrogeological support data does not have to be re-stated, it should be referenced in the environmental impact analysis.

2. In addition to the items in section immediately above, the EIA shall address the following issues:

   i. An inventory of the physical environmental elements of the proposed site;

   ii. A description of the quality of the environment as it exists prior to commencement of mining activity or, for a renewal, as it exists at the time of renewal;

   iii. A description of the environment as projected at the end of mining activity;

   iv. Compatibility of the proposed extraction activity with adjacent existing land uses and future land use plans/Township Master Plan;

   v. Impact of the proposed extraction activity on flora and wildlife habitats;

   vi. Economic impact of the proposed extraction activity on the surrounding area;

   vii. Effects of the proposed extraction activity on groundwater supply, level, quality, and flow on site and within two miles of the proposed extraction activity;

   viii. Effects of the proposed activity on adjacent surface water resources;

   ix. Effect of the proposed activity on air quality within one thousand (1,000') feet of the proposed extraction; and

   x. Whether the proposed activity is located within one thousand (1,000) feet of a residence, two thousand (2,000) feet of a school, and/or 500 feet of a commercial development.

p. **Property value impact analysis**. Applicant shall provide a report on the impact of the applicant's Mining Operation use on property values in the vicinity of the mineral mining property and along the proposed transportation route serving the property.

Potential impacts on property values were evaluated in the 2020 CUP Application, which indicated that "The proposed use is consistent with the current use and past use for several decades," and "being consistent with decades of use, the proposed use will preserve and not negatively impact property values."

q. **Reclamation plan**. A reclamation plan showing that the entire property will be left in a form for development with uses that are permitted in the district, relating such reuse to existing uses or probable uses for surrounding properties, shall be provided and shall include the following elements:

See Figure 2.

1. All rehabilitation activity shall comply with soil erosion and sedimentation requirements of Part 91 of the Michigan Natural Resources and Environmental Protection Act, MCL 324.9101 et seq., as amended.

Noted.

2. Proposed topography at contour intervals to provide adequate grading information, subject to the Township engineers recommendation, with two (2) feet being the

minimum. Such grade and slope designations shall be included with respect to areas proposed to be beneath the surface of permanent water areas.

See Figure 2.

3. Schedule of progressive rehabilitation: The plan should provide that after mining is completed on one specified area, reclamation shall commence in that area before mining continues on other areas of the site. The plan shall provide that as mining areas are worked out or abandoned they are progressively rehabilitated to a condition of being entirely lacking in hazards, inconspicuous, and blended with the general surrounding ground form so as to appear natural.

See Figure 2.

4. Proposed ground cover and other plantings to stabilize the soil surface and to beautify the restored area, as well as to protect from erosion and siltation.

See Figure 2.

5. Concept plan(s) for the proposed end use of the site when restored drawn to scale, and prepared by a professional engineer, or licensed landscape architect, registered in the State of Michigan. The concept plan shall include:

    i. The proposed circulation system, including the location of internal roads and connection to the external road network.

    ii. Delineation of drainage patterns, identification of lakes, flood plains, wetlands, and, if residential use is proposed, conceptual layout of lots.

    iii. A description of the permits and other legal steps that would be required to implement the proposed end-use.

See Figure 2.

6. A landfill or other disposal or refuse site will not be considered a suitable or satisfactory use.

Noted.

7. A description of the construction and rehabilitation techniques that will be used, including:

    i. A description of methods and materials to be used in restoring the site.

The site will be restored using a mixture of overburden and other onsite material. Heavy equipment such as bulldozers and front end loaders will be used to relocate material and create appropriate sloping.

    ii. The proposed date for completing all extraction operations and handling of all spoils and extraneous materials.

The anticipated additional duration of mining planned under this CUP renewal application is approximately 6 years, with 1.5 years planned for reclamation following the completion of mining. The proposed date for completion of mining is December 31, 2031.

    iii. The date for completing the final reclamation.

Final reclamation will be completed on or before June 30, 2033. Final reclamation will include sloping and vegetation but not final development of the property.

    iv. A list of all seeding and planting materials, which must include native stock.

See Figure 2.

(e) CONDITIONAL USE PERMIT STANDARDS AND REVIEW CRITERIA

(1) **Conditional use permit required**. Mineral mining shall require a conditional use permit, as described in Section 74-131. It shall be a violation of this Ordinance for any person or entity to engage in the extraction of natural resources without an approved conditional use permit approved by the Township, or to engage in mining activity that is not expressly authorized in an approved conditional use permit.

(2) **Conditional use permit standards**. If the Township finds any of the following, it shall not grant a conditional use permit: (i) there are no valuable natural resources located on the property; (ii) that there is not a need for the natural resources by the applicant or in the market served by the applicant; or (iii) a very serious consequence would occur from the proposed mining activity or (iv) if requirements of this ordinance have not been met. The burden of demonstrating competent, material and substantial evidence meeting each standard is on the applicant. The applicant's failure to provide sufficient information, data or documentation necessary to meet a standard is a basis for denial of the application. In determining if "very serious consequences" would occur, the applicant and Township must consider the cumulative impacts of all adverse impacts. The following factors shall be considered in making that determination that a very serious consequence would occur:

a. The relationship of extraction and associated activities with existing land uses.

b. The impact on existing land uses in the vicinity of the property.

c. The impact on property values in the vicinity of the property and along any proposed transportation route serving the property, based on credible evidence.

d. The impact on pedestrian and traffic safety in the vicinity of the property and along any proposed transportation route serving the property, including:

1. The average and maximum number of loaded trucks per day anticipated to leave the proposed operation during the operating season.

2. The impact on motorized and non-motorized vehicular and pedestrian traffic, resulting from the number, size, weight, noise, and fumes of vehicles, vehicular control, braking, and vehicular movements in relation to routes of traffic flow, proximity and relationship to intersections, adequacy of sight distances, location and driveways and other means of access, off- street parking and provisions for pedestrian traffic.

3. Overall, the impact of the proposed use, including transportation route(s), on children, older persons, and handicapped/disabled persons, with consideration to be given to the extent to which such persons shall be required to forgo or alter their activities.

e. The impact on other identifiable health, safety, and welfare interests in the township.

f. The overall public interest in the extraction of the specific natural resources on the property.

g. The impact on other important natural resources, such as wetlands, lakes, watercourses, aquifers, natural habitats and similar environmental resources, the preservation of which is necessary for the public health, safety and welfare of the Township.

(3) In addition to the above standards, the proposed use must also meet the standards for all conditional use permits, Section 74-136 and 74-137, and for preliminary site plans, Section 74-175b and where applicable, final site plans, section 74-176c.

(4) **Detailed mining requirements**. Mining operations shall meet the following requirements:

a. Side slopes around the active extraction-area perimeter shall have a grade not exceeding one (1) vertical foot per four (4) horizontal feet. The banks adjacent to any submerged areas shall have a grade not exceeding one (1) vertical foot per six (6) horizontal feet, out to a depth of six (6) feet.

b. Extraction areas which are inactive for over one year must be stabilized and slopes reduced to 1:4.

c. The post-reclamation use proposed in the concept plan must be acceptable based on a review of the zoning district, Township master plan, surrounding land uses, and site characteristics.

d. Upland Slope. All upland reclamation grades for extraction operations shall have a slope not steeper than one (1) foot vertical rise in a four (4) foot horizontal plane, except that the Planning Commission may approve plans that allow steeper reclaimed slopes in order to provide a smoother transition to undisturbed topographic features or the protection of existing environmental features.

e. Submerged slope. All submerged grades established by the excavation of material below the water table and the creation of a water body shall have underwater slopes as follows:

1. For water bodies the submerged grades shall be one (1) foot vertical rise in a six (6) foot horizontal plane, or flatter, to a depth of six (6) feet, unless designated for future public access or the future use is not specified.

2. For all water bodies where the future use is not specified and/or the reclamation plan designates a final use after mining as public access, the area designated for public access shall have submerged grades of one (1) foot vertical rise in a ten (10) foot horizontal plane, or flatter, to a depth of six (6) feet as measured from the low water elevation.

Slopes for mining and reclamation activities are consistent with the 2020 CUP Application. Current conditions and reclamation grading are shown on Figure 1 and Figure 2, respectively.

f. Wetlands. Mining in wetlands is discouraged. In instances where mining in a wetland is proposed, a township wetland use permit is required. If the wetland use permit has been approved by the Township, mitigation may be required.

No mining in wetlands is proposed.

g. Surface Water. Before disturbing the surface of the site and removing topsoil, all necessary measures for diversion and drainage of runoff from the site to prevent pollution of waters of the state shall be installed in accordance with approved site reclamation plans. Diverted or channeled runoff resulting from reclamation may not adversely affect neighboring properties. Site reclamation shall be conducted and completed in a manner that assures compliance with the EGLE water quality standards for surface waters.

This site has been in operation as a sand and gravel mine since the 1950s. On-going operations do not pose a risk to surface watercourses or water bodies within or outside of the property lines. Activities at the site will not alter drainage patterns at the surface or subsurface waters in adjacent properties. The reclamation plan shown on Figure 2 depicts planned site conditions following cessation of mining.

Site reclamation will be conducted in accordance with Part 301 permit and regulatory requirements to avoid negative impacts to surface water.

h. Groundwater. The site shall be reclaimed in a manner that does not cause a permanent lowering of the water table resulting in adverse effects on surface waters or a significant

reduction in the quantity or quality of groundwater reasonably available for future users of groundwater. Site reclamation shall be conducted in a manner which does not degrade groundwater quality in the aquifers. Where on-site lakes or ponds are connected to the groundwater, to ensure that future on-site uses adjacent to these lakes and ponds do not lead to degradation of the quality of the groundwater, enforceable conditions that protect groundwater quality must be provided in a restrictive covenant or master deed to run with the land.

Based on the reclamation plans included in the 2020 CUP Application and the extensive groundwater evaluation documented in the Hydrogeologic Investigation Report, planned future operations and reclamation will not degrade groundwater quantity or quality.

i. Endangered Species. If threatened or endangered species are identified within the extraction area boundaries, the extraction and reclamation plan shall indicate how the threatened or endangered species shall be protected.

The Environmental Impact Analysis includes an evaluation of endangered species.

j. Setbacks. A two hundred (200') foot minimum setback distance from the property line to the reclamation area boundary line shall be provided on all reclamation plans. The Township may approve plans requiring more than the minimum setback to protect public health, safety, welfare, and the natural environment.

Setbacks will be consistent with those shown in the 2020 CUP Application and associated site plans.

k. Road track out control plan to alleviate mud, soils, dust and other materials from the under carriage, and wheels of trucks resulting from the mining operation, which may include sweeping; spraying the under carriage, wheels and wheel wells; or other best management practices. The plan shall include proposed management practices on both access roads and public roads, beyond normal maintenance of the road commission(s). This plan is to be reviewed annually by the Township Board;

Track-out has not been observed to occur from existing mining operations. A cattle grate ahead of the scale entrance knocks off mud before trucks drive onto the scales. The site driveway is crushed stone, which further minimizes track-out.

l. Dust control plan to alleviate dust resulting from mining operations, which may include sweeping, paving, spraying water, windbreaks, strategic placement of stockpiles, or other best management practices. The plan shall include proposed management practices on both access roads and public roads, beyond normal maintenance of the road commission(s). This plan is to be reviewed annually by the Township Board;

A dust control plan is included as Attachment H.

m. Prior to coming on-site, all imported fill materials shall meet the following specifications: (i) Materials shall be inert materials; (ii) Materials shall be free of contaminants, (iii) meet the definition of fill provided in this ordinance. Ann Arbor Township may require imported materials be inspected and tested, at the applicant's expense, to determine that the materials are inert and free of contaminants. If the applicant, or persons associated with the applicant, seeks authorization from any federal, state or county governmental body or agency related to the importation of materials on a site, the applicant shall simultaneously file a copy of that application with the Township.

The applicant is not proposing to import material as part of this operation.

(f) SPECIFIC OPERATING CONDITIONS

(1) **De-watering**. Mineral Mining Operations shall not include de-watering operations for extraction or any other processing of natural resources unless all of the following conditions are met to the satisfaction of the Township:

a. The hydrogeological study required under 74.592a(d)(1)g. demonstrates with a high degree of confidence and to the satisfaction of the Township that no adverse impacts, when considered alone or in combination with other adverse impacts that may occur from the mining operations, will result in very serious consequences due to the proposed de-watering operations, including but not limited to, adverse impacts to domestic water supply wells or natural resources;

b. An aquifer monitoring plan, including monitoring wells installed and monitored at the operator's expense, is provided for Township review and, if satisfactory to the Township, approval; and

c. The Conditional Use Permit specifically states that if there is any evidence of adverse impact to water resources, as determined by the Township, de-watering operations shall immediately cease. The applicant shall immediately report any such known adverse impacts to the Township Supervisor and mitigate the same. De-watering operations may not resume until a plan to address the adverse impact has been submitted by the applicant and approved by the Township.

d. When de-watering or discharge is proposed, the public notice must include that de-watering or discharge has been requested.

The applicant is not applying to dewater in this CUP renewal application.

(2) **Discharge**. Mineral Mining Operations shall not include discharge of process water out of the extraction area unless all of the following conditions are met to the satisfaction of the Township:

a. The comprehensive hydrogeological study required under 74.592a(d)(1)g. demonstrates with a high degree of confidence and to the satisfaction of the Township that: (i) any discharge out of the extraction area returns water directly and in a substantially undiminished volume to any aquifer affected by an approved de-watering operation; and (ii) this discharge has no adverse impacts, when considered alone or in combination with other adverse impacts that may occur from the mining operations, that will result in very serious consequences to the quality and quantity of water feeding water supply wells that draw from the affected

b. The Conditional Use Permit specifically states that if there is any evidence of adverse impact to water resources, as determined by the Township, discharge operations shall immediately cease. The applicant shall immediately report any such known adverse impacts to the Township Supervisor and mitigate the same. Discharge operations may not resume until a plan to address the adverse impact has been submitted by the applicant and approved by the Township.

The applicant is not proposing to discharge water in this CUP renewal application.

(3) **Blasting**. Mining operations shall not include blasting operations for extraction of natural resources unless all of the following conditions are met to the satisfaction of the Township:

a. A comprehensive blasting plan and impact analysis demonstrates that, with a high degree of confidence and to the satisfaction of the Township that no adverse impacts, when considered alone or in combination with other adverse impacts that may occur from the mining operations, will result in very serious consequences due to the proposed blasting

operations including but not limited to, adverse impacts to schools or residences within 1 mile of the mineral mining operation property line. Adverse impacts include sound greater than 85dB at the property line or at residential or educational properties within 1 mile, vibrations, dust that can be discerned at the property line or at residential or educational properties within 1 mile of the boundary of the Mineral Mining Operation site.

b. Blasting may not occur within 1500 ft of an adjacent residence.

c. Blasting shall be underground.

d. Blasting may only occur between the hours of 1:00 and 3:00 p.m., one day per week and not on a Saturday, Sunday or legal holiday.

e. Blasting shall not produce debris outside the excavation area.

f. For each occurrence of blasting, at least one week notice of blasting shall be provided to the township and all residents within 1 mile of the mineral mining operation boundary.

g. A blasting monitoring plan, including noise and vibration measurements which shall be installed and monitored at the operator's expense, is provided for Township review and, if satisfactory to the Township, approval.

h. The Conditional Use Permit specifically states that if there is any evidence of adverse impact due to the blasting activity, blasting operations shall immediately cease. The applicant shall immediately report any such know adverse impacts to the Township Supervisor and mitigate the same. Blasting may not resume until a plan to address the adverse impact has been submitted by the applicant and approved by the Township.

This operation will not be blasting.

(4) **Access**. There shall be no more than one access point from a public road to such lot for each 660 feet of front lot line. Such entrance shall be located not less than 500 feet from an intersection of two or more public roads.

The applicant will maintain one access point to the mine.

(5) **Hours of Operation**. Unless further limited by other sections of the Ann Arbor Charter Township Mineral Mining Ordinance, Mineral Mining Operations shall be permitted only between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, and between 8:00 a.m. and 12:00 noon on Saturday. Operations shall not be permitted on Sunday or legal holidays.

The start time for operations will remain the same as it has been since 2020: 7am Monday through Saturday. This start time is consistent with customary practices in the industry and maintaining it is imperative to the applicant's business. Letters from the applicant's customers confirming the need for these hours are provided in Attachment I.

On weekdays, trucks will not be allowed to enter the site after 5 pm. Trucks will be loaded and will exit the site by 5:30 pm. No loading or hauling within the site will occur after 5:30 pm. The processing plant will be completely shutdown by 6 pm. No mining activity will occur after 6 pm. As a practical matter, this means that excavation will typically stop by approximately 5:30 pm.

No mining activity will occur after 12 pm on Saturdays.

(6) **Setbacks**. The following setbacks shall be required:

a. A setback of the Extraction Area from the nearest public road right-of-way or adjoining property line of not less than 100 feet, and not less than 500 feet from the nearest residential dwelling on adjacent property as of the date of submittal of the plan for

extraction. Additional mitigation requirements for dust and noise may be required at the discretion of the Township.

b. The following minimum setbacks of fixed machinery, equipment and buildings, and equipment used for screening, crushing and washing:

   1. Not less than 300 feet from the nearest public road right of way.

   2. Not less than 300 feet from the nearest adjoining property line.

c. A setback of 150 feet from the perimeter of the site to internal roads, and 300 feet from the perimeter of the site to all stockpiles.

Setbacks will be consistent with those shown in the 2020 CUP Application and associated site plans.

(7) All roads, driveways, parking lots, and loading and unloading areas within 100 feet of any lot line shall be paved or treated in an environmentally sensitive manner so as to limit the impact of windborne dust on adjoining lots and public roads.

Noted. Water will be used to control dust on unpaved surfaces or routinely travelled surfaces may be improved with asphalt millings.

(8) The Operator shall be held responsible for all public roads upon which trucks transport materials from the mineral mines to keep those roads in a drivable condition at least equal to that which existed prior to the beginning of mineral mining operations; and to keep the roads dust free and to clean any and all spillage of material and dirt, rock, mud, and any other debris carried onto the roads by these trucks or other equipment. Trucks must be limited to those that are within load and dimensional limits for County Normal Routes including seasonal load limits, and trucks shall not be operated from the mine when conditions along the route are unsafe due to rainy or icy conditions

Activities conducted by the applicant will comply with applicable requirements of the County Road Commission or equivalent entity having regulatory authority over the roads.

(9) Any noise, odors, smoke, fumes, or dust generated on the site by any excavating, loading, or processing operation and able to be borne by the wind shall be confined within the boundary lines of such site as much as possible so as not to impact any adjoining lot or public road and shall comply with any applicable Township ordinances.

Earthmoving equipment that is used at a mining operation has undergone continuous improvements through the past decades; noise, odor, smoke, and fumes from heavy equipment is minimized due to these upgrades. Dust is managed through control measures such as applying water in active mining haul routes and stockpile areas.

(10) Truck loads shall be fully secured before leaving the site, and trucks shall not idle or queue outside of the Extraction Area or on public roads.

The applicant will communicate this requirement to its customer truck drivers.

(11) All areas within a mineral mine shall be progressively rehabilitated in accordance with the reclamation plan.

Noted.

(12) Only equipment owned or leased by the operator of the mineral mining operation and used in the operation of the mineral mine shall be stored overnight or for longer periods anywhere on the premises. Storage of any other equipment on the premises shall be prohibited.

Noted.

(13) Operator shall have obtained approval of a potable water supply and sanitary sewage disposal systems by the Washtenaw County Health Department.

Noted.

(14) All materials that are transported from the site must have been mined on site. No materials may be brought to the site for subsequent sale or transportation from the site.

The applicant does not intend to bring materials to the site for subsequent sale or transportation.

(15) Concrete, cement, or asphalt production shall not be allowed as part of a mineral mining operation.

The applicant does not intend to conduct concrete, cement or asphalt production.

(16) **Perimeter Berms**. Prior to the commencement of any extraction operations under any Conditional Use Permit the Applicant/Owner/Operator shall have completed construction of a berm in accordance with the approved site plan, seeded to prevent erosion around those areas of the site where adjacent properties are exposed to the views and noise of the extraction operation and as provided in the approved site plan. The berm shall be of variable height with the top and outside sides of the berm varying in slope from four (4) feet horizontal to one (1) foot vertical to ten (10) feet horizontal to one (1) foot vertical. The berms shall not be uniform or geometric in shape and shall be blended into the natural landscape. The lower or "valley" parts of the berm shall be heavily planted with a mix of evergreen and deciduous trees and shrubs to create an effective visual screen and as provided in the approved site plan. Each berm shall be constructed so as to prevent surface water running off the berm onto any property adjacent to the site. The location of the berm shall be noted in the approved site plan. Exterior facing berms for settling ponds or similar structures are considered perimeter berms and shall meet this standard.

Perimeter berms have been constructed and reinforced in discussion with Ann Arbor Charter Township.

(17) **Noise**. Noise levels at the boundary of the site shall not exceed 65dB. Noise levels caused by applicant's truck traffic along the transportation route shall not exceed 82dB in a single occurrence, or 74dB based upon the arithmetic average of daily readings of maximum sound levels from truck traffic events during permitted hours of operations, such readings taken from noise monitors approved by the Township installed by the applicant at each entrance and exit to the site, and at off-site locations chosen at the discretion of the Township and installed by the Township at the expense of the applicant along the designated route. The applicant's Noise control plan referenced in Section 74-592a(d)(1)(k) shall include the acknowledgment and agreement that if such average readings due to truck traffic to and from the site exceed 74 dB at any noise monitoring location, the applicant shall reduce the amount of daily trips to and from the mine until such noise readings fall within the permitted daily average limit of 74 dB, and the applicant shall reduce such trips accordingly upon each such occurrence.

A noise control plan is included as Attachment G.

(18) The applicant shall demonstrate compliance with all of the provisions of Section 74-594, Performance Standards, as amended.

Activities will be consistent with those proposed in the previously-approved 2020 CUP Application.

(19) The Township shall require a schedule of water sampling, the frequency of which shall be determined by the Township. At a minimum, monitor wells shall be sampled and analyzed annually for the indicator parameters and two times per year for the full list of chemical parameters identified in Section 74-592a (d)(1)g.3.i., and compared to the EGLE Generic Residential Cleanup Criteria and Screening Levels promulgated or issued under Part 201 of the

Michigan Natural Resources and Environmental Protection Act, MCL 324.20101 et seq., as amended, as well as baseline water quality data for the site, if available. At the option of the Township, annual residential and public water supply well sampling shall commence at a time based on consideration of groundwater flow rate, direction, and distance from the site boundaries. Water supply wells shall be sampled and analyzed for the parameters identified for baseline water quality data including water levels. The Township, at the expense of the applicant, may require additional testing frequency and/or analyses for additional parameters to better assess any potential water quality or quantity risks or concerns. The results of such water testing shall be provided to the Township as soon as they are available.

Water quality sampling is not applicable to this CUP renewal application.

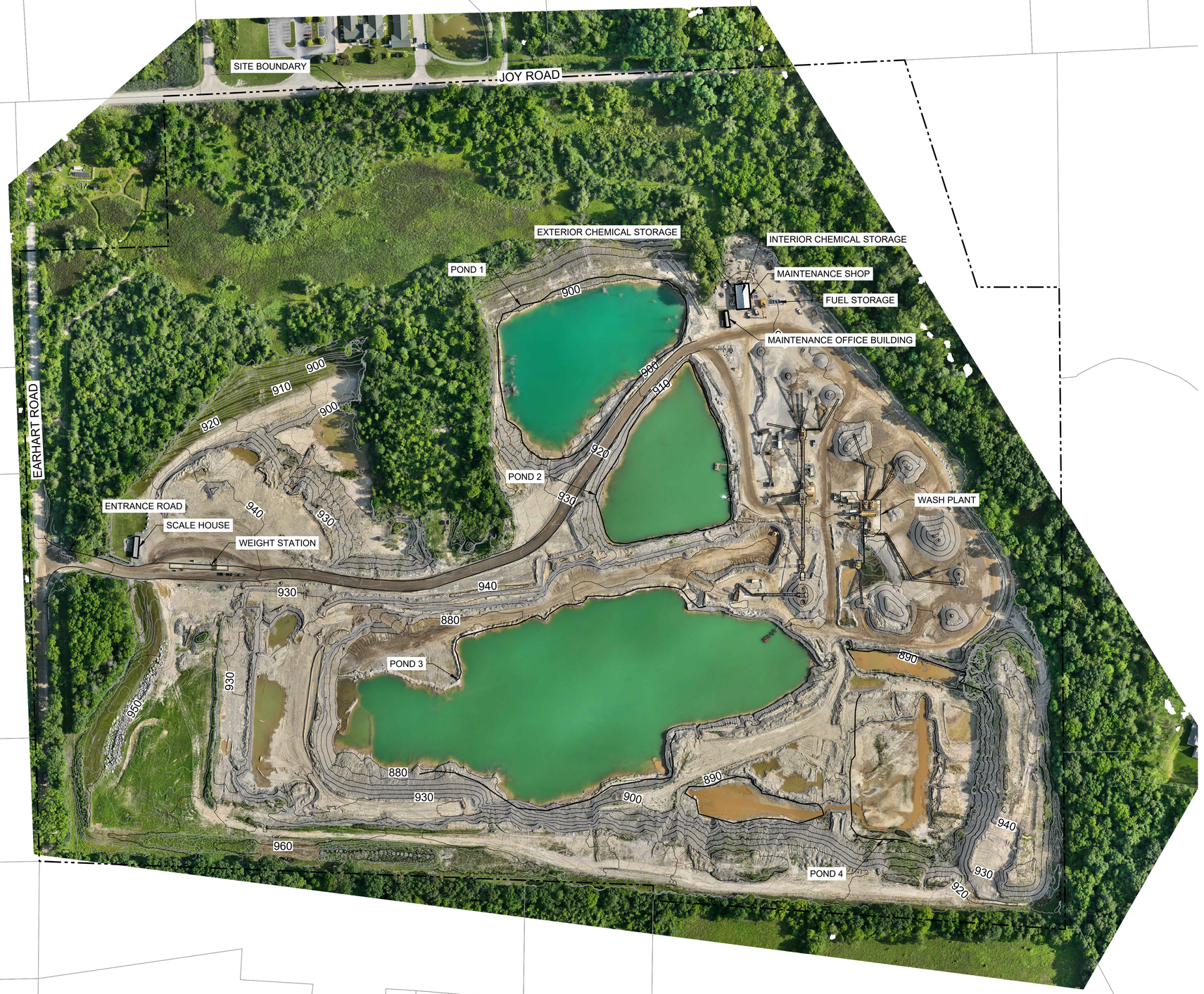
(20) The applicant shall have an analysis of any water samples performed at a state-certified water quality laboratory. Tests shall be performed on water supply and monitor wells in accordance with standards and parameters jointly established by the Township's expert and the applicant's expert taking into consideration the type and level of extractive activities which have and/or which will occur on the site. In the event the Township's expert and applicant's expert disagree, then the Township's expert shall make the determination.

Water quality sampling is not applicable to this CUP renewal application.

(21) The Township shall be entitled to split at any time any samples taken by the applicant. The Township, at the expense of the applicant, may cause tests to be performed on the split samples. Results of such tests shall be provided to the applicant.

Water quality sampling is not applicable to this CUP renewal application.

FIGURES



LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- TOPOGRAPHIC CONTOURS 2-FT INTERVAL

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. SURVEY PERFORMED BY MID-MICHIGAN MATERIALS, 24 JULY 2025.

0 150 300 450 600
SCALE IN FEET

HALEY ALDRICH

HALEY & ALDRICH OF MICHIGAN, INC
455 E. Eisenhower Parkway, Suite 210
Ann Arbor, MI 48108-3323
Tel: 734.887.8400
www.haleyaldrich.com

PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666-016
Scale:	AS SHOWN
Date:	30 JULY 2025
Drawn By:	BCH
Designed By:	BCH
Checked By:	SL
Approved By:	LN
Stamp:	

Rev.	Description	By	Date
1.	STORAGE LOCATIONS		08/20/25

VELLA PIT CONDITIONAL USE PERMIT RENEWAL APPLICATION

4984 EARHART RD.
ANN ARBOR, MICHIGAN

EXISTING CONDITIONS

Figure 1

Sheet: 1 of 1

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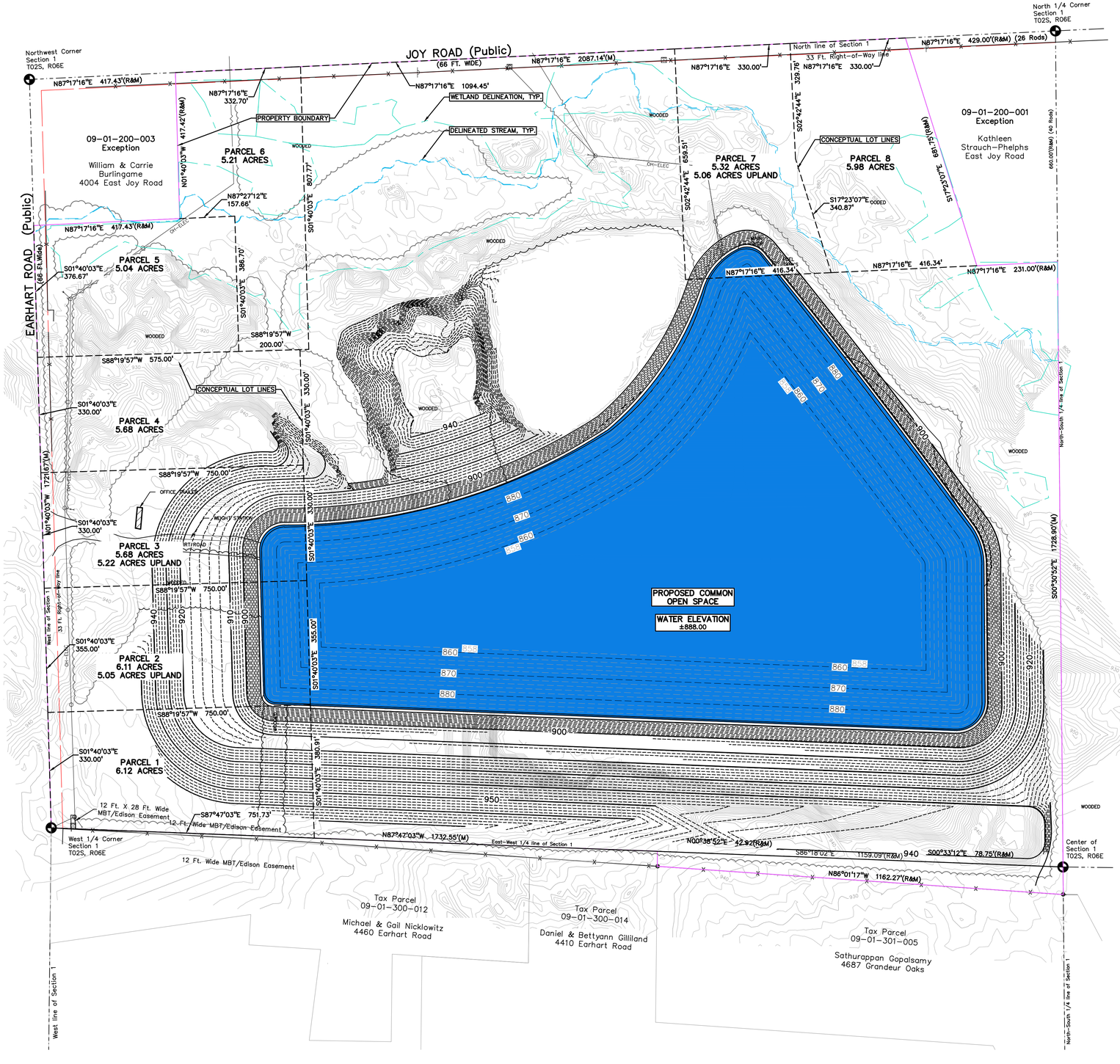
Sheet: C-100

Flood Zone Rating and Statement:

Said described property is located within an area having a Zone Designation "X" (Area of Minimal Flooding), on Flood Insurance Community Panel 26161C0258E, Effective Date – March 03, 2012. Per FEMA Interactive Map.



\\peo-fs-fs1\shared\PROJECTS\2019\2019-490 ANN ARBOR-DEC\DWG\SITE PLANS\R-19SITE RECLAMATION-19490.dwg PLOT DATE: 8/15/2025 BY: John Stebelton, PE

LEGEND

- PROPOSED LOT LINE
- PROPERTY BOUNDARY
- RIGHT OF WAY BOUNDARY
- WETLAND DELINEATION BOUNDARY
- DELINEATED STREAM
- EXISTING CONTOURS
- PROPOSED GRADING
- WATER SURFACE
- TREE ROW
- DELINEATED STREAMS

NOTES

1. SITE PLAN PROVIDED BY MID-MICHIGAN MATERIALS.
2. CONCEPTUAL LOTS WILL BE FOR RESIDENTIAL USE ONLY.
3. ALL LOTS HAVE DIRECT ACCESS TO PUBLIC ROADS. NO INTERNAL ROADWAYS ARE CURRENTLY ANTICIPATED.

NOTE:

- PARCELS 1 THROUGH 8 WILL BE USED FOR RESIDENTIAL USES.

RECLAMATION PLAN NOTES:

- AFTER MINING IS COMPLETED ON ONE SPECIFIED AREA, RECLAMATION SHALL COMMENCE IN THAT AREA BEFORE MINING CONTINUES ON OTHER AREAS OF THE SITE.
- A LANDFILL OR OTHER DISPOSAL OR REFUSE SITE WILL NOT BE CONSIDERED A SUITABLE OR SATISFACTORY USE.
- EXISTING MINING SITE WILL UTILIZE PROPOSED ELEVATIONS AND CONTOURED TOPOGRAPHY TO DEVELOPED INTO A POND.
- APPROXIMATE DATE OF COMPLETING ALL EXTRACTION OPERATIONS AND HANDLING OF ALL SPOILS AND EXTRANEOUS MATERIALS
  - •• DECEMBER 31, 2033
- APPROXIMATE DATE OF FINAL RECLAMATION
  - •• DECEMBER 31, 2034
- LIST OF ALL SEEDING AND PLANTING MATERIALS USED FOR GROUND COVER TO STABILIZE SOIL SURFACE AND BEAUTIFY RESTORED AREAS
  - •• SEED AND MULCH, FOR NATIVES REFER TO CHART ON THIS SHEET

LEGEND:

- EX. OH, ELEC, POLE & GUY WIRE
- EX. U.G. CABLE TV & PEDESTAL
- EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
- EX. U.G. ELEC.MANHOLE, METER & HANDHOLE
- EX. GAS LINE
- EX. GAS VALVE & GAS LINE MARKER
- EX. TRANSFORMER & IRRIGATION VALVE
- EX. WATER MAIN
- EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
- EX. WATER VALVE BOX & SHUTOFF
- EX. SANITARY SEWER
- EX. SANITARY CLEANOUT & MANHOLE
- EX. COMBINED SEWER MANHOLE
- EX. STORM SEWER
- EX. CLEANOUT & MANHOLE
- EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
- EX. YARD DRAIN, U.G. ROOF DRAIN & DOWNSPOUT
- EX. UNIDENTIFIED STRUCTURE
- EX. MAILBOX, SIGN, LIGHTPOLE & GUARD POST
- EX. FENCE
- EX. GUARD RAIL
- EX. DEC. TREE, CONIFEROUS TREE & SHRUB
- EX. TREE TAG, & TREE LINE
- EX. SPOT ELEVATION
- EX. CONTOUR
- EX. WETLAND
- IRON FOUND / SET
- NAIL FOUND / NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND / SET
- SECTION CORNER FOUND
- R M C — RECORDED / MEASURED / CALCULATED
- GNSS — GLOBAL NAVIGATION SATELLITE SYSTEM

Slope Stabilization Seed Mix
Stantec Native Plant Nursery 574-586-2412
stantec.com/native-plant-nursery

Botanical Name	Common Name	Ounces/Acre	PLS Seeds/Oz	PLS Seeds/SQ FT
Permanent Grasses:				
Andropogon gerardii	Big Bluestem	48.00	8188	9.02
Bouteloua curtipendula	Side-Oats Grama	16.00	9375	3.44
Carex spp.	Prairie Sedge Mix	4.00	33422	3.07
Elymus canadensis	Canada Wild Rye	32.00	4258	3.13
Elymus virginicus	Virginia Wild Rye	24.00	4375	2.41
Panicum virgatum	Switch Grass	12.00	28356	7.81
Schizachyrium scoparium	Little Bluestem	32.00	8800	6.46
Sorghastrum nutans	Indian Grass	32.00	8516	6.26
		200.00		**41.61**
Temporary Cover:				
Avena sativa	Common Oat	512.00	8125	95.50
Lolium multiflorum	Annual Rye	240.00	14188	78.17
	Total	**752.00**		**173.67**

Mix Statistics				
Native Component	PLS lbs./Acre	PLS Seeds/Acre	PLS Seeds/Sq. Ft.	% of Native Mix
Forbs	-	-	-	0.00%
Grasses	12.50	1,812,352	41.61	100.00%
Total Natives	12.50	1,812,352	41.61	100.00%
Cover	47.00	7,565,120	173.67	
Totals	59.50	9,377,472	215.28	

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
GREGORY BONO
ENGINEER
No. 54435
LICENSED PROFESSIONAL ENGINEER

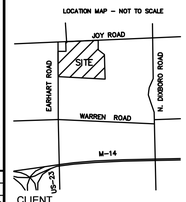
NORTH

0 75 150 300
SCALE: 1" = 150'

811 Know what's below. Call before you dig.

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

LOCATION MAP – NOT TO SCALE



CLIENT
MID MICHIGAN MATERIALS
6966 FISHER ROAD
JEDDO, MICHIGAN 48032

LEGAL DESCRIPTION:

(per First American Title Insurance Company, Commitment No. C000122143, Commitment Date: June 04, 2020, Revision No. 3, Dated June 15, 2020)

Tax Id Number(s): I–09–01–200–002
Land situated in the Township of Ann Arbor, in the County of Washtenaw, in the State of Michigan

The Northwest fractional 1/4 of Section 1, except beginning in the North line of section at a point which is 26 rods West of North 1/4 corner of Section 1; thence East 26 rods to North 1/4 corner of Section 1; thence South 40 rods in the North and South 1/4 line; thence West 14 rods; thence Northwesterly to the point of beginning. ALSO EXCEPT North 417.42 feet of West 417.42 feet of Northwest 1/4 of Section 1. Also commencing at South 1/4 corner of Section 1; thence North 86 degrees 49 minutes 07 seconds West 1214.13 feet; thence North 02 degrees 07 minutes 34 seconds East 2597.57 feet to point of beginning; thence continue North 02 degrees 07 minutes 34 seconds East 42.92 feet; thence South 86 degrees 18 minutes 02 seconds East 1159.09 feet; thence South 00 degrees 55 minutes 22 seconds West 78.75 feet; thence North 84 degrees 32 minutes 15 seconds West 1162.27 feet to the point of beginning. Being part of the West 1/2 of Section 1, Town 2 South, Range 6 East.

More particularly described as:

Part of the Northwest 1/4 of Section 1, Township 02 South, Range 06 East of Ann Arbor Township, Washtenaw County, Michigan.

Commencing at the Northwest corner of Section 1, Township 02 South, Range 06 East, Thence along the north line of said Section 1, N87°17'16"E, 417.43 feet to the Point–of–Beginning: Thence continuing along said north line of Section 1, N87°17'16"E, 2087.14 feet; thence along the west line of Tax Parcel 09–01–200–001, S17°23'07"E, 681.75 feet; thence along the south line of said Tax Parcel 09–01–200–001, N87°17'16"E, 231.00 feet to the north–south 1/4 line of said Section 1 as monumented; thence along said north–south line as monumented, S00°30'52"E, 1728.90 feet to the Center of said Section 1 as referenced in Quit Claim deed recorded in Liber 5130, Page 979, Washtenaw Register of Deed; thence along said north–south line of said Section 1 as monumented, S00°33'12"E 78.75 feet; thence N86°01'17"W, 1162.27 feet; thence N00°38'52"E, 42.92 feet to the east–west 1/4 line as monumented; thence along said east–west 1/4 line as monumented, N87°47'03"W, 1732.55 feet to the west 1/4 corner of said Section 1, thence along the west line of said Section 1, N01°40'03"W, 1721.67 feet; thence along the south line of Tax Parcel 09–01–200–003, N87°17'16"E, 417.43 feet; thence along the east line of said Tax Parcel 09–01–200–003, N01°40'03"W, 417.42 feet to the north line of said Section 1 and the Point–of–Beginning.

PROJECT TITLE
ASC-WSG
4984 EARHART ROAD
ANN ARBOR, MICHIGAN 48105

REVISIONS
-

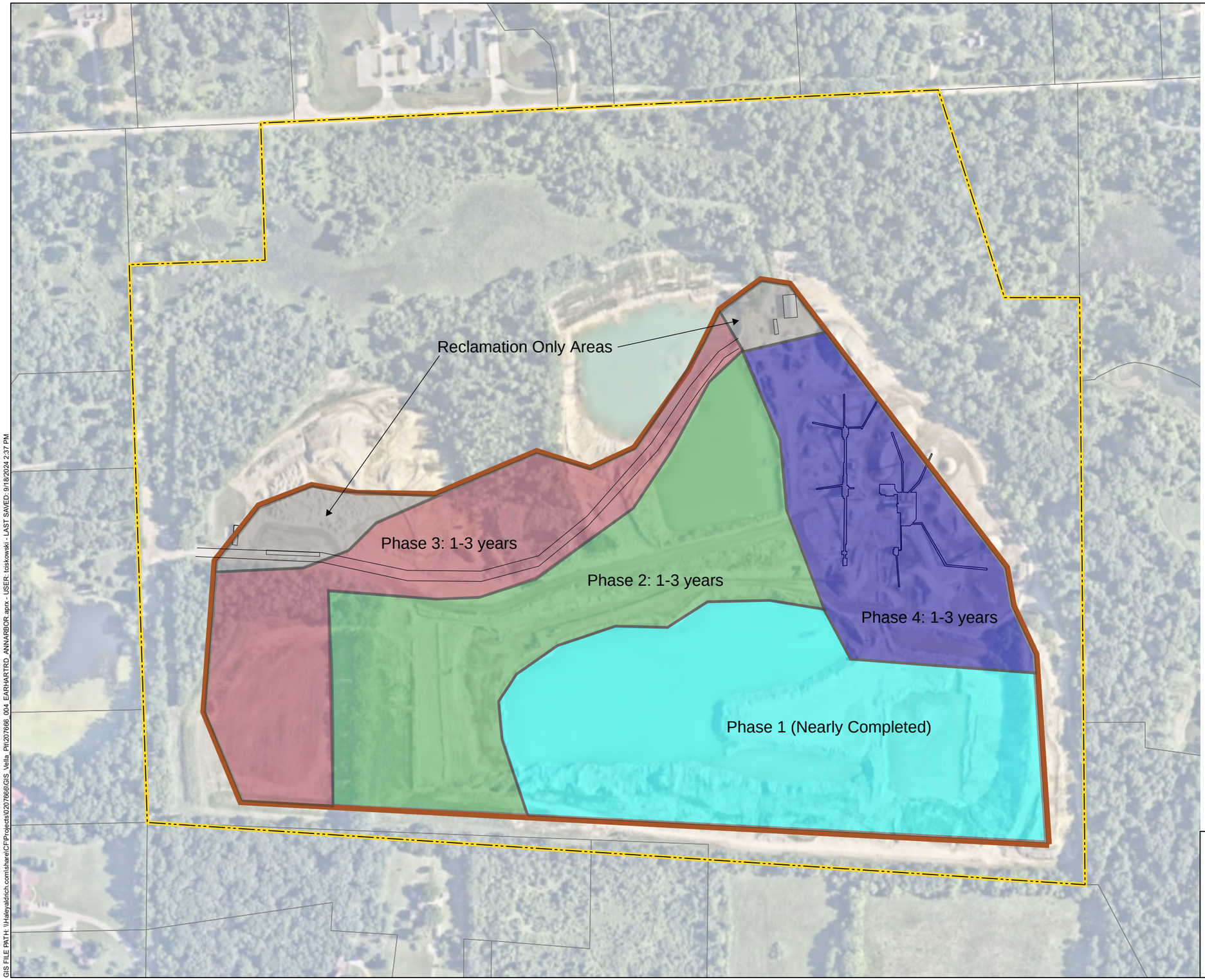
ORIGINAL ISSUE DATE:
AUGUST 15, 2024

DRAWING TITLE
CONCEPT POST-RECLAMATION SITE PLAN

PEA JOB NO.	2019-490
P.M.	DC
DN.	JKS
DES.	-

DRAWING NUMBER:
FIGURE 2

NOT FOR CONSTRUCTION



LEGEND

- PROPOSED LIMIT OF EXCAVATION
- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PARCEL DATA SOURCE: WASHTENAW COUNTY, MICHIGAN
3. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024
4. TIMING FOR PHASING IS APPROXIMATE AND WILL DEPEND ON MARKET DEMAND AND SITE CONDITIONS ENCOUNTERED.
5. EXACT TRUCK ROUTE WITHIN THE PIT WILL DEPEND ON SITE CONDITIONS ENCOUNTERED AND MAY BE RELOCATED WITHIN THE EXISTING BERMS AND WILL BE AT A LOWER ELEVATION THAN EXISTING BERMS.
6. DURING PHASE 4 EXCAVATION, A TEMPORARY PROCESSING PLANT WILL BE LOCATED AND RELOCATED AS NECCESARY WITHIN THE PHASE 4 FOOTPRINT.

N

0 300 600
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

CONCEPTUAL MINE PHASING PLAN

AUGUST 2025

FIGURE 3

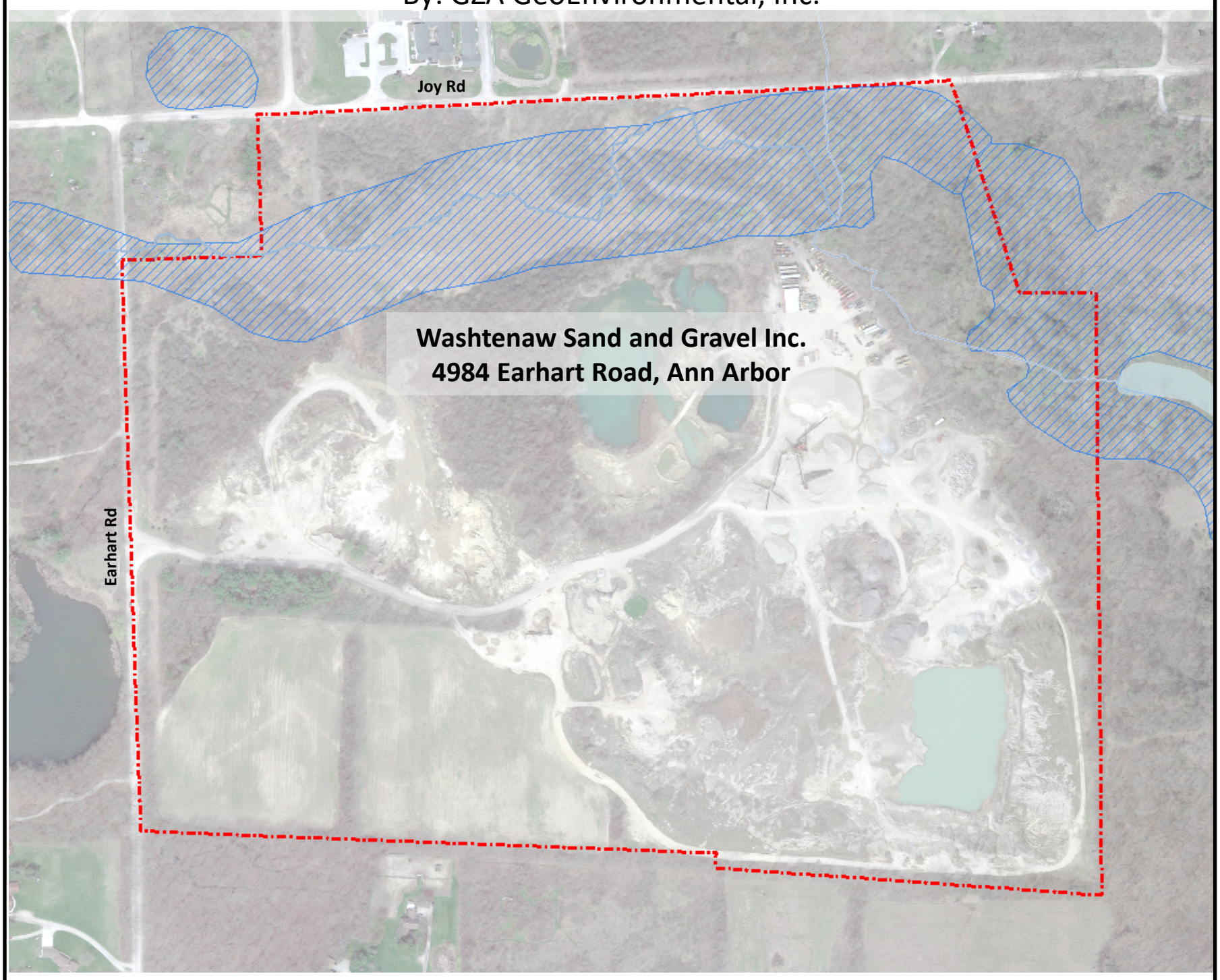
GIS FILE PATH: \\haleyaldrich.com\share\CFProjects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/18/2024 2:37 PM

ATTACHMENT A
2020 CUP Application

Conditional Use Permit And Site Plan Application for:

Ajax Materials Corporation - Washtenaw Sand and Gravel, LLC

By: GZA GeoEnvironmental, Inc.



MID MICHIGAN MATERIALS

February 2020

GZA GeoEnvironmental, Inc.

Conditional Use Permit And Site Plan Application For:
Ajax Materials Corporation - Washtenaw Sand and Gravel, LLC
February 2020
MID MICHIGAN MATERIALS

Compliance with Chapter 74 provides reasonable restrictions and regulations for the proposed land uses and promote the health, safety and general welfare of the residents of the Township.

The purpose of Chapter 74 is not specifically defined, but we believe that the purpose and intent are similar, and the Application was prepared to meet what we believe the Township intended to accomplish with the Ordinance.

"(2) Will be compatible with the natural environment and existing and future land uses in the vicinity".

The proposed use is consistent with decades of use for sand and gravel mining and processing. Time has shown that the past use is compatible with the natural environment and existing land uses in the vicinity, and the future use will be similar as demonstrated in this Application.

"(3) Will be compatible with the master plan".

The Ann Arbor Township 2015 Master Plan does not acknowledge the need for construction aggregate or the presence of the existing mine despite decades of aggregate production in the Township for local roads and construction projects. The proposed use will be consistent with past use and hopefully remain as unnoticed and compatible with the goals of the Master Plan.

"(4) Will be served adequately by essential public facilities and services, such as highways, streets, police and fire protection, drainage ways and structures, refuse disposal, or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide adequately for any such services".

The proposed use will be served adequately by the same essential public facilities and services, such as highways, streets, police and fire protection, drainage ways, structures, and refuse disposal as it is currently.

"(5) Will not be detrimental, hazardous, or disturbing to existing or future neighboring uses, persons, property or the public welfare".

The proposed use will be essentially the same as the past decades of use and will not be detrimental, hazardous, or disturbing to existing or future neighboring uses, persons, property or the public welfare.

"(6) Will not create additional requirements at public cost for public facilities and services that will be detrimental to the economic welfare of the community".

The proposed use will be essentially the same as the past decades of use and will not create additional requirements at public cost for public facilities and services that will be detrimental to the economic welfare of the community.

"DIVISION 4. - SITE PLAN REVIEW

Sec. 74-171. - Authority.

The Planning Commission shall review site plans as required in this article.

Sec. 74-172. - General procedures for submission and review of site plans."

"(a) Buildings, structures and uses requiring site plan review. The following buildings, structures and uses require site plan review:"

Items (1) through (6) are not applicable to the proposed use.

"(7) In recreation-conservation and agriculture districts, any permitted principal building and structures except (a) single-family residences with a floor area of 5,000 square feet or less, and (b) farm buildings and structures".

The Site is zoned as recreation-conservation and the requirements of Division 4 Article 7 – Zoning are addressed in the contents of this Application.

Items (8) through (14) are not applicable to the proposed use.

"(15) Any structure or use for which site plan review is otherwise required by this chapter."

The requirements of Division 4 Article 7 – Zoning are addressed in the contents of this Application.

"(b) Prohibited actions. No person may begin grading, removal of trees or other vegetation, land filling, or construction of buildings, structures or improvements for any project that requires site plan approval until a final site plan is approved and the other requirements of this article (such as an executed development agreement and deposit of performance guarantee) are met".

It is the Applicant's intent to acquire the property upon receipt of a CUP and approved Site Plan; therefore, it is expected that mineral extracting operations will continue through the application and review process as they generally have for decades.

"(c) Who may apply. Any person with a legal interest in the property may apply for site plan review. If the applicant is not the fee simple owner of all land covered by the project, the application also shall include the written consent of each fee simple owner. The applicant shall provide a current title commitment of the property showing all owners and parties in interest".

Appendix A provides the current title commitment and/or ownership information.

"(d) Site plan stages. The procedure for processing site plans includes three stages:

(1) Pre-application conference (optional). The applicant may request a pre-application conference. The conference is encouraged, but is not mandatory. During this conceptual review phase, the applicant presents a generalized site plan showing the overall concept of the project. Such matters as use, density, compatibility with development in the area and the effect of the project on Township services will be discussed during this phase. The applicant schedules the conference through the Township Supervisor. Conference attendees will include the applicant and the applicant's consultants, the Township consultants, one or more representatives from the Planning Commission, and representatives of other Township departments as appropriate".

A pre-application meeting was held at the Town Hall on February 6, 2020. We did not provide a generalized site plan rather relied upon the general understanding of everyone in attendance of the existing site conditions as an historical sand and gravel mining operation and recognition that the Site Plan to be submitted will primarily depict existing conditions and a proposed mine reclamation plan.

"(2) Preliminary site plan review. At this phase, the applicant submits a preliminary site plan meeting the requirements of this article. The requirements for a preliminary site plan are less detailed than for a final site plan".

As discussed at the pre-application meeting, a Preliminary Site Plan will not be submitted due to time constraints on property acquisition closing.

"(3) Final site plan review. Following approval of the preliminary site plan, the applicant submits a final site plan meeting the requirements of this article".

Understood.

"The applicant or a representative must be present at each scheduled review, or the application will be tabled for a maximum of two consecutive meetings due to lack of representation, after which the site plan will be dismissed and a new application required".

Understood

"(e) Combining preliminary and final site plans. An applicant may, at the applicant's discretion and risk, combine a preliminary and final site plan in one application for approval if the project will not be developed in phases. However, the Planning Commission shall have the authority, in its sole discretion, to require submittal of a preliminary site plan separate from a final site plan, when the complexity or size of the project warrants".

As discussed at the pre-application meeting, we are combining the Preliminary and Final Site Plans.

"Sec. 74-173. - Applications; determination that an application is complete; Planning Commission action.

(a) Application. An applicant may apply for preliminary or final site plan approval by filing with the Township Clerk, at least 20 calendar days prior to the next Planning Commission meeting, a completed application form, the required fees, and 17 copies of all information required by this article. Five (5) of the submittal copies shall include full size (24 × 36 inches) drawings and twelve (12) of the copies shall include reduced (11 × 17 inches) drawings. In addition to the required paper copies, an electronic version of the site plan submittal (including all supporting materials) shall be provided in a format acceptable to the Township"

Sixteen (16) copies of the Final Site Plan are included in the Application with drawings provided on 11 x 17 inch paper. In addition, 4 copies of the Final Site Plan are submitted on 24 x 36 inch plots.

"Sec. 74-174. - General requirements for all site plans.

(a) Format and information required. All site plans shall be prepared in the following format and contain the following information:

(1) Plans shall be prepared by a professional engineer, architect, planner, landscape architect, or land surveyor registered in the State of Michigan, whose seal shall be affixed to the first sheet".

Understood.

"(2) Each sheet in a set of plans shall show:

a. The name and general description of the property;

b. All revision dates;

c. The scale;

d. A north arrow, which shall be displayed on the right side of the sheet (and each sheet shall be oriented so that north is either up or to the left;

e. The title of each sheet; and

f. The name, address, and telephone number of the person or firm that prepared the sheet."

Items a through f are included on each sheet of the Site Plan.

"(3) Each sheet in a set shall be numbered consecutively and shall have proper match lines or other keys to provide reasonable continuity and orientation".

Understood

"(4) The first sheet in each set shall be the cover sheet and shall include a sheet index. At a minimum, the cover sheet shall show:

a. The name and address of the applicant and each record property owner;

b. The name and addresses of all adjacent property owners;

c. The legal description of the property;

d. The tax identification number;

e. The address of the site;

f. Lot dimensions and bearings;

g. Zoning classification and existing land use of the property and adjacent properties;

h. zoning data, including:

1. Required setbacks;

2. Minimum lot area;

3. Lot width;

4. Building height;

5. ground floor and total floor area to be constructed;

6. Proposed total ground floor coverage (ground floor area divided by net lot area);

7. Proposed total floor area ratio (total floor area divided by net lot area).

i. The date of the plan and all revision dates;

j. The project name (lower right corner);

k. Any existing or proposed deed restrictions and easements;

l. The Township identifying number for the project in the lower right corner once it has been assigned; and

m. A vicinity map showing the general location of the site in relation to the nearest cross street (or section corner for a metes and bounds parcel)."

Items a through m are included on the cover sheet of the Site Plan labeled Figure 1. A Township identifying number will be provided by the Township.

"(5) All plans shall be of a scale not greater than one inch equals 20 feet and not less than one inch equals 200 feet, and of such accuracy and clarity that the Planning Commission can readily interpret the plan."

Understood.

"(6) All plans shall show a high resolution aerial photo of the site."

Understood.

"(7) No applied shading shall be used that obscures any lettering or other graphical information."

Understood.

"(8) If a site is to be developed in two or more phases, all plans shall show the entire property in the development, its proposed layout, and the location of each phase."

A phased development is not proposed for the Site.

Sec. 74-175. - Requirements for preliminary site plans.

"(a) Information required. In addition to the information required for all site plans, a preliminary site plan shall provide the following information:

(1) Physical features.

a. The shape, size and location of existing and proposed development on the site, including buildings, parking areas and service drives, loading zones and the location of existing and proposed public streets serving the property".

Figure 2 depicts the existing conditions of the Site , including the operational layout, processing area (screening, washing, stockpiles,) maintenance and office.

"b. For residential projects, the number and types of dwelling units and density".

Not Applicable.

"c. For non-residential projects, the number of buildings".

A pole barn maintenance building and office trailer are shown on Figure 2.

"d. The location, width, and purpose of existing easements".

The existing easements are shown on Figure 2.

"e. The location of: (1) any drain tile that serves the property, whether located on or off the property that is the subject of the site plan; and (2) any drain tile on the property that serves other properties. If the applicant determines that no drain tile exists on the property, the applicant will provide a written statement to the Planning Commission representing that the applicant has made a good faith investigation into the existence of drain tile on the property, and that there is no evidence to indicate the presence of any drain tile on the property".

To investigate the potential for drain tiles at or surrounding the Site, GZA compiled publicly available historic and current USGS quadrangles and historical and current aerial photography. Review of historical aerial photographs from the following years did not indicate the presence of drain tiles: 1940, 1960, 1966, 1979, 1984, 1987, 1990, 1998, 1999, 2002, 2005, 2007, 2008, 2010, and 2015.

Our assessment of drains, including county drains and county drain right-of-way data on the Washtenaw County GIS Map Viewer do not have a record of drain tiles on Site.

In addition to our survey of publicly available data, GZA corresponded with the current owner, Mr. Tom Vella. Mr. Vella reported that he had no knowledge of, nor any installation, of drain tiles at the Site nor the surrounding fields during his ownership from 1957 to Present. A GZA Senior Water Resources Engineer evaluated the surface water drainage and noted drainage patterns in the two agricultural fields is primarily to the north and likely due to overland flow and not accommodated by drain tiles. We believe it is unlikely there are drain tiles occupying the southwest farming field or the fields to the south of the property line.

"f. An area-wide stormwater drainage map showing existing and proposed drainage courses and stormwater basins that are on-site or affect the site. This map shall provide contours shown at five-foot intervals, and a stormwater management plan consistent with the Township's stormwater management ordinance".

A Site-specific Stormwater Management Plan is included in Appendix B. The Plan was developed in accordance with Article 8 – Stormwater Management, and applicable County, State and Federal regulation.

"g. A sanitary sewer service area map showing service areas on-site or upstream. This map shall provide contours".

The Site is not serviced by sanitary sewer.

"h. A general proposed utility layout for sanitary sewer, water, and stormwater systems, including estimated locations for proposed wells, septic tanks, drain fields, and other proposed underground tanks".

Sanitary sewer systems are not existing or proposed. Water is suppled from a potable water supply well. Because the Site in internally drained, there are no proposed stormwater management systems. Figure 2 shows the existing location of the septic drain field.

"i. The total proposed stormwater impact surface area and percentage of proposed stormwater impact surface area to total gross area. Stormwater impact surface is that surface, including stormwater basins (at the designed capacity elevation), which has a runoff coefficient in excess of 0.3 as defined by the WCWRC".

The active and reclaimed mine will be internally drained.

"j. The location of any proposed trash storage areas and screening. If no outdoor trash storage is intended, the plan shall so state".

See Figure 2.

*"k. A written preliminary review **from** the Washtenaw County Water Resources Commissioner indicating the project's conformance to WCWRC standards regardless of whether or not the project is within the jurisdiction of the WCWRC".*

Correspondence from the Washtenaw County Water Resources Commissioner is in Appendix C.

*"l. A written preliminary technical review **from** the Washtenaw County Road Commission indicating the project's conformance to WCRC standards."*

Correspondence from the Washtenaw County Road Commissioner is in Appendix D.

"m. If the project is located within the Fleming Creek watershed, a written review from the Fleming Creek Advisory Council, or any successor entity ("FCAC"), related to the impact of the project on the watershed and any recommended design modifications or management strategies to better protect water resources. The Planning Commission may waive this requirement or defer consideration of the FCAC review to the final site plan review if the FCAC does not provide a written response within 45 days after the applicant submits its written request to the FCAC for review".

Correspondence from the Fleming Creek Advisory Council is in Appendix E.

"(2) Natural features.

a. The existing topography and proposed grading, at one foot contour intervals"

See Figure 2 for existing topography.

See Figure 5 for proposed grading and Reclamation Plan.

"b. Off-site elevations within approximately 100 feet of each property line not bordered by a public street to assist in determining proper grading and drainage".

Figure 2 includes the elevations within approximately 100 feet of the property boundary.

"c. Soils information, for sites utilizing on-site septic tanks and drain fields".

Soil information is shown on Figure 2.

"d. The location and extent of soils that are unbuildable in their natural state because of organic content or water table level, based on the Washtenaw County Soil Survey".

Organic soils and shallow water table have not been identified within the area proposed for mining, but both exist in in areas mapped as wetlands.

"e. The location and size of open areas and recreation areas".

Not applicable.

"f. The location and type of natural features on or adjacent to the site, including wetlands, watercourses, 100-year floodplains, woodlands, landmark trees, steep slopes, endangered species habitat as identified by the Michigan Department of Natural Resources, and groundwater recharge areas. Fence rows and individual trees of six-inch or larger caliper shall be shown in and within 25 feet of any area proposed to be affected. When natural features exist on-site or adjacent to the site, the applicant shall provide a Natural Features Impact Statement including the following elements, as described in the Township's Land Development Standards or Natural Features Ordinance:"

See Figure 2 for location of natural features. The elements of a Natural Features Impact Statement are provided in the following subsections.

"1. A site inventory map showing all natural features and any proposed loss of, or impact on, natural features. This map must clearly show the locations and types of existing natural features both on the site and those within a region 100 feet beyond the site boundaries including edges of woodlands and wetlands, buffer areas, watercourse streambanks, pond ordinary high water marks, floodways, floodplains, areas of hydric soils, highly permeable soils, groundwater recharge areas, steep slopes, landmark trees and a written description of the quality, character and health of the natural features."

See Figure 2 for location of wetlands and forested areas.

"2. A natural features protection plan. This plan must delineate natural features to be retained on the site or excluded from development, limits of soil disturbance, and protective measures such as barrier fencing, restrictions on traffic and storage of materials under trees, and soil erosion control measures. If applicable, the plan will include information on sustaining the natural features to be retained on the site."

The wetland area on the northern portion of the Site as shown on Figure 2 will not be accessed during mining. The wetland boundaries are obvious and if determined to be necessary will be flagged, staked or otherwise clearly marked to prevent entry before mining in the vicinity.

There are approximately 14 acres of forested areas on the property in the mine plan areas that contain aggregate resources. No other natural features that require a protection plan.

"3. An alternatives analysis. This analysis displays and discusses the alternatives, approaches and designs that were considered in arriving at the design proposed to minimize disturbance to natural features on the site. The analysis will include a written

justification of the degree of disturbance to natural features and basis for the mitigation proposed."

An alternatives analysis was not considered. The property was intended for mining aggregate for decades and is being acquired for the same purpose. As the only active mining operation in the Township, an alternatives analysis would not identify a more suitable location for an aggregate mine in the Township.

"4. A mitigation plan. If disturbance of natural features is authorized by applicable ordinances and approvals, a mitigation plan concerning replacement of disturbed natural features shall be submitted."

A mitigation plan specifically to address natural features is not applicable. However, a mine reclamation plan was prepared as depicted on Figure 3 and 4 to show how the property will be restored following mining.

"g. A written site analysis, supported by graphics, that evaluates the design and development potential of the site, to identify the nature and the effect of the design and development on the existing conditions of the site, and to determine the site's relationship to neighboring properties as well as physical and natural features in the area. The analysis shall show a correlation of the principal characteristics of the developed site that will affect the layout and future use of the property. The site analysis will show what natural features will remain and what natural features will be removed. The analysis shall also indicate the method used in the field to mark trees to be removed and trees to be preserved."

The Site is an active mining operation that has partially developed or mined on approximately 50% of the property and approximately 75% of the planned mining area. An applicable analysis is the comparison of the Existing Conditions shown on Figure 2 to the proposed conditions shown on the Reclamation Plan as Figure 3 and 4.

"(3) Other information. The Planning Commission may require the applicant to submit such other information, such as a traffic study, as the Commission determines is necessary for proper review of the preliminary site plan".

The Applicant discussed the existing and proposed mining and highway use with the Washtenaw County Road Commissioner. The preliminary technical review from the Washtenaw County Road Commission (WCRC) indicating the project's conformance to WCRC standards is contained in Appendix D.

Sec. 74-176. - Requirements for final site plans.

"(a) Phased projects. If a project is being developed in phases, a separate final site plan must be submitted for each phase."

The continuous use of mineral extraction will not be a phased development.

"(b) Information required. In addition to the information required for a preliminary site plan, a final site plan shall include the following information:

(1) Physical features

a. *Location and overall dimensions of existing structures and drives within 200 feet of common property lines and identification of existing improvements to remain and to be removed."*

See Figure 2.

"b. Surface type and width of streets adjacent to the site, and the surface elevation of any existing street at the intersection of each proposed driveway or other street."

See Figure 2 for existing roads and driveways.

"c. Proposed buildings or other structures including dimensions, distance between buildings, finished floor elevations, basement elevations, grade line elevations, and an indication if buildings are proposed as walkouts or view-outs."

See Figure 2 for existing buildings and structures. No additional buildings or structures are proposed.

"d. Proposed drives or streets, including: names; right-of-way or easement width; surface type and width, including typical cross sections; surface elevations; location and type of curbs, where proposed; expansion of existing street rights-of-way; length and width of turning lanes, where permitted; and curve radii."

No new drives or streets are proposed.

"e. Proposed building and address numbers, including the locations, typical copy, and dimensions. "

No new building or address numbers are proposed.

"f. Proposed parking areas, including: the number and size of spaces with supporting calculations; location of each space; type of surface, including typical cross sections; aisle width; angle of spaces; and location of wheel stops or curbs, when applicable."

Existing parking areas are shown on Figure 2.

"g. Proposed loading areas, including the dimensions, surface type, and typical cross sections."

Not applicable.

"h. Proposed sidewalks and pedestrian paths, including width, surface type, and typical cross sections."

Not applicable

"i. Proposed fences or screens, including height, type, typical details, elevations, and sections."

A perimeter fence will be installed in general accordance with the details shown on Figure 5.

"j. Proposed outdoor trash storage, including dimensions and typical details of the enclosure. If no outdoor trash storage is intended, the plan shall so state."

See Figure 2

"k. Proposed central mailboxes, if applicable, or a notation that individual boxes will be used."

The existing mailbox is located near the Site entrance on the west side of Earhart Road.

"l. Proposed identification and advertising signs, including dimensions, area, height, illumination, and typical copy."

A sign will be located approximately where shown on Figure 2 as generally described on Figure 5.

"m. Proposed traffic control signs, specifying typical and intended purpose."

None proposed.

"n. Proposed retaining walls, including dimensions, materials of wall and fill, typical vertical sections, and design calculations."

None proposed.

"o. Proposed outside lights and street lights, if applicable, including type, height, intensity, direction, and typical details."

The location of existing outside lights are shown on Figure #. No changes are proposed to the lights and any new lights if determined to be necessary for safety reasons will be installed where needed.

"p. Information concerning the existing utilities serving the site, including: the location, size, inverts, fire hydrants, gatewells, manholes, and catchbasins; locations and elevations of ditches, culverts, and bridges adjacent to the site; location of utility poles and lines; and location and size of natural gas lines and appurtenances."

The location of electric utility poles and lines are shown on Figure 2. There are no fire hydrants, gatewells, manholes, catchbasins, ditches, culverts, or bridges on or adjacent to the Site.

"q. Information concerning the proposed utilities for the project, including the following (profile illustrations should be included with plan views on the same sheet):

"1. Proposed water system, including: size, material and type of lines; location of fire hydrants and valves; profiles; location of meter room; water meter schematic; and fire riser schematic."

The existing private water supply well is shown on Figure 2. No public utilities are proposed.

"2. Proposed sanitary sewer system, including: size, material and type of lines; inverts; location of manholes; profiles; and design basis."

The location of the private septic system is shown on Figure 2. No sanitary sewer system is proposed for the Site.

"3. Utility structure schedules (tables) for sanitary sewer, storm sewer and water mains."

Not applicable.

"4. Groundwater information for the site with supporting evidence, including site specific soils information."

The U.S. Department of Agriculture *Web Soil Survey* maps ten soil types including: gravel pit, Wawasee loam, Boyer loamy sand, Houghton muck disintegration moraine, and Gilford sandy loam. The well record for the potable well on the Site identifies gravel and stones from 0 to 51 feet below ground surface (bgs), gray clay from 51 to 206 feet bgs, and gravel from 206 to 212 feet bgs. Groundwater is estimated at 890 elevation above mean seal level.

"5. A hydro-geological study if groundwater information (including the high groundwater table) warrants further investigation, as determined by Township consultants."

Further investigation of groundwater is not anticipated.

"6. Proposed electrical, telephone, and gas services; new utility poles, if applicable; underground lines and surface equipment; and size of natural gas lines and appurtenances."

None proposed.

"7. The location of proposed wells, septic tanks, drain fields, and other proposed underground tanks."

See Figure 2 for location of existing water supply well and septic system.

"r. A storm drainage narrative clearly and concisely describing the intended method of designing the storm drainage systems, including: drainage areas, existing and proposed; retention basin and discharge concepts; storm sewer and ditch design criteria, compliance with Washtenaw County Water Resources Commissioner development criteria; and downstream capacity limitations. The narrative should include all the appropriate associated computations and shall be in compliance with the Township's stormwater management ordinance. The narrative should be prepared on standard 8½ by 11 inch sheets that are dated, numbered, and titled. Maps of similar size portraying the concepts involved should also be included."

Not applicable. The Site is internally drained. Stormwater naturally drains or is diverted to the mine pits. Storm sewers are not needed or used on the Site.

"s. Proposed storm drainage system, including: dimensions and calculations of stormwater retention areas; location, size, calculations, and material type of storm sewers; location and centerline elevations of swales or ditches; inverts; location of manholes and catch basins; direction of flow; drainage patterns; profiles of sewers, retention basins, culverts, swales, and ditches; and design basis. The plan shall also include a stormwater maintenance plan, complete with annual tasks and anticipated costs."

Not applicable. The Site is internally drained. Stormwater naturally drains or is diverted to the mine pits.

"t. A written review from the office of the Washtenaw County Water Resources Commissioner ("WCWRC") indicating the project's conformance to WCWRC standards regardless of whether or not the project is within the jurisdiction of the WCWRC."

A written response from the WCWRC office is in Appendix C.

"(2) Natural features"

"a. Two USGS-based benchmarks on the site."

There are no USGS benchmarks on the Site.

"b. Proposed open space and recreation areas, including, use, size, and proposed improvements."

Not applicable.

"c. A proposed landscape plan meeting the requirements of section 74-586."

Existing conditions are shown on Figure 2. A landscape plan for the Site was not prepared.

"d. A soil erosion control plan."

Because the Site is internally drained, a soil erosion control plan was not prepared.

"e. A completed State/County Environmental Permits Checklist for Non-Residential projects as attached in Appendix A of the Land Development Standards. These permits must include all MDEQ wetland permits and any necessary endangered species approvals."

It was confirmed at the February 6, 2020 pre-application meeting that the requested checklist does not exist.

"(3) *Other requirements."*

"a. When applicable, the applicant shall provide evidence of approval by the following agencies:

1. MDEQ.

2. Washtenaw County Road Commission.

3. Washtenaw County Health Department.

4. Michigan Department of Transportation."

Correspondence from the Washtenaw County Road Commission is contained in Appendix D. Evidence of approval from the other agencies is not anticipated and was not requested.

"b. If warranted by the nature of the project and proposed stormwater system, the Planning Commission shall require that a drainage district be established for the entire project giving the Washtenaw County Water Resources Commission ultimate responsibility for the stormwater system."

Not applicable.

"c. When applicable, the Planning Commission shall require evidence of City of Ann Arbor review of proposed utilities."

Not applicable.

"d. The Planning Commission may request other information for proper review of a site plan and a determination on the standards for review, in view of the nature of the project."

Other information was not requested.

"(c) Standards for review. In reviewing the final site plan, the Planning Commission shall consider the following standards:

(1) All required information is provided."

(2) The plan substantially conforms to the approved preliminary site plan and continues to meet the standards for preliminary site plan approval.

(3) The plan, including all engineering drawings, meets Township requirements for fire and police protection, water supply, sewage disposal or treatment, storm drainage, and other public facilities and services.

(4) The drainage plan for the project is adequate to handle anticipated storm water runoff and will not cause undue runoff onto neighboring property or overloading of water courses in the area.

(5) Outside lighting will not adversely affect adjacent or neighboring properties, or traffic on adjacent streets.

(6) Outdoor storage of garbage and refuse is contained, screened from view, and located so as not to be a nuisance to the project or neighboring properties.

(7) The proposed grading or filling will not destroy the character of the project or the surrounding area and will not adversely affect the adjacent or neighboring properties.

(8) The parking layout will not adversely affect the flow of traffic within the project or to and from the adjacent streets.

(9) The plan meets the standards of other government agencies, when applicable, and the approval of these agencies has been obtained.

(10)The plan provides for the proper expansion of existing public streets serving the project, when applicable."

Understood. The Site Plans were prepared to meet the standards summarized above.

"Sec. 74-177. - Development agreement.

After final site plan approval the applicant shall enter into a development agreement with the Township in a form provided by the Township. No building permits will be issued for the project nor will any earth change or construction activity be permitted at the site until execution of a development agreement. The development agreement shall incorporate the standards, findings and conditions for approval of the final site plan and shall provide for deposit of a performance guarantee as described in section 74-178. Final approval of the development agreement shall occur upon signature of the agreement by the Township Supervisor after (i) the Township attorney, staff and consultants confirm incorporation of all standards, findings and conditions for approval, (ii) deposit of the performance guaranty and (iii) signature of the agreement by an authorized representative of the owner of the project and, if different, the developer of the project."

The applicability of this section was discussed at the February 6, 2020 pre-application meeting where it was determined that if a development agreement is required that such an agreement would be reasonably negotiated.

"Sec. 74-178. - Performance guarantee.

(a) The applicant shall provide to the Township Clerk irrevocable bank letters of credit, cash deposits, or other security acceptable to the Township Board after a final site plan is approved. No building permits will be issued for the project nor will any earth change or construction activity be permitted at the site until the applicant provides the performance guarantee. The guarantee shall cover site improvements as defined in section 74-176(e) shown on the approved final site plan for all or any portion of the site plan for which the permit is issued."

Financial assurance is addressed in Sec. 74-592 below.

"Sec. 74-182. - Fees.

Fees for the review of site plans and inspections as required by this article shall be established and may be amended by resolution of the Township Board."

Understood.

"ARTICLE V. - SUPPLEMENTARY DISTRICT REGULATIONS

Sec. 74-592. - Mineral mining.

(a) Conditional use permit standards. Mineral mining shall require a conditional use permit, as described in section 74-131. The Township Board shall grant a conditional use permit if it finds that no very serious consequences would result from the operation of the mineral mining activity.

If it is demonstrated that a very serious consequence to the Township would occur, the Township Board shall not grant a conditional use permit. In accordance with MCL 125.3205, Section (5), the following factors shall be considered in making that determination:

(1) The relationship of extraction and associated activities with existing land uses.

(2) The impact on existing land uses in the vicinity of the property.

(3) The impact on property values in the vicinity of the property and along the proposed hauling route serving the property.

(4) The impact on pedestrian and traffic safety in the vicinity of the property and along the proposed hauling route serving the property.

(5) The impact on other identifiable health, safety, and welfare interests in the local unit of government.

(6) The overall public interest in the extraction of the specific natural resources on the property."

Mining operations on the property have been ongoing for several decades and no material changes are proposed. Township Supervisor confirmed during the February 6, 2020 pre-application meeting that he was not aware of complaints from citizens associated with the mining operation during his 18-year tenure on the Town Board.

History has demonstrated that no very serious consequences have resulted from past and should not result from the continued operation of the mineral mining activity.

"(b) Market information. The applicant shall submit a report prepared by a geologist or other experts with credentials satisfactory to the Township Board to demonstrate compliance with MCL 125.3205, Sections (3) and (4), that the natural resources to be extracted shall be considered valuable, and the applicant can receive revenue and reasonably expect to profit from the proposed mineral mining operation. The applicant shall also provide documentation to demonstrate that there is a need for the natural resources to be mined by either the applicant or in the market served by the applicant."

Recognizing that the mining operation that is the subject of the Application is an ongoing operation for several decades, and AMC is investing to continue the operation, the need is demonstrated, and no additional study should be required. However, a market study was performed and is included in Appendix F.

"(c) Conditions for mineral mining. Mineral mining operations shall be subject to the following conditions:

(1) There shall be not more than one entranceway from a public road to such lot for each 660 feet of front lot line. Such entrance shall be located not less than 500 feet from an intersection of two or more public roads."

The existing entranceway from Earhart Road is the only entranceway that will be used for the Operation.

"(2) Such operations shall be permitted only between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and between 7:00 a.m. and 12:00 noon on Saturday. Operations shall not be permitted on Sunday or legal holidays, except by special permit from the Planning Commission."

Understood.

"(3) On such site no digging, stockpiling, excavating or equipment storage and repair shall take "place closer than 100 feet from any lot line, and 300 feet from an existing residential zoning district. Stockpiles of stripped topsoil shall be seeded with grass or other plant materials and shall be prevented from eroding onto other properties."

Understood.

"(4) On such lot all roads, driveways, parking lots, and loading and unloading areas within 100 feet of any lot line shall be paved or treated in an environmentally-sensitive manner so as to limit the nuisance caused by windborne dust on adjoining lots and public roads."

Understood. Water will be used to control dust on unpaved surfaces or routinely travelled surfaces may be improved with asphalt millings.

"(5) Each operator shall be held responsible for all public roads upon which trucks haul materials from the mineral mines to keep those roads in a driveable condition at least equal to that which existed prior to the beginning of mineral mining operations; and to keep the roads dust

free and to clean any and all spillage of material and dirt, rock, mud, and any other debris carried onto the roads by these trucks or other equipment."

Truck traffic is planned to use Earhart Road, traveling south towards Plymouth Road. Discussions are ongoing with the WCRC to maintain and/or improve Earhart road to accommodate the mining operation.

"(6) Any noise, odors, smoke, fumes, or dust generated on such lot by any digging, excavating, loading, or processing operation and borne or able to be borne by the wind shall be confined within the lines of such lot as much as possible so as not to cause a nuisance or hazard on any adjoining lot or public road."

Earthmoving equipment that is used at a mining operation has undergone continuous improvements through the past decades; noise, odor, smoke, and fumes from heavy equipment is minimized due to these upgrades and would likely be improved from the current operations. Dust is managed through control measures such as applying water in active mining haul routes and stockpile areas.

"(7) Such removal shall not be conducted so as to:

a. Cause the pollution by any material of any surface or subsurface watercourse or body outside of the lines of the lot on which such use shall be located, or of any existing body of water located within the premises."

On-going operations do not pose a risk to surface watercourses or water bodies within or outside of the property lines.

"b. Cause or threaten to cause the erosion by water of any land outside of such lot or of any land on such lot so that earth materials are carried outside of the lines of such lot."

On-going operations do not pose a risk of erosion off on adjacent properties.

"c. Alter the drainage pattern of surface or subsurface waters on adjacent property. In the event that such removal shall cease to be conducted, it shall be the continuing responsibility of the owner and the operator thereof to assure that no erosion or alteration of drainage patterns shall take place after the date of the cessation of operation as specified in this paragraph."

Activities at the Site will not alter drainage patterns at the surface or subsurface waters in adjacent properties. The reclamation plan shown on Figure 4 depicts how the Site conditions following cessation of mining.

"(8) All fixed equipment and machinery shall be located at least 100 feet from any lot line and 500 feet from any existing residential zoning district. In the event the zoning classification of any land within 500 feet of such equipment or machinery shall be changed to a residential classification subsequent to the operation of such equipment or machinery, the operation of such equipment or machinery may continue henceforth but in no case less than 100 feet from any lot line adjacent to such residential district. A fence of not less than six feet in height shall be erected around the periphery of the area being excavated. Fences shall be adequate to prevent trespass."

Fixed equipment and machinery will be located at least 100 feet from any lot line and 500 feet from any existing residential zoning district. A fence will be installed around the mining operation as detailed on Figure 5.

"(9) All areas within a mineral mine shall be rehabilitated progressively as they are worked out or abandoned to a condition of being entirely lacking in hazards, inconspicuous, and blended with the general surrounding ground form so as to appear natural."

The conceptual mining and reclamation sequence is shown on Figure 3 and the conceptual final Reclamation Plan is shown on Figure 4.

"(10) The applicant shall submit a plan for the use of the property during mining operations at the time of application for the permit. The plan shall provide the following information:

a. Boundary lines of the property; dimensions and bearings of the property lines, correlated with the legal description;"

See Figure 2.

"b. Aerial photo, showing property and adjacent areas, location and outline of wooded areas, streams, marshes, and other natural features;"

See Figure 2.

"c. Existing site improvements such as buildings, drives, wells, and drain fields;"

See Figure 2.

"d. Existing topography at contour intervals of two feet;"

See Figure 2.

"e. Extent of future mining areas and depth thereof;"

See Figure 2 and Figure 3 for conceptual mining phases. The maximum depth will be approximately elevation 830 feet.

"f. Location and nature of structures and stationary equipment to be located on the site during mining operations;"

See Figure 2.

"g. Location and description of soil types;"

See Figure 2.

"h. An estimate of the kind and amount of material to be withdrawn from the site and the expected termination date of mining operations;"

Aggregate material will not differ from what was historically mined: coarse to fine sand with varying amounts of gravel and silt. The anticipated life of the mine is approximately 25 to 30 years, depending on market conditions.

"i. Description of all operations to be conducted on the premises, such as, but not limited to, digging, sorting, and washing operations, and the type, size, and nature of equipment to be used with each operation;"

Overburden, non-targeted material considered not economically viable, overlays the desirable material. Overburden is removed with excavators and articulating haul trucks to be placed as reclamation material or, if desired, sold. Material (e.g. ore) is excavated with an extended boom excavator and/or a front-end loader. Following excavation, the ore is transported to a hopper, a type of vessel that aids in channeling unconsolidated material towards a conveyor belt. Conveyor systems are varying lengths and widths depending on the specific needs during the life of mine; material conveyed is screened through various large sieves. Screened fine aggregate is washed of clay and silt, and sorted through a secondary screening process. Screened and/or washed material is stockpiled based on grain size. Front-end loaders scoop and load articulating haul trucks or an over-the-road haul truck.

"j. Location and width of drives, sight distances; land widenings on public roads at intersections of same with drives;"

No change is proposed to the interior or exterior roads.

"k. Tree areas and other natural features to be retained;"

Wetlands shown on Figure 2 are not part of the current mine plan.

"l. Description of pollution and erosion control measures;"

During operations, use of modern, maintained machinery and vehicles meeting applicable emissions performance standard will be utilized. Use of dust abatement techniques, such as water, and moderating operations during adverse weather conditions on unpaved and unvegetated surface will reduce potential airborne dust.

Fuel and maintenance chemical storage, like those stored in an automotive repair shop, will be enclosed to minimize potential to impact the environment. Use of recycled wash water and reclaimed surface water will minimize withdrawal and consumption of groundwater.

"m. Certified statement by a qualified engineer, with supporting data and analyses, concerning expected impact on the water table and water supply wells in the vicinity of the site; and"

The mine operation does not include groundwater pumping to facilitate dewatering. The operation pumps water from existing mine pits to use in the washing operation, but that water is returned to the pond in a closed loop system with no resulting net loss of groundwater from the property.

GZA considered the use of groundwater to meet the needs of the proposed mine and evaluate the impact on groundwater quantity in the mine area. Review of local geology and groundwater use in the area of the mine identify one primary source of groundwater for potable use, that is from vertically extensive sand and gravel deposits logged locally to depths of at least 2,000 feet.

The sand and gravel aquifer is expected to be have the capacity to provide the required water needs of the proposed mine with minimal impact on the groundwater table surface. Note that all water supply wells have some impact on the groundwater

table, but use must be managed to not have a negative impact on neighbors and ecological resources.

Based on the estimated hydraulic conductivity range for the sand and gravel aquifer, the drawdown ¼-mile from a well pumping 100 to 200 gallons per minute (gpm) is expected to be less than 10 feet. That degree of drawdown is not expected to adversely impact neighboring wells. More importantly, the pond that has been used for wash water source for at least 20 years is located about ¼ mile from two residential properties, without apparent water well issues.

"n. Map showing truck routes to and from the site."

The existing truck haul route within the Township is Earhart Road south to Plymouth. Road.

"(11) The applicant shall file a plan for restoring the site to a safe, attractive, and usable condition. The plan shall be filed with the application for the conditional use permit and shall provide the following information:

a. Boundary lines of the property, dimensions and bearings of the property lines, correlated with the legal description;

b. Location and extent of all-natural features to be retained during mining operations;"

c. Contour lines at intervals of two feet of the proposed restored surface, clearly showing connection to existing undisturbed contour lines;

d. Schedule and areas of progressive rehabilitation;

e. Proposed ground cover and other plantings to stabilize the soil surface and to beautify the restored area;

f. Sketch plan of the proposed use of the site when restored; and

g. Description of methods and materials to be used in restoring the site."

A reclamation plan is provided as Figure 4.

"(12) The applicant shall provide the following:"

a. Security deposits, in the form and amounts recommended by the Planning Commission and approved by the Township Board, to guarantee restoration of the site and to cover the costs of the Township Engineer in certifying conformance."

A financial assurance cost estimate is contained in Appendix G.

"b. A security deposit when required by the Planning Commission, to maintain and replace public roads traversed by trucks associated with the mining operation. The security shall be deposited with the County Road Commission in the form and amount required by the Road Commission."

We do not anticipate that a security deposit will be required.

"c. A date for completing the mineral mining operation, such date to be based upon the estimated volume of material to be extracted and an average annual extraction rate. The

conditional use permit shall not be issued for a period to exceed five years. Any extension of operations beyond that date shall require a new conditional use permit, which shall be applied for and processed as provided in this chapter upon proof by the applicant that restoration of the site has begun."

As discussed at the February 6, 2020 pre-application meeting this condition is a challenge but we understand.

"(13) Travel routes for trucks entering and leaving the site shall be shown on a map of the Township at the time of application for the conditional use permit. Such routes, except arterial streets or their equivalents, shall not pass through residential areas."

The existing truck haul route within the Township is Earhart Road south to Plymouth. Road.

"(14) Only equipment owned or leased by the operator of the mineral mining operation and used in the operation of the mineral mine shall be stored overnight or for longer periods anywhere on the premises. Storage of any other equipment on the premises shall be prohibited."

Understood.

"(15) Potable water supply and sanitary sewage disposal systems shall be approved by the Washtenaw County Health Department before a conditional use permit shall be issued."

Existing potable water supply well and septic system will be utilized. No new water supply or septic systems are proposed.

"(16) Concrete, cement, or asphalt production shall not be allowed as part of a mineral mining operation unless located in a district which allows such use."

Understood.

"(17) The applicant shall demonstrate compliance with all of the provisions of section 74-594 Performance Standards of the Township Zoning Code."

Understood.

"Sec. 74-594. - Performance standards.

No lot, building, or structure in any district shall be used in any manner so as to create any dangerous, injurious, noxious, or otherwise objectionable element or condition so as to adversely affect the surrounding area or adjoining premises. Uses in all districts shall comply with the following performance standards:

(1) Fire hazard.

a. Does not constitute a fire hazard per se;

b. Complies with the fire Prevention Code (MCL 29.1 et seq.) and the rules and regulations promulgated thereunder by all authorized agencies, State and local;

c. Is protected by adequate and proper fire suppression and firefighting equipment;

d. Provides isolated and approved storage for all flammable, explosive and corrosive materials and substances."

Upon AMC-WSG, LLC control of operations, compliance with existing fire codes and standards will be confirmed and upgraded where required.

"(2) Water pollution. Conforms to the applicable laws of the State, (i.e., Natural Resources and Environmental Protection Act (MCL 324.101 et seq.)) and rules and regulations promulgated thereunder by all authorized agencies, State and local."

The proposed operation will comply with the applicable laws.

"(3) Air pollution.

a. Conforms to the applicable laws of the State (i.e., Natural Resources and Environmental Protection Act (MCL 324.101 et seq.).

b. Does not emit or cause fumes, gas, mist, odor, smoke, vapor, dust, including road or other earth dust, or any combination thereof in excess of minimum standards established under the authority of the laws of the State, or in such volume as to create a public nuisance."

The proposed operation will comply with the applicable laws.

"(4) Noise abatement.

a. Is provided with noise abatement materials and equipment;

b. Will not generate unpleasant and objectionable noise greater in volume or intensity than the average of traffic noises at exterior property lines."

Upon AMC-WSG, LLC control of operations, the noise levels will be measured and noise abatement measure taken as necessary to meet this standard.

"(5) Vibrations. No vibrations shall be permitted which are discernible without instruments on any adjoining lot or property."

Vibration causing equipment, other than mobile equipment, is not proposed for use at the mining operation.

"(6) Glare. No direct or reflected glare shall be permitted which is visible from any property, or from any public street, road, or highway."

Understood. We are under the impression that this is not an ongoing concern at the property and will be complied with by AMC-WSG, LLC.

"(7) Radioactive hazards. Any use or operation which involves the use, possession, or transportation of any form of radioactive materials or substances is expressly prohibited unless the use is in conformity to specifications, regulations, and standards promulgated by the Atomic Energy Commission of the United States and by the State Department of Public Health."

Understood but not considered applicable.

"(8) Electrical disturbances. Manufacturing and processing machinery, other equipment and domestic appliances using electrical power which generates radio frequency interferences at levels in excess of those approved by the Federal Communications commission are prohibited."

Understood but not considered applicable.

"(9) Erosion. No erosion, by either wind or water, shall be permitted which will carry objectionable substances onto neighboring properties, lakes, ponds, rivers, or streams. Any use of land shall be in accordance with the provisions of Part 91 of the Natural Resources Act (MCL 324.9101 et seq.)."

The Site is internally drained so erosion onto neighboring properties is not feasible.

"Sec. 74-595. - Setbacks on arterial roads.

(a) No building or structure shall be located less than a distance equal to the sum of 60 feet and the required minimum front yard of the district in which located, from the existing right-of-way centerline of any of the following roads:"

Understood

ARTICLE VII. - NATURAL FEATURES SETBACK AND STEEP SLOPE USE PROTECTION[8]

"Sec. 74-683. - Natural feature setback.

(a) *Regulation.* A natural feature setback shall be maintained in relation to all areas defined in this article as being a natural feature, unless and to the extent, it is determined to be in the public interest not to maintain such setback, in accordance with the standards set forth in this article.

The Michigan Department for Environment, Great Lakes and Energy (EGLE) Wetlands Map Viewer identifies scrub/shrub wetlands and scrub/shrub mix on the northern portion of the Site beyond past and planned mining as shown on Figure #. It is the intent of the planned mining to maintain the natural feature setback in accordance with the standards and provisions in subsection (d) of this section.

"Sec. 74-684. - Steep slope protection.

(a) Regulation. Protective measures shall be implemented in relation to all areas defined in this article as being a steep slope, unless and to the extent, it is determined to be in the public interest not to implement such protective measures, in accordance with the standards set forth in this article."

Steep slopes, as defined in this section, do not exist and are not proposed to be developed.

"Sec. 74-685. - Natural feature setback or steep slope use permit.

(a) Authorization. Under certain conditions defined in this section, a natural features setback and/or steep slope use permit may be authorized by the Planning Commission to allow limited construction, activity, use, or operations within the natural feature setback or steep slope area."

A natural features setback and/or steep slope use permit will not be pursued.

Conditional Use Permit Application and Site Plan

AMC-WSG, LLC

Ann Arbor Township, Washtenaw County, Michigan

The Conditional Use Permit Application ("Application") and Site Plan for Ajax Materials Corporation - Washtenaw Sand and Gravel, LLC (AMC-WSG, LLC/"Applicant") for the property at 4984 Earhart Road (the "Site") was prepared for the Ann Arbor Charter Township in accordance with the following:

- Ann Arbor Township Ordinance, Chapter 74, Zoning;
- Ann Arbor Township Ordinance, Chapter 26, Environment;
- Ann Arbor Township Land Development Standards, Chapter 18 (the "Standards").

The Application narrative and referenced Site Plan provide the information required by the Ordinance and the Standards.

It is important to recognize that the proposed mining operation and property that are subject of the Application and Site Plan will be essentially the same as the existing mining operation. There are no material changes proposed to the mining property, mining boundaries or mining processes.

"DIVISION 3. - CONDITIONAL USE PERMITS

Sec. 74-133. - Application and fee.

(a) Information required for a conditional use permit application."

"(1) Application for a conditional use permit shall be made by filing an application form with the required information and paying the required fee with the Township Clerk. The fee shall be set by resolution of the Township Board."

The Township Application For Conditional Use Permit and check to cover the fees was submitted to the Township on February 10, 2020.

"(2) For any conditional use that is also subject to site plan review pursuant to chapter 74, article II, division 4, section 74-172, the applicant shall submit, concurrent with the conditional use permit application, all information required for preliminary site plan review (or a combined preliminary and final site plan at the applicant's election), together with any additional information required by this chapter for such proposed conditional use. The applicant is encouraged to request a pre-application conference pursuant to section 74-172 (b) prior to submitting a conditional use permit application and preliminary site plan application to obtain informal feedback and comments from the Township on the feasibility of the proposed conditional use permit."

A pre-application meeting to address the conditional use permit and Site Plan review was conducted on February 6, 2020.

"(3) For any conditional use that also requires site plan approval, the conditional use permit application shall be processed concurrently with the site plan application, and the public hearing described below shall not be set until both applications are complete and all fees paid, together with any additional information required by this chapter for such proposed conditional use, as all such

information is necessary or advisable for the Planning Commission to adequately review and analyze the proposed conditional use. Any Planning Commission recommendation of approval of the conditional use permit shall be subject to approval of the site plan for the project and final Township Board approval of such conditional use permit."

GZA prepared a Final Site Plan, herein referred to as "The Plan" or "The Site Plan", in accordance with Chapter 74 Zoning, Chapter 26 Environment and Chapter 18 of the Ann Arbor Township Land Development Standards - Natural Features Standards.

"(b) Notification requirements. The Planning Commission shall establish a date for a public hearing on an application for a conditional use permit after confirming that the applicant has provided all information and paid all fees required by this chapter, including the information required by section 74-133 (a)(3) above.

(1) A notice of the public hearing shall be published and mailed in the manner prescribed in section 74-61."

Understood.

"(2) A sign shall be posted on the property proposed for a conditional use in the manner described in section 74-61(g)."

Understood.

"Sec. 74-136. - Required standards and findings.

The Planning Commission and the Township Board shall review the particular circumstances and facts of each proposed use in terms of the following standards and required findings, and with respect to any additional standards set forth in article V of this chapter, supplemental regulations. The Planning Commission shall find and record adequate data, information, and evidence showing that the proposed use meets all required standards as follows: "

We address the six standards presented below. Chapter 74 does not include an article V, supplemental regulations.

"(1) Will be harmonious, and in accordance with the objectives, intent, and purposes of this chapter".

We assume harmonious to imply that the Application was prepared in a manner that is agreeable and balanced with Chapter 74. To demonstrate harmony with Chapter 74, we prepared the application using Chapter 74 as the foundation to be certain not to miss any Articles, Sections or requirements.

Chapter 74 does not outline specific objectives. To demonstrate our commitment to our interpretation of the objectives, we used Chapter 74 as the foundation of the Application addressing each applicable article, section and requirement.

The intent of Chapter 74 is defined in Section 74-1. The proposed use is consistent with the current use and past use for several decades. So, without a doubt, the proposed use is a wise and economical use of the land. Being consistent with decades of use, the proposed use will preserve and not negatively impact property values, will have no changes in the conservation of natural resources, will not cause overcrowding in the use of land, not cause increased congestion of population and transportation systems, and will not over-use public facilities.

FIGURES

PREPARED FOR:

THE APPLICANT
MID MICHIGAN MATERIALS
6966 FISHER ROAD
JEDDO, MICHIGAN 48032

THE OWNER
WASHTENAW SAND AND
GRAVEL CO.
4984 EARHART ROAD,
ANN ARBOR, MICHIGAN 48105

PREPARED BY:

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

GZA GEOENVIRONMENTAL
601 FIFTH STREET NW, SUITE 102,
GRAND RAPIDS, MICHIGAN 49504

Tax Id Number(s): I-09-01-200-002
Land situated in the Township of Ann Arbor, in the County of Washtenaw, in the State of Michigan

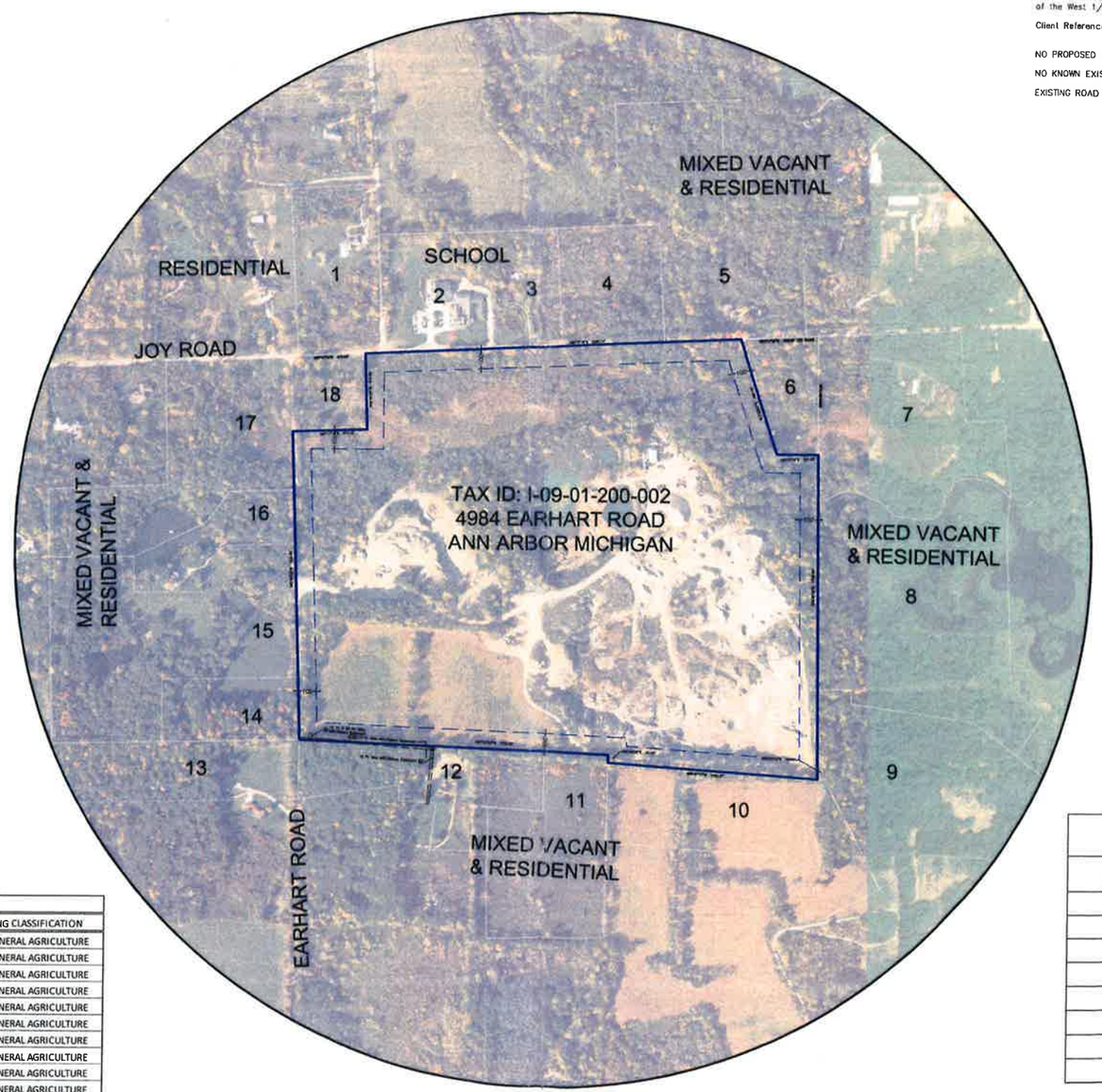
The Northwest fractional 1/4 of Section 1, except beginning in the North line of section at a point which is 26 rods West of North 1/4 corner of Section 1; thence East 26 rods to North 1/4 corner of Section 1; thence South 40 rods in the North and South 1/4 line; thence West 14 rods; thence Northwesterly to the point of beginning. ALSO EXCEPT North 417.42 feet of West 417.42 feet of Northwest 1/4 of Section 1. Also commencing at South 1/4 corner of Section 1; thence North 86 degrees 49 minutes 07 seconds West 1214.13 feet; thence North 02 degrees 07 minutes 34 seconds East 2597.57 feet to point of beginning; thence continue North 02 degrees 07 minutes 34 seconds East 42.92 feet; thence South 86 degrees 18 minutes 02 seconds East 1159.09 feet; thence South 00 degrees 55 minutes 22 seconds West 78.75 feet; thence North 84 degrees 32 minutes 15 seconds West 1162.27 feet to the point of beginning. Being part of the West 1/2 of Section 1, Town 2 South, Range 6 East.

Client Reference: 4984 E Joy Rd, Ann Arbor, MI 48105

NO PROPOSED DEED RESTRICTIONS AND EASEMENTS

NO KNOWN EXISTING DEED RESTRICTIONS

EXISTING ROAD EASEMENTS ARE ALONG JOY ROAD AND EARHART ROAD



NAME, ADDRESS, AND ZONING CLASSIFICATION OF ADJACENT PROPERTIES

ID	OWNER NAME	PROPERTY ADDRESS	ZONING CLASSIFICATION
1	HUFNAGEL ALAN M & MICHELE E	5085 EARHART RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
2	SPIRITUS SANCTUS ACADEMY	4101 E JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
3	SPIRITUS SANCTUS ACADEMY	4225 E JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
4	SPIRITUS SANCTUS ACADEMY	4257 E JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
5	DF LAND DEVELOPMENT, LLC	4451 E JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
6	STRAUCH-PHELPS KATHLEEN	E JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
7	BEAGLE JOSEPH L & MARY P TRUSTEES	4650 JOY RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
8	DF LAND DEVELOPMENT	4715 RIDGE CREEK LANE, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
9	DF LAND DEVELOPMENT	4700 GRANDEUR OAKS, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
10	GOPALSAMY, SATHURAPPAN	4687 GRANDEUR OAKS, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
11	GILLILAND DANIEL P & BETTYANN	EARHART RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
12	NICKLOWITZ MICHAEL & GAIL	4460 EARHART RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
13	DOMINOS FARMS HOLDING MILLER PROPERTY	4485 EARHART RD, ANN ARBOR, MICHIGAN, 48105	A-1, GENERAL AGRICULTURE
14	HOTZ SCOTT & JILL	4525 EARHART RD, ANN ARBOR, MICHIGAN, 48105	RC, RECREATION CONSERVATION
15	WIEMER GAIL B	EARHART RD, ANN ARBOR, MICHIGAN, 48105	RC, RECREATION CONSERVATION
16	BUNCH RICHARD J & AMY S	4989 EARHART RD, ANN ARBOR, MICHIGAN, 48105	RC, RECREATION CONSERVATION
17	BURLINGAME WILLIAM	EARHART RD, ANN ARBOR, MICHIGAN, 48105	RC, RECREATION CONSERVATION
18	BURLINGAME WILLIAM H & CARRIE	4004 E JOY RD, ANN ARBOR, MICHIGAN, 48105	RC, RECREATION CONSERVATION

INDEX OF FIGURES

FIGURE NUMBER	FIGURE TITLE
1	COVER
2A	EXISTING CONDITIONS
2B	EXISTING CONDITIONS WITH AERIAL BASEMAP
3A	MINING OPERATIONS PLAN
3B	CONCEPTUAL EXAMPLE OF MINING AND RECLAMATION PROGRESSION
3C	CONCEPTUAL EXAMPLE OF MINING AND RECLAMATION PROGRESSION
4	PROPOSED CONCEPTUAL RECLAMATION
5	TYPICAL FENCE AND SIGN DETAILS

FIGURE 1

PLAN DATE: FEBRUARY 11, 2020
PROJECT NAME: AMC-WSG, LLC.
TOWNSHIP ID NUMBER:

RESIDENCE
128'-7"
EARHART ROAD (66' WIDE, DIRT)
JOY ROAD (66' WIDE, DIRT)
122'-1"
89'-2"
124'-4"
111'-4"
SCHOOL
RESIDENCE
44'-3"
68'-0"
RESIDENCE
Br
WawabE
WawabC
WawabB
WawabE
WawabB
WOODED AREA
N87°17'16"E 2087.14'
OHW
WawabC
OHW
Br
WawabE
WawabB
N00°07'52"E 417.42'
OHW
WETLAND
N87°17'16"E 417.43'
OHW
Hn
PROPOSED LOCATION OF DIVERSION BERM TO MANAGE STORMWATER
SEPTIC FIELD
TRASH STORAGE
Gf
POLE BARN
OFFICE TRAILER
POTABLE WATER WELL
OPEN SHED
S17°20'07"E 881.76'
N87°17'16"E 231.00'
WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT
NO EASTMENT FOR OVERHEAD ELECTRIC AND COMMUNICATION LINES AND GUY POLES
POND
POND
Hn
PROPOSED LOCATION OF DIVERSION BERM TO MANAGE STORMWATER
W
HN
BnF
MINE PIT
PROCESSING AREA
WOODED AREA
EARHART ROAD (66' WIDE, DIRT)
N00°07'52"E 1726.49'
OHW
OHW
OHW
E
BnC
HAUL ROAD
HAUL ROAD
WawabC
S00°30'52"E 1726.66'
ADVERTISING SIGN
W
WawabB
Gp
MINE PIT
BnF
AGRICULTURE
POND
WawabD
12 Ft. X 28 Ft. Wide MBT/Edison Easement
12 Ft. Wide MBT/Edison Easement
N87°47'03"W 1732.55'
N00°38'52"E 42.92'
S00°33'12"E 78.75'
12 Ft. Wide MBT/Edison Easement
MBT/EDISON 12-FOOT EASEMENT
N86°01'17"W 1182.27'
RESIDENCE
52'-5"
RESIDENCE
WawabC
WawabB
WawabC
WOODED AREA
100'-10"

LEGEND:

- DOWNWARD FACING LIGHT (POLE BARN)
- EXISTING MAJOR CONTOUR INTERVAL (5 FOOT)
- EXISTING MINOR CONTOUR INTERVAL (1 FOOT)
- WETLANDS (NATIONAL WETLAND INVENTORY)
- EASEMENT
- DIVERSION BERM (MANAGE STORMWATER)
- WATERWAY (NATIONAL HYDROGRAPHY)
- PROPOSED MINING BOUNDARY / AREA TO BE DISTURBED
- HAUL ROADS (GRAVEL)
- PROCESSING AREA
- BARBED WIRE FENCE
- SURFACE WATER FLOW DIRECTION
- WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT (140.04 ACRES)
- USDA SOILS SURVEY (SEE TYPES BELOW)

PeB

SOIL TYPES:

BnB, BnC, BnE, BnF	Boyer loamy sand
Br	Brookston loam
CoF	Conover loam
Gf	Gilford sandy loam
Gp	Gravel Pit
Hn	Houghton muck
MmF	Miami loam
WawabB, WawabC, WawabD, WawabE	Wawasee loam

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.
2. BASEMAP DEVELOPED BY AUTODESK IMAGERY, WHICH USES BING MAPS IMAGE SERVICE
3. SOILS SURVEY WAS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE WEB SOIL SURVEY INTERACTIVE MAP, 02-06-2020
4. THERE ARE NO KNOWN USGS BENCHMARKS LOCATED ON THE SITE

N
W
E
S

0 75' 150' 300' 450'
SCALE IN FEET 1" = 150'

NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION, OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

AMC-WSG, LLC

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com | 616-956-6123
601 Fifth Street NW Suite 102
Grand Rapids, MI 49504

PREPARED FOR:
MID MICHIGAN MATERIALS
6966 FISHER ROAD
JEDDO, MICHIGAN 48032

PROJ MGR: LMN	REVIEWED BY: MAD	CHECKED BY: MJK	FIGURE 2A
DESIGNED BY: MJK	DRAWN BY: ANE	SCALE: AS SHOWN	
DATE: FEBRUARY, 2020	PROJECT NO. 16.0062936.02	REVISION NO. 0	SHEET NO. 2 OF 8

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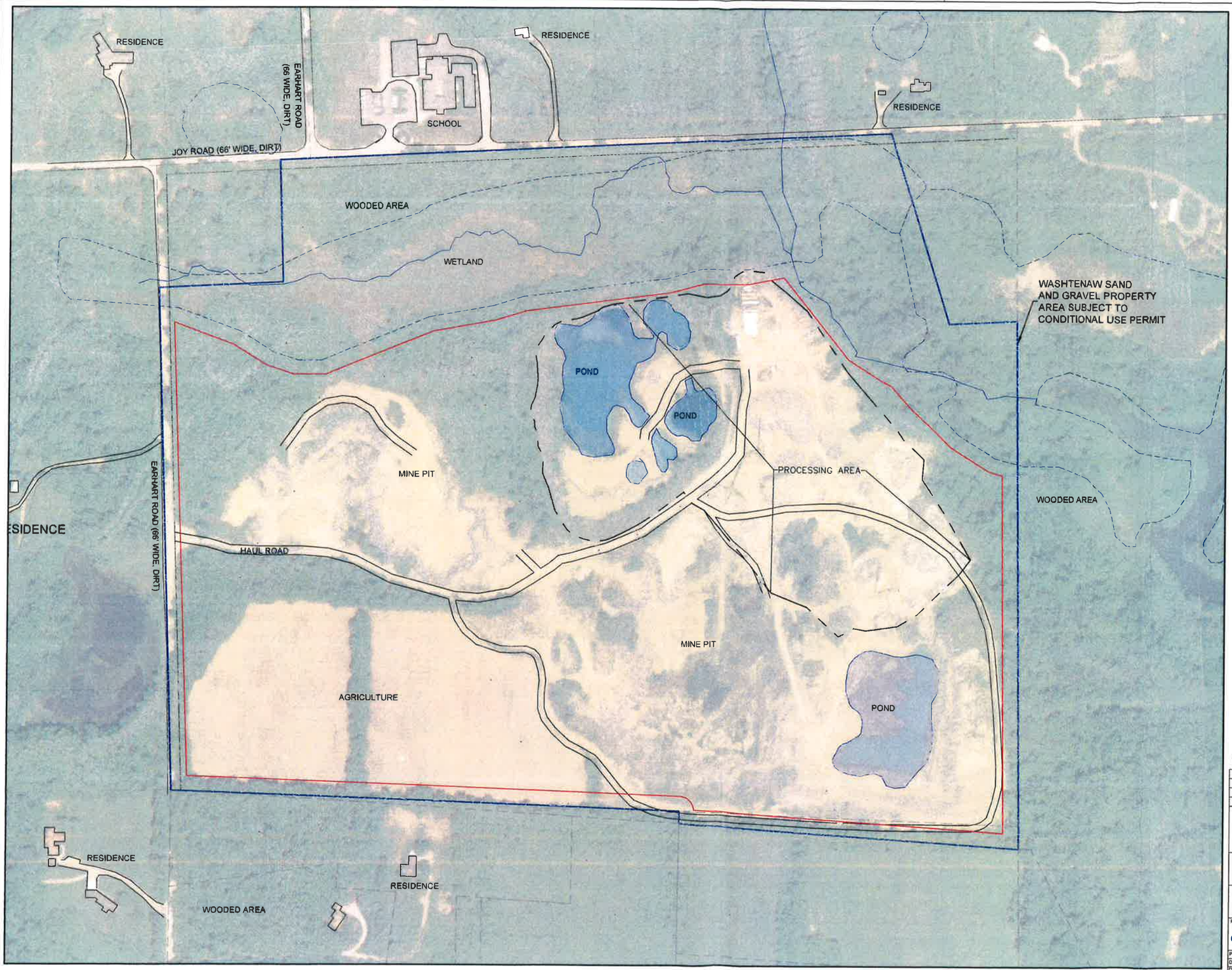

LEGEND:

- EXISTING MAJOR CONTOUR INTERVAL (5 FOOT)
- EXISTING MINOR CONTOUR INTERVAL (1 FOOT)
- WETLANDS
- EASEMENT
- WATERWAY
- PROPOSED MINING BOUNDARY / AREA TO BE DISTURBED
- HAUL ROADS (*GRAVEL*)
- PROCESSING AREA
- WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT (144 ACRES)

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.
2. BASEMAP DEVELOPED BY AUTODESK IMAGERY, WHICH USES BING MAPS IMAGE SERVICE
3. SOILS SURVEY WAS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE WEB SOIL SURVEY INTERACTIVE MAP, 02-06-2020
4. THERE ARE NO KNOWN USGS BENCHMARKS LOCATED ON THE SITE

N
W E
S

0 75' 150' 300' 450'
SCALE IN FEET 1" = 150'

NO.	ISSUE/DESCRIPTION	BY	DATE

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WSG-AMC, LLC

EXISTING CONDITIONS WITH AERIAL BASEMAP

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Grand Rapids, MI 49504

PREPARED FOR:
MID MICHIGAN MATERIALS
6986 FISHER ROAD
JEDDO, MICHIGAN 48032

PROJ MGR.	LMN	REVIEWED BY:	MAD
DESIGNED BY:	MAD	DRAWN BY:	ANE
DATE:	FEBRUARY, 2020	PROJECT NO.	16.0062936.02
CHECKED BY:	MJK	FIGURE	2B
SCALE:	AS SHOWN		
REVISION NO.	0	SHEET NO. 3 OF 8	

©2020 - GZA GeoEnvironmental, Inc. - C:\GZA\GIS\LIVE\2020\62936\MXD\62936.02 - WASHTENAW CUP EXISTING\MXD\[62936.02_WASHTENAW_EXISTING.MXD] - LAST EDITED FEBRUARY 11, 2020 12:20 PM MICHAEL.DONATO

JOY ROAD (66' WIDE, DIRT)

EARHART ROAD (66' WIDE, DIRT)

WASH WATER POND

50'-0" WETLANDS BUFFER

WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT

PROCESSING AND STOCKPILE AREA

AREA TO BE DISTURBED

HAUL ROAD

EARHART ROAD (66' WIDE, DIRT)

A

B

C

D

E

F

G

H

LEGEND:

- PROPERTY BOUNDARY
- WETLANDS
- EASEMENT
- WATERWAY
- PROCESSING AREA
- ROADS
- AREA TO BE DISTURBED
- A — ANTICIPATED MINING PHASE WITH MINING DIRECTION (2-5 YEARS PER PHASE AT APPROXIMATELY 300,000 TONS)

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.
2. BASEMAP DEVELOPED BY AUTODESK IMAGERY, WHICH USES BING MAPS IMAGE SERVICE
3. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.

N W E S

0 75' 150' 300' 450'

SCALE IN FEET 1" = 150'

NO.	ISSUE/DESCRIPTION	BY	DATE

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AMC-WSG, LLC

MINING OPERATIONS PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
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601 Fifth Street NW Suite 102
Grand Rapids, MI 49504

PREPARED FOR:
MID MICHIGAN MATERIALS
6888 FISHER ROAD
JEDDO, MICHIGAN 48032

PROJ MGR: LMN	REVIEWED BY: MJK	CHECKED BY: MAD	FIGURE 3A
DESIGNED BY: MJK	DRAWN BY: ANE	SCALE: AS SHOWN	
DATE: FEBRUARY, 2020	PROJECT NO. 16.0062936.02	REVISION NO. 0	SHEET NO. 4 OF 8

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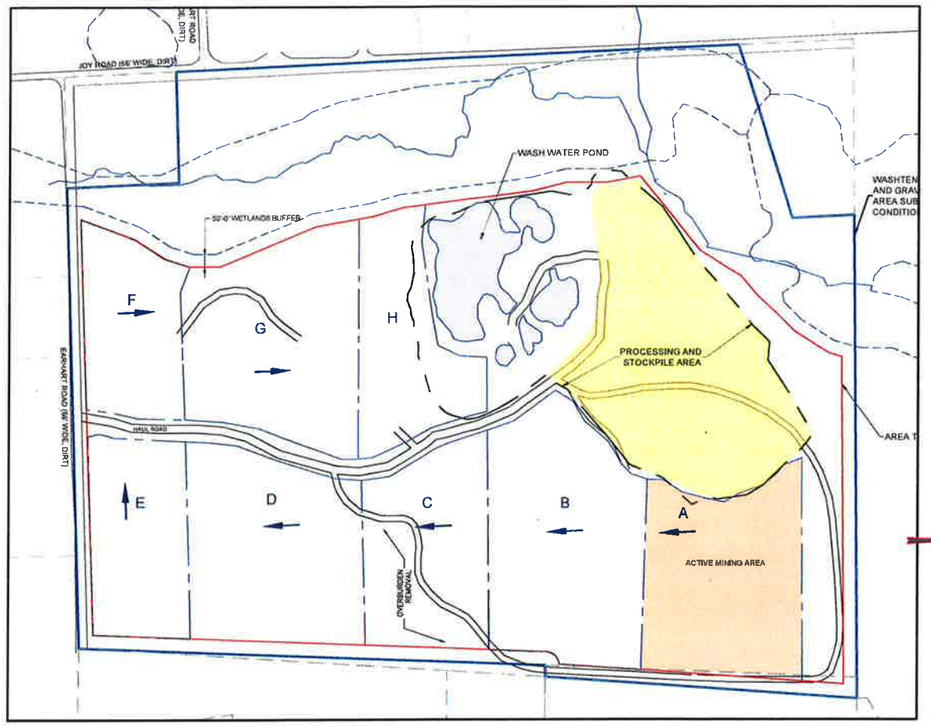

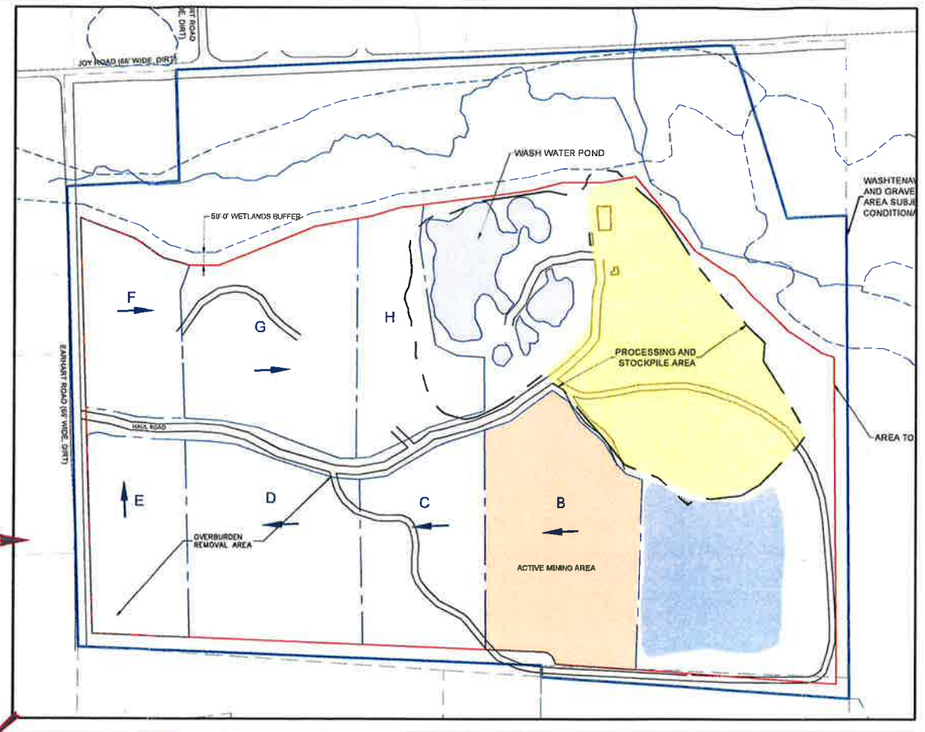

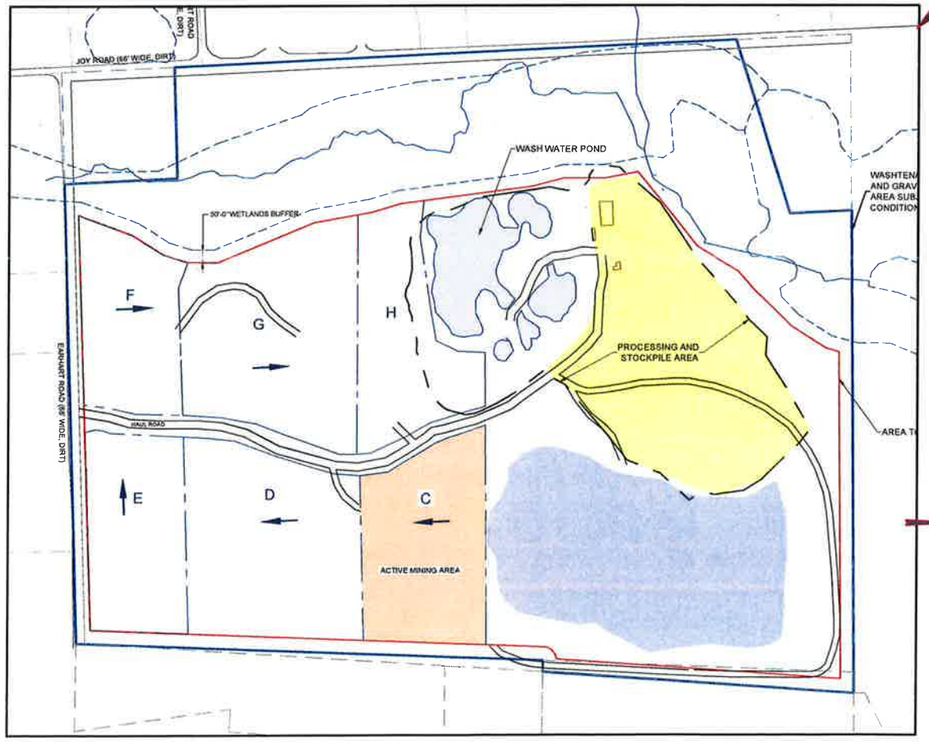

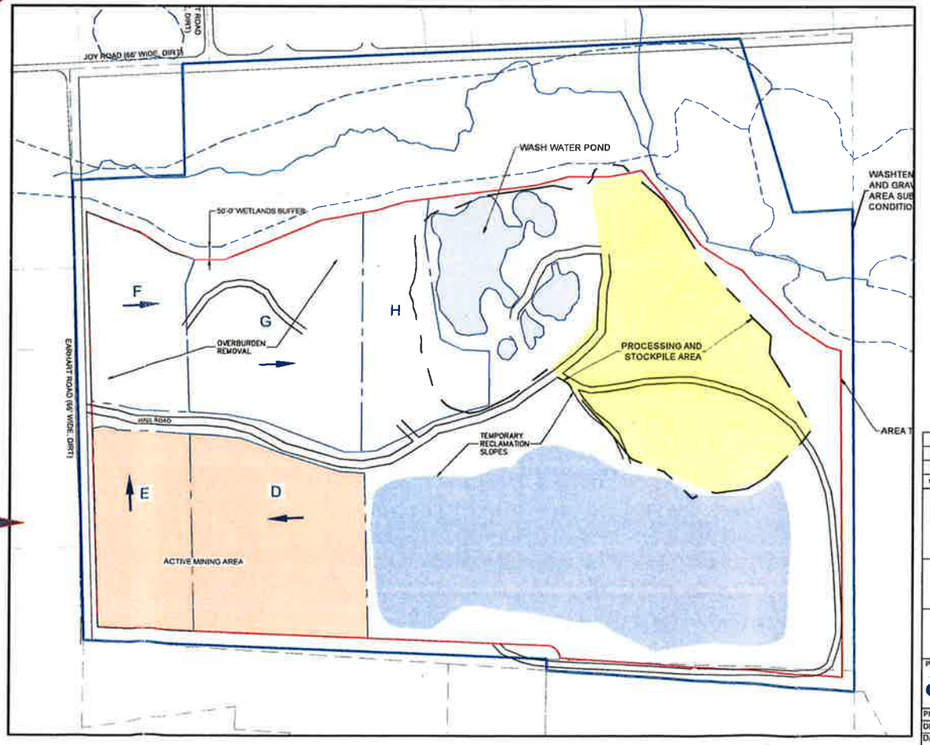

LEGEND:

- PROPERTY BOUNDARY
- WETLANDS
- EASEMENT
- WATERWAY
- PROCESSING AREA
- ROADS
- AREA TO BE DISTURBED
- A — ANTICIPATED MINING PHASE (2-5 YEARS) (APPROXIMATELY 500,000 TONS)
- ACTIVE MINE AREA
- RECLAMATION AREA (WATER BODY)
- PROCESSING AREA

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.
2. BASEMAP DEVELOPED BY AUTODESK IMAGERY, WHICH USES BING MAPS IMAGE SERVICE
3. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
4. ACTIVE MINING PHASE TO LAST APPROXIMATELY 2-5 YEARS, DEPENDENT ON VOLUME EXTRACTED
5. RECLAMATION AREA MATERIALS WILL INCLUDE CLAY OVERBURDEN, UNMARKETABLE MATERIALS, WASH POND FINES AND TOPSOIL

N W E S

NO.	ISSUE/DESCRIPTION	BY	DATE

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AMC-WSG, LLC

CONCEPTUAL EXAMPLE OF MINING AND RECLAMATION PROGRESSION

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
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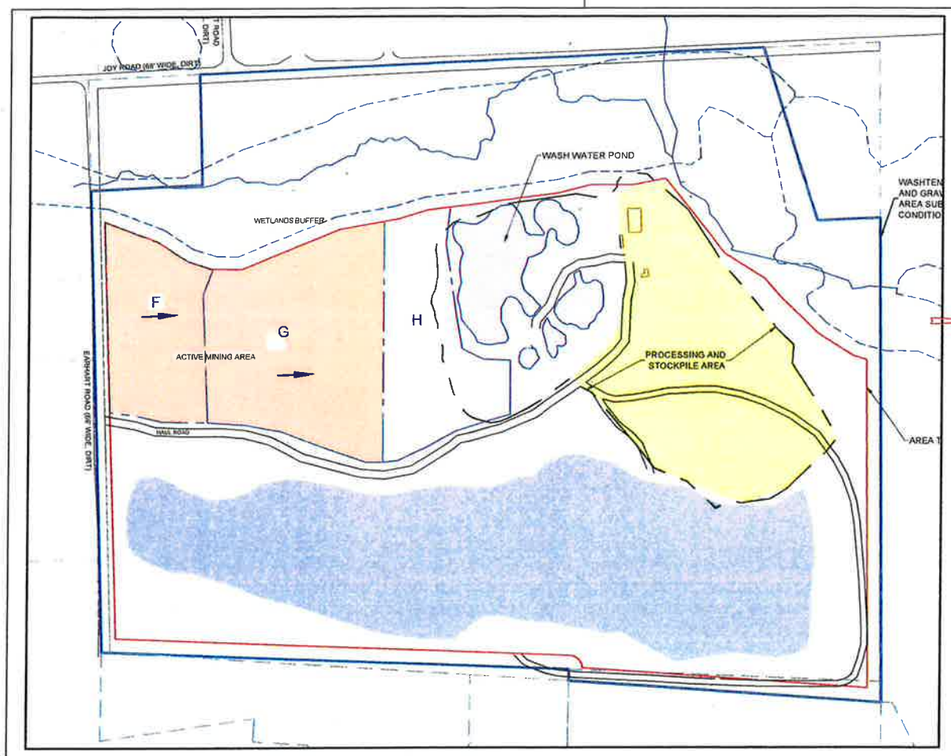
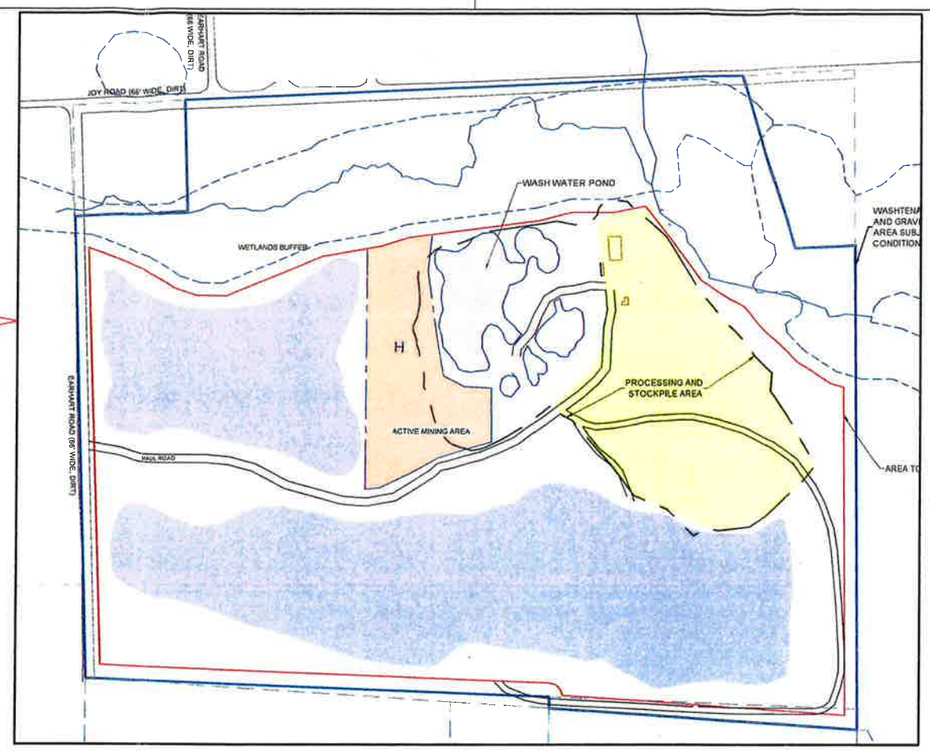
601 Fifth Street NW Suite 102
Grand Rapids, MI 49504

PREPARED FOR:
MID MICHIGAN MATERIALS
6986 FISHER ROAD
JEDDO, MICHIGAN 48032

PROJ MGR: MAD	REVIEWED BY: MJK	CHECKED BY: MAW	FIGURE 3B
DESIGNED BY: MJK	DRAWN BY: ANE	SCALE: NOT TO SCALE	
DATE: FEBRUARY, 2020	PROJECT NO. 16.0062936.02	REVISION NO. 0	SHEET NO. 9 OF 9

©2020 - GZA GeoEnvironmental, Inc. - C:\USERS\MJOHNSON\DOCUMENTS\PROJECTS\MMC\A33934.02_MIDMITIGATION_SITEPLAN.DWG 3B - MMWG FEBRUARY 11, 2020 12:41 PM MJOHNSON



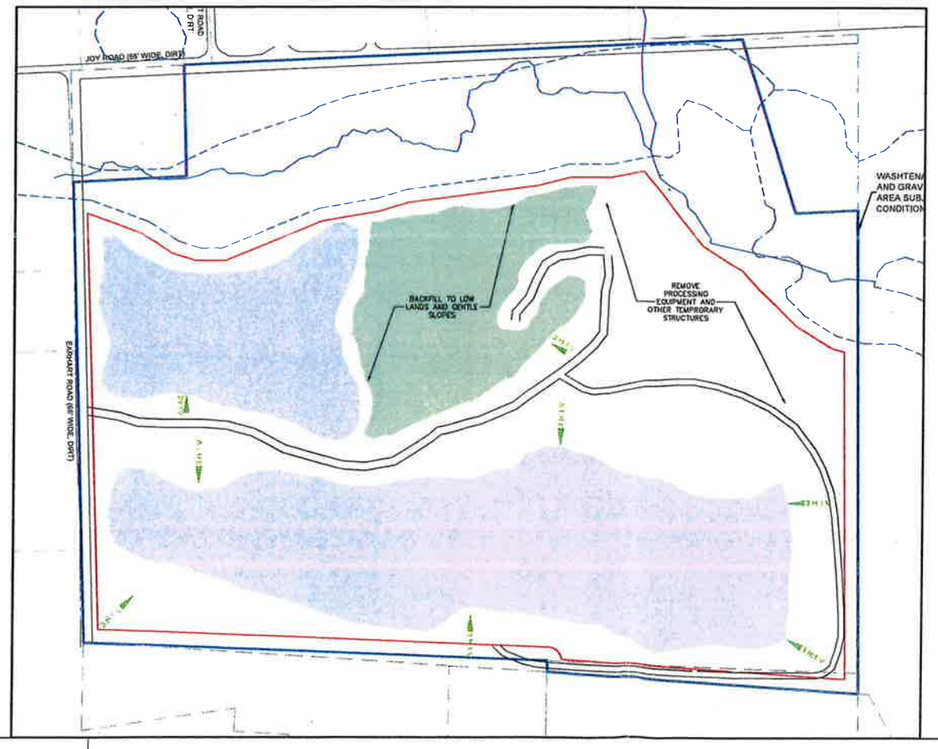


LEGEND:

- PROPERTY BOUNDARY
- WETLANDS
- EASEMENT
- WATERWAY
- PROCESSING AREA
- ROADS
- AREA TO BE DISTURBED
- A — ANTICIPATED MINING PHASE (2-5 YEARS) (APPROXIMATELY 500,000 TONS)
- ACTIVE MINE AREA
- RECLAMATION AREA (*WATER BODY*)
- PROCESSING AREA

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.
2. BASEMAP DEVELOPED BY AUTODESK IMAGERY, WHICH USES BING MAPS IMAGE SERVICE
3. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
4. ACTIVE MINING PHASE TO LAST APPROXIMATELY 2-5 YEARS, DEPENDENT ON VOLUME EXTRACTED
5. RECLAMATION AREA MATERIALS WILL INCLUDE CLAY OVERBURDEN, UNMARKETABLE MATERIALS, WASH POND FINES AND TOPSOIL



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NO.	ISSUE/DESCRIPTION	BY	DATE

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AMC-WSG, LLC

CONCEPTUAL EXAMPLE OF MINING AND RECLAMATION PROGRESSION

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com | 616-956-6123 601 Fifth Street NW Suite 102 Grand Rapids, MI 49504	PREPARED FOR: MID MICHIGAN MATERIALS 5966 FISHER ROAD JEDDO, MICHIGAN 48032
PROJ MGR: LMN · REVIEWED BY: MAD · CHECKED BY: MJK	FIGURE 3C
DESIGNED BY: MAD · DRAWN BY: ANE · SCALE: NOT TO SCALE	
DATE: FEBRUARY, 2020 · PROJECT NO. 16.0062936.02 · REVISION NO. 0	SHEET NO.: 5 OF 8

©2020 – GZA GeoEnvironmental, Inc. G:\16\00062936.02\CAD\DRAWINGS\00062936.02 - MODIFIED MMR CUP DEVELOPMENT\00062936.02_MODIFIED MMR_CUP_SITEPLAN.DWG 3C - MONDAY, FEBRUARY 11, 2020 12:43 PM MICHAEL SONDAG

JOY ROAD (66' WIDE, DIRT)

EARHART ROAD (66' WIDE, DIRT)

EARHART ROAD (66' WIDE, DIRT)

WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT

GRADE TO UP LANDS AND GENTLE SLOPES

GRADE TO GENTLE SLOPES AGRICULTURAL OR WILDLIFE HABITAT

3H:1V

3 H:1 V

3 H:1 V

3 H:1 V

3 H:1 V

3 H:1 V

LEGEND:

- PROPERTY BOUNDARY
- WETLANDS
- WATERWAY
- ROADS
- HAUL ROAD CONVERTED TO TRAVEL WAY
- AREA SUBJECT TO RECLAMATOIN
- RECLAMATION AREA (*WATER BODY*)
- PROPOSED UPLANDS

NOTES:

1. GENERAL PLANS WERE PROVIDED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC.

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NO.	ISSUE/DESCRIPTION	BY	DATE

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AMC-WSG, LLC

PROPOSED CONCEPTUAL RECLAMATION

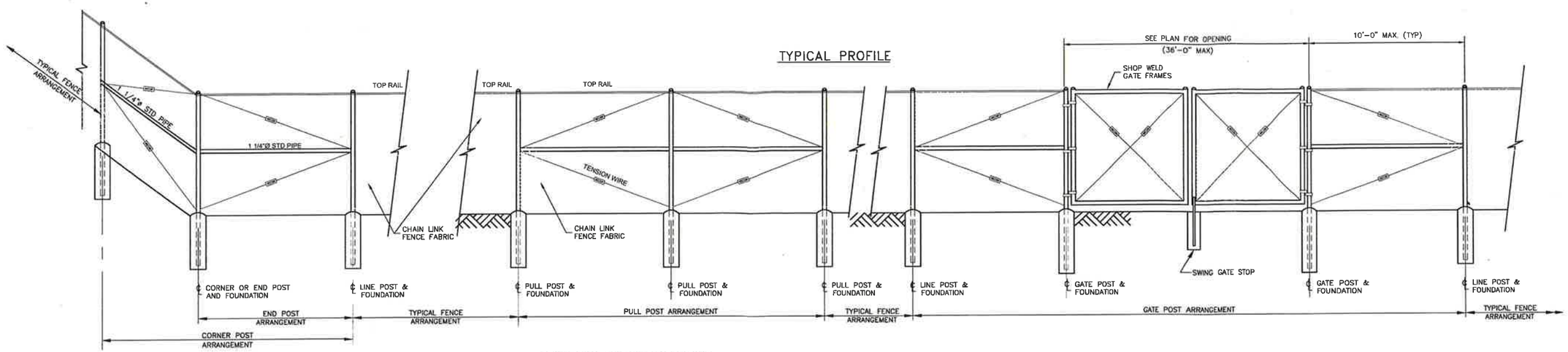
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com | 616-956-6123
803 Fifth Street NW Suite 102
Grand Rapids, MI 49504

PREPARED FOR:
MID MICHIGAN MATERIALS
6996 FISHER ROAD
JEDDO, MICHIGAN 48032

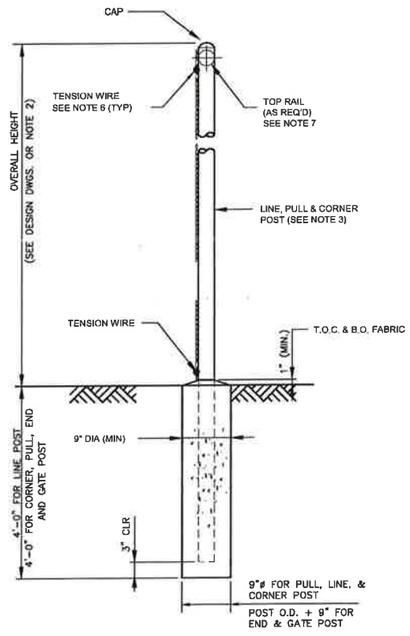
PROJ MGR: LMN	REVIEWED BY: MJK	CHECKED BY: MJK	FIGURE 4
DESIGNED BY: MAD	DRAWN BY: ANE	SCALE: NOT TO SCALE	
DATE: FEBRUARY, 2020	PROJECT NO. 18.0082936.02	REVISION NO. 0	SHEET NO. 7 OF 8

© 2020 GZA GeoEnvironmental, Inc. G:\...\NORTHWA CUP DEVELOPMENT\REVISED DWG\18293602-NORTHWA_SITEPLAN.DWG 4 RECLAMATION FEBRUARY 11, 2020 1:35 PM MICHAEL DEVLIETO

TYPICAL PROFILE



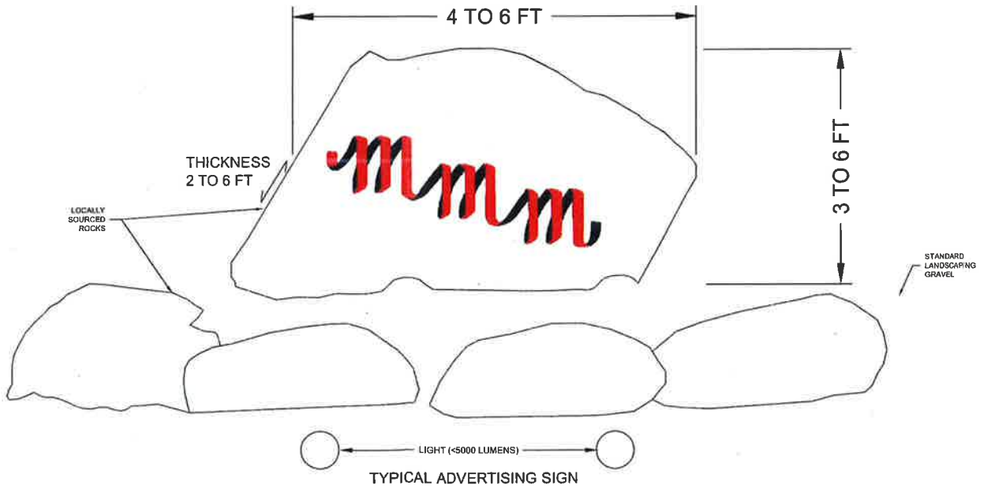
SWING GATE AND POST SCHEDULE		
TYPE OF GATE	WIDTH OF OPENING	GATE POST SIZE & WT PER FT
SINGLE SWING	UP TO 6'-0"	2 1/2"Ø STD PIPE
SINGLE SWING	6'-1" TO 13'-0"	3 1/2"Ø STD PIPE
SINGLE SWING	13'-1" TO 18'-0"	6"Ø STD PIPE
SINGLE SWING	WIDER THAN 18'-0"	8"Ø STD PIPE
DOUBLE SWING	UP TO 12'-0"	2 1/2"Ø STD PIPE
DOUBLE SWING	12'-1" TO 26'-0"	3 1/2"Ø STD PIPE
DOUBLE SWING	26'-1" TO 36'-0"	6"Ø STD PIPE
DOUBLE SWING	WIDER THAN 36'-0"	8"Ø STD PIPE



TYPICAL SECTION

FENCING SPECIFICATIONS

1. CODES AND OTHER REGULATIONS: FENCES TO CONFORM TO THE REQUIREMENTS OF ANY STATE OR LOCAL CODES HAVING JURISDICTION. THE MORE RIGID SPECIFICATION TO GOVERN IN CASE ONE CODE CONFLICTS WITH ANOTHER, OR WITH ANY PART OF THIS SPECIFICATION.
2. FENCE TO HAVE A HEIGHT OF 6'-0" (ANN ARBOR TOWNSHIP) OVERALL, UNLESS THE DEGREE OF ELECTRICAL HAZARD REQUIRES A HIGHER FENCE FOR PERSONNEL PROTECTION. FABRIC TO BE 2" MESH CHAIN LINK OF #11 GAUGE WIRE WITH TOP AND BOTTOM SELVAGES. ALL FABRIC AND OTHER STEEL PARTS TO BE GALVANIZED TO CONFORM TO NOTE 11 OF THIS SPECIFICATION.
3. POST TO BE PLACED NOT MORE THAN 10'-0" ON CENTERS. PULL AND LINE POSTS TO BE A 1 1/4" DIA. STD. PIPE. END AND CORNER POST TO BE 2" O.D. STD. PIPE FOR SWING GATE POST. SEE SCHEDULE THIS DRAWING. FOR PULL AND GATE POSTS SIZES SEE SCHEDULE (THIS DWG).
4. SLIDE GATE POSTS: SLIDE GATES UP TO 30'-0" OPENINGS TO HAVE POSTS MADE OF 2 1/4" DIA. STD. PIPE. SLIDE GATES WIDER THAN 30'-0" TO HAVE POSTS MADE OF 6 " DIA. STD. PIPE.
5. POST SETTING: ALL POSTS TO BE EMBEDDED IN CONCRETE AS SHOWN ON TYPICAL SECTION.
6. TOP AND BOTTOM TENSION WIRE TO BE #7 GAUGE COILED SPRING TENSION WIRE. FASTEN TO FABRIC WITH PIG RINGS AT 2'-0" INTERVALS.
7. TOP RAIL TO BE 1 1/4" DIA. STD. PIPE AND TO PASS THROUGH BASE OF LINE POST TOPS AND FORM A CONTINUOUS BRACE FROM END TO END STRAIGHT RUN OF FENCE AND TO BE SECURELY FASTENED TO TERMINAL POSTS.
8. GATE FRAMES: FRAMES TO BE MADE OF 1 1/2" DIA. STD. PIPE. GATES TO BE FURNISHED WITH ALL NECESSARY HARDWARE, INCLUDING HEAVY LOCKING DEVICE AND HOLD-BACK DEVICE, AND OTHERWISE TO CONFORM TO FENCE IN WHICH IT IS TO BE INSTALLED.
9. EXTENSION ARMS TO BE PRESSED STEEL FOR LINE POSTS AND HEAVY GALVANIZED MALLEABLE IRON AT CORNER POSTS. THESE ARMS TO BE OF SUFFICIENT STRENGTH TO WITHSTAND A WEIGHT OF 200 LBS. APPLIED AT OUTER STRAND OF BARBED WIRE. GATE AND END POSTS TO BE A MINIMUM OF 12" HIGHER THAN THE FABRIC FOR FENCES WITH BARBED WIRE EXTENSION. ALL POSTS WITHOUT EXTENSION OR OTHER END FITTINGS TO HAVE CAPS.
10. FABRIC BANDS: THE FABRIC TO BE FASTENED TO THE LINE POSTS WITH BANDS OF 11 GAUGE WIRE, SPACED AT ABOUT 14" ON CENTER, AND TO THE TOP RAIL WITH 11 GAUGE WIRE AT ABOUT 24" CENTERS. THE WIRE TO BE GALVANIZED STEEL. AT END, CORNER, AND GATE POSTS, THE FABRIC TO BE FASTENED WITH GALVANIZED STRAPS CONNECTED TO A STIFFENING BAR LACED THROUGH THE END LINK'S OF THE MESH. THE STRAPS AND BAR TO BE MANUFACTURER'S STANDARD.
11. GALVANIZING:
    A. FABRIC TO BE HOT-DIP GALVANIZED AFTER WEAVING AND TO HAVE MINIMUM COATING OF 1.2 OUNCES OF ZINC PER SQUARE FOOT OF UNCOATED WIRE SURFACE. OR, AS AN ALTERNATE, MAY BE BETHANIZED "B" ELECTROLYTICALLY COATED WITH PURE ZINC, 1.2 OUNCES PER SQUARE FOOT OR WIRE SURFACE.
    B. ALL OTHER STEEL PARTS TO BE GALVANIZED WITH ASTM A-120, ASTM 1-121, ASTM A-123 OR 1-153 WHICHEVER IS APPLICABLE.
    C. ANY WELDING TO GALVANIZED MATERIAL TO BE GROUND AND CLEAN BEFORE WELDING AND HAND PAINTED. GALVANIZED WHEN WORK IS COMPLETED.



TYPICAL ADVERTISING SIGN

NO.	ISSUE/DESCRIPTION	BY	DATE

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AMC-WSG, LLC
CONDITIONAL USE PERMIT & CUP APPLICATION
ANN ARBOR, MICHIGAN

TYPICAL FENCE AND SIGN DETAILS

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MID MICHIGAN MATERIALS 6986 FISHER ROAD JEDDO, MICHIGAN 48032	
PROJ MGR: LMN	REVIEWED BY: MJK	CHECKED BY: MJK	FIGURE 5
DESIGNED BY: MAD	DRAWN BY: MAD	SCALE: NOT TO SCALE	
DATE: FEBRUARY, 2020	PROJECT NO. 16.0062936.02	REVISION NO. 0	SHEET NO. 8 OF 8

©2020 - GZA GeoEnvironmental, Inc. G:\16\0062936\02\Drawings\Figures\CAD Documents\Figures\Fig5_Typical Fence and Sign Details.dwg 2-26 FEBRUARY 11, 2020 12:58 PM MICHAEL EDWARDS

APPENDIX A

THANK YOU FOR MAKING US YOUR PARTNER.

About Amrock Commercial

Amrock delivers innovative solutions to streamline the real estate experience for lenders, property owners and real estate professionals nationwide. From single properties to complex portfolio transactions, our experienced Commercial team can handle all your title and escrow needs.

(800) 594-1044 | commercial@amrock.com | amrock.com

COMMITMENT FOR TITLE INSURANCE
ISSUED BY
FIRST AMERICAN TITLE INSURANCE COMPANY TITLE INSURANCE COMPANY

NOTICE

IMPORTANT—READ CAREFULLY: THIS COMMITMENT IS AN OFFER TO ISSUE ONE OR MORE TITLE INSURANCE POLICIES. ALL CLAIMS OR REMEDIES SOUGHT AGAINST THE COMPANY INVOLVING THE CONTENT OF THIS COMMITMENT OR THE POLICY MUST BE BASED SOLELY IN CONTRACT.

THIS COMMITMENT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACONTRACTUAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

THE COMPANY'S OBLIGATION UNDER THIS COMMITMENT IS TO ISSUE A POLICY TO A PROPOSED INSURED IDENTIFIED IN SCHEDULE A IN ACCORDANCE WITH THE TERMS AND PROVISIONS OF THIS COMMITMENT. THE COMPANY HAS NO LIABILITY OR OBLIGATION INVOLVING THE CONTENT OF THIS COMMITMENT TO ANY OTHER PERSON.

COMMITMENT TO ISSUE POLICY

Subject to the Notice; Schedule B, Part I—Requirements; Schedule B, Part II—Exceptions; and the Commitment Conditions, First American Title Insurance Company (the "Company"), commits to issue the Policy according to the terms and provisions of this Commitment. This Commitment is effective as of the Commitment Date shown in Schedule A for each Policy described in Schedule A, only when the Company has entered in Schedule A both the specified dollar amount as the Proposed Policy Amount and the name of the Proposed Insured.

If all of the Schedule B, Part I—Requirements have not been met within 180 after the Commitment Date, this Commitment terminates and the Company's liability and obligation end.

COMMITMENT CONDITIONS

1. DEFINITIONS

(a) "Knowledge" or "Known": Actual or imputed knowledge, but not constructive notice imparted by the Public Records.

(b) "Land": The land described in Schedule A and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is to be insured by the Policy.

(c) "Mortgage": A mortgage, deed of trust, or other security instrument, including one evidenced by electronic means authorized by law.

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(d) "Policy": Each contract of title insurance, in a form adopted by the American Land Title Association, issued or to be issued by the Company pursuant to this Commitment.
(e) "Proposed Insured": Each person identified in Schedule A as the Proposed Insured of each Policy to be issued pursuant to this Commitment.
(f) "Proposed Policy Amount": Each dollar amount specified in Schedule A as the Proposed Policy Amount of each Policy to be issued pursuant to this Commitment.
(g) "Public Records": Records established under state statutes at the Commitment Date for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge.
(h) "Title": The estate or interest described in Schedule A.

2. If all of the Schedule B, Part I—Requirements have not been met within the time period specified in the Commitment to Issue Policy, this Commitment terminates and the Company's liability and obligation end.

3. The Company's liability and obligation is limited by and this Commitment is not valid without:
(a) the Notice;
(b) the Commitment to Issue Policy;
(c) the Commitment Conditions;
(d) Schedule A;
(e) Schedule B, Part I—Requirements; [and]
(f) Schedule B, Part II—Exceptions[; and
(g) a counter-signature by the Company or its issuing agent that may be in electronic form].

4. COMPANY'S RIGHT TO AMEND
The Company may amend this Commitment at any time. If the Company amends this Commitment to add a defect, lien, encumbrance, adverse claim, or other matter recorded in the Public Records prior to the Commitment Date, any liability of the Company is limited by Commitment Condition 5. The Company shall not be liable for any other amendment to this Commitment.

5. LIMITATIONS OF LIABILITY
(a) The Company's liability under Commitment Condition 4 is limited to the Proposed Insured's actual expense incurred in the interval between the Company's delivery to the Proposed Insured of the Commitment and the delivery of the amended Commitment, resulting from the Proposed Insured's good faith reliance to:
  (i) comply with the Schedule B, Part I—Requirements;
  (ii) eliminate, with the Company's written consent, any Schedule B, Part II—Exceptions; or
  (iii) acquire the Title or create the Mortgage covered by this Commitment.
(b) The Company shall not be liable under Commitment Condition 5(a) if the Proposed Insured requested the amendment or had Knowledge of the matter and did not notify the Company about it in writing.
(c) The Company will only have liability under Commitment Condition 4 if the Proposed Insured would not have incurred the expense had the Commitment included the added matter when the Commitment was first delivered to the Proposed Insured.
(d) The Company's liability shall not exceed the lesser of the Proposed Insured's actual expense incurred in good faith and described in Commitment Conditions 5(a)(i) through 5(a)(iii) or the Proposed Policy Amount.

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(e) The Company shall not be liable for the content of the Transaction Identification Data, if any.

(f) In no event shall the Company be obligated to issue the Policy referred to in this Commitment unless all of the Schedule B, Part I—Requirements have been met to the satisfaction of the Company.

(g) In any event, the Company's liability is limited by the terms and provisions of the Policy.

6. LIABILITY OF THE COMPANY MUST BE BASED ON THIS COMMITMENT

(a) Only a Proposed Insured identified in Schedule A, and no other person, may make a claim under this Commitment.

(b) Any claim must be based in contract and must be restricted solely to the terms and provisions of this Commitment.

(c) Until the Policy is issued, this Commitment, as last revised, is the exclusive and entire agreement between the parties with respect to the subject matter of this Commitment and supersedes all prior commitment negotiations, representations, and proposals of any kind, whether written or oral, express or implied, relating to the subject matter of this Commitment.

(d) The deletion or modification of any Schedule B, Part II—Exception does not constitute an agreement or obligation to provide coverage beyond the terms and provisions of this Commitment or the Policy.

(e) Any amendment or endorsement to this Commitment must be in writing [and authenticated by a person authorized by the Company].

(f) When the Policy is issued, all liability and obligation under this Commitment will end and the Company's only liability will be under the Policy.

7. IF THIS COMMITMENT HAS BEEN ISSUED BY AN ISSUING AGENT

The issuing agent is the Company's agent only for the limited purpose of issuing title insurance commitments and policies. The issuing agent is not the Company's agent for the purpose of providing closing or settlement services.

8. PRO-FORMA POLICY

The Company may provide, at the request of a Proposed Insured, a pro-forma policy illustrating the coverage that the Company may provide. A pro-forma policy neither reflects the status of Title at the time that the pro-forma policy is delivered to a Proposed Insured, nor is it a commitment to insure.

9. ARBITRATION

The Policy contains an arbitration clause. All arbitrable matters when the Proposed Policy Amount is $2,000,000 or less shall be arbitrated at the option of either the Company or the Proposed Insured as the exclusive remedy of the parties. A Proposed Insured may review a copy of the arbitration rules at <http://www.alta.org/arbitration>.]

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COMMITMENT FOR TITLE INSURANCE

Issued by

First American Title Insurance Company

SCHEDULE A

1. **Commitment Date:** October 04, 2019, 8:00 AM

2. **Policy to be issued:**

   (a) Owner's Policy (6/17/06) $1,500,000.00 (Without Standard Exceptions)
   Proposed Insured: AMC - Mid Michigan Materials, LLC, a Michigan limited liability company

3. **The estate or interest in the land described or referred to in this Commitment is:**
   Fee Simple

4. **The Title Is, at the Commitment Date, vested In:**
   Washtenaw Sand and Gravel Co., a/k/a Washtenaw Sand & Gravel Co.

5. **The land referred to in this Commitment is described as follows:**

   Land situated in the Township of Ann Arbor, in the County of Washtenaw, in the State of Michigan

   (See Attached Exhibit A - Legal Description)

   Client Reference: 4984 E Joy Rd, Ann Arbor, MI 48105

This commitment is valid and binding for a period of 180 days from the date hereof. Thereafter it is void and of no effect.

Issued By: Amrock Inc.
MI
662 Woodward Ave.
Detroit, MI 48226
Phone: (800) 594-1044
Questions? Contact: Melissa Hohf
313-782-0362
Fax: 855-455-3543
Email: MelissaHohf@amrock.com
Website: www.amrock.com

Agent for: First American Title Insurance Company
Countersigned by: Amrock Inc.

By:

Brian D. Hughes, Agent
Authorized Signature

This page is only a part of a 2016 ALTA® Commitment for Title Insurance issued by First American Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

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SCHEDULE B - Part I
(Requirements)

All of the following Requirements must be met:

1. The Proposed Insured must notify the Company in writing of the name of any party not referred to in this Commitment who will obtain an interest in the Land or who will make a loan on the Land. The Company may then make additional Requirements or Exceptions.

2. Pay the agreed amount for the estate or interest to be insured.

3. Pay the premiums, fees, and charges for the Policy to the Company.

4. Documents satisfactory to the Company that convey the Title or create the Mortgage to be insured, or both, must be properly authorized, executed, delivered, and recorded in the Public Records.

5. The following are the requirements to be compiled with:
   A. Payment to, or for the account of, the sellers or mortgagors of the full consideration for the estate or interest to be insured.
   B. Instruments in insurable form which must be executed, delivered and duly filed for record.

6. NOTE: It has been requested by the Proposed Insured that the Company issue its Alta Policy without standard exceptions. The Alta Policy without standard exceptions shall be issued upon the Company determining that the following additional requirements have been satisfied.

   Submission of an affidavit in acceptable form executed by the present title holder establishing the following facts:

   That the present affiant is in possession of said property and has no knowledge of any other parties in possession or claiming rights of possession.

   That the affiant has no knowledge of the granting of any unrecorded water, mineral and/or oil rights, unrecorded easements or claims of easements, boundary line disputes, or claims of such grants or right relative thereto.

   Submit proper sworn statements and waivers showing payment or release of lien rights covering improvements made on subject land in the last 120 days or satisfactory proof that no improvements have been made within the last 120 days.

   Submit satisfactory survey by an approved surveyor, certified to the Company, showing no encroachments or adverse rights upon the subject property or any variation between the property description in this commitment and the survey description.

7. Submit proof that Washtenaw Sand and Gravel Co., a/k/a Washtenaw Sand & Gravel Co. is a duly registered entity capable of conveying real estate and a proper resolution of the Board of Directors authorizing the conveyance of the subject property and setting forth who has authority to execute the proposed Deed.

8. Record Deed from Washtenaw Sand and Gravel Co., a/k/a Washtenaw Sand & Gravel Co. to AMC - Mid Michigan Materials, LLC, a Michigan limited liability company.

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9. Unrecorded construction lien coverage will not be furnished pursuant to this Commitment unless the mortgagee, builder and/or owner has made satisfactory arrangements with the Company and received the Company's approval for such coverage. Relative to the approval process, certain documentation must be furnished to the Company for their review and approval. This documentation includes, but is not limited to, the construction contract and budget, financial statements of both borrowers and general contractor/builder, sworn statements and waivers of lien for contracts for any work performed to date, indemnifications, executed construction draw agreement and such other related documentation as the Company shall require.

10. Submit to the Company satisfactory evidence that the property to be insured herein is not subject to either a Commercial or Industrial Facility Tax as established under Act 198 of Public Acts of 1974 or Act 255 of Public Acts of 1978. Should either tax apply, submit evidence satisfactory to the Company that all such taxes have been paid.

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SCHEDULE B - PART II
(Exceptions)

THIS COMMITMENT DOES NOT REPUBLISH ANY COVENANT, CONDITION, RESTRICTION, OR LIMITATION CONTAINED IN ANY DOCUMENT REFERRED TO IN THIS COMMITMENT TO THE EXTENT THAT THE SPECIFIC COVENANT, CONDITION, RESTRICTION, OR LIMITATION VIOLATES STATE OR FEDERAL LAW BASED ON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, GENDER IDENTITY, HANDICAP, FAMILIAL STATUS, OR NATIONAL ORIGIN.

The Policy will not insure against loss or damage resulting from the terms and provisions of any lease or easement identified in Schedule A, and will include the following Exceptions unless cleared to the satisfaction of the Company:

1. Any defect, lien, encumbrance, adverse claim, or other matter that appears for the first time in the Public Records or is created, attaches, or is disclosed between the Commitment Date and the date on which all of the Schedule B, Part I—Requirements are met.

2. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land.

3. Rights or claims of parties in possession not shown by the Public Records.

4. Easements or claims of easements not shown by the Public Records.

5. Any lien or rights to lien for services, labor or material, heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

6. Taxes and assessments that have become a lien against the property but are not yet due and payable. The Company assumes no liability for tax increases occasioned by retroactive revaluation, changes in the land usage or loss of any exemption status for the insured premises.

7. Oil and Gas Lease in favor of Hunt Energy Corporation recorded January 9, 1981 in Liber 1788, Page 313.

8. Overhead and Underground Easement granted to Michigan Bell Telephone Company recorded January 30, 1981 in Liber 1790, Page 291.

9. Underground Easement granted to Michigan Bell Telephone Company recorded January 30, 1981 in Liber 1790, Page 295.

10. Easements disclosed in Warranty Deed recorded October 17, 1985 in Liber 2012, Page 369.

11. Oil and Gas Lease in favor of Houston Hunt recorded March 11, 1986 in Liber 2036, Page 252.

12. Rights of the public and other riparian owners in and to those portions of the subject property lying in the waters flowing through subject property.

13. Rights of the public and any governmental unit in any part of the land taken, deeded or used for street, road or highway purposes.

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14. Any provision contained in any instrument of record, which provisions pertain to the transfer of divisions under Section 109(3) of the Subdivision Control Act of 1967, as amended.

15. Rights of tenants now in possession of the land under unrecorded leases or otherwise.

16. Interest of others in oil, gas and mineral rights, if any, whether or not recorded in the Public Records.

17. Interest, if any, of the United States, State of Michigan, or any political subdivision thereof, in the oil, gas and minerals in and under and that may be produced from the captioned Land.

NOTE: Any map/plat that is furnished is only an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.

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EXHIBIT A - LEGAL DESCRIPTION

Tax Id Number(s): I-09-01-200-002

Land situated in the Township of Ann Arbor, in the County of Washtenaw, in the State of Michigan

The Northwest fractional 1/4 of Section 1, except beginning in the North line of section at a point which is 26 rods West of North 1/4 corner of Section 1; thence East 26 rods to North 1/4 corner of Section 1; thence South 40 rods in the North and South 1/4 line; thence West 14 rods; thence Northwesterly to the point of beginning. ALSO EXCEPT North 417.42 feet of West 417.42 feet of Northwest 1/4 of Section 1. Also commencing at South 1/4 corner of Section 1; thence North 86 degrees 49 minutes 07 seconds West 1214.13 feet; thence North 02 degrees 07 minutes 34 seconds East 2597.57 feet to point of beginning; thence continue North 02 degrees 07 minutes 34 seconds East 42.92 feet; thence South 86 degrees 18 minutes 02 seconds East 1159.09 feet; thence South 00 degrees 55 minutes 22 seconds West 78.75 feet; thence North 84 degrees 32 minutes 15 seconds West 1162.27 feet to the point of beginning. Being part of the West 1/2 of Section 1, Town 2 South, Range 6 East.

Client Reference: 4984 E Joy Rd, Ann Arbor, MI 48105

APPENDIX B

Known for excellence.
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STORMWATER MANAGEMENT PLAN
AMC-WSG, LLC
Ann Arbor Charter Township, Michigan

February 11, 2020
16.0062936.02

PREPARED FOR:

Mid Michigan Materials, Inc.
6966 Fisher Road
Jeddo, Michigan 48032

PREPARED BY:

GZA GeoEnvironmental, Inc.
601 Fifth Street NW, Suite 102 | Grand Rapids, Michigan 49504
616-956-6123

31 Offices Nationwide
www.gza.com

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ATTACHMENT A – STANDARD RUNOFF AND STORAGE CALCULATIONS

GZA GeoEnvironmental, Inc. (GZA) prepared this Stormwater Management Plan (SWMP) for Ajax Materials Corporation - Washtenaw Sand and Gravel, LLC (AMC-WSG, LLC doing business as Mid Michigan Materials, Inc. (MMM), for the mine property located at 4984 Earhart Road, Ann Arbor, Washtenaw County, Michigan (the "Site"). The SWMP was prepared in general accordance with Chapter 74 *Zoning* and Chapter 26, *Environment*. The SWMP references the Conditional Use Permit and Site Plan Application (the "Application") under which a Stormwater Management Plan is required. Refer to the Application for the Site Plan figures referenced throughout this document.

1 SITE INFORMATION

Site Name & Street Address	AMC-WSG, LLC 4984 Earhart Road Ann Arbor, Michigan
Township	Ann Arbor Charter Township
Section	Northwest portion of Section 1, Town 2 South, Range 6 East

The Site location is shown on the Cover Sheet, **Figure 1** of the Site Plan. The approximately 140-acre Site consists of one irregular-shaped parcel bounded by East Joy Road to the north and Earhart Road to the west. The Site is occupied by Washtenaw Sand & Gravel Company. Approximately 70 acres of the Site are developed with access road, maintenance, office, storage, processing and mining as depicted on **Figure 2**. The remaining areas of the Site are agricultural (row-crops), forested and wetlands.

Site soils as mapped by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) are provided on **Figure 2**.

2 EXISTING CONDITIONS

Figure 2 depicts the natural features at the Site and immediate vicinity. Worksheet 12, below, identifies existing natural resources as required by the *Washtenaw County Water Resources Commissioner Rules and Guidelines* (October 2016).

Worksheet 12 – Natural Features Inventory

Existing Natural Resources	**Mapped (yes, no, n/a)**	**Total Area (acres)**	**Protected/Undisturbed Area (acres)**
Waterbodies	No	0[1]	n/a
Floodplains	No	0	n/a
Riparian Areas	No	0	n/a
Wetlands	Yes	23	23
Woodlands	Yes	25	15
Natural Drainage Area	No	n/a	n/a
Steep Slopes, 15-25%	No	n/a	n/a
Steep Slopes, over 25%	No	n/a	n/a
Special Habitat Areas	No	n/a	n/a
Other	No	n/a	n/a
TOTAL EXISTING (ACRES)		**48**	**38**

1. Waterbodies onsite are active mine pits and not Natural Resources.

The disturbed area of the Site is internally drained with stormwater contained in the mine pits. Some stormwater is taken from one of the pits and used as wash water for washing gravel and recirculated to the mine in a closed loop system. There are no stormwater discharges or outlets from the Site to adjoining water resources. Historically the mine pits are believed to accommodate onsite stormwater runoff from every storm event, including specifically the 2-year/24-hour, 100-year, and 500-year storm events, without offsite migration of stormwater.

3 PROPOSED CONDITIONS

The Site mining areas will continue to be internally drained. The areas in agriculture use and forests will continue to allow stormwater to be overland flow and infiltration until the areas are mined.

Proposed Stormwater Management System

Figure 3 of the Design Plan depicts areas proposed for future mining which will continue to be internally drained. There are no proposed layouts and drainage areas for stormwater management infrastructure, or modifications to vicinity drainage so the Engineer's Certificate of Outlet is omitted from the SWMP. **Attachment A** includes the detention volume calculations and assessment that the proposed topography meets these requirements.

4 PROPOSED DOCUMENTATION

Easements, Maintenance Agreements, Performance Guarantees, And Construction Modifications

The need for easements, performance guarantees or construction modifications were not identified.

Proposed Inspection and Maintenance Plan

As mining progresses, the potential land where off-Site discharge of stormwater can originate decreases and the capacity of the mine pits to contain stormwater increases. The mine pits will remain after mining as one or more lake with no natural outlet. The Applicant affirms that they will be responsible for financing the inspection and maintenance of the mining property to identify and manage unmined areas with potential for off-Site migration of stormwater until the Site as reclaimed as shown in **Figure 4**.

5 REFERENCES

Washtenaw County Water Resources Commissioner Rules and Guidelines, Procedures and Design Criteria for Stormwater Management Systems, Issued August 6, 2014, Revised October 17, 2016.

Ann Arbor Township Ordinances, Chapter 26.

ATTACHMENT A – RUNOFF AND STORAGE CALCULATIONS

PART E. Standard Method Runoff Volume Calculations for the First Flush, Bankfull and 100-year Recurrence Rainfall Events

Contributing Drainage Area		PRE-DEVELOPMENT						POST-DEVELOPMENT				
		Grass Good Condition "B" HSG			First Flush Calcualtions (in)	Pre-Development Bankfull Calculations (in)	Pre-Development 100-year Calculations (in)	Assumed Water With Vegetate Setback			Post-Development Bankfull Calculations (in)	Post-Development 100-year Calculations (in)
		CN	S	RAINFALL DEPTH (IN)	1	2.35	5.11	CN	S	RAINFALL DEPTH (IN)	2.35	5.11
AREA 1 North												
AREA (SF)	633,362.4	61	6.39	RUNOFF (IN)		0.15	1.44	98	0.20	RUNOFF (IN)	2.12	4.87
AREA (Acres)	14.54											
				RUNOFF VOLUME (CF)	52,780	8,115	75,773			RUNOFF VOLUME (CF)	111,982	257,198
AREA 2 South												
AREA (SF)	1,486,267.2	61	6.39	RUNOFF (IN)		0.15	1.44	98	0.20	RUNOFF (IN)	2.12	4.87
AREA (Acres)	34.12											
RUNOFF VOLUME (CF)				RUNOFF VOLUME (CF)	123,856	19,043	177,811			RUNOFF VOLUME (CF)	262,781	603,548
AREA 3 West												
AREA (SF)	1,301,572.8	61	6.39	RUNOFF (IN)		0.15	1.44	98	0.20	RUNOFF (IN)	2.12	4.87
AREA (Acres)	29.9											
RUNOFF VOLUME (CF)				RUNOFF VOLUME (CF)	108,464	16,676	155,715			RUNOFF VOLUME (CF)	230,126	528,547
AREA 4 Remaining Area to be Mined												
AREA (SF)	1,326,837.6	61	6.39	RUNOFF (IN)		0.15	1.44	98	0.20	RUNOFF (IN)	2.12	4.87
AREA (Acres)	30.5											
RUNOFF VOLUME (CF)				RUNOFF VOLUME (CF)	110,570	17,000	158,737			RUNOFF VOLUME (CF)	234,593	538,807
TOTAL RUNOFF VOLUME (CF)						60,834	568,035				839,483	1,928,100

PART E. Standard Method Detention Requirements for the First Flush, Bankfull and 100-year Recurrence Rainfall Event

		PRE-DEVELOPMENT		
		First Flush Calcualtions	Pre-Development Bankfull Calculations	Pre-Development 100-year Calculations
TOTAL RUNOFF VOLUME (CF)		271,814	41,792	390,224
North POND				
SURFACE AREA (SF)	162,178.0			
SURFACE AREA (ACRES)	3.7			
Average Depth (FT)	6.0			
VOLUME (CF)	973,068.0			
DEPTH OF WATER STORED (FT)		1.68	0.26	2.41

TOTAL RUNOFF VOLUME		123,856	19,043	177,811
South POND				
SURFACE AREA (SF)	121,128.0			
SURFACE AREA (ACRES)	2.8			
Average Depth (FT)	6.0			
VOLUME (CF)	726,768.0			
DEPTH OF WATER STORED (FT)		1.02	0.16	1.47

		POST-DEVELOPMENT	
		Post-Development Bankfull Calculations	Post-Development 100-year Calculations
TOTAL RUNOFF VOLUME (CF)		839,483	1,928,100
Final POND			
SURFACE AREA (SF)	2,624,490.0		
SURFACE AREA (ACRES)	60.3		
Average Depth (FT)	6.0		
VOLUME (CF)	15,746,940.0		
DEPTH OF WATER STORED (FT)		0.32	0.73

APPENDIX C

Mark Krumenacher

From: Theresa M. Marsik <marsikt@washtenaw.org>
Sent: Friday, February 7, 2020 8:59 AM
To: 'moran@aatwp.org'; eric.humesky (eric.humesky@stantec.com)
Cc: Mark Krumenacher; Michael DeVasto
Subject: RE: Washtenaw Sand and Gravel 4984 Earhart Road

Mark and Eric,

We were informed that Washtenaw Sand and Gravel located at 4984 Earhart Road will be sold to a new owner. Since there are no plans to add impervious surface at the site and there is no county drain located on or adjacent to the site, no upgrade to the storm water management and no permit will be required by this office.

Let me know if you need anything further.

Thanks,

Theresa

Theresa M. Marsik, P.E.
Stormwater Engineer
Water Resources Commissioner's Office
705 N. Zeeb Rd., Ann Arbor, MI
Direct: (734) 222-6844
Office:(734) 222-6860
Fax: (734) 222-6803
marsikt@washtenaw.org
https://www.washtenaw.org/drains

How did we do?
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https://www.surveymonkey.com/r/WCWRCsurvey

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MATTHEW F. MacDONELL, P.E.
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COUNTY HIGHWAY ENGINEER

JAMES D. HARMON, P.E.
DIRECTOR OF OPERATIONS

DANIEL D. ACKERMAN
DIRECTOR OF FINANCE & IT

February 10, 2020

Mr. Robert Wilson
6966 Fisher Road
Jeddo, MI 48032

RE: Permit Application 16527
Proposed Haul Route – Earhart Road

Dear Mr. Wilson:

WCRC has reviewed your application for a designated haul route on Earhart Road from the entrance to property tax ID I -09-01-200-002 to M-14. Our comments are as follows:

1) Per the current edition of the AASHTO Geometric Design of Highways and Streets, 610 feet of sight distance shall be provided for southbound Earhart Road traffic approaching the existing driveway and 530 feet of sight distance for northbound traffic. Removal of the roadside earth berm and/or a change on the road grade may be required to achieve this distance. Please perform an engineering study to calculate this distance and what corrections, if deemed necessary, must occur.
2) As a condition of a haul route permit, WCRC would require Mid Michigan Materials to participate in dust control applications to Earhart Road due the additional trips generated from hauling activities. Section 8.5.8 of the WCRC Procedures and Regulations for Permit Activities states *"The applicant shall be responsible for all costs of "above normal" maintenance work necessary on the haul route. Unless otherwise specified on the permit, the WCRC shall perform all maintenance work. The cost of the "above normal" maintenance is based on current labor rates, equipment rental rates and material costs, plus indirect costs and overhead. The applicant shall reimburse the WCRC within 30 days following issuance of billing statements for costs incurred by the WCRC or the permit may be revoked."* This term would be added as a condition of a haul route permit should one be issued.
3) WCRC has an internal meeting scheduled this week to discuss what, if any, road improvements will be necessary from the existing driveway approach to M-14 as a condition of issuing a haul route. Per Section 8.5.12.b.iii, when hauling of 250,000 tons of material is exceeded per year, or over 25 round trip truck movements per day on average occurs, the road shall be reconstructed to a county designated route. WCRC will report back to your company once internal deliberation occurs.

I can be reached at 734-327-6679 or email at mccullochm@wcroads.org should you have questions.

Sincerely,

Mark H. McCulloch
Senior Project Manager – Permits

Cc: Matt MacDonell / Gary Streight – WCRC
Mike Moran – Ann Arbor Township Supervisor
Eric Humesky - Stantec

Fleming Creek Correspondence

GZA spoke with Kris Olsson at Fleming Creek on February 10, 2020. She requested that we email her, which we did (see attached). We have not received a response in writing from Fleming Creek.

Michael DeVasto

From: Michael DeVasto
Sent: Monday, February 10, 2020 2:54 PM
To: kolsson@hrwc.org
Subject: Preliminary Site Plan Discussion - WSG
Attachments: General Site Layout.pdf; Appendix C CorrespondenceFromWCWRC_NoPermit.pdf

Kris,

Again, thank you very much for contacting me today. Attached is a general site map with the site location, the wetlands / watercourse as they are mapped via. publicly available resources, and some text showing the "future mining area". There are no proposed changes to the site; it will be internally drained and no impervious surfaces like asphalt roads are proposed.

I also attached the corresponded we had with the Washtenaw County Water Resources Commissioner for your records.

Thanks, please don't hesitate to call with any questions.

Michael A. DeVasto, P.G.
Assistant Project Manager
GZA | 601 Fifth Street NW, Suite 102 | Grand Rapids, MI 49504
o: 616-258-7207 | c: 262-327-7938 | michael.devasto@gza.com | www.gza.com | www.rosewestra.com | GZA LinkedIn
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February 11, 2020

ANDERSON ECONOMIC GROUP

Market Study for Washtenaw Sand and Gravel

Prepared by:

Anderson Economic Group, LLC
Cristina Benton, Senior Consultant
Sara Bowers, Senior Analyst

Commissioned by:
Mid Michigan Materials on behalf of Washtenaw Sand and Gravel

Anderson Economic Group, LLC
East Lansing | Chicago

1555 Watertower Place, Suite 100
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I. Executive Summary

PURPOSE OF REPORT

Anderson Economic Group, LLC was retained by Mid Michigan Materials (MMM) to complete a market study for Washtenaw Sand and Gravel (WSG). MMM wishes to purchase the WSG mine and apply for a Conditional Use Permit with Ann Arbor Charter Township. The township zoning ordinance requires applicants of the conditional use permits for mineral mining to submit a report that demonstrates compliance with the market information requirements set forth in the Michigan Zoning Enabling Act. In particular, this study analyzes the need for the mineral resources extracted at Washtenaw Sand and Gravel by the market, an whether these natural resources are valuable and the company can receive revenues.

This study is consistent with the following requirements set forth in section 74-592. - Mineral mining of the Ann Arbor Charter Township Zoning Ordinance.

> Market information. The applicant shall submit a report prepared by a geologist or other experts with credentials satisfactory to the Township Board to demonstrate compliance with MCL 125.3205, Sections (3) and (4), that the natural resources to be extracted shall be considered valuable, and the applicant can receive revenue and reasonably expect to profit from the proposed mineral mining operation. The applicant shall also provide documentation to demonstrate that there is a need for the natural resources to be mined by either the applicant or in the market served by the applicant.

This study is consistent with the following requirements set forth in section 205 of the Michigan Zoning Enabling Act (Public Act 110 of 2006).

> (3) An ordinance shall not prevent the extraction, by mining, of valuable natural resources from any property unless very serious consequences would result from the extraction of those natural resources. Natural resources shall be considered valuable for the purposes of this section if a person, by extracting the natural resources, can receive revenue and reasonably expect to operate at a profit.
>
> (4) A person challenging a zoning decision under subsection (3) has the initial burden of showing that there are valuable natural resources located on the relevant property, that there is a need for the natural resources by the person or in the market served by the person, and that no very serious consequences would result from the extraction, by mining, of the natural resources.

OVERVIEW OF APPROACH

To complete our analysis, we took the following steps:

1. Reviewed the Michigan Zoning Enabling Act and the Ann Arbor Charter Township zoning ordinance as they relate to the mining operation;
2. Reviewed the prevailing professional standards for demonstrating "need ....in a market" as well as addressing what natural resources are "valuable";

3. Reviewed background information about the company and the mine;
4. Defined the primary market area, compiled and analyzed aggregate market data, including (a) uses; (b) industry characteristics; (c) demography; (d) economy; (e) production levels; and (f) supply characteristics;
5. Estimated current and future demand in the market, as well as existing and future supply levels for the materials proposed to be extracted;
6. Assessed the profitability of th mining operation;
7. Prepared a set of maps, data tables, other exhibits, and a list of sources demonstrating our analysis on this study; and
8. Summarized the results of our work in a narrative.

OVERVIEW OF FINDINGS

Based on our analysis, we have found that:

1. The primary market, served by Washtenaw Sand and Gravel, for the aggregates proposed to be extracted, is Southeast Michigan.

a. Washtenaw Sand and Gravel mine, located in Ann Arbor Charter Township, Washtenaw County, produces sand and gravel. These aggregate materials are used as basic materials for building construction as well as road repair and construction.

b. Current and future customers of the mine include ready-mix concrete companies, paving contractors, and other similar companies operating in building and road construction in the market.

c. We found that the primary market served by the mine consists of Wayne and Washtenaw counties. The market is limited primarily to this region, mainly because of (1) the current and expected customers of the sand and gravel mine and their markets, and (2) transportation costs impacting the final costs of the aggregates.

- See "Overview of Mid Michigan Materials and the Washtenaw Sand and Gravel Mine" on page 6, "Demand and Supply Analysis" on page 13, and "Washtenaw Sand and Gravel" on page 6.

2. There is a significant and ongoing need for construction sand and gravel in Southeast Michigan.

a. The demand for sand and gravel materials extracted at WSG is expected to continue to increase over the next two decades in the market. This demand is largely determined by projected population and household growth, the poor condition of the road infrastructure, and the expected road construction in Southeast Michigan.

- Population and households are projected to grow in the primary market area by 2045 by 8.4 and 11.2 percent, respectively.
- Roads in the market are decaying, and the majority are in "poor" or "fair" condition (38 percent and 40 percent, respectively). Governor Gretchen Wit-

mer has made fixing the state's roads a major priority and has recently launched a major road construction program.

- Our conservative estimates, under two scenarios, indicate that the need for aggregates in the primary market area, will continue to increase for the next 20 years. We project an annual need of up to 18.0 million to 21.1 million metric tons of sand and gravel in the market over the next 20 years. See Table 1 below.

TABLE 1. Current and Projected Demand for Aggregates in the Market

Commodity	Current Demand, 2018	Projected Demand, 2040 (Scenario #1)	Projected Demand, 2040 (Scenario #2)
Sand and Gravel	9.7 million tons	10.3 million tons	12.1 million tons
Crushed Stone	5.1 million tons	5.4 million tons	6.3 million tons

Analysis: Anderson Economic Group using based data from USGS and Esri, Inc.

b. New sources of sand and gravel are needed in the market to meet this increased demand for sand and gravel.

- It is reasonable to expect that many of the mines currently operating in the market will end operations in the next 20 years if average rates of production and current economic trends are maintained. This will result in a significant reduction in annual production capacity in the primary market area, if no new production is added to the market, especially when accounting for varying degrees of material quality at these mines.
- The mines in the market produce aggregates of various quality, and may not all fully meet the Michigan Department of Transportation specifications.
- See "Overview of Aggregates" on page 8, "Factors of Demand for Aggregates in the Market" on page 13, "Existing Aggregate Operations in Southeast Michigan" on page 18, "Estimated Gap in the Supply of Aggregates" on page 20, and "Appendix B. Methods and Definitions" on page B-1.

3. It is likely that a well-managed mining facility will be profitable, and Washtenaw Sand and Gravel can reasonably expect to receive revenue and operate at a profit.

a. Mid Michigan Materials is a long-standing construction aggregate company, operating in Southeast Michigan since the 1960s.

b. Our review of financial benchmark data of sand and gravel mining companies in the central region of the U.S., which includes Michigan, indicates that these companies had, on average, a gross profit margin of 36.7 percent and an operating profit margin of 9.7 percent in 2019, which indicate that the profitability in construction sand and gravel industry is higher than many other sectors.

c. Based on our review of benchmark data and WSG pro forma figures, we expect the company to receive revenues and operate the mine profitably similar to its peers in the industry.

- See "Demand and Supply Analysis" on page 13, "Factors of Demand for Aggregates in the Market" on page 13, "Overview of Aggregates" on page 8, "Operational and Financial Review" on page 24, and "Definitions and Standards" on page B-1.

4. Aggregates of the type produced at the Washtenaw Sand and Gravel mine are a valuable commodity.

a. The sand and gravel materials address the significant need in the market for such resources in light of the anticipated supply gaps in the market. The building and road construction is highly dependent on market demographic and economic trends, which indicate that the demand for aggregate materials is expected to increase in the next two decades.

- See Finding 1, Finding 2, and Finding 3,"Overview of Aggregates" on page 8,"Factors of Demand for Aggregates in the Market" on page 13, and "Operational and Financial Review" on page 24.

STRUCTURE OF THE REPORT

Information about Mid Michigan Materials and Washtenaw Sand and Gravel mine are outlined in "Overview of Michigan Aggregates Industry" on page 8. Our review of the construction aggregates, uses, and characteristics is included in the chapter, "Overview of Aggregates" on page 8. This is followed by our review of the Michigan aggregate industry in "Michigan Aggregates Industry" on page 11.

Our rigourous market supply and demand analysis is included in the chapter, "Demand and Supply Analysis" on page 13. This is followed by our financial analysis of the profitability of the proposed mining facility in "Operational and Financial Review" on page 24.

This report also includes an extensive list of maps and other exhibits included in "Appendix A. Market and Financial Exhibits" on page A-1, a review of definitions and industry standards in economics and valuation, and other methodology in "Appendix B. Methods and Definitions" on page B-1, and a list of sources relied upon in this analysis, "Appendix C. Data Sources" on page C-1. The report also includes information about Anderson Economic Group and the authors of this report, in "Appendix D. About Anderson Economic Group" on page D-1.

CAUTIONS AND LIMITATIONS

We base our analyses and findings on available industry data and professional judgment. In our analysis, we have reviewed the general business profile of companies in construction sand and gravel mining industry in the central region of the U.S. and summary financial data provided by MMM for Washtenaw Sand and Gravel. We have not reviewed the detailed financial statements of MMM nor the detailed business plans for the mining facility. If additional facts and

information become available, we may qualify, extend, or revise the conclusions in this market study.

II. Overview of Mid Michigan Materials and the Washtenaw Sand and Gravel Mine

MID MICHIGAN MATERIALS, INC

Mid Michigan Materials, Inc. provides sand and gravel, crushed stone, and other specialty materials to readi-mix producers and the road building and construction industry.[1] The company, which was founded in 1962, operates three locations in Southeast Michigan. These are the Bechtel Pit in Brown City, MI; Burgess Pit in Ruby, MI, and Wilson Pit, in Jeddo, MI. The company is based in Jeddo, MI.

- Exhibit 1, "MMM Facilities in Southeast Michigan," on page A-3.

WASHTENAW SAND AND GRAVEL

Location. Mid Michigan Materials wishes to purchase the Washtenaw Sand and Gravel mining operation located at 4984 Earhart Road, Ann Arbor, MI 48105. The mine was established in 1957, and is located northeast of Ann Arbor, in Ann Arbor Charter Township and Washtenaw County.

- See Exhibit 2, "Location of Washtenaw Sand and Gravel and Ann Arbor Charter Township," on page A-4.
- See Exhibit 3, "Overview of Washtenaw Sand and Gravel," on page A-5.

Mine Operations. The mine is currently an open pit sand and gravel mine. The property is approximately 140 acres in size. The current production is about 125,000-150,000 tons, and Mid Michigan Materials plans to increase production to approximately 250,000 tons/year of usable material. The expected life of the mine is 20 years. After mining, the material is processed on site for specific market criteria.[2]

Mine Products. The mine produces sand and gravel products, including washed sand, granular sand, washed stone, and clay. Mid Michigan Materials anticipates that customers for these products to include primarily hot mix asphalt paving contractors and ready-mix concrete companies, and current customers of the mine. The asphalt and concrete products will likely be used for construction projects in Southeast Michigan.

- See "Types and Uses of Aggregates" on page 8.

1. Mid Michigan Materials, "About Mid Michigan Materials," accessed February 5, 2020, www.midmichiganmaterials.com/.
2. Per information received from Mid Michigan Materials, February 2020.

FIGURE 1. Washtenaw Sand and Gravel

Source: Mid Michigan Materials

III. Overview of Michigan Aggregates Industry

In this section, we review the aggregates industry, and in particular the types and uses of aggregates as well as the cost, market, and other characteristics. We also review the production of construction aggregates in Michigan.

OVERVIEW OF AGGREGATES

Michigan has a long history of mineral production due to its specific geology, which was shaped by glaciers, waves, and weather.[3] Minerals mined in Michigan include fuel minerals and non-fuel minerals such as iron ore, cement, salt, sand and gravel, magnesium compounds, and crushed stone.

Types and Uses of Aggregates

Construction aggregates consist of basic raw materials used in agriculture, industries, and in the construction of buildings and roads.[4] These aggregates include sand and gravel, crushed stone, slag, and crushed concrete aggregates. Aggregates are also described as either natural aggregates or slag aggregates. Natural aggregates are those originating from stone quarries, gravel, sand, or rock deposits. Sand and gravel are naturally weathered pieces of larger rocks and are typically rounded shapes, while crushed stone and concrete are made from rocks that have been broken down by machines. The types of rocks used for natural aggregates depends on what occurs naturally in the area.[5] Slag aggregates are by-products formed in the production of iron, copper, and steel.[6]

Sand and Gravel. The use of sand and gravel falls into two categories: construction and industrial. When used in construction, sand and gravel may be used (a) to make concrete for road construction (for road base, coverings, and road stabilization), (b) for mixing with asphalt as an ingredient in asphalt paving mixtures, (c) as construction fill, and (d) in the production of concrete blocks and bricks. It is also used for snow and ice control; for filtration; golf courses; railroad ballast; and products such as roofing shingles. In industrial applications, the resources are used in the production of other materials, such as glass,

3. Gary Campbell and Mark Roberts, "Economic Implications of Projected Land Use Patterns for the Minerals Industry in Michigan," Michigan Land Resource Project Final Report. Lansing, MI: Michigan Economic and Environmental Roundtable (MEER) and Public Sector Consultants, Inc (2001): 67-110.
4. The Michigan Department of Transportation established specifications for aggregates used in Michigan for construction purposes, Michigan Department of Transportation, "2012 Standard Specifications for Construction," www.mdotjboss.state.mi.us/SpecProv/specBookHome.htm.
5. Atak Trucking, "When To Use Crushed Stone As Opposed To Gravel," accessed February 5, 2020 from www.ataktrucking.com/when-to-use-crushed-stone-as-opposed-to-gravel/.
6. Michigan Department of Transportation, "2012 Standard Specifications for Construction book," Section 902. Aggregates, mdotjboss.state.mi.us/SpecProv/specBookHome.htm.

foundry sand, and abrasive sand.[7] The majority of sand and gravel produced in the United States and Michigan is used in the construction industry.

- See Exhibit 4, "Michigan Construction Sand and Gravel Sold or Used in 2016, by Major Use Category," on page A-6.

Michigan's sand and gravel reserves are glacial deposits that were created as a result of glacial activity. Sand and gravel are produced across the state; however, most of the sand and gravel is located in areas where the ice melted rapidly, and sand and gravel accumulated in interlobate areas such as Southeast Michigan. The Southeast Michigan interlobate region extends from Lapeer County, through Oakland and Washtenaw Counties, into Ohio.[8]

Crushed Stone. Crushed stone is created by mining a suitable rock deposit and breaking down the rock by machines to a desired size. It is used in many applications similar to sand and gravel, but differs from gravel in that it is crushed manually rather than naturally over time. In 2016, about 68 percent of crushed stone production was limestone and dolomite, followed by granite, traprock, miscellaneous stone, sandstone and quartzite, marble, and other materials.[9] The type of stone produced in a region is generally dictated by what occurs naturally in the area.[10] Most crushed stone is used as construction materials, for road surfacing, and for foundation support under weight-bearing structures, and for cement manufacturing. Larger sized limestone aggregate may be used for stream stabilization or to protect against erosion. Limestone formations can be found in the southeastern part of the Upper Peninsula, the Saginaw Bay area, and the Detroit area.[11]

Slag. Slag falls into two categories: blast furnace slag and steel furnace slag. Blast furnace slag is created in the production of iron, iron ore, and other similar products. Steel furnace slag is created during steelmaking.[12] Slag provides long-term stability in railroad applications and its durable nature makes it ideal for

7. Mineral Education Coalition, "Sand and Gravel," accessed February 10, 2020, mineralseducationcoalition.org/minerals-database/sand-and-gravel/.
8. Randall Schaetzl, "Sand and Gravel Mining for Aggregate" and "Interlobate Moraines," Michigan State University, Department of Geography, www.geo.msu.edu/extra/geogmich/sand&gravel.html and www.geo.msu.edu/extra/geogmich/interlobates.html.
9. United States Geological Survey, "2016 Minerals Yearbook: Stone, Crushed [Advance Release]," United States Geological Survey, January 2020.
10. Atak Trucking, "When To Use Crushed Stone As Opposed To Gravel," accessed February 5, 2020 from www.ataktrucking.com/when-to-use-crushed-stone-as-opposed-to-gravel/.
11. Gary Campbell and Mark Roberts, "Economic Implications of Projected Land Use Patterns for the Minerals Industry in Michigan," Michigan Land Resource Project Final Report. Lansing, MI: Michigan Economic and Environmental Roundtable (MEER) and Public Sector Consultants, Inc (2001): 67-110.

unpaved parking lots and road surfaces. Slag is also used in paved roads to provide resistance against rutting and to improve traction on icy roadways.[13]

Crushed Concrete. Crushed concrete is a recycled aggregate produced from broken concrete. The process of recycling concrete involves breaking, removing, and crushing existing concrete into a material of a given size and quality. Crushed concrete can be used with or without any prior processing. Without processing, it can be used in road construction, in base or fill for drainage structures, or in protection from erosion or noise. After processing, crushed concrete can be used as new concrete for pavement, median barriers, curbs, and as bridge foundations.[14] Recycled concrete cannot be used in hot mix asphalt mixtures. The recycling of portland cement concrete is done at quarries and sales yards or distribution sites, while asphalt concrete is often recycled in place.

Transportation and Cost

Transportation. More than 80 percent of the construction sand and gravel produced in the U.S. is transported by truck, followed by five percent by waterways, and two percent by rail. Further, a portion of the aggregate materials produced in the U.S. is not transported, but rather is used at or near the production site for asphalt or portland cement concrete production.[15] Typically, aggregates are used within 40 miles of where they are extracted.[16] Similarly, the vast majority of crushed stone is transported by truck in the U.S.[17]

Cost. The construction sand and gravel materials are high-volume, low-value commodities. Transportation is a major factor in the final price of sand and gravel. Average transportation costs are 10 to 15 cents per ton-mile, and they

12. Federal Highway Administration, "User Guidelines for Waste and Byproduct Materials in Pavement Construction," accessed February 5, 2020, www.fhwa.dot.gov/publications/research/infrastructure/structures/97148/ssa1.cfm.
13. TMS International, "Slag: The All-Purpose Aggregate," accessed February 5, 2020, www.tmsinternational.com/slag-aggregates.cfm.
14. Portland Cement Association, "Recycled Aggregates," accessed February 5, 2020, www.cement.org/learn/concrete-technology/concrete-design-production/recycled-aggregates.
15. United States Geological Survey, "2016 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]," United States Geologic Survey, January 2020.
16. While fuel prices are currently relatively low, fuel prices vary over time, and affect the transportation costs and the final aggregates cost.
Randall Schaetzl, "Sand and Gravel Mining for Aggregate," Michigan State University, Department of Geography, www.geo.msu.edu/extra/geogmich/sand&gravel.html.
William K. Jaeger, "The hidden costs of relocating sand and gravel mines," Oregon State University, Resources Policy, February 2006.
17. United States Geological Survey, "2016 Minerals Yearbook: Stone, Crushed [Advance Release]," United States Geologic Survey, January 2020.

could be even higher in specific markets. Therefore the longer the distance from the mine to the user is, the higher the final cost of the materials is. The cost of transporting the heavy materials from the plant to the market may actually exceed the price of the sand and gravel at the facility if the distance between them is above a certain level.[18]

Other Characteristics

Local and Regional Market. Most aggregate materials are used within the market surrounding the mining facility because it is not economically feasible to transport these resources over long distances. Longer distances and the extra fuel necessary to transport the materials will likely raise the cost to the final consumer.[19] Therefore, sand and gravel operations tend to be located in the proximity to the final consumer. As a result, the demand for sand and gravel and therefore the location of sand and gravel mines are highly dependent on local and regional demand.

Duration of Production and Future Uses. In general, the duration of the extraction of sand and gravel is dependent on the amount of reserves found at the site and the extent of annual production. However, the average production life for a sand and gravel mine is 25 years.[20] After the minerals are extracted, the sites are usually developed. A typical development could include a man-made lake, new housing, and recreational land uses.[21].

MICHIGAN AGGREGATES INDUSTRY

Production of Construction Aggregates

Sand and Gravel. In 2018 in Michigan, an estimated 45.6 million metric tons of sand and gravel was produced and shipped for consumption, an increase of 5.3% compared with 2017.[22] This quantity represents an increase of 31.8 percent since 2009, when the state produced 34.6 million metric tons of construction sand and gravel. Because the aggregates industry reacts to the demand from infrastructure, commercial, and residential construction, these figures show the cyclical nature of this business. The slow growth in production after 2009 is

18. For instance, the transportation of one metric-ton of sand and gravel for 40 miles at a cost of $0.15 per ton-mile would require a total transportation cost of $6.0 per metric ton. This is about equal to the average unit value per metric ton of sand and gravel material in Michigan, which was $6.03 per metric ton in 2016. See "Production of Construction Aggregates" on page 11 for average unit value per metric ton for aggregate materials.
19. United States Geological Survey, "2016 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]," United States Geologic Survey, January 2020.
20. Michigan Aggregates Association, "About Us," accessed February 5, 2020, www.miagg.org/about.php.
21. See, for example Oxford Lakes and other residential developments in Oxford, MI.

likely due to the slow but steady recovery in residential, commercial, and road construction after the slowdown during the Great Recession.

Crushed Stone. In 2018, the state produced an estimated 24.0 million metric tons of crushed stone for consumption, which represents a 4.4% decline over 2017. This represents a 23.0% increase since 2009, when Michigan produced 20.4 million metric tons. The increase in the production of crushed stone in the last ten years indicate improvements in the state's economy.

Crushed Concrete. Recycling of asphalt and cement concrete represents a small percentage of aggregate consumption. In 2016 in Michigan, a total of 0.7 million metric tons of recycled asphalt concrete and 0.9 million metric tons of recycled portland cement concrete was sold or used by producers.[23] This represents a 36.1 percent increase, and a decline of 5.6% respectively, over 2009.

- See Exhibit 5, "Aggregates Sold or Used by Producers in Michigan, 2009-2018," on page A-7.

Construction Aggregates Producers. Construction aggregates are mined and produced in almost every county in the state. There are currently 81 active sand and gravel mines and 301 intermittent mines for sand and gravel in Michigan, for a total of 389 active or intermittent mines in the state. There are a total of 30 crushed stone mines operating in the state, including 15 active and 15 intermittent crushed stone mines.[24]

- See Exhibit 6, "Principal Producing Areas in Michigan," on page A-8.
- See Exhibit 7, "Aggregate Producing Counties in Michigan," on page A-9.

22. In general, the aggregate production information released by USGS refers to production for consumption or material that was sold or used by the companies. Stockpiled production is not reported until it is sold or consumed by the producer. The production tonnage is assumed to represent the amount produced for domestic consumption and export.
United States Geological Survey, "2016 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]," January 2020.

23. Estimates for production in 2017 and 2018 are not yet available.

24. U.S. Department of Labor, Mining Safety and Health Administration, Mine Data Retrieval System, accessed February 5, 2020 from www.msha.gov/mine-data-retrieval-system.
The Mining Safety and Health Administration is an agency created in 1978 that develops and enforces safety and health rules for all U.S. mines, and provides technical, educational and other types of assistance to mine operators. MSHA's mission is included in the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended by the Mine Improvement and New Emergency Response (MINER) Act of 2006. MSHA is required to inspect each underground mine four times a year and each surface mine twice a year for health and safety compliance. Information on all the mines in the U.S. is being collected through the various MSHA programs.
Active mines refer to mines that were actively operating at the time of inspection, while intermittent mines include mines that were temporary not producing at the time of the inspection. No abandoned mines were included in these figures.

IV. Demand and Supply Analysis

In this section, we (a) define the market for the sand and gravel produced at Washtenaw Sand and Gravel, (b) review the characteristics of demand for construction aggregates in the market, and (c) estimate current and future demand for aggregates in the market. We also discuss the supply of aggregates in the market as well as existing supply constraints.

SOUTHEAST MICHIGAN MARKET

We identified a primary market area for the products that will be extracted at Washtenaw Sand and Gravel. The primary market area (PMA) includes Wayne and Washtenaw counties. Traditionally, the mine has also served some small areas in SE Livingston county and SW Oakland county.

- See Exhibit 8, "Washtenaw Sand and Gravel and Primary Market Area," on page A-10.

The delineation of the primary market area is primarily based on the current and anticipated customers of the aggregates at Washtenaw Sand and Gravel. These include hot mix asphalt paving contractors and ready-mix concrete companies, and current customers of the mine. It is expected that these companies serve primarily customers in Wayne and Washtenaw counties. This market delineation is also based on the aggregate characteristics. The transportation and the cost of the aggregates limit how far sand and gravel will be shipped to asphalt facilities and other aggregate users in the road construction and the construction industry.

- See "Mid Michigan Materials, Inc" on page 6, "Washtenaw Sand and Gravel" on page 6 and "Transportation and Cost" on page 10.

FACTORS OF DEMAND FOR AGGREGATES IN THE MARKET

The demand for aggregate materials in Southeast Michigan is driven by several primary factors, including the activity in the public and private construction sectors, population growth, and the related economic development. Typically, economic activity, construction spending, and road construction projects drive the output for construction aggregates in the U.S.[25]

We discuss below two main factors of demand for products derived from construction sand and gravel in the Southeast Michigan market: (1) expected population and economic growth driving residential and commercial construction; and (2) expected road construction.

25. See Mineral Commodity Summary and Minerals Yearbook released by United States Geological Survey related to the construction aggregate industry in the United States, www.usgs.gov/centers/nmic/construction-sand-and-gravel-statistics-and-information, accessed February 2020.

Population and Economic Growth

Projected Population Growth. The Southeast Michigan Council of Governments (SEMCOG) estimates that, overall from 2015 through 2045, the population of the primary market area will increase by 8.4 percent and households will increase by 11.2 percent.[26]

- See Exhibit 9, "2015-2045 Population and Employment Forecast for the Primary Market Area," on page A-11.

Population and household growth will likely necessitate additional residential construction in the Southeast Michigan region. This construction will increase the need for aggregate material for asphalt and concrete applications. For example, a new subdivision requires about 400 tons of aggregate per home.[27] Further, roadways will need to be built in these new subdivisions, and an increase in population equates to more drivers on arterials and highways. These roads need improvements and maintenance to safely support the population increase.

Southeast Michigan Economy. In 2018, Southeast Michigan's real GDP (in 2012 dollars) was $266.3 billion. This includes the economic activity in the Detroit and Ann Arbor metropolitan statistical areas.[28] From 2014 to 2018, the Southeast Michigan GDP grew at the same rate as the MI overall, at 2.2 percent.

The region's mining, quarrying, and oil and gas extraction sector increased faster than the overall economy. Between 2014 and 2018, this sector experienced annual increases in output of more than 9.9% annually. The region's construction industry has also experienced annual increases in output by 3.7% annually. The growth in the last five years indicates the recent demand for construction services and aggregates to serve the overall region.

- See Exhibit 10, "Southeast Michigan GDP by Sector, 2014 and 2018," on page A-12.

Business and economic growth will likely necessitate additional commercial-driven construction in the Southeast Michigan region. Aggregate materials are crucial inputs in the manufacturing of cement and asphalt that go into the development of new buildings and roadways.

26. Southeast Michigan Council of Governments, "Southeast Michigan 2045 Forecast Summary," August 2018.
27. Michigan Aggregates Association, "About Us," accessed February 5, 2020, www.miagg.org/about.php.
28. Detroit-Warren-Dearborn Metropolitan Statistical Area includes Wayne, Oakland, Macomb, Livingston, St. Clair, and Lapeer counties.

Road Construction

Condition of Roads. Michigan's roads are among the worst in the nation.[29] Among all roads in the state supported by federal aid, almost 41 percent are in "poor" condition, and 38 percent are in "fair" condition. Between 2010 and 2018, the number of road-miles that qualify as "good" condition have stagnated, while the number of road-miles in "poor" condition have increased. By the year 2030, it is projected that 47 percent of Michigan's federal-aid supported roads will be in "poor" condition.[30]

- See Exhibit 11, "Actual and Forecasted Condition of Federally-Funded Michigan Roads," on page A-13.

On the overall, the counties in the primary market area have, proportionally, more road-miles in "poor" condition than the state as a whole. And because a large percentage of the state's population lives in these counties, roadways in Southeast Michigan are hard-hit every day and are in dire need of maintenance, repair, and investment.

- See Exhibit 12, "Road Conditions in Southeast Michigan Counties and the State of Michigan," on page A-13.

Road Funding. One of the major priorities for Michigan Governor Gretchen Whitmer during her election campaign was the state's roads.[31] Governor Gretchen Whitmer has recently announced a $3.5 billion road-bonding program to jump-start highway reconstruction projects across the state. The program will almost double the Department of Transportation's capital spending over the next five years. The state plans to undertake an additional 122 road and bridged construction projects that the agency otherwise would not have the money to do in the next five years.[32] Funds will go towards state trunk lines and freeways over the next five years.

Notable road construction projects. The Gordie Howe International Bridge, which will link Detroit, Michigan with Windsor, Ontario, will be a 74-month construction project. It will be a cable-stayed bridge of about 1.5 mile long, with towers on either end. The bridge will provide six lanes to meet anticipated

29. Rosaen, Alex, Colby W. Spencer and Erin Glover, "Economic Impact and Policy Analysis of Four Michigan Transportation Investment Proposals," Anderson Economic Group, LLC, September 2012.

30. Michigan Transportation Asset Management Council, Pavement Condition and Forecasting Dashboard, accessed October 2, 2018 from www.mcgi.state.mi.us/mitrp/tamcDashboards/reports/pavement/forecast.

31. Gretchen Whitmer for Governor, "See where Gretchen stands. Issues," accessed February 10, 2020 from www.gretchenwhitmer.com/issues/infrastructure/.

32. Chad Livengood, "Whitmer's highway construction financing plan to top $5.1 billion over life of bonds, *Crain's Detroit*, February 4, 2020, www.crainsdetroit.com.

growth in traffic in future years, and is projected to be complete by the end of 2024, with the most active period of construction to occur between 2021-2023.[33]

For the metropolitan area of Detroit, the new bond plan will include: a $456 million rebuild of 1-696 from 1-275 to Dequindre Road, a $217 M rebuild of 1-96 from Kent Lake Rd to Novi Road, and a $324 M reconstruction of 1-275 in Wayne County from Five Mile to south of 1-94.

Major notable projects in the market include the I-75 Modernization Project and the I-94 Modernization Project. The I-75 project will widen and reconstruct portions of the I-75 freeway. The project includes the addition of an HOV lane, reconstructing existing freeway lanes, replacing structures, community-developed aesthetic improvements, and other work. The project will cover about 18 miles of freeway on I-75, from M-102 to M-59.[34] Various sections of the project will be completed over approximately the next ten years.[35] The I-94 Modernization Project involves reconstruction of sections of I-94 in Detroit, and includes 67 bridges and two major highway interchanges.[36]

Asphalt and Concrete Producers in Southeast Michigan. There are many asphalt and concrete producers in Southeast Michigan.[37] All of these companies require aggregate materials to manufacture asphalt and concrete or purchase derived products to provide pavement and road construction services for construction and development companies, as well as for state, county, and local road commissions that perform road construction and maintenance in Southeast Michigan.

33. Windsor-Detroit Bridge Authority, "Project Update," August 21, 2019, https://www.gordie-howeinternationalbridge.com/en/project-update.
34. Michigan Department of Transportation, "I-75 Modernization Project," accessed February 10, 2020, https://www.michigan.gov/mdot/0,4616,7-151-9621_11058_53088_64867---,00.html.
35. Michigan Department of Transportation, "I-75 Modernization Project Frequently Asked Questions (FAQs) October 2015 (Updated August 2019)," accessed February 10, 2020 from www.michigan.gov/documents/mdot/I-75_Modernization_FAQs_466010_7.pdf.
36. The Prewitt Group, "Interstate 94 Modernization Project," accessed February 10, 2020 from https://i94detroit.org/.
37. Asphalt Pavement Association of Michigan Membership Directory, accessed February 11, 2020, www.apa-mi.org/list_of_members.php.
Michigan Concrete Association Member Directory, accessed February 11, 2020 from www.miconcrete.org/mca-member-directory.

CURRENT AND PROJECTED DEMAND FOR AGGREGATES

Current Demand for Aggregates in the Primary Market Area

Due to limitations in data availability, we estimate a population-adjusted demand for aggregates in the primary market area. Based on this, the population-adjusted demand for sand and gravel was 24.2 million metric tons in the primary market area in 2018.[38] Similarly, we estimated that 15.6 million metric tons of crushed stone were produced for consumption in the market in 2018. See Table 2 below.,

TABLE 2. Estimated Current Demand for Aggregates, Primary Market Area

Aggregates	Michigan Production for Consumption, 2018	Share of Michigan Population in the Primary Market Area, 2018	2018 Demand in the Primary Market Area
Sand and gravel	45.6 million tons	21.3%	9.7 million tons
Crushed stone	24.0 million tons	21.3%	5.1 million tons

Source: Anderson Economic Group, LLC using based data from Esri, Inc. and USGS.

Notes: We assume a similar demand per capita of aggregates across Michigan (of about 4.5 tons of sand and gravel per person and 2.4 tons of crushed stone per person). Because data is not available, we also assume that the amount of imports from surrounding counties into the primary market area to be comparable to the amount of exports made to surrounding counties in the extended market area. This is likely a conservative measure due to concentration of economic and residential activity in the market, the quality of the roads, and the limited number of aggregate mines in the market. If the per capital consumption of sand and gravel increases to 5-8 tons per person range, the demand total will be much higher.

- See Exhibit 13, "Demand for Aggregates in the Southeast Michigan Market," on page A-14 and See "Appendix B. Methods and Definitions" on page B-1 for a detailed methodology.

Future Demand for Aggregates in the Primary Market Area

We projected the demand for construction sand and gravel and the demand for crushed stone in the Southeast Michigan market under two scenarios:

38. In general, the aggregate production information released by USGS refers to production for consumption or material that was sold or used by the companies. Stockpiled production is not reported until it is sold or consumed by the producer. The production tonnage is assumed to represent the amount produced for domestic consumption and export.
United State Geological Survey (USGS) provides information on production for consumption for each state, including Michigan. This represents a reasonable measure of actual demand in each state, as the production is assumed to represent the amount produced for actual consumption, where consumption reflects the level of demand for sand and gravel.
In these estimates, we do not account for import and export of aggregate materials. In general, the export and import of aggregate materials represent very small shares of the production for consumption, and the vast majority of the materials are used in the local markets. See USGS annual Mineral Commodity Summaries for Construction Sand and Gravel.

1. Assuming demand for aggregates to follow projected population growth in the region, based on SEMCOG-projected population change.
2. Assuming demand for aggregates to grow based on historical industry production rates for aggregates in Michigan.

Population-Based Projection of Demand. In first scenario, using annual growth rate of 0.3% for the forecasted population, we project that in 20 years, by 2040, 10.3 million metric tons of sand and gravel and 5.4 million metric tons of crushed stone would need to be produced for consumption in the primary market area.

- See Exhibit 15, "Population-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040," on page A-15.

Industry-Based Projection of Demand. Based on historical trends, assuming a growth rate of 1% annually, we project that in 2040, about 12.1 million metric tons of sand and gravel will be needed to be produced annually for consumption in the Southeast Michigan market, if reserves are available. Similarly, using the same method, we project that 6.3 million metric tons of crushed stone would need to be produced for consumption in the Southeast Michigan market, if reserves are available.

- See also Exhibit 14, "Industry-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040," on page A-15.
- See Table 3 below.,

TABLE 3. 2040 Forecast of Annual Demand for Aggregates Summary

Aggregates	Population-based projection	Industry-based projection
Sand and gravel	10.3 million tons	12.1 million tons
Crushed stone	5.4 million tons	6.3 million tons

Source: Anderson Economic Group

SUPPLY OF AGGREGATES IN SOUTHEAST MICHIGAN

In this section we review the current sources of construction aggregates in Southeast Michigan, as well as the characteristics of supply necessary to meet the estimated increased in demand for construction aggregates in the market.

Existing Aggregate Operations in Southeast Michigan

Sand and Gravel Mines. There are a total of 11 active and intermittent sand and gravel mines in operation in the Primary Market Area.[39] We note that only 3.8% of all sand and gravel mines operating currently in Michigan are located in the primary market area, while more than 21% of Michigan's population lives in the same market. This may indicate that the amount of imports into the market exceeds the amount of aggregates leaving the market for the surrounding areas.

- See Exhibit 9, "2015-2045 Population and Employment Forecast for the Primary Market Area," on page A-11.
- Exhibit 16, "Construction Sand and Gravel Mines in Southeast Michigan," on page A-16.

Crushed Stone and Slag Producers. There are two active stone mines in the market. These are located in Wayne County (cement, lime).

- See Exhibit 17, "Crushed Stone Mines in Southeast Michigan," on page A-17.

Quality of existing sand and gravel sources. These mines produce aggregates of various quality, and some of the mines may not fully meet the Michigan Department of Transportation specifications for adequate aggregates to be used in paving applications.[40] Poorer quality materials can be used in limited applications, including for fill sand.

Current Production of Aggregates. Using the USGS production for consumption figures and adjusting them for the size of the population in the primary market area, we estimated that the production for consumption in the primary market area was 14.8 million tons of aggregates in 2018. It is likely that the demand for such products in the market is much higher than the production, due to in part the small percentage of mines in the primary market area relative to the percentage of population in the market. It is expected that aggregates are being imported from the extended market area into the primary market area.

39. U.S. Department of Labor, Mining Safety and Health Administration, Mine Data Retrieval System, accessed February 5, 2020 from www.msha.gov/mine-data-retrieval-system.

    The Mining Safety and Health Administration is an agency created in 1978 that develops and enforces safety and health rules for all U.S. mines, and provides technical, educational and other types of assistance to mine operators. MSHA's mission is included in the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended by the Mine Improvement and New Emergency Response (MINER) Act of 2006. MSHA is required to inspect each underground mine four times a year and each surface mine twice a year for health and safety compliance. Information on all the mines in the U.S. is being collected through the various MSHA programs. Active mines refer to mines that were actively operating at the time of inspection, while intermittent mines include mines that were temporary not producing at the time of the inspection. No abandoned mines were included in this analysis. Mines with incomplete information are included in the count of total mines but not in estimates for depletion on page 20.

40. MDOT Aggregate Source Inventory Database & Bituminous Mix Design Guide, available at https://mdotjboss.state.mi.us/BITMIX/BITMIXHome.htm#Lapeer%20-%2044, accessed on October 5, 2018. The database includes test results for the quality of the resources extracted at pits located in Michigan, including those in Southeast Michigan.
    See also for example the List of Prequalified Aggregate Suppliers and approved manufacturers by the Michigan Department of Transportation, available at www.michigan.gov/documents/mdot/MDOT_PrequalifiedAggregateSourceList_387538_7.pdf.

• See "Current Demand for Aggregates in the Primary Market Area" on page 17.

Estimated Gap in the Supply of Aggregates

We next assessed the supply of aggregates in the primary market area and expected depletion of these mines. We identified the average production span of a mine, as well as the date the currently-operating mines in the market opened.

Expected Life for Mines in Southeast Michigan. The average production span for a sand and gravel mine is about 25 years.[41] However, mines could have a longer life span if they are not active all the time, if they slow down production due to decreased demand, if they operate on an intermittent basis, or if the amount of reserve is actually larger than originally estimated.

Estimated Depletion of Mines. We collected data on the current status and start date of the operations for the sand and gravel mines in the market to estimate for how long the currently-operating mines can reasonably be expected to continue producing construction sand and gravel. Using the date provided as the first year of operation, we added 25 years to estimate the year of depletion of a mine, provided that average production rates and economic trends are maintained. Several mines in the market appear to have been established decades ago; however, they appear to still be operating nowadays, indicating that other conditions affected the operations of the mine.[42]

If we apply the average life span to the existing mines in the market, we observe that several mines in the primary market area will likely depleted in the next 20

41. Michigan Aggregates Association, "About Us," accessed October 2, 2018, www.miagg.org/about-us/.

42. For eight sand and gravel mines in the market, the beginning record of operations is the same date in 1950 in the MSHA records, indicating the mine started operations at an unknown date but recorded by MSHA at that date. They are included in the total number of mines, but we did not assume they would be depleted in the next 25 years.

years. See Table 4 below and Exhibit 18, "Summary of Sand and Gravel Mines in Southeast Michigan Market," on page A-18.

TABLE 4. Gravel and Sand Mines, with Average Expected Life

Mines	Number of Mines	Percent of Mines
Mines likely to end operations in the next 10 years (by 2030)	6 out of 9	66.7%
Mines likely to end operations in the next 15 years (by 2035)	7 out of 9	77.8%
Mines likely to end operations in the next 20 years (by 2040)	9 out of 9	100%

Note: This assumes that average production levels and mine lifetimes are maintained. Eight mines have incomplete information available, so we base our estimates on the 28 mines with known dates for the beginning of operations. Of course, we note that variation in mining techniques, economic trends, usage of materials, internal business factors, and the amount of available reserves may affect the actual rate of depletion of the reserves of sand and gravel mines in the market.

Source: U.S. Department of Labor, Mining Safety and Health Administration; Michigan Aggregates Association; Anderson Economic Group, LLC

Analysis: Anderson Economic Group, LLC

- See Exhibit 16, "Construction Sand and Gravel Mines in Southeast Michigan," on page A-16.
- See Exhibit 18, "Summary of Sand and Gravel Mines in Southeast Michigan Market," on page A-18.
- See also Exhibit 19, "Financial Ratio Benchmark Data for Construction Sand and Gravel Mining Industry, Central Region, 2019," on page A-19.

MEETING THE DEMAND FOR CONSTRUCTION AGGREGATES IN THE MARKET

To meet the estimated increase in demand for such materials in Southeast Michigan, construction aggregates, including sand and gravel, can be made available through the following supply options:

- Increase production levels at current sand and gravel mining facilities,
- Increase level of production of alternative aggregates,
- Increase the level of imports of construction materials, or
- Open new mining operations.

There are several constraints associated with these aggregate supply options. These are discussed below.

Current Facilities. Existing operations are permitted to operate following the requirements of operation listed in their permit, including hours of operation, equipment capacity, number of trucks, and space limitations. Some facilities may be able to increase production, while other existing operations might not be able to increase production due to reserve amounts, zoning constraints, or other

factors. Facilities that are able to increase production may experience a faster depletion of its raw material reserves.

Further, as previously stated, we observe that up to 89 percent of construction sand and gravel mines in the primary market area would end operations in the next 20 years if average production rates are maintained. This may result in a shortage of locally-produced aggregates if additional sources are not made available in the next 2 decades.

- See Exhibit 18, "Summary of Sand and Gravel Mines in Southeast Michigan Market," on page A-18.
- See also "Expected Life for Mines in Southeast Michigan" on page 20.

Other Aggregate Sources. Crushed stone can substitute sand and gravel in most of its uses. There are only six facilities in Southeast Michigan that produce crushed stone, and those are located in Wayne and Monroe Counties. These locations are at a farther distance from the areas that are projected to experience the most growth. The market for slag is influenced by Federal and State programs that affect construction spending, favor the use of "alternative" materials in construction, and affect the availability of competing alternative or natural materials.[43] Further, the availability of slag is dependant on the production of steel and iron in Southeast Michigan. Recycled concrete is still a small portion of the consumption of aggregate materials, and is limited in what types of applications it can be used. Recycled concrete cannot be used in hot mix asphalt mixtures, which is an important paving material in road construction and maintenance.

- See "Types and Uses of Aggregates" on page 8.
- See also "Crushed Stone Mines in Southeast Michigan" on page 17.

Imports of Raw Materials. Limited amounts of construction sand and gravel and crushed stone are being imported into the market, due to the high transportation costs of longer hauling distances.[44] When crushed stone, including limestone, and sand and gravel are being imported into Southeast Michigan, the final costs of the materials include the water shipping costs and the truck transportation costs to the final users in the growing suburban areas, rendering the prices of the imports less competitive than locally-sourced aggregates.

- See "Overview of Michigan Aggregates Industry" on page 8 and "Transportation and Cost" on page 10.

43. Slag can substitute directly or indirectly for raw materials in certain uses and are thus considered to be sustainable raw material. Major examples of such substitution are for natural stone aggregates in concrete and for natural raw materials in cement manufacture.

44. In general, very limited amounts of aggregates are being imported into the U.S. See United States Geological Survey, "2016 Mineral Commodity Summary: Construction Sand and Gravel."

New Facilities. Sand and gravel operations seek to locate in close proximity to final users in order to remain competitive.[45] However, most of the land in Oakland and Livingston counties has been developed or is considered prime farm land, making the extraction of sand and gravel from these deposits located under these areas difficult in the foreseeable future.[46] If mining operations are located farther from the market, and especially the areas of highest demand, the final price of aggregates will increase when materials are transported longer distances. Therefore, the cost of pavement as well as the cost of road or highway construction projects will also increase accordingly.

Land Use Patterns. Aggregate deposits may be unavailable for extraction because they are already covered by urban and suburban development, mainly residential land uses. Further, land fragmentation across metropolitan areas may hinder efficient and intensive mining activities. Land use regulations, local resistance to mining operations, and land fragmentation could discourage sand and gravel operations from locating close to densely populated areas.

- See Exhibit 9, "2015-2045 Population and Employment Forecast for the Primary Market Area," on page A-11.
- See Exhibit 19, "Financial Ratio Benchmark Data for Construction Sand and Gravel Mining Industry, Central Region, 2019," on page A-19.
- See also "Other Characteristics" on page 11.

45. We have no information about new mines opening or which have received approval to open, in Southeast Michigan. We cannot anticipate the opening of other sand and gravel mines in the market.

46. Housing comprises 45 percent of the land in Southeast Michigan. See Southeast Michigan Council of Governments, "Creating Success with Our Transportation Assets: 2040 Regional Transportation Plan for Southeast Michigan," June 2013.

V. Operational and Financial Review

In this section, we review the nature of business in the aggregate industry and the typical profile of an aggregate producer using financial benchmark data. We then discuss the profitability of the Washtenaw Sand and Gravel mining facility.

NATURE OF BUSINESS IN THIS INDUSTRY

Local and Regional Markets. Construction sand and gravel mining companies supply products mainly to local markets for building and road construction, real estate development, and agricultural sectors. The market for aggregate materials is predominantly regional rather than national because construction aggregates are high-volume, low-value commodities. Transportation cost is a major factor in the final price of aggregate materials or the products derived from the natural resources.

High Risk in Mining Business. The profitability of a mining project is contingent on many factors. Among others, total size of reserves, the production feasibility of the mineral content, accessibility of mine and energy costs, regulatory environment, and pricing of the commodity are major risk factors for the investment return. Construction sand and gravel mining companies typically make sizeable initial investments when they develop a new mining site or acquire an existing mining operation. They expect to generate healthy cash flows to cover their initial investment and earn a positive return on their investment over the life of the project. Delays in production due to regulatory environment and public backlash, as well as change in market and pricing environment may change the profitability of these projects dramatically. Because of this aspect of the industry, most of the new projects approved by investors are steady and less risky operations, targeting mainly local markets.

TYPICAL OPERATING PROFILE OF AN AGGREGATE PRODUCER

We reviewed financial benchmark data for companies in construction sand and gravel mining industry in the central region of the U.S. which includes the State of Michigan.[47] According to the industry composite by Risk Management Association (RMA), in 2019, these companies had, on average, a gross profit margin of 36.7 percent, and an operating profit margin of 9.7 percent. They had a profit before tax margin of 10.2%, on average in 2019. These margins indicated that the profitability in construction sand and gravel industry is higher than many other sectors. However, note that high profit margins per se do not indicate high return on investment for the industry, which is characterized by higher capital spending and riskier cash flows than many other industries.

47. Central region includes Illinois, Indiana, Kentucky, Michigan, Missouri, and Ohio. Note that as discussed above, each mine has some unique characteristics. Hence, their cost structure and profit levels would vary to a certain extent.

- See Exhibit 19, "Financial Ratio Benchmark Data for Construction Sand and Gravel Mining Industry, Central Region, 2019," on page A-19.

PRO-FORMA PROJECT FINANCES

We reviewed summary pro-forma operating plan provided by Mid Michigan Materials for Washtenaw Sand and Gravel.[48] In general, these financial ratios are consistent with ratios demonstrated in the industry. Note that industry financial composite include the financial statements of a large sample of companies in the industry, whereas the pro-forma financial figures include only the Washtenaw Sand and Gravel mine. Based on this analysis, we expect the company to operate the mine profitably similar to its peers in the industry. Note also the demand for aggregates has remained solid in Michigan over the last decade, based on our analysis.

- See "Mid Michigan Materials, Inc" on page 6.
- See also "Washtenaw Sand and Gravel" on page 6.
- See also "Factors of Demand for Aggregates in the Market" on page 13.

48. Summary pro-forma operating plan for proposed project provided by Mid Michigan Materials on February 5, 2020 under a confidentiality pledge by Anderson Economic Group.

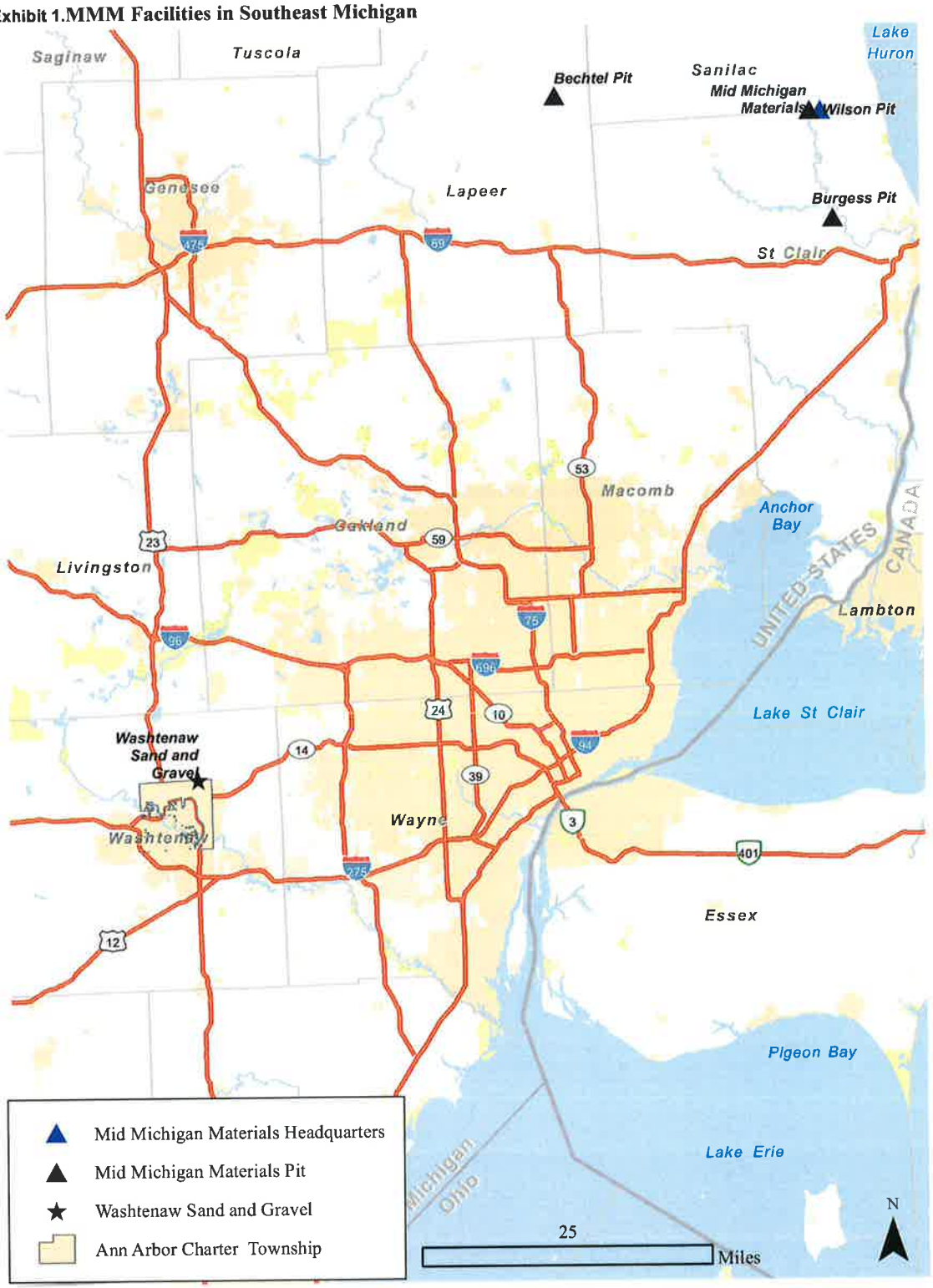
Appendix A. Market and Financial Exhibits

LIST OF EXHIBITS

3. Exhibit 1, "MMM Facilities in Southeast Michigan," on page A-3.
4. Exhibit 2, "Location of Washtenaw Sand and Gravel and Ann Arbor Charter Township," on page A-4.
1. Exhibit 3, "Overview of Washtenaw Sand and Gravel," on page A-5.
2. Exhibit 4, "Michigan Construction Sand and Gravel Sold or Used in 2016, by Major Use Category," on page A-6.
3. Exhibit 5, "Aggregates Sold or Used by Producers in Michigan, 2009-2018," on page A-7.
4. Exhibit 6, "Principal Producing Areas in Michigan," on page A-8.
5. Exhibit 7, "Aggregate Producing Counties in Michigan," on page A-9.
6. Exhibit 8, "Washtenaw Sand and Gravel and Primary Market Area," on page A-10.
7. Exhibit 9, "2015-2045 Population and Employment Forecast for the Primary Market Area," on page A-11.
8. Exhibit 10, "Southeast Michigan GDP by Sector, 2014 and 2018," on page A-12.
9. Exhibit 11, "Actual and Forecasted Condition of Federally-Funded Michigan Roads," on page A-13.
10. Exhibit 12, "Road Conditions in Southeast Michigan Counties and the State of Michigan," on page A-13.
11. Exhibit 12, "Road Conditions in Southeast Michigan Counties and the State of Michigan," on page A-13.
12. Exhibit 13, "Demand for Aggregates in the Southeast Michigan Market," on page A-14.
13. Exhibit 14, "Industry-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040," on page A-15.
14. Exhibit 15, "Population-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040," on page A-15.
15. .Exhibit 16, "Construction Sand and Gravel Mines in Southeast Michigan," on page A-16.
16. .Exhibit 17, "Crushed Stone Mines in Southeast Michigan," on page A-17.
17. Exhibit 18, "Summary of Sand and Gravel Mines in Southeast Michigan Market," on page A-18.
18. Exhibit 19, "Financial Ratio Benchmark Data for Construction Sand and Gravel Mining Industry, Central Region, 2019," on page A-19.

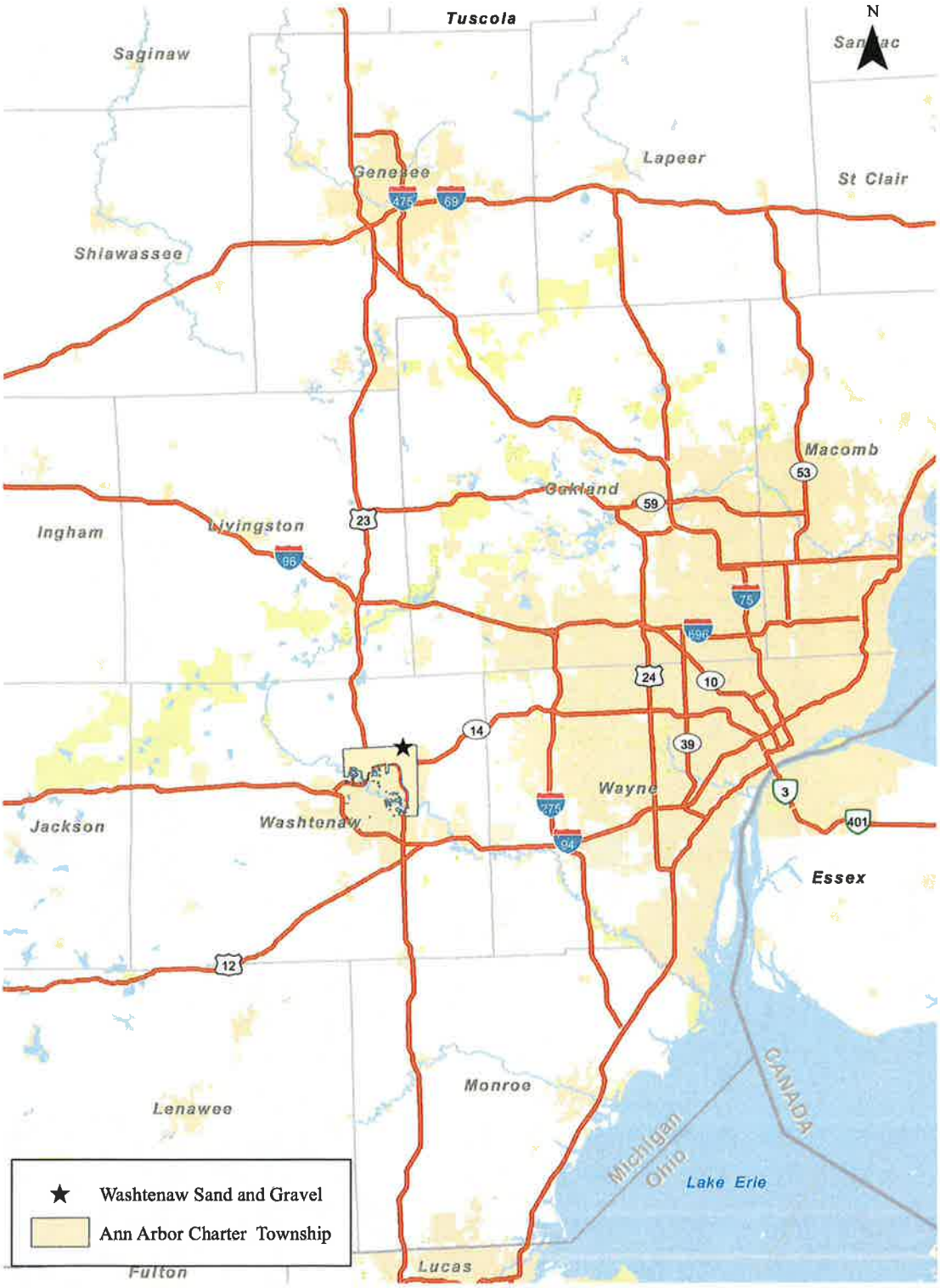
19. Exhibit 20, "Selected Valuation Standards: Excerpts from "Solutions Manual and Reference for The Economics of Business Valuation"," on page A-21.

Exhibit 1.MMM Facilities in Southeast Michigan



Source: Mid Michigan Materials, www.midmichiganmaterials.com/
Analysis: Anderson Economic Group

Exhibit 2. Location of Washtenaw Sand and Gravel and Ann Arbor Charter Township



Analysis: Anderson Economic Group

Exhibit 3. Overview of Washtenaw Sand and Gravel

Source: Mid Michigan Materials

Exhibit 4. Michigan Construction Sand and Gravel Sold or Used in 2016, by Major Use Category

Use	Quantity (thousand metric tons)	Value (thousands)	Unit Value
Concrete aggregate (including concrete sand)	2,210	$14,000	$6.33
Plaster and gunite sands	NA	NA	-
Concrete products (blocks, bricks, pipe, decorative, etc.)	NA	NA	-
Asphaltic concrete aggregates and other bituminous mixtures	1,680	11,500	$6.85
Road base and coverings (include road and other stabilization)	3,690	24,900	$6.75
Fill	2,080	8,450	$4.06
Snow and ice control	60	242	$4.03
Railroad ballast	26	265	$10.19
Other uses[1]	31,500	189,000	$6.00
Total or average[2]	**41,300**	**249,000**	**$6.03**

Note: Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[1] Reported and estimated production without a breakdown by end use

[2] Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

Source: United States Geological Survey, 2016 Minerals Yearbook
Analysis: Anderson Economic Group

Exhibit 5. Aggregates Sold or Used by Producers in Michigan, 2009-2018

A. Quantity (in thousands of metric tons) of Aggregate Sold or Used by Producers in Michigan

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Compound Annual Growth Rate (CAGR), 2009-2018
Construction Sand and Gravel	34,600	33,600	32,100	31,600	31,800	36,400	39,100	41,300	43,300	45,600	3.1%
Crushed Stone	20,400	21,900	22,700	22,400	27,100	26,300	27,700	27,700	25,100	24,000	1.8%
Recycled Materials:											
Recycled Asphalt Concrete	532	883	838	966	895	887	855	724	n/a	n/a	
Recycled Portland Cement	1,010	1,210	1,040	962	1,050	1,070	943	953	n/a	n/a	

B. Value (in thousands of dollars) of Aggregate Sold or Used by Producers in Michigan

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Construction Sand and Gravel	$176,000	$192,000	$179,000	$173,000	$167,000	$204,000	$237,000	$249,000	$269,000	$292,000
Crushed Stone	$115,000	$122,000	$137,000	$142,000	$193,000	$194,000	$199,000	$199,000	$185,000	$182,000
Recycled Materials:										
Recycled Asphalt Concrete	$3,010	$3,560	$3,530	$3,930	$4,430	$4,180	$4,220	$3,980	n/a	n/a
Recycled Portland Cement	$7,180	$8,030	$7,200	$6,160	$7,120	$7,810	$5,420	$5,820	n/a	n/a

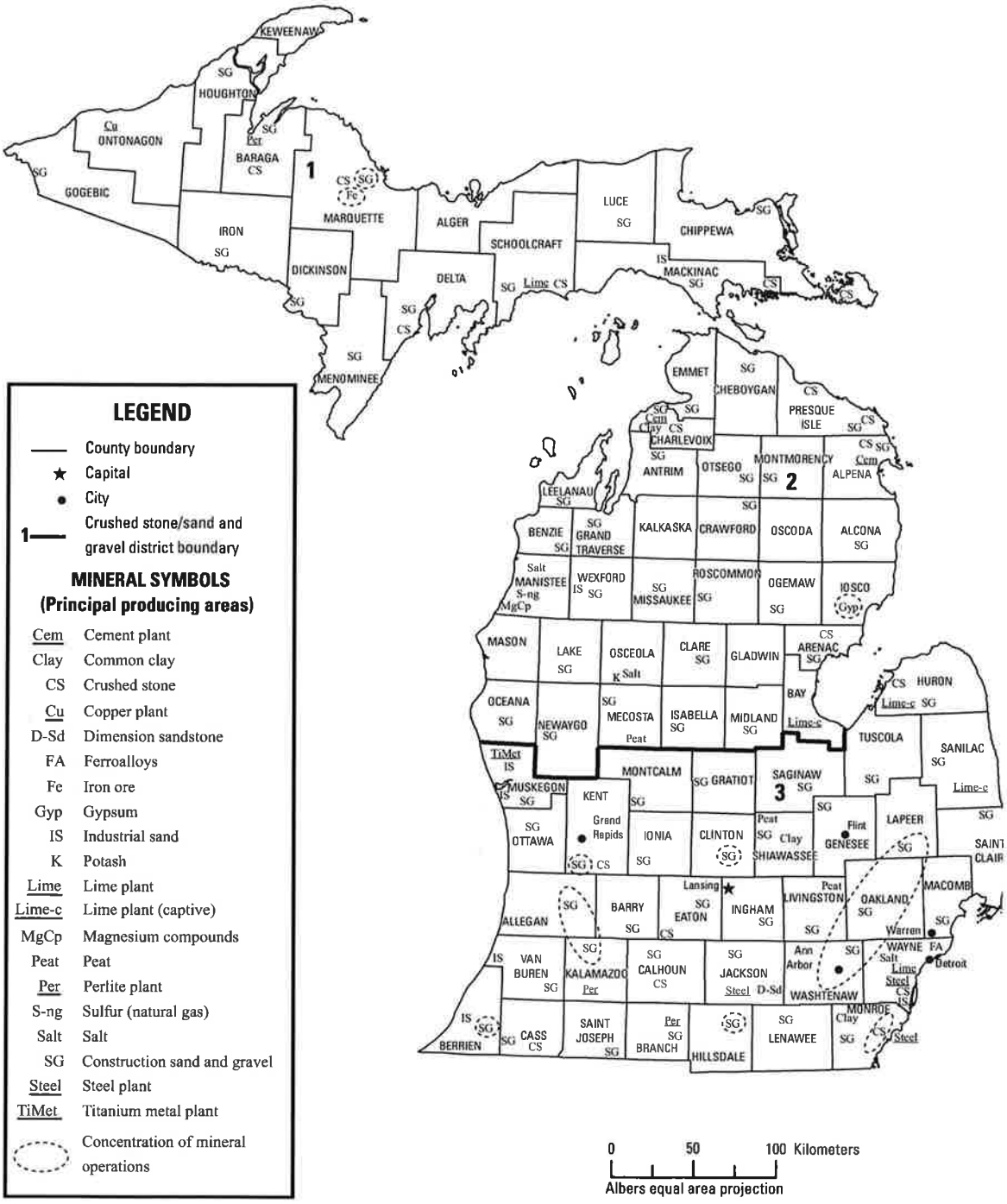
C. Unit Value (in dollars) of Aggregate Sold or Used by Producers in Michigan

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Construction Sand and Gravel	$5.10	$5.70	$5.57	$5.48	$5.26	$5.61	$6.06	$6.03	$6.21	$6.40
Crushed Stone	$5.66	$5.55	$6.00	$6.34	$7.10	$7.40	$7.18	$7.18	$7.37	$7.58
Recycled Materials:										
Recycled Asphalt Concrete	$5.67	$4.03	$4.21	$4.07	$4.95	$4.71	$4.94	$5.50	n/a	n/a
Recycled Portland Cement	$7.13	$6.66	$6.93	$6.41	$6.79	$7.28	$5.75	$6.11	n/a	n/a

Source: U.S. Geological Survey, 2009 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel), 2010 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel), 2012 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel); 2014 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel); 2015 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel); 2016 Minerals Yearbook (Crushed Stone; Construction Sand and Gravel); Fourth Quarter 2018 Mineral Industry Surveys (Crushed Stone and Construction Sand and Gravel.

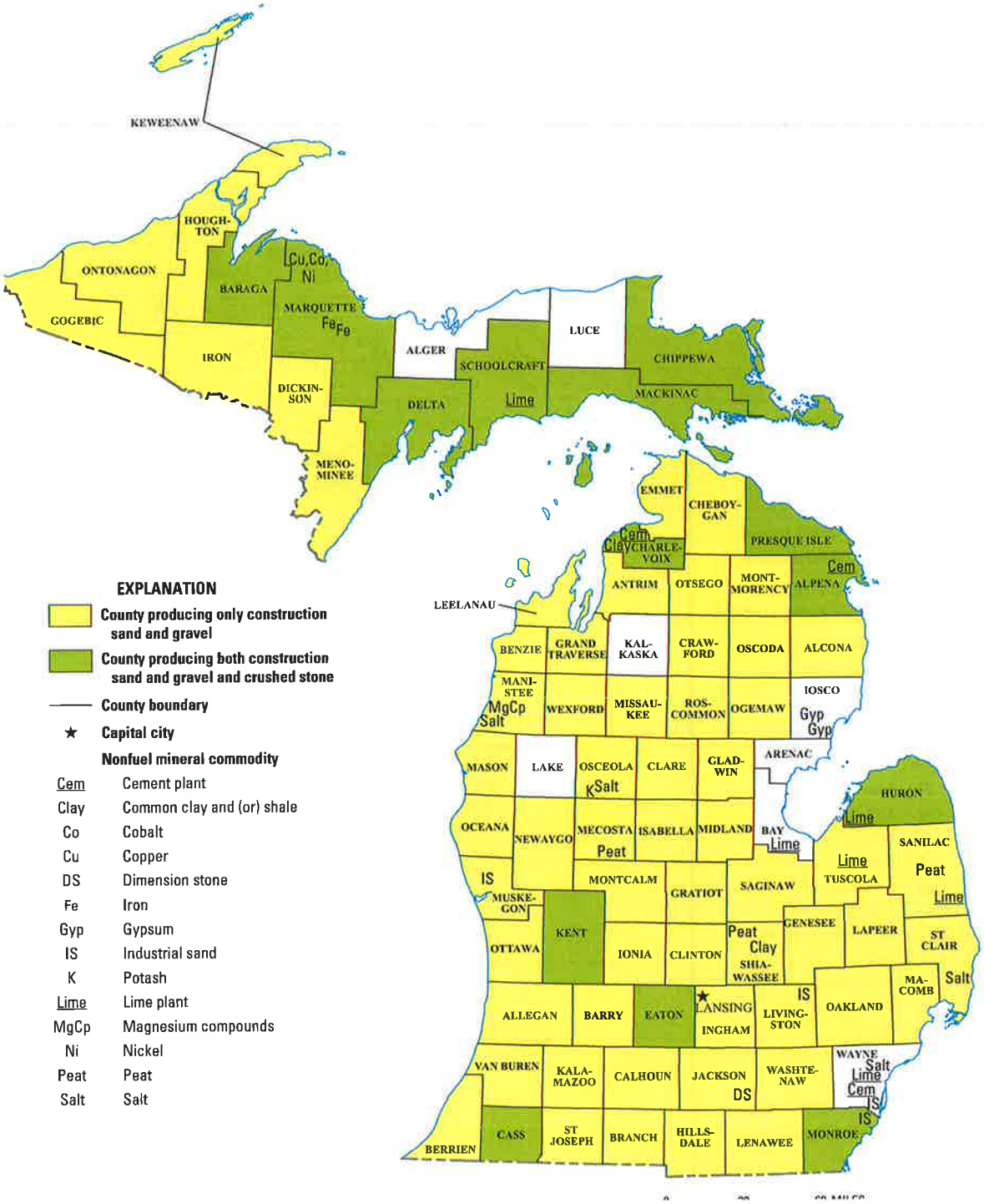
Analysis: Anderson Economic Group

Exhibit 6. Principal Producing Areas in Michigan



Source: United States Geological Survey, 2012-2013 Minerals Yearbook, Michigan [Advance Release], October 2016

Exhibit 7.Aggregate Producing Counties in Michigan



Source: United States Geological Survey, 2014 Minerals Yearbook, Michigan [Advance Release], September 2019

Exhibit 8.Washtenaw Sand and Gravel and Primary Market Area

Source: Anderson Economic Group
Analysis: Anderson Economic Group

Exhibit 9. 2015-2045 Population and Employment Forecast for the Primary Market Area

	2015	2025	2035	2045	Change 2015-2045 *Number*	*Percent*
Washtenaw County						
Population	358,551	395,790	431,785	452,791	*94,240*	*26.3%*
Households	138,045	156,405	171,649	180,670	*42,625*	*30.9%*
Employment	256,651	274,110	283,994	296,410	*39,759*	*15.5%*
Wayne County						
Population	1,759,951	1,728,860	1,778,174	1,844,061	*84,110*	*4.8%*
Households	690,935	694,261	719,579	740,975	*50,040*	*7.2%*
Employment	927,801	932,389	935,057	949,345	*21,544*	*2.3%*
Southeast Michigan						
Population	2,118,502	2,124,650	2,209,959	2,296,852	*178,350*	*8.4%*
Households	828,980	850,666	891,228	921,645	*92,665*	*11.2%*
Employment	1,184,452	1,206,499	1,219,051	1,245,755	*61,303*	*5.2%*

Source: Southeast Michigan Council of Governments, "Southeast Michigan 2045 Forecast Summary," August 2018.
Analysis: Anderson Economic Group

Exhibit 10.Southeast Michigan GDP by Sector, 2014 and 2018

Description	2014	2018	2014-2018 CAGR
All industry total	239,006,144	260,643,367	2.2%
Private industries	216,550,318	237,412,497	2.3%
Agriculture, forestry, fishing and hunting*	NA	NA	NA
Mining, quarrying, and oil and gas extraction	326,806	477,525	9.9%
Utilities*	NA	2,398,665	NA
Construction	7,100,029	8,205,162	3.7%
Manufacturing	44,573,915	46,798,365	1.2%
Durable goods manufacturing	37,736,282	39,313,237	1.0%
Nondurable goods manufacturing	6,860,142	7,544,062	2.4%
Wholesale trade*	18,731,884	NA	NA
Retail trade	13,477,094	16,364,978	5.0%
Transportation and warehousing*	NA	NA	NA
Information	7,489,737	8,795,045	4.1%
Finance, insurance, real estate, rental, and leasing	39,368,215	41,769,720	1.5%
Finance and insurance	12,052,453	12,085,401	0.1%
Real estate and rental and leasing	27,301,661	29,760,126	2.2%
Professional and business services*	NA	47,004,378	NA
Educational services, health care, and social assistance	21,963,382	23,718,646	1.9%
Educational services	1,952,492	1,854,077	-1.3%
Health care and social assistance	20,010,914	21,877,270	2.3%
Arts, entertainment, recreation, accommodation, and food services	8,407,846	9,171,544	2.2%
Arts, entertainment, and recreation	2,074,994	2,186,146	1.3%
Accommodation and food services	6,333,278	6,983,500	2.5%
Other services (except government and government enterprises)	5,202,168	5,174,829	-0.1%
Government and government enterprises	22,484,379	23,299,358	0.9%
Memo:			
Michigan Real GDP	*431,510,900*	*470,529,200*	*2.2%*
US Real GDP	*16,912,038,000*	*18,638,164,000*	*2.5%*

Note: Southeast Michigan includes the Detroit–Warren–Dearborn Metropolitan Statistical Area (MSA) and Ann Arbor MSA. Overall, the following counties are included: Washtenaw, Lapeer, Livingston, Macomb, Oakland, St. Clair, and Wayne.
Real GDP is in thousands of chained 2012 dollars. Industry detail is based on the 2012 North American Industry Classification System (NAICS).
** Not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.*
Metropolitan Areas are defined (geographically delineated) by the Office of Management and Budget bulletin no. 18-04 issued September 14, 2018.

Source: Bureau of Economic Analysis, Real GDP by State (million of chained 2012 dollars)

Analysis: Anderson Economic Group

Exhibit 11. Actual and Forecasted Condition of Federally-Funded Michigan Roads

		Good	Fair	Poor
Actual (2010-2018)	2010	19%	48%	32%
	2011	19%	47%	34%
	2012	20%	47%	33%
	2013	19%	47%	34%
	2014	18%	45%	38%
	2015	16%	45%	39%
	2016	18%	43%	39%
	2017	20%	40%	40%
	2018	21%	38%	41%
Forecast (2020-2030)	2020	28%	26%	46%
	2022	33%	21%	46%
	2024	32%	23%	45%
	2026	30%	25%	45%
	2028	29%	25%	46%
	2030	28%	25%	47%

Source: Michigan Transportation Asset Management Council 2018, Pavement Condition and Comparison Dashboard, accessed 2/8/2020
Analysis: Anderson Economic Group, LLC

Exhibit 12. Road Conditions in Southeast Michigan Counties and the State of Michigan

	2017-2018								
	Good Condition			Fair Condition			Poor Condition		
	Share of Lane Miles	Centerline Miles	Lane Miles	*Share of Lane Miles*	Centerline Miles	Lane Miles	*Share of Lane Miles*	Centerline Miles	Lane Miles
Washtenaw County	*32.5%*	299	681	*30.3%*	286	634	*37.2%*	347	777
Wayne County	*15.8%*	400	1,132	*39.2%*	981	2,808	*45.0%*	1,137	3,230
Total Primary Market Area	***19.6%***	**699**	**1,813**	***37.2%***	**1,266**	**3,442**	***43.3%***	**1,484**	**4,007**
Memo									
Total Michigan	*21.1%*	*8555.1*	*18934.2*	*38.4%*	*15389.9*	*34490.7*	*40.5%*	*16419.8*	*36375.2*

Source: Michigan Transportation Asset Management Council 2018, Pavement Condition and Comparison Dashboard, accessed 2/8/2020.
Analysis: Anderson Economic Group

Exhibit 13. Demand for Aggregates in the Southeast Michigan Market

Share of Michigan Population in the Southeast Michigan Market, 2018

Area	Population
Primary Market Area	2,137,710
State of Michigan	10,057,191
Pct. of Statewide Pop. in PMI	21.3%

Note: Population for Southeast Michigan include the five counties identified in our analysis (Livingston, Monroe, Oakland, Washtenaw, and Wayne).

Source: Anderson Economic Group, LLC; Inter-census estimates from ESRI, Inc.

Analysis: Anderson Economic Group, LLC

Population-Adjusted Demand for Aggregates in the Southeast Michigan Market, 2018

	2018 Michigan Quantity	Population Share	2018 Primary Market Area Demand
Sand and Gravel (metric tons)	45,600	21.3%	9,693
Crushed Stone (metric tons)	24,000	21.3%	5,101
Total	*69,600*		*14,794*

Note: The estimate of demand for aggregates in Southeast Michigan are based on population for two reasons: (1) Production of aggregates is heavily reliant on the demand for road construction, which is highly related with population in an area, and (2) The market for aggregates is mainly local rather than national. The United States Geological Survey reports "production for consumption" numbers which represent material that was either sold to other companies or consumers, or was used by producers.

Source: United States Geological Survey, "2016 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]"; United States Geological Survey, "2016 Minerals Yearbook: Stone, Crushed [Advance Release]; Esri, Inc.

Analysis: Anderson Economic Group

Exhibit 14.Industry-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040

	2018 (Estimate)	2019 (Projection)	2020 (Projection)	2021 (Projection)	2022 (Projection)	2023 (Projection)
Sand and Gravel (metric tons)	9,693	9,789	9,887	9,986	10,086	10,187
Crushed Stone (metric tons)	5,101	5,152	5,204	5,256	5,308	5,362

	2024 (Projection)	2025 (Projection)	2026 (Projection)	2027 (Projection)	2028 (Projection)	2029 (Projection)
Sand and Gravel (metric tons)	10,289	10,392	10,496	10,601	10,707	10,814
Crushed Stone (metric tons)	5,415	5,469	5,524	5,579	5,635	5,691

	2030 (Projection)	2031 (Projection)	2032 (Projection)	2033 (Projection)	2034 (Projection)	2035 (Projection)
Sand and Gravel (metric tons)	10,922	11,031	11,141	11,253	11,365	11,479
Crushed Stone (metric tons)	5,748	5,806	5,864	5,922	5,982	6,042

	2036 (Projection)	2037 (Projection)	2038 (Projection)	2039 (Projection)	2040 (Projection)
Sand and Gravel (metric tons)	11,594	11,710	11,827	11,945	12,064
Crushed Stone (metric tons)	6,102	6,163	6,225	6,287	6,350

Note: The rate of annual growth increase each year is based on the production for consumption reported by USGS for sand and gravel and crushed stone in Michigan and trends in the industry.

Source: *Anderson Economic Group analysis of data from Exhibit 5 on page A-7 and Exhibit 13 on page A-14.*

Analysis: Anderson Economic Group

Exhibit 15.Population-Based Projection of Demand for Aggregates in the Southeast Michigan Market, 2017-2040

	2018 (Estimate)	2019 (Projection)	2020 (Projection)	2021 (Projection)	2022 (Projection)	2023 (Projection)
Sand and Gravel (metric tons)	9,693	9,719	9,746	9,772	9,799	9,826
Crushed Stone (metric tons)	5,101	5,115	5,129	5,143	5,157	5,172

	2024 (Projection)	2025 (Projection)	2026 (Projection)	2027 (Projection)	2028 (Projection)	2029 (Projection)
Sand and Gravel (metric tons)	9,853	9,880	9,907	9,934	9,961	9,989
Crushed Stone (metric tons)	5,186	5,200	5,214	5,228	5,243	5,257

	2030 (Projection)	2031 (Projection)	2032 (Projection)	2033 (Projection)	2034 (Projection)	2035 (Projection)
Sand and Gravel (metric tons)	10,016	10,043	10,071	10,098	10,126	10,154
Crushed Stone (metric tons)	5,272	5,286	5,300	5,315	5,330	5,344

	2036 (Projection)	2037 (Projection)	2038 (Projection)	2039 (Projection)	2040 (Projection)
Sand and Gravel (metric tons)	10,182	10,210	10,238	10,266	10,294
Crushed Stone (metric tons)	5,359	5,373	5,388	5,403	5,418

Note: The rate of increase in production each period is based on the CAGR of regional population growth forecasts for 2015-2045. See Exhibit 8 on page A-10.

Source: Anderson Economic Group analysis of data from Exhibit 5 on page A-7 and Exhibit 9 on page A-11.

Analysis: Anderson Economic Group

Exhibit 16. Construction Sand and Gravel Mines in Southeast Michigan

Mine ID	Mine Name	Opr. Begin Date	Current Mine Status	Current Operator Name	County	Estimated Year of Depletion (25 Years after Begin Date)
2001254	A A Grange Hall Rd Plant	1/1/1950	Active	American Aggregates of Michigan Inc	Washtenaw	1975
2000872	Washtenaw Sand & Gravel	1/1/1950	Active	Washtenaw Sand & Gravel	Washtenaw	1975
2002524	Stoneco Burmeister	1/1/1980	Intermittent	Michigan Materials and Aggregates Company	Washtenaw	2005
2002886	Clinton Plant	6/1/1992	Intermittent	Gerken Materials Inc.	Washtenaw	2017
2002949	Zeeb Road	4/1/1995	Active	Michigan Materials and Aggregate Company	Washtenaw	2020
2003124	NIETHAMMER TRANSPORT	7/1/1999	Intermittent	Niethammer Transport, Inc.	Washtenaw	2024
2003310	Freedom Sand & Gravel	12/1/2004	Intermittent	American Aggregates of Michigan Inc	Washtenaw	2029
2003423	52 Minerals, LLC	2/2/2009	Intermittent	52 Minerals, LLC	Washtenaw	2034
2003513	Lippman Plant #2	8/17/2015	Intermittent	Cardinal Aggregates	Washtenaw	2040
2003585	M-52 Sand & Gravel	9/11/2019	Intermittent	M-52 Sand and Gravel	Washtenaw	2044
2003580	Powerscreen	7/10/2019	Intermittent	TR Transport LLC	Washtenaw	2044

Note: Mine status as of February 2020. We have excluded from the list any mines with a status of "Abandoned" by the Mine Safety and Health Administration. The county listed indicates the general location of the mine.

Source: Mine information from U.S. Department of Labor, Mining Safety and Health Administration, Mine Data Retrieval System, accessed February 2020; expected depletion date based on average industry figures, reported by the Michigan Aggregates Association.

The Mining Safety and Health Administration is an agency created in 1978 that develops and enforces safety and health rules for all U.S. mines, and provides technical, educational and other types of assistance to mine operators. MSHA's mission is included in the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended by the Mine Improvement and New Emergency Response (MINER) Act of 2006. MSHA is required to inspect each underground mine four times a year and each surface mine twice a year for health and safety compliance. Information on all the mines in the U.S. is being collected through the various MSHA programs. Active mines refer to mines that were actively operating at the time of inspection, while intermittent mines include mines that were temporary not producing at the time of the inspection. No abandoned mines were included in this analysis.

Analysis: Anderson Economic Group

Exhibit 17.Crushed Stone Mines in Southeast Michigan

Mine ID	Mine Name	Opr Begin Date	Current Mine Status	County	Current Operator	Operator Start Date
2000362	River Rouge Facility	1/1/1950	Active	Wayne	Carmeuse Lime and Stone, Inc	10/14/2010
2002434	St Marys Cement - Detroit	1/1/1979	Active	Wayne	St. Marys Cement (U.S.) LLC	8/1/2001

Note: Mine status as of February 2020. The county listed indicates the general location of the mine.

Source: Mine information from U.S. Department of Labor, Mining Safety and Health Administration, Mine Data Retrieval System, accessed February 2020.

Analysis: Anderson Economic Group

Exhibit 18.Summary of Sand and Gravel Mines in Southeast Michigan Market

	Number	Percent of Total
Sand and Gravel Mines	11	
Mines with Complete Information	9	100.0%
Mines to end operations in 5 Years (by 2025)	4	44.4%
Mines to end operations in 10 Years (by 2030)	6	66.7%
Mines to end operations in 15 Years (by 2035)	7	77.8%
Mines to end operations in 20 Years (by 2040)	9	100.0%

Note: To estimate when mines would end operations, if current industry trends are maintained, we used the year the mine was opened and added 25 years to find the date of depletion.

The number of mines likely to be depleted by 2035 are inclusive of those likely to be depleted by 2025, and so on.

Variation in mining techniques, economic trends, usage of materials, and the amount of available reserves affect the actual rate of depletion of the reserves of sand and gravel mines in the market.

Several mines have, according to our source, the same beginning date of operation, 1950, indicative of the Mining Safety and Health Administration's recording process. We categorize these mines as having unknown depletion dates, and so they are not accounted for in our estimates of when mines may be depleted.

Source: U.S. Department of Labor, Mining Safety and Health Administration 2020, Mine Data Retrieval System, accessed February 5, 2020; expected depletion date based on information from Michigan Aggregates Association 2020; Anderson Economic Group

Analysis: Anderson Economic Group

Exhibit 19. Financial Ratio Benchmark Data for Construction Sand and Gravel Mining Industry, Central Region, 2019

ASSETS	
Cash & Equivalents	9.9
Trade Receivables - (net)	7.9
Inventory	8.0
All Other Current Assets	.7
Total Current Assets	26.6
Fixed Assets (net)	53.3
Intangibles (net)	12.7
All Other Non-Current Assets	7.5
Total Assets	100.0
LIABILITIES	
Notes Payable-Short Term	3.9
Cur. Mat.-L/T/D	6.4
Trade Payables	3.3
Income Taxes Payable	.0
All Other Current Liabilities	3.1
Total Current Liabilities	16.7
Long Term Debt	19.2
Deferred Taxes	.5
All Other Non-Current Liabilities	10.7
Net Worth	53.0
Total Liabilities & Net Worth	100.0
INCOME DATA	
Net Sales	100.0
Gross Profit	36.7
Operating Expenses	27.0
Operating Profit	9.7
All Other Expenses (net)	-.5
Profit Before Taxes	10.2
RATIOS	
Current - upper	4.0
Current - median	1.7
Current - lower	.8
Quick - upper	3.2
Quick - median	.9
Quick - lower	.4
Sales / Receivables - upper	[8] 48.5
Sales / Receivables - median	[25] 14.4
Sales / Receivables - lower	[38] 9.6
Cost of Sales / Inventory - upper	[19] 18.8
Cost of Sales / Inventory - median	[49] 7.5
Cost of Sales / Inventory - lower	[104] 3.5
Cost of Sales / Payables - upper	[11] 34.2
Cost of Sales / Payables - median	[16] 22.9
Cost of Sales / Payables - lower	[31] 11.9
Sales / Working Capital - upper	3.9
Sales / Working Capital - median	12.1
Sales / Working Capital - lower	NM
EBIT / Interest - upper	10.0

Exhibit Cont.

EBIT / Interest - median	(19)	4.8
EBIT / Interest - lower		1.6
Net Profit + DDA / Curr Mat LTD - upper		
Net Profit + DDA / Curr Mat LTD - median		
Net Profit + DDA / Curr Mat LTD - lower		
Fixed / Worth - upper		.8
Fixed / Worth - median		1.1
Fixed / Worth - lower		2.0
Debt / Worth - upper		.4
Debt / Worth - median		.7
Debt / Worth - lower		2.0
% Profit before Taxes / Tangible Net Worth - upper		32.2
% Profit before Taxes / Tangible Net Worth - median	(18)	17.3
% Profit before Taxes / Tangible Net Worth - lower		6.2
% Profit before Taxes / Total Assets - upper		12.8
% Profit before Taxes / Total Assets - median		5.7
% Profit before Taxes / Total Assets - lower		2.3
Sales / Net Fixed Assets - upper		3.8
Sales / Net Fixed Assets - median		1.6
Sales / Net Fixed Assets - lower		1.1
Sales / Total Assets - upper		1.4
Sales / Total Assets - median		.8
Sales / Total Assets - lower		.7
% Depr, Depl, Amort / Sales - upper		4.4
% Depr, Depl, Amort / Sales - median	(18)	6.5
% Depr, Depl, Amort / Sales - lower		11.2
% Officers', Directors', Owners' Comp / Sales - upper		2.2
% Officers', Directors', Owners' Comp / Sales - median	(7)	8.0
% Officers', Directors', Owners' Comp / Sales - lower		10.0
Net Sales ($)		492847M
Total Assets ($)		520305M

Note: Central region includes Illinois, Indiana, Kentucky, Michigan, Missouri, and Ohio.

Numbers shown are ratios to total assets, liabilities, or income, totaling 100.

Source: eStatement studies by the Risk Management Association for Sand and Gravel Mining Companies, 2019.

Exhibit 5-1. Code of Federal Regulations: Fair Market Value

The fair market value is the price at which the property would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or to sell and both having reasonable knowledge of relevant facts. The fair market value of a particular item of property includible in the decedent's gross estate is not to be determined by a forced sale price. Nor is the fair market value of an item of property to be determined by the sale price of the item in a market other than that in which such item is most commonly sold to the public, taking into account the location of the item wherever appropriate.

Source: Code of Federal Regulations (for US Code Title 26), Sec. 20.2031-1 Definition of gross estate; valuation of property, subsection (b).

Exhibit 5-2. Professional Summary of Fair Market Value Elements (Mercer)

Section 20.2031-1(b) of the Estate Tax Regulations (section 81.10 of the Estate Tax Regulations 105) and section 25.2512-1 of the Gift Tax Regulations (section 86.19 of Gift Tax Regulations 108) define fair market value, in effect, as [1] the price at which the property would change hands [2] between a willing buyer [3] and a willing seller [4] when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, [5] both parties having reasonable knowledge of the relevant facts. Court decisions frequently state in addition that [6] the hypothetical buyer and seller are assumed to be able, [7] as well as willing, to trade and [8] to be well informed about the property and [9] concerning the market for such property. [parenthetical numbers added]

Source: IRS, Mercer (1999); similarly stated in many other references.

Exhibit 5-3. Revenue Ruling 59-60 (1959)[82]

SEC. 4. FACTORS TO CONSIDER.

.01 It is advisable to emphasize that in the valuation of the stock of closely held corporations or the stock of corporations where market

82 Note: This ruling was later "modified" by RR 65-193, and "amplified" by RR 77-287, RR 80-213, and RR 83-120. However, these modifications and amplifications did not change the listed essential elements of a valuation estimate for US income tax purposes.

quotations are either lacking or too scarce to be recognized, all available financial data, as well as all relevant factors affecting the fair market value, should be considered. The following factors, although not all-inclusive are fundamental and require careful analysis in each case:

(a) The nature of the business and the history of the enterprise from its inception.

(b) The economic outlook in general and the condition and outlook of the specific industry in particular.

(c) The book value of the stock and the financial condition of the business.

(d) The earning capacity of the company.

(e) The dividend-paying capacity.

(f) Whether or not the enterprise has goodwill or other intangible value.

(g) Sales of the stock and the size of the block of stock to be valued.

(h) The market price of stocks of corporations engaged in the same or a similar line of business having their stocks actively traded in a free and open market, either on an exchange or over-the-counter.

Source: IRS; Original text provided by TaxLinks; found at: http://www.taxlinks.com.

Exhibit 5-4. Professional Summary of Valuation Elements (Anderson)

1. Accounting Information
a. Historical sales and revenue
b. Cost and profitability
c. Capital structure and discount rate
d. History and form of business operation
e. Any material, peculiar conditions
2. Economic Assumptions
a. Growth assumptions for company
b. Economic conditions in the industry
c. Conditions in geographic trade area
d. Value of franchises, licenses, and intangible assets
e. Market transactions for similar businesses
3. Management Policies
a. Management and management policies
b. Important business plan assumptions

Source: Anderson (2004), chapter 10.

Exhibit 5-5. Professional Summary of Business Valuation Factors (Gaughan)

Factors to Be Considered When Doing a Business Valuation

Several factors need to be analyzed when conducting a business valuation. These include firm-specific factors as well as external variables such as the state of the economy and the condition of the industry. These external factors define the environment in which the firm operates. Firm-specific factors reflect the unique aspects of the firm as it operates in this economic environment.

Note: Gaughan then describes in separate sub-sections the following factors: firm-specific factors, economic factors, industry factors, and financial analysis. He also lists the elements of IRS RR 59-60 as a reference.

Source: Gaughan (2004), chapter 8.

Exhibit 5-6. Professional Summary of Business Valuation Elements (Trout)

On a larger scale, other factors shown in the following list must be considered before beginning the pathway shown in [a flow-chart figure in the original text showing the steps in a financial analysis].

1. *Macroeconomic Factors.* The economy,...

2. *Microeconomic Factors*. Industry analysis, industry valuation ratios, intra-industry competition, typical use of debt in the industry, customers, suppliers.

3. Firm-Specific Factors. Market share, historic financial characteristics, debt ratio, diversification, customers, suppliers, competitive position in the market.

4. Selection of Comparable Companies...

5. Determination of Market Comparables for Target Company...

All of these factors should at least be considered in preparing a valuation report, even if some of the factors to not play an important part in the analytical process.

Source: Trout, in Gaughan (2000), chapter 8.

a. Appraisal Practices

In the following exhibits we include guidance statements that describe the proper methodology to observe in practical valuation tasks, as stated by authorities in the field.

Exhibit 5-7. Professional Appraisal Standards for Federal Agencies

USPAP 2008–2009

Standards Rule 9-3

In developing an appraisal of an equity interest in a business enterprise with the ability to cause liquidation, an appraiser must investigate the possibility that the business enterprise may have a higher value by liquidation of all or part of the enterprise than by continued operation as is. If liquidation of all or part of the enterprise is the indicated premise of value, an appraisal of any real property or personal property to be liquidated may be appropriate.

Standards Rule 9-4

In developing an appraisal of an interest in a business enterprise or intangible asset, an appraiser must collect and analyze all information necessary for credible assignment results.

(a) An appraiser must develop value opinion(s) and conclusion(s) by use of one or more approaches that are necessary for credible assignment results.

(b) An appraiser must, when necessary for credible assignment results, analyze the effect on value, if any, of:

(i) the nature and history of the business enterprise or intangible asset;

(ii) financial and economic conditions affecting the business enterprise or intangible asset, its industry, and the general economy;

(iii) past results, current operations, and future prospects of the business enterprise;

(iv) past sales of capital stock or other ownership interests in the business enterprise or intangible asset being appraised;

(v) sales of capital stock or other ownership interests in similar business enterprises;

(vi) prices, terms, and conditions affecting past sales of similar ownership interests in the asset being appraised or a similar asset; and

(vii) economic benefit of tangible and intangible assets.

Comment on (i)-(vii): This Standards Rule directs the appraiser to study the prospective and retrospective aspects of the business enterprise and to study it in terms of the economic and industry environment within which it operates.

Source: Erin Grover, ed., "Solutions Manual and Reference for The Economics of Business Valuation," Anderson Economic Group, 2013.

Appendix B. Methods and Definitions

In this section, we review well-established definitions and industry standards in economics and valuation for the notions of "valuable" and "the need ...in the market."

DEFINITIONS AND STANDARDS

Relevant Statute

The Michigan Zoning Enabling Act, PA110 of 2006, is the statutory authority for evaluating market demand for the natural resource in this analysis.

The statute lists the requirements for challenging a zoning decision in section 205 subsection (4) [MCL 125.3205]:

> ...showing that there are valuable natural resources located on the relevant property, that there is a need for the natural resources by the person or in the market served by the person, and that no very serious consequences would result from the extraction, by mining, of the natural resources.

To properly evaluate what constitutes a "valuable" natural resource, as well as "need...in the market" for that resource, we referred to applicable professional standards in economics and valuation.

Definition of "Valuable"

"Fair Market Value" in Economics and Valuation. There is a well-established definition of "valuable" that arises from its use in economics, law, taxation, and valuation. In particular, the term "fair market value" is used in countless statutes, regulations, contracts, and tax regulations. A common definition of fair market value within this broad literature is: "the amount that a willing seller would accept as payment from a willing buyer, both having good information, and neither under any compulsion."

This phrasing is similar or identical to many common definitions of "market value" and "fair market value" used in statutes, contracts, and scholarly texts.[49]

"True Cash Value" in Michigan. A common use of the concept of market value arises in property taxation. Here, Michigan's Constitution uses the term "true cash value."[50]

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49. See, e.g., IRS Revenue Ruling -60 (see below); Anderson, *Economics of Business Valuation*, Stanford University Press, 2012 (chapter 2 and Appendix B); US Code of Federal Regulations (for US Code Title 26), Sec. 20.2031-1; *US Professional Appraisal Practice* (2008-09), Standards Rule 9-3 and 9-4, and comment.

> The legislature shall provide for the uniform general ad valorem taxation of real and tangible personal property not exempt by law except for taxes levied for school operating purposes. The legislature shall provide for the determination of true cash value of such property; the proportion of true cash value at which such property shall be uniformly assessed,... [Michigan Constitution, Article IX section 3]

The term "true cash value" in Michigan law is defined in the General Property Tax Act, Public Act 206 of 1893, at section 27:

> ..."true cash value" means the usual selling price at the place where the property to which the term is applied is at the time of assessment, being the price that could be obtained for the property at private sale, and not at auction sale except as otherwise provided in this section, or at forced sale.

This definition is equivalent to the common definition of "fair market value," as evidenced by "usual selling price" and in "private sale, and not at auction sale...or at forced sale."

Valuation Standards. There are a number of valuation standards in common use. Of these, the most common is the seminal IRS Revenue Ruling -60 (19), which list key factors to be considered when valuing closely-held companies, or the stock of corporations where market quotations are not available.

Elements that Establish Value for a Business. Critical elements that establish value are stated in the references cited in this section. These firm-specific and external factors include but are not limited to:

1. "The nature of the business and the history of the enterprise from its inception;"
2. "The economic outlook in general and the condition and outlook of the specific industry in particular;" and
3. "The earning capacity of the company."[51]

Thus, to establish "value" for the natural resource, we can examine the factors that establish fair market value of that resource and of the businesses that produce and distribute it.

50. This phrase occurs in multiple sections, such as Article IX section 5 (regarding public service businesses), and in numerous statutes (including the General Property Tax Ac, Act 206 of 1893).

51. See IRS Revenue Ruling -60, 19-1 CB 237. The document is reprinted in many other valuation texts. Note that the ruling itself has been amended by the IRS multiple times since its original release in 19.

Definition of "Need . . . in the Market"

For the purposes of showing that there is a market need for natural resources, the definition of "need . . . in the market" that we use in this report is supported by our established definition of "value." Where a good or service possesses the elements of value, there is a mutual need between the buyer and seller to produce and consume the good or service in the market.

The idea of market demand or "need...in the market" is recognized in other fields including economics, business valuation, market studies, and taxation. The definition of need in the market refers to the actual need or demand for a product or service in the market, and not to a scarcity or unavailability of that product or service. Demand or need refers to what consumers want, and what they are willing to pay for the product or service, which is then reflected in the market price for that product. Need is demonstrated on the basis of people being willing to pay a certain price for a product or service. We can observe and measure numerous factors to demonstrate this need in the market.

This definition is consistent to a number of references, including the following books.

4. Walter Adams and James Brook, eds., *The Structure of American Industry,* 2001, Prentice-Hall, Inc., Upper Saddle River, New Jersey. The book reviews the factors that influence the demand for specific products, in this case automobiles. These factors are used to measure the demand for automobiles in the market.
5. David R. Henderson, ed., *The Fortune Encyclopedia of Economics,* 1993, Warner Books, Inc., New York, NY. The book talks about the concept of demand as one of the building blocks of economic analysis, important for understanding many industries, including natural resources.
6. Bernard Baumolh, *The Secrets of Economic Indicators*, 2005, Wharton School Publishing, Upper Saddle River, New Jersey. The book describes the many indicators used to understand the demand conditions in the market. One of these indicators is construction spending, which is a major factor in understanding the demand for natural resources such as sand and gravel.

Also, the market studies literature considers the needs of the costumers in the market in order to measure the demand for a good or service. The demand is determined by examining the characteristics of the consumers and the local market.

See Figure 20, "Selected Valuation Standards: Excerpts from "Solutions Manual and Reference for The Economics of Business Valuation"," on page 21.

MARKET DEMAND AND SUPPLY ESTIMATES APPROACH

Current Demand for Aggregates in the Market

Due to limitations in data availability, we estimated the current demand in the primary market area using the state industry figures. In general, the aggregate production information released by USGS refers to production for consumption or material that was sold or used by the companies. Stockpiled production is not reported until it is sold or consumed by the producer. The production tonnage is assumed to represent the amount produced for domestic consumption and export.

United State Geological Survey (USGS) provides information on production for consumption for each state, including Michigan. This represents a reasonable measure of actual demand in each state, as the production is assumed to represent the amount produced for actual consumption, where consumption reflects the level of demand for sand and gravel.

Therefore, we assume a similar per capita consumption of aggregates across the state, regardless of market. Based on this assumption, we can estimate the demand in the primary market area by adjusting state demand numbers by the share of the state's population living in the primary market area. To do so, we calculated the share of Michigan's population that lives in the Southeast Michigan market. We then applied this share of Michigan's population living in the Southeast Michigan market to the total amount of sand and gravel and crushed stone produced for consumption in Michigan in 2018.

In these estimates, we do not account for import and export of aggregate materials. In general, the export and import of aggregate materials represent very small shares of the production for consumption in a state, and the vast majority of the materials are used in the local markets. In a smaller area, because data is not available, we also assume that the amount of imports from surrounding counties into the primary market area to be comparable to the amount of exports made to surrounding counties in the extended market area. This is likely a conservative measure due to concentration of economic and residential activity in the market, the quality of the roads, and the limited number of aggregate mines in the market.

Projected Demand for Aggregates in the Market

We projected the demand for construction sand and gravel and the demand for crushed stone in the primary market area over the next 20 years under two scenarios. In the first scenario, we assume that demand for aggregates would increase at a rate equal to forecasted population growth in the market. In the second scenario, we assume that demand for aggregates would increase at a rate based on historic state-wide industry trends, in terms of production for consumption in Michigan

Population-Based Projection of Demand. In this method, using forecasted population growth, we project the amount of sand and gravel to be produced for consumption in the Southeast Michigan market. To do so, we gathered the SEMCOG-forecasted population changes from 2015 through 2045. We then calculated the compound annual growth rate (CAGR) for the region's population during this period (about 0.3 percent). Finally, we applied the CAGR for the population projection to the 2018 demand in Southeast Michigan to project the demand for sand and gravel in the Southeast Michigan market through 2040. Similarly, we projected the level of production for consumption of crushed stone using the second method from our construction sand and gravel calculation, described above.

Industry-Based Projection of Demand. Using the historical state-wide industry trends, we applied a 1% compound annual growth rate (CAGR) to project the amount of sand and gravel to be produced annually for consumption in the Southeast Michigan market, if reserves are available.

To do so, we gathered the USGS-reported production for consumption for construction sand and gravel for 2007 through 2018, and reviewed the change in production and the performance of the industry during that time. We used an annual growth rate of one percent to estimate the future annual change in demand. We then applied this annual growth rate to our estimated demand in Southeast Michigan to project the demand for sand and gravel in the Southeast Michigan market through 2040.

To project the level of demand for crushed stone in Southeast Michigan, we gathered USGS data on the production for consumption of crushed stone for 2007 through 2018, and reviewed the change in production and the performance of the industry during that time. We used an annual growth rate of one percent to estimate the future annual change in demand. We then applied this growth rate to the population-adjusted demand in Southeast Michigan to project the demand for crushed stone in the market.

Appendix C. Data Sources

COMPANY INFORMATION

1. Mid Michigan Materials, "About Mid Michigan Materials," accessed February 5, 2020, www.midmichiganmaterials.com/.

MARKET DEMAND AND SUPPLY REFERENCES

2. United States Department of the Interior, United States Geologic Survey, "2012-2013 Minerals Yearbook: Michigan [Advance Release]," October 2016, minerals.usgs.gov/minerals/pubs/state/mi.html.
3. United States Geological Survey, "2009 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]," June 2012, minerals.usgs.gov/minerals/pubs/commodity/myb/.
4. United States Geological Survey, "2010 Minerals Yearbook: Sand and Gravel, Construction [Advance Release]," July 2011, minerals.usgs.gov/minerals/pubs/commodity/myb/.
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Appendix D. About Anderson Economic Group

ANDERSON ECONOMIC GROUP

Anderson Economic Group, LLC is a premier boutique research and consulting firm, with offices in East Lansing, Michigan; and Chicago, Illinois. The experts at AEG specialize in market studies, economics, business valuation, and industry analyses. They have conducted market and industry studies as well as business valuation for a variety of private, public, and non-profit clients across the United States. Our clients include local and state governments, publicly-held corporations, non-profit organizations, trade associations, and small businesses.

The consultants at Anderson Economic Group are often published on topics within their respective fields of expertise. Publications from our team include:

- *The Economics of Business Valuation: Toward a Value Functional Approach,* published by Stanford University Press in 2013.
- *Business Economics and Finance with MATLAB®, GIS, and Simulation Models,* published in 2000.
- *Annual State Business Tax Burden Rankings,* published by Anderson Economic Group since 2007.

Work by AEG has been utilized in legislative hearings, legal proceedings, and public debates, as well as major planning exercises and executive strategy discussions.

Past clients of Anderson Economic Group include:

- *Governments:* The government of Canada; the states of Michigan, North Carolina, and Wisconsin; the cities of Detroit, Cincinnati, and Sandusky; counties such as St. Clair County, MI, Oakland County, MI, and Collier County, FL; and authorities such as the Detroit-Wayne County Port Authority.
- *Corporations:* Bank of America Merrill Lynch, InBev USA, ITC Holdings Corp., Ford Motor Company, First Merit Bank, Labatt USA, Lithia Motors, Meijer, Inc., National Wine & Spirits, Nestle, and Relevent Sports; automobile dealers and dealership groups representing Toyota, Honda, Chrysler, Mercedes-Benz, General Motors, Kia, and numerous other brands.
- *Nonprofit organizations:* Higher education institutions including Michigan State University, Wayne State University, and University of Michigan; trade associations such as the Michigan Manufacturers Association, Service Employees International Union, Automation Alley, and Business Leaders for Michigan, and convention and visitor bureaus of several major cities.

Please visit www.AndersonEconomicGroup.com for more information.

Exhibit D-1. Representative Clients of Anderson Economic Group

Businesses

- AT&T
- Bank of America Merrill Lynch
- BorgWarner
- Delphi Corporation
- Detroit Lions
- First Merit Bank
- Graymont
- Innkeepers USA
- ITC Holdings Corp.
- ITT Automotive
- Johnson Controls
- Lockwood Development
- Meijer, Inc.
- Michigan Motion Pictures, Inc.
- Nestle Waters North America
- Palace Sports & Entertainment
- Pollard Banknote
- PG&E Generating
- Raleigh Studios
- Relevent Sports
- Rock Ventures
- Soave Enterprises
- Spartan Stores
- The Taubman Company
- Visteon

Automotive Companies

- DaimlerChrysler
- Ford Motor Company
- General Motors Corporation
- Honda North America
- Lithia Motors, Inc.
- New Country Automotive Group
- Auto dealers representing: Audi, BMW, Buick, Cadillac, Chevrolet, Chrysler, Dodge, Ferrari, Fiat, Ford, GMC, Harley-Davidson, Honda, Hyundai, Jeep, Kia, Lexus, Lincoln, Lotus, Mazda, Mercedes-Benz, Mini, Nissan, Porsche, Ram, Subaru, Suzuki, Toyota, Volkswagen, and Volvo brands

Alcohol Beverage Companies

- Beck's North America
- Diageo North America, Inc.
- The Gambrinus Company
- Heineken USA
- InBev USA
- Labatt USA
- National Wine & Spirits
- PBR Knoxville, LLC
- William Grant & Sons
- Wholesalers representing: Anheuser-Busch, Ballast Point, Beck's Brewery, Bell's Brewery, Coors, Elysian, Jim Beam, Labatt, Miller, Molson, and Mondavi brands

Governments

- U.S. Department of Commerce
- Federal Government of Canada
- Province of Ontario, Canada
- Commonwealth of Kentucky
- State of Michigan
- State of North Carolina
- State of Ohio
- State of Wisconsin
- Cass County, Michigan
- Collier County, Florida
- Oakland County, Michigan
- St. Clair County, Michigan
- Wayne County, Michigan
- City of Cincinnati, Ohio
- City of Detroit, Michigan
- City of Hamtramck, Michigan
- City of Lansing, Michigan
- City of Sandusky, Ohio
- Detroit-Wayne County Port Authority
- Kent County Convention & Arenas Authority
- Bloomfield Hills School District
- University of Detroit Jesuit High School

Nonprofit and Trade Organizations

- Automation Alley
- Beaumont Hospitals
- Blue Cross Blue Shield
- Business Leaders for Michigan
- Experience Grand Rapids
- Ferris State University
- Grand Rapids Area Chamber
- Greater Lansing CVB
- Greater Naples Chamber
- International Mass Retailers Association
- The Mackinac Center for Public Policy
- McClaren Healthcare Corporation
- Michigan Chamber of Commerce
- Michigan Economic Development Corporation
- Michigan Manufacturers Association
- Michigan Retailers Association
- Michigan State University
- National Education Association
- The Nature Conservancy
- The Niskanen Center
- Oakland University
- Project Management Institute
- Pulse Canada
- Telecommunication Association of Michigan
- Turkish Exporters' Assembly (TIM)
- University of Chicago
- University of Michigan
- University Research Corridor
- Van Andel Institute
- Walsh College
- Wayne State University
- West Virginia High-Tech Consortium
- Wolverine Power Cooperative

REPORT AUTHORS

Cristina Benton

Dr. Cristina Benton is a senior consultant with Anderson Economic Group, directing the market and industry analysis practice area. Her background is in research and data analysis, community and economic development, and urban planning.

While at AEG, Dr. Benton has conducted numerous economic development, retail, industry, and market analyses along with auto dealership franchise projects. She has led work for clients that include the State of Michigan; the Project Management Institute; the City of Trenton, New Jersey; Experience Grand Rapids; the Ann Arbor Area Convention and Visitors Bureau; and Automation Alley. Dr. Benton has also worked with many automobile dealerships and their attorneys in matters of sales performance assessments, geographic territory analyses, market opportunity studies, and expert testimony.

Prior to joining AEG, Dr. Benton worked as a community and economic development assistant with the City of East Lansing, Michigan, and as a research assistant at Michigan State University working on the evaluation of economic revitalization programs. She also taught university classes on economic development and lectured on market analysis.

Dr. Benton holds a PhD in geography and a master's in urban and regional planning, both from Michigan State University, along with a bachelor's degree in public administration from Babes-Bolyai University, Romania. She is a member of the Michigan Economic Developers Association (MEDA) and the National Association of Forensic Economics.

CONTRIBUTORS

Sara Bowers

Ms. Sara Bowers is a senior analyst with Anderson Economic Group, working in the market and industry analysis practice area. Her background is in community and economic development and urban planning.

While working at AEG, Ms. Bowers has been involved in projects that focus on the economic impacts of industries or events, market analysis for hundreds of automobile dealerships, and sales effectiveness metrics for franchised businesses. She is an expert in spatial market analyses and manages the firm's Geographic Information System (GIS) software. Among the clients for whom she has worked are the Ann Arbor Area Convention and Visitors Bureau, Grand Rapids Whitewater, Capital Area Salvation Army, the University of Michigan, Automation Alley, and a number of franchised retail clients in the automotive industry. Among the automotive brands she has worked for are Buick, Chevrolet, Cadillac, GMC, Ford, Chrysler, Jeep, Dodge, Toyota, Honda, Kia, Hyundai, Nissan, Volkswagen, Volvo, Subaru, Mercedes-Benz, and BMW.

Ms. Bowers holds an MPS in community and economic development from Penn State University and a BS in geography from Michigan State University. She is a member of the American Planning Association (APA).

Kenan Cosguner

Kenan Cosguner is a consultant in AEG's strategy and business valuation practice area. His work includes financial and industrial data analysis, equity research, and valuation. He specializes in beverage, food and non-food retail, automotive, and franchise businesses.

During his tenure at Anderson Economic Group, Mr. Cosguner has assessed the business performance and value of multiple automotive dealerships. He has also assessed commercial damages for automotive clients involved in litigation, and has also conducted detailed financial analyses of assets for the oil and gas industry.

Prior to joining Anderson Economic Group, Mr. Cosguner worked as a research department director for Itstanbul's BNP Paribas Asia (TEB Investment). He authored comprehensive reports on both private and listed companies in consumer discretionary/staples, retail, real estate, aviation, agriculture, automotive, utilities, and mining sectors. He also worked previously in AEG's strategy and business valuation practice area between 2004 and 2006.

Mr. Cosguner holds an MBA with concentrations in accounting and finance from the Eli Broad Graduate School of Management at Michigan State University, and a BS degree in industrial engineering from Bilkent University in Ankara, Turkey. He has been a Chartered Financial Analyst since 2001.

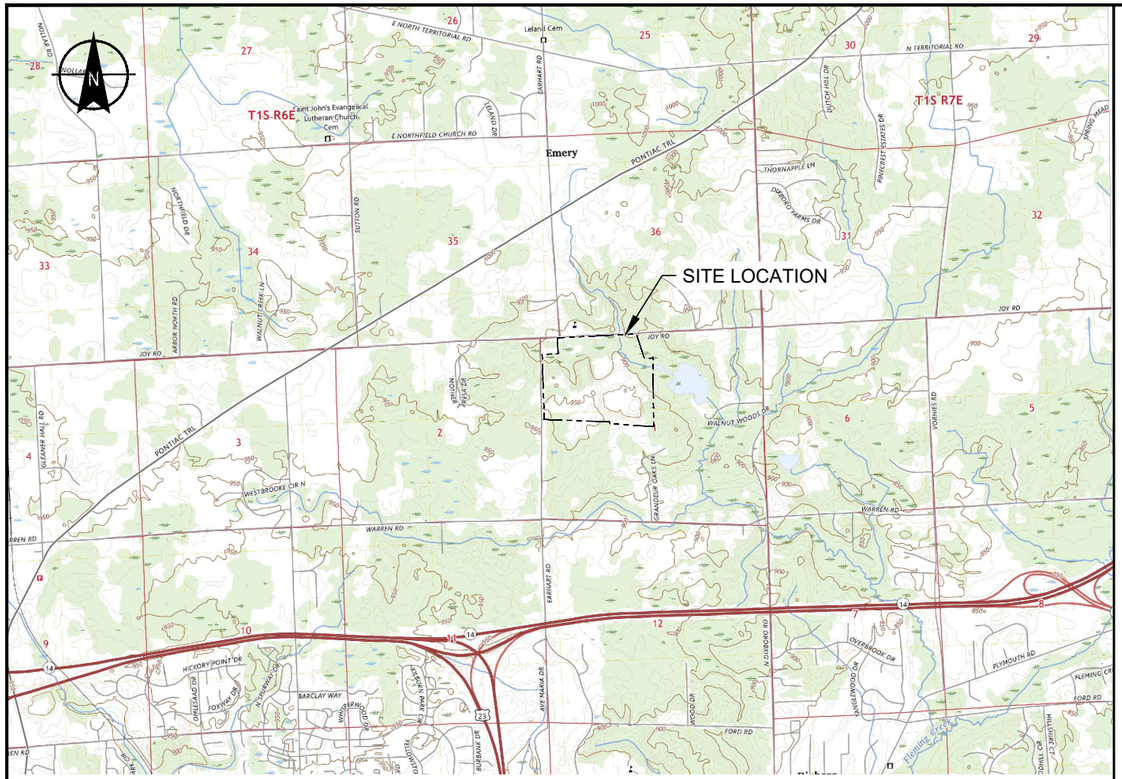
APPENDIX G

AMC-WSG, LLC Reclamation Financial Assurance Cost Estimate

Active Mine Area - February 2020

#	Item	Unit	Number	Cost	Item Total	Note
1	Earthwork					
a	General slope and stockpile grading	Days	5	$ 5,000	$ 25,000	General grading to 3H:1V slopes
b	General Excavation and grading to create more open water	Days	5	$ 5,000	$ 25,000	Obtain material for slope grading
c	Topsoil	Cubic Yards	40,000	$ 3.50	$ 140,000	Disturbed areas ~54 acres. Can create more open water - Use 50 acres, 6 inches of topsoil
2	Establishment of vegetation (Agricultural or Wildlife Habitat)	Acre	50	$ 1,125	$ 56,250	
3	Matting of Slopes for Stabilization	Acre	10	$ 2,500	$ 25,000	Based on estimated 10,000 linear feet of slopes at conservative average length of 40 feet
4	Abandon Water Supply Well	Each	1	$ 5,000	$ 5,000	
5	Remove Processing Equipment	Each	1	$ 5,000	$ 5,000	
6	Erosion and Sediment Control Practice Implementation —Silt fence installation and removal.	Linear foot	1,000	$ 3	$ 3,000	Allowance, if needed
7	Township Costs to Administer (5%)	Lump Sum	1	$ 14,213	$ 14,213	Administration of design and reclamation oversight
				TOTAL	**$ 298,463**	Approximately $5,969 per acre

ATTACHMENT B
ILS Permit Application Figures



SITE LOCUS
TOPO SOURCE: USGS TOPOGRAPHIC MAP, ANN ARBOR EAST, MICHIGAN QUADRANGLE (2023).

SITE AERIAL
MAP SOURCE: NEARMAP, 2023

VELLA PIT PART 301
APPLICATION FOR PERMIT

SITE ADDRESS:
4984 EARHART RD.
ANN ARBOR, MICHIGAN
TOWNSHIP 02 SOUTH, RANGE 06 EAST

DRAWING INDEX		
SHEET NO.	SHEET TITLE	DESCRIPTION
1	G-100	TITLE SHEET AND DRAWING INDEX
2	C-100	EXISTING CONDITIONS
3	C-101	PRE-2020 CONDITIONS
4	C-102	CROSS SECTIONS
5	C-103	WETLAND LOCATION PLAN
6	C-104	WELL LOCATION PLAN
7	C-105	CONCEPTUAL RECLAMATION PLAN
8	C-106	RECLAMATION CROSS SECTIONS

HALEY ALDRICH

HALEY & ALDRICH OF MICHIGAN, INC
455 E. Eisenhower Parkway, Suite 210
Ann Arbor, MI 48108-3323
Tel: 734.887.8400
www.haleyaldrich.com

PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666_003
Scale:	AS SHOWN
Date:	23 OCTOBER 2023
Drawn By:	JD
Designed By:	JD
Checked By:	OS
Approved By:	LN
Stamp:	

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

TITLE SHEET AND DRAWING INDEX

G-100

Sheet: 1 of 8

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LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- TOPOGRAPHIC CONTOURS 5-FT INTERVAL
- ORDINARY HIGH WATER MARK
- CROSS SECTION (1 / C-102)

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
3. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023.
4. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105.
5. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.

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Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

EXISTING CONDITIONS

C-100

Sheet: 2 of 8

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SITE BOUNDARY

JOY ROAD

POND 1
WATER EDGE EL. = 898 FT
BOTTOM OF POND EL. = 880 FT

MAINTENANCE SHOP

MAINTENANCE OFFICE BUILDING

1 C-102

EARHART ROAD

ENTRANCE ROAD

WASH PLANT

POND 2
WATER EDGE EL. = 900 FT
BOTTOM OF POND EL. = 878 FT

2 C-102

3 C-102

POND 4
WATER EDGE EL. = 892 FT
FILLED WITH SEDIMENT

LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- TOPOGRAPHIC CONTOURS 5-FT INTERVAL
- ORDINARY HIGH WATER MARK
- CROSS SECTION (1 / C-102)

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.
3. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2019.
4. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE. UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105.
5. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.

N

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SCALE IN FEET

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Project No.:	0207666_003
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Drawn By:	JD
Designed By:	JD
Checked By:	OS
Approved By:	LN
Stamp:	

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

PRE-2020 CONDITIONS

C-101

Sheet: 3 of 8

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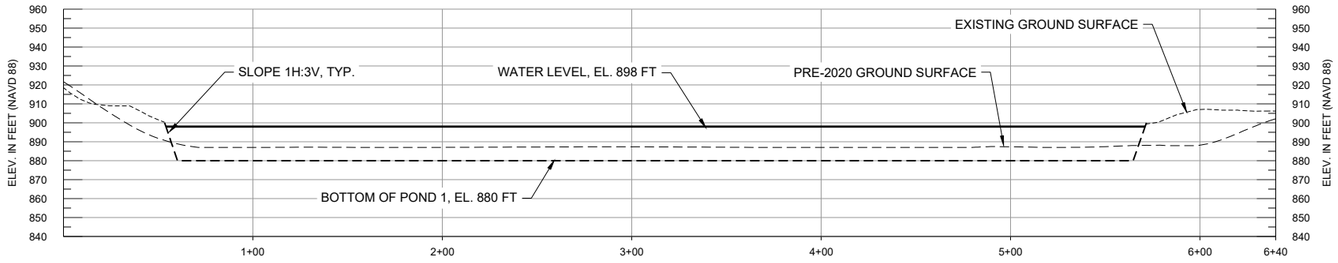

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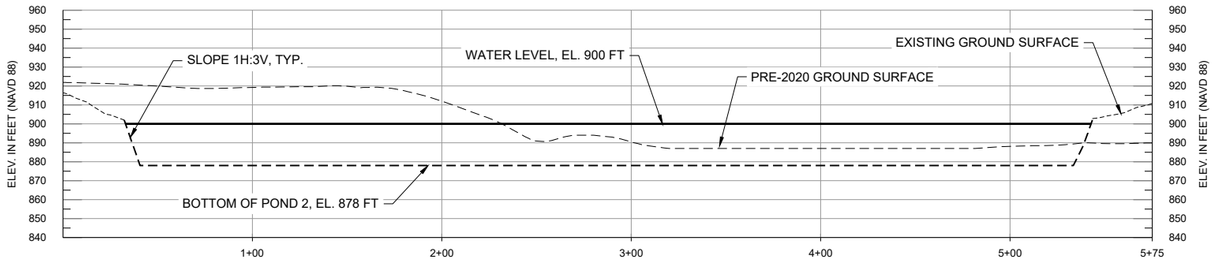

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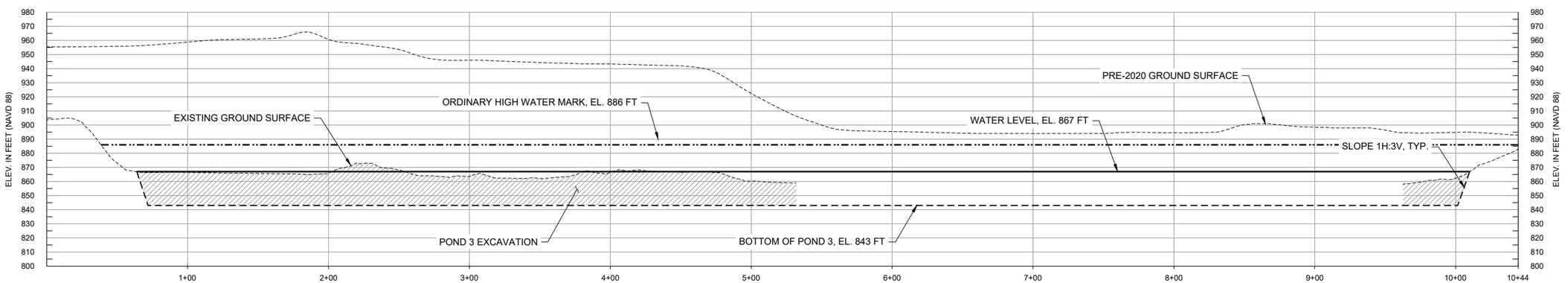

3 / C-100 CROSS SECTION - POND 3
SCALE: AS SHOWN

HORIZ. 0 50 100 150 200
VERT. 0 50 100 150 200
SCALE IN FEET

NOTES

1. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
2. PRE-2020 GROUND SURFACE DATA SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.
3. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.
4. POND 3 EXCAVATION VOLUME IS 158,406 CU YD.

HALEY ALDRICH

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PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666_003
Scale:	AS SHOWN
Date:	23 OCTOBER 2023
Drawn By:	JD
Designed By:	JD
Checked By:	OS
Approved By:	LN
Stamp:	

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

CROSS SECTIONS

C-102

Sheet: 4 of 8

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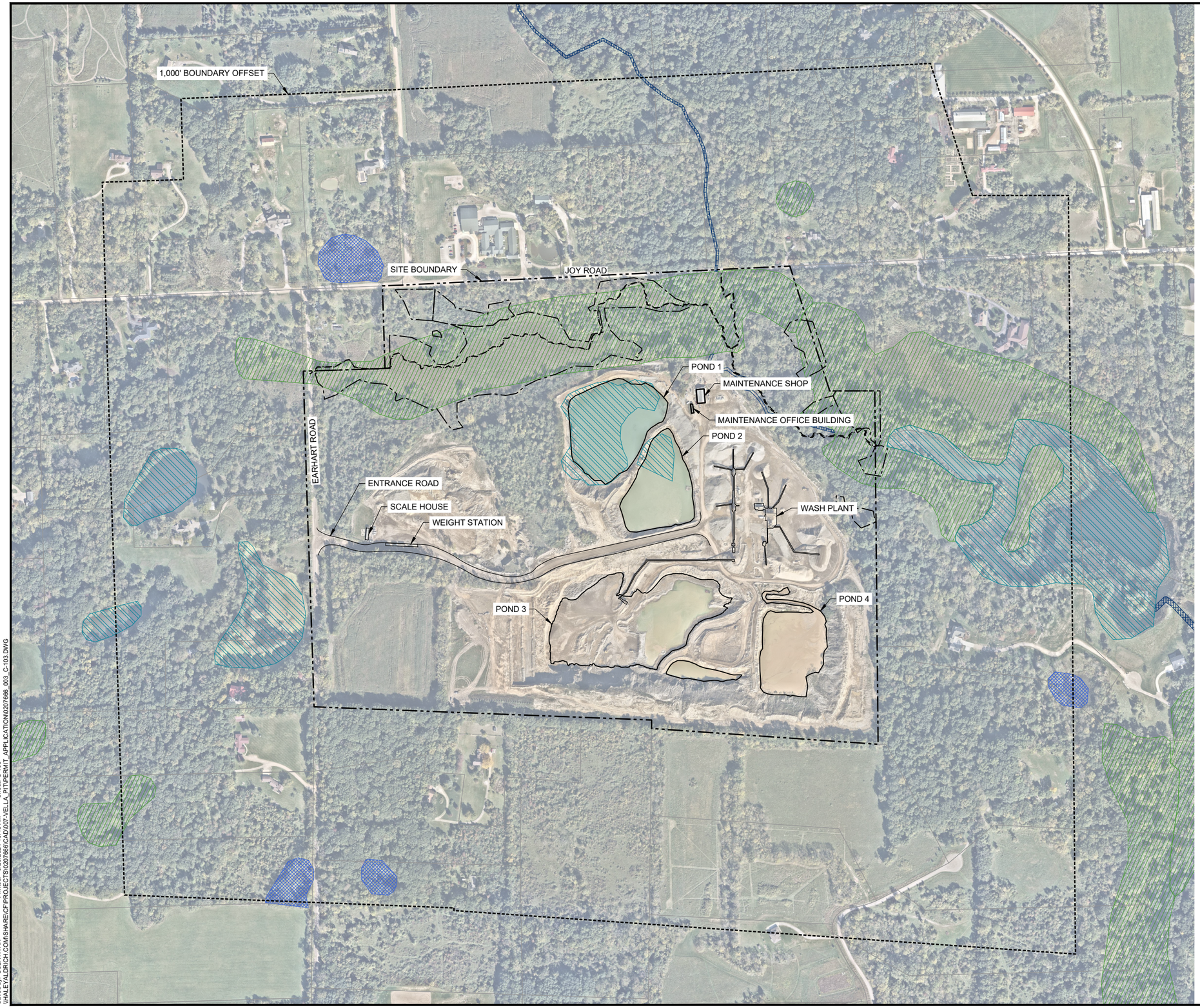

LEGEND

- SITE BOUNDARY
- 1,000-FT BOUNDARY OFFSET
- PARCEL BOUNDARY
- WETLAND DELINEATION
- STREAM DELINIATION
- FRESHWATER FORESTED/SHRUB WETLAND (USGS)
- FRESHWATER EMERGENT WETLAND (USGS)
- FRESHWATER POND (USGS)
- RIVERINE (USGS)

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. REGIONAL WETLANDS DATA SOURCE: U.S. FISH AND WILDLIFE NATIONAL WETLANDS INVENTORY, 2023. WETLAND BOUNDARY IS APPROXIMATE.
3. ON-SITE DELINEATED WETLANDS DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
4. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023.

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WETLAND LOCATION PLAN

C-103

Sheet: 5 of 8

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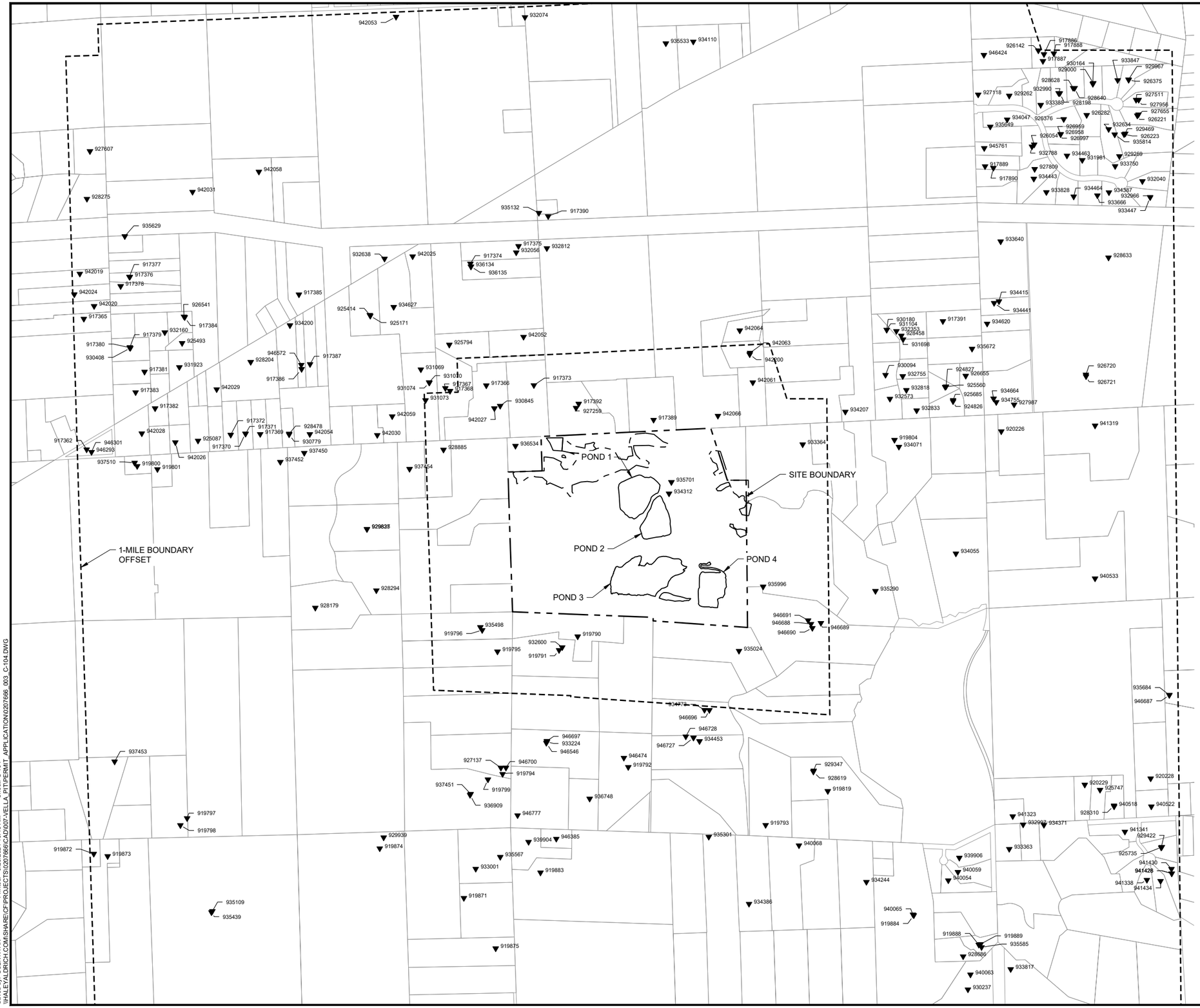

LEGEND

- SITE BOUNDARY
- 1-MILE BOUNDARY OFFSET
- PARCEL BOUNDARY
- 933847 ▼ WELL LOCATION AND DESIGNATION

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. WELL LOCATION DATA SOURCE: MICHIGAN DEPARTMENT OF ENVIRONMENT GREAT LAKES, AND ENERGY WELLOGIC DATABASE, 2024.

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VELLA PIT PART 301
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4984 EARHART RD.
ANN ARBOR, MICHIGAN

WELL LOCATION PLAN

C-104

Sheet: 6 of 8

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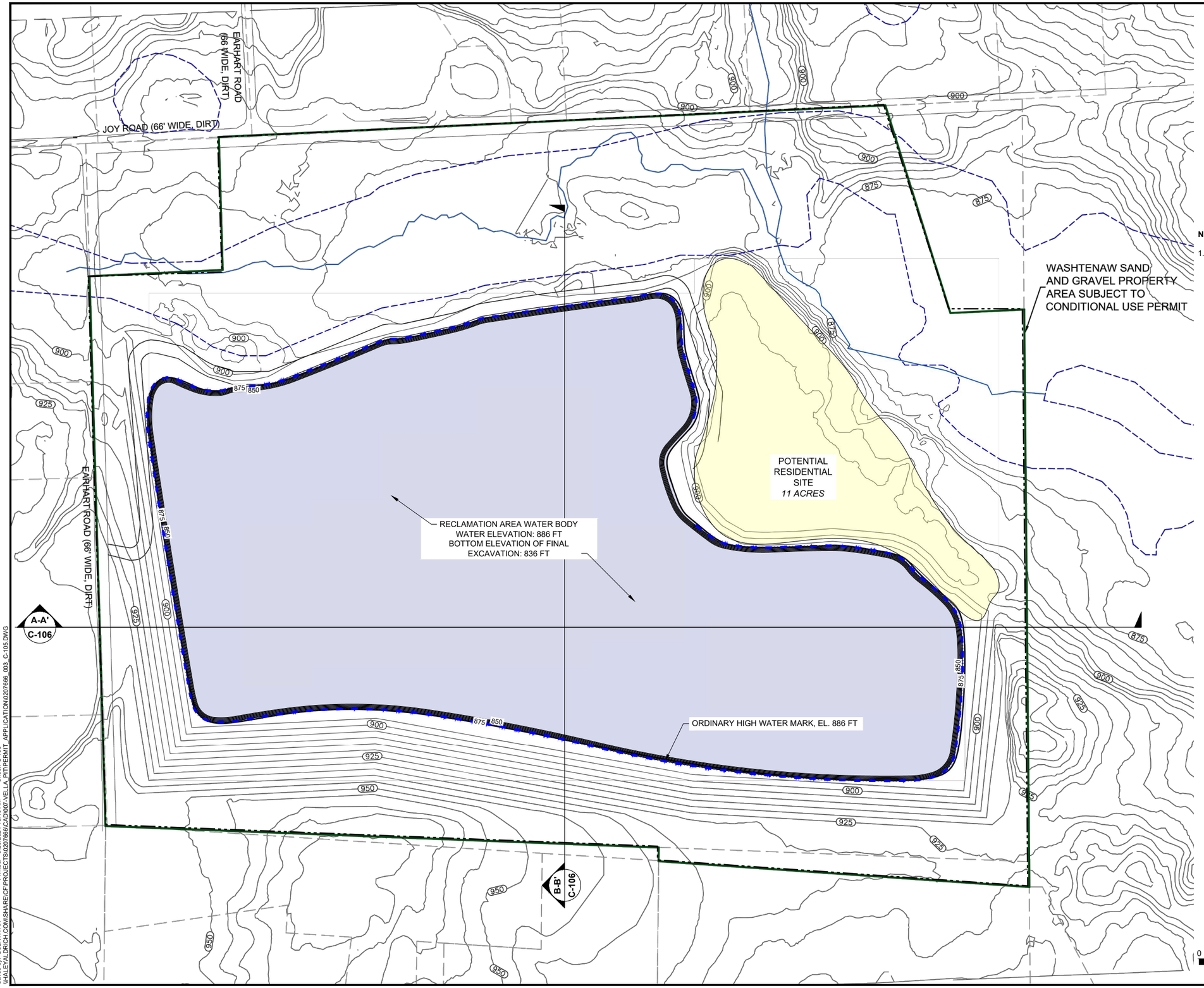

LEGEND:

- TOPOGRAPHIC MAJOR CONTOUR INTERVAL (25 FOOT)
- TOPOGRAPHIC MINOR CONTOUR INTERVAL (5 FOOT)
- PROPERTY BOUNDARY
- WETLANDS
- WATERWAY
- POTENTIAL RESIDENTIAL SITE(S) *APPROXIMATELY 10 ACRES*
- ORDINARY HIGH WATER MARK, EL. 886 FT
- RECLAMATION AREA (WATER BODY)
- POTENTIAL RESIDENTIAL SITE *(11 ACRES)*

NOTES

1. THIS PLAN IS BASED ON A FIGURE THAT WAS PREPARED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC. IN OCTOBER 2020.

0 150 300 450 600
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4984 EARHART RD.
ANN ARBOR, MICHIGAN

CONCEPTUAL RECLAMATION PLAN

C-105

Sheet: 7 of 8

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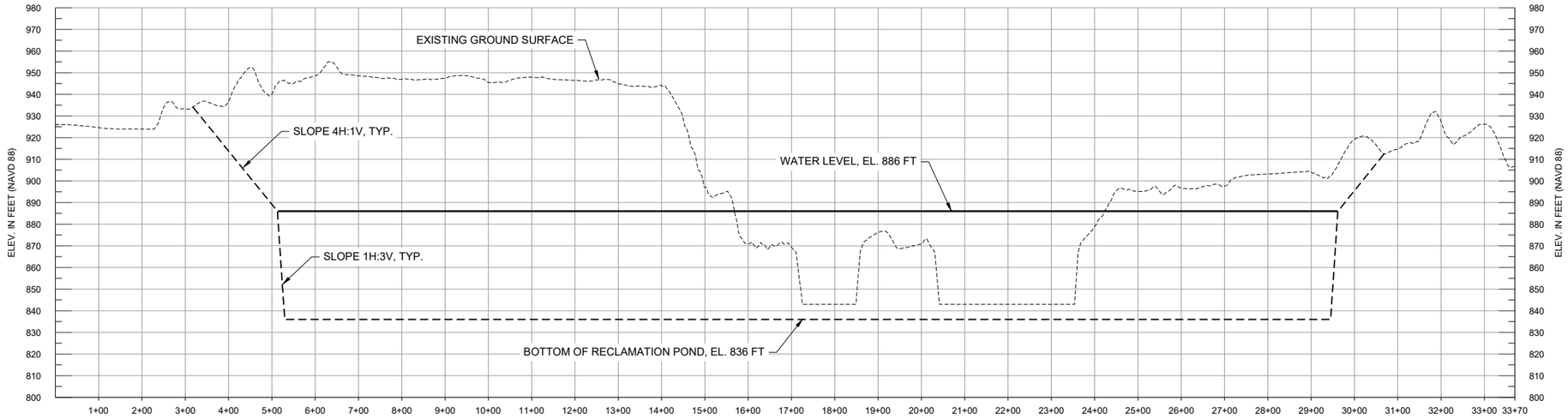

1 C-105 **CROSS SECTION A-A'**
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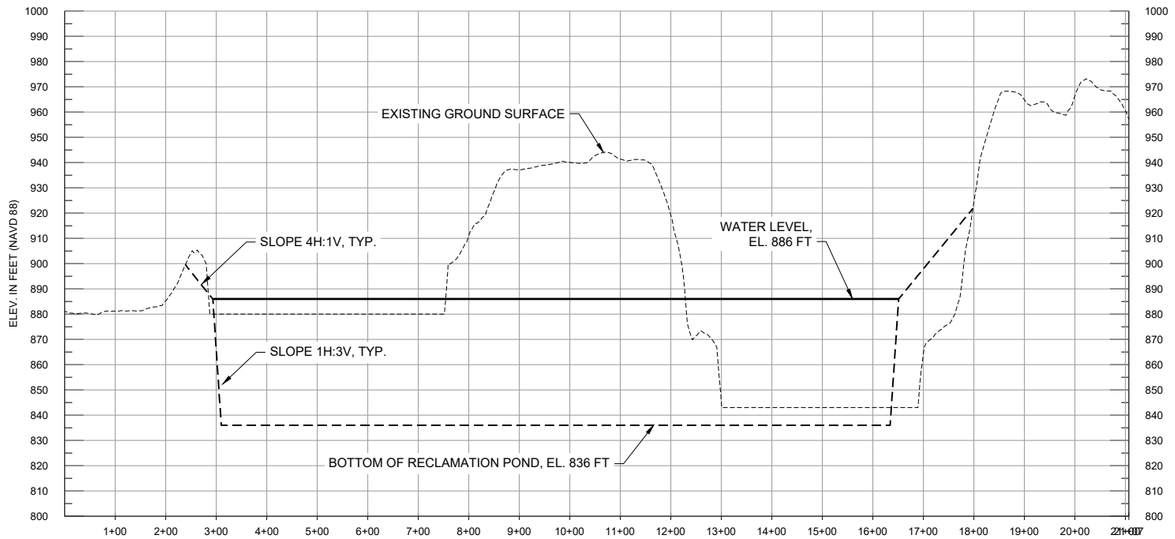

2 C-105 **CROSS SECTION B-B'**
SCALE: AS SHOWN

NOTES

1. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
2. PRE-2020 GROUND SURFACE DATA SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.

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VERT. 0 30 60 90 120
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VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

RECLAMATION CROSS SECTIONS

C-106

Sheet: 8 of 8

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ATTACHMENT C
Hydrogeologic Investigation Report

HALEY ALDRICH

www.haleyaldrich.com

REPORT ON

VELLA PIT HYDROGEOLOGICAL INVESTIGATION
REVISED SEPTEMBER 2024
4984 EARHART ROAD
ANN ARBOR TOWNSHIP, MICHIGAN

by
Haley & Aldrich of Michigan, Inc.
Ann Arbor, Michigan

for
Mid Michigan Materials, Inc.
Oxford, Michigan

File No. 0207666-004
September 2024

HALEY & ALDRICH OF MICHIGAN, INC.
455 E. Eisenhower Parkway
Suite 210
Ann Arbor, MI 48108
734.887.8400

27 September 2024
File No. 0207666-004

Mid Michigan Materials, Inc.
1955 Lakeville Road
Oxford, Michigan 48371

Attention: Mr. Robert Wilson

Subject: Vella Pit Hydrogeological Investigation
4984 Earhart Road
Ann Arbor Township, Michigan

Dear Mr. Wilson:

Haley & Aldrich of Michigan, Inc. has prepared this Revised Hydrogeological Investigation Report on behalf of Mid Michigan Materials, Inc. for the Vella Pit Sand and Gravel Mine location at 4984 Earhart Road, Ann Arbor Township, Michigan (Site). This report summarizes the updated results and findings of the Hydrogeological Investigation at the Site.

Sincerely yours,
HALEY & ALDRICH OF MICHIGAN, INC.

Nicholas W. Schaffer
Technical Specialist, Hydrogeologist

Sylvan Long
Senior Project Manager, Hydrogeologist

Leslie M. Nelson, P.E.
Senior Environmental Engineer

Enclosures

HALEY & ALDRICH OF MICHIGAN, INC.
455 E. EISENHOWER PARKWAY
SUITE 210
ANN ARBOR, MI 48108
734.887.8400

SIGNATURE PAGE FOR

REPORT ON

VELLA PIT HYDROGEOLOGICAL INVESTIGATION
REVISED SEPTEMBER 2024
4984 EARHART ROAD
ANN ARBOR TOWNSHIP, MICHIGAN

PREPARED FOR

MID MICHIGAN MATERIALS, INC.
OXFORD, MICHIGAN

PREPARED BY:

Nicholas Schaffer
Technical Specialist, Hydrogeologist
Haley & Aldrich of Michigan, Inc.

REVIEWED AND APPROVED BY:

Sylvan Long
Senior Project Manager, Hydrogeologist
Haley & Aldrich of Michigan, Inc.

Leslie M. Nelson, P.E.
Senior Environmental Engineer
Haley & Aldrich of Michigan, Inc.

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1. Introduction

Haley & Aldrich of Michigan, Inc. (Haley & Aldrich) prepared this report on the Vella Pit Hydrogeological Investigation – Revised September 2024 (the "Revised Hydrogeology Report") conducted at the Mid Michigan Materials, Inc (MMM) Vella Pit sand and gravel mine located at 4984 Earhart Road, Ann Arbor Township, Washtenaw County, Michigan (Site).

Haley & Aldrich submitted the original Vella Pit Hydrogeological Investigation report ("the Original Hydrogeology Report") as an attachment to an after-the-fact Inland Lakes and Streams (ILS) Permit Application for the Site dated 29 November 2023. The after-the-fact ILS Permit Application was submitted in response to a Violation Notice from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Water Resources Division (WRD) dated 14 September 2023. The Violation Notice indicated that an after-the-fact ILS Permit was required for the southern pond that had been created during mining activity and the northern pond berm that was reinforced within 500 feet of a stream to be in compliance with Part 301, ILS, of the Michigan Natural Resources and Environmental Protection Act.

The original hydrogeological investigation and the Original Hydrogeology Report were designed and developed in accordance with guidance document *DRAFT WRD Hydrogeologic Investigation Completeness Checklist and Guidance* dated May 2023 provided by the WRD to Haley & Aldrich on 15 August 2023 (the "May 2023 Draft Guidance"). After reviewing the Original Hydrogeology Report, EGLE provided the results of their completeness review via email on 10 January 2024, which compared the 29 November 2023 Original Hydrogeology Report with the requirements of new *DRAFT WRD Hydrogeologic Investigation Completeness Checklist and Guidance* dated December 2023 (the "December 2023 Draft Guidance"). During teleconference meetings on 10 January 2024, 24 January 2024, 14 August 2024, and 19 August 2024 EGLE permitting and WRD staff provided further clarification of agency expectations for updating the hydrogeological investigation and report in accordance with the December 2023 Draft Guidance.

This Revised Hydrogeology Report presents updated data that characterizes the Site geology, hydrology, and hydrogeology and evaluates potential hydrogeological effects of the excavation and pond creation described in the ILS Permit Application in accordance with the December 2023 Draft Guidance, written comments, and verbal guidance provided by EGLE since December 2023. The December 2023 Draft Guidance is included in Appendix A.

Appendix B includes a response to comments that indicates how and in which section(s) the Revised Hydrogeology Report addresses EGLE's comments on the Original Hydrogeology Report and each applicable item in the Hydrogeologic Investigation Completeness Checklist in the December 2023 Draft Guidance.

EGLE's comments on the 29 November 2023 ILS Permit Application also included revisions to Site plans and cross-section drawings required for the main application and not part of the Original Hydrogeology Report. Haley & Aldrich understands that the original versions of those plans and drawings were not available to WRD staff reviewing the Original Hydrogeology Report. To facilitate access to relevant information from the revised ILS Permit Application by WRD staff reviewing the Revised Hydrogeology Report, the revised plans and drawings that are being submitted with the revised ILS Permit Application are included as Appendix C.

Section 2 of this report provides an overview of the Site and a project description, including mining and reclamation plans and an overview of resources evaluated for potential effects of mining activities.

Section 3 describes the field investigations completed to collect hydrogeological data at the Site.

Section 4 presents and discusses the results of field investigations and analysis of the data from those investigations, including evaluation of geologic cross sections, surface water and groundwater elevation measurements, and groundwater potentiometric surface maps produced from those groundwater measurements.

Section 5 describes numerical groundwater flow modeling performed to evaluate hydrogeological conditions at the Site and potential effects on on-site and off-site resources (streams, wetlands, surface water bodies, and wells). Modeling is used to evaluate historical conditions prior to dewatering of Pond 3, because historical hydrogeological data is not available given the after-the-fact nature of the ILS Permit Application. Modeling is also used to evaluate future conditions, including potential hydrogeologic effects of future phases of mining and final site reclamation.

Section 6 presents conclusions of the hydrogeologic investigation and evaluation of effects on resources.

2. Site and Project Description

2.1 SITE LOCATION

The Site is an active sand and gravel mine located in the northern one-half of Section 1, Township 2 South, Range 6 East in Washtenaw County, Michigan as shown in Figure 1. The Site is bounded to the north by Joy Road and residential properties, to the south and east by residential properties, and to the west by Earhart Road and residential properties. Land use adjacent to the Site is primarily forest, agricultural, and low-density residential. Some sections of the Site parcel are forested or used for agricultural purposes.

2.2 SITE DESCRIPTION

The Site is situated on a topographic high which stands approximately 100 feet higher than much of the surrounding area, as shown in Figure 1. The Site parcel encompasses approximately 142 acres of land; however, the current extent of the mining operates in approximately 75 acres. Wetlands exist in the lower-lying forested areas of the Site along the north and northeastern portions of the parcel, outside of the extent of mining. There is also an unnamed creek which is a tributary of Fleming Creek located to the south of the Site (Figure 2).

2.3 HISTORICAL AND CURRENT MINING ACTIVITIES

Sand and gravel have been mined at the Site since operations began in 1956. Current activities at the Site include mining and production of washed sand and stone. Structures, processing areas, and other Site features associated with these operations are shown on Figure 3. The reserve material is mechanically mined and hauled to the wash plant. The wash plant washes and sizes the material into usable finished product. Finished product is stockpiled on-site and is hauled via truck by the consumer.

Water for the wash plant is obtained by pumping from Pond 3 for temporary storage in Pond 2, then pumping from Pond 2 to the wash plant (Figure 4). Return water from the wash plant flows via gravity to one of the on-site settling ponds (Pond 4) and is recirculated into Pond 3. The volume of water pumped from Pond 3 for use in the wash plant is less than 2 million gallons per day (mgd).

Dewatering of the mining pit (Pond 3 in Figure 4) was historically performed to facilitate mechanical surface mining, including previously lowering the water table in the mine by approximately 29 feet. The mine pit dewatering pump (in Pond 3) was shut off and dewatering ceased on 10 October 2023, prior to the completion of monitoring well installation and collection of the groundwater measurements included in this report. Limited quantities of water are still pumped from Pond 3 for the wash plant operation described above.

2.4 FUTURE MINING ACTIVITIES AND RECLAMATION

MMM estimates that mining of the remaining sand and gravel reserves at the Site will take approximately 15 to 20 years. Recent Site topography based on an October 2023 drone survey is shown in Figure 5. A conceptual plan showing the approximate final lateral extent and depth of mining is included as Sheet C-105 in Appendix C. A rough volumetric analysis of the current and final planned topography using Autodesk Civil 3D software indicates that approximately 7.3 million cubic yards (CY) of

material remains to be excavated[1]. Based on this rough volume estimate and assuming 15 years to remove the remaining material, the average estimated annual volume of material excavated would be approximately 487,000 CY per year.

Future mining activities are planned to be conducted primarily from March through November (weather dependent), although there may be loading from stockpiles in the winter depending on customer demand, and winter mining could occur if conditions are favorable for mining. Assuming Site operations continue to occur six days per week with a standard mining season of March through November, excavation is expected to take place approximately 234 days per year.

Excavated material will continue to be staged and processed at the wash plant.

While dewatering was previously performed to facilitate excavation in the dry, MMM is currently pilot testing removal via mechanical dredging beneath the surface of Pond 3.

A conceptual reclamation plan is also shown on Sheet C-105 in Appendix C. This conceptual plan includes creation of a single lake in the pit where mining has occurred at the Site, including the former locations of the current Site ponds after excavation in those areas is complete. The estimated extent and bathymetric contours of the pond (i.e., final excavation contours) are shown on Sheet C-105. The final area of the pond is anticipated to be approximately 59 acres. The final depth of the pond is anticipated to be approximately 50 feet.

This Revised Hydrogeology Report evaluates the hydrogeological effects of planned mining activities through the final excavation and reclamation of the mine in approximately 15 to 20 years. Future dewatering of Site ponds is not currently planned; however, limited pumping (<2 mgd) will be required to provide water to Pond 2 for use at the wash plant. That water will continue to be recirculated at the Site, rather than discharged off-site. Anticipated hydrogeological effects of that limited pumping and recirculation are evaluated in this report.

2.5 CLIMATE

Washtenaw County has a well-defined seasonal climate and is influenced by the Great Lakes. Frequent weather changes come from the passing of weather fronts and associated low and high centers of air pressure across the region. Winds are typically from the southwest, but during the winter months are dominantly from the northwest. The mean average temperature normal is 48.8 degrees Fahrenheit (°F); the mean low temperature normal is 16.2°F in January and the mean high temperature normal is 83.7°F in July. The total annual precipitation normal for the county is approximately 38 inches (National Oceanic and Atmospheric Administration, 2023).

2.6 SURFACE WATER HYDROLOGY

Figure 2 shows a resource map including regionally mapped wetlands, streams, ponds, and lakes within 1 mile of the Site. Surface water features identified in the immediate vicinity of the Site are discussed in further detail below.

[1] Estimate includes reserve material, overburden material, and unclassified material.

2.6.0 Wetlands & Streams

In the north and northeast portions of the Site, a belt of forest/shrub wetlands drains to Massey Lake via an unnamed tributary of Fleming Creek running from the northwest to the southeast as shown in Figure 2. Massey Lake drains south into another belt of forest/shrub wetlands, which subsequently drain into Fleming Creek.

In response to EGLE's comments on the ILS Permit Application, Haley & Aldrich performed a wetland and stream delineation at the Site, which is documented in the *Wetland and Stream Delineation Report for Mid Michigan Materials – Vella Pit* dated 6 May 2024 (the "Wetland Delineation Report"). The Wetland Delineation Report is included as Appendix D.

The delineated Site wetlands and streams are also shown in more detail in Sheet C-103 in Appendix C, which is being submitted with the revised ILS Permit Application.

Review of Site geology (see Section 2.8.1) indicates that the Site wetlands and streams are located on the surface clay unit that overlies the sand and gravel aquifer in Site areas where clay stripping and mining have not occurred.

2.6.1 Lakes

There are a number of small lakes and ponds in the vicinity of the Site. Some of these are natural, while others are artificial or artificially supplemented by groundwater pumped from residential wells. Massey Lake, the largest in the area, is situated on privately owned property to the east of the Site and receives water from the abovementioned unnamed creek. This lake drains to Fleming Creek as shown in Figure 2.

2.6.2 Site Ponds

There are four ponds created by mining (Ponds 1 through 4) at the Site as shown in Figure 3. Pond 1 is the northernmost pond and is the location of the Site's National Pollution Discharge Elimination System permitted outfall[2]. Pond 2 collects pumped water from Pond 3 and supplies the wash plant with water. Pond 3 comprises a large portion of the mining pit area south of Pond 2. Pond 4 is east of Pond 3 and acts as the initial settling basin for fines originating from the wash plant, before water returns to Pond 3.

Pond 2 and Pond 4 receive water from precipitation, surface water runoff, limited pumping from Pond 3, and recirculation from the wash plant. Pond 1 receives water from precipitation only. Based on the evaluation of Site groundwater presented in subsequent sections below, these ponds appear to be situated in the vadose zone and do not appear to be groundwater fed. However, water infiltrating downward through the pond bottoms can recharge the sand and gravel aquifer. Because Ponds 1, 2, and 4 have been used for water storage/recirculation, settling of fines has occurred and the pond bottoms are expected to have significantly lower permeability than the sand and gravel materials at the Site. The presence of a layer of fine-grained material at the bottom of these ponds has been confirmed through field observations by Haley & Aldrich geologists.

Pond 3 receives water from precipitation, surface runoff, and recirculation of water from Pond 4. It is also at a location and elevation where it maintains a continuous hydraulic connection to groundwater in the surrounding sand and gravel aquifer materials, as discussed further in subsequent sections below.

[2] While this outfall is permitted, there is currently no discharge from the outfall.

2.6.3 Stormwater

Stormwater at the Site is designed to remain within the mining area. Exterior berms were hydroseeded and covered with erosion control blankets in fall 2023 (north berms) and in 2024 (east berms) to correct this issue. Ongoing inspections are performed in this area and erosion control maintenance activities are performed as needed based on those inspections.

2.7 REGIONAL GEOLOGIC SETTING

The topography of Washtenaw County is typical of an area that has been glaciated. The northwest portion of the county is relatively hilly and contains numerous lakes and wetlands that are interconnected or flow through wide swampy valleys. In the southeast, the elevation of the land surface decreases as the soils shift from glacial moraine deposits to lakebed deposits. Between these two topographically different areas, local steepening of the land surface marks the shoreline of former glacial lakes. In the northeast part of the county, subsurface glacial tills and end moraine deposits of clay, sand, and gravel can reach up to 250 feet thick. Throughout most of the county, glacial deposits are underlain by the Coldwater Shale, except in the western part where they are underlain by the Marshall Sandstone, and in the southeastern part, where they are underlain by Paleozoic limestone (Fleck, 1980).

2.8 SITE GEOLOGY

2.8.0 Overburden

Vella Pit is situated in an area of Washtenaw County dominated by fine to medium textured glacial tills and end moraines (Farrand and Bell, 1982). The main sand and gravel body mined at Vella Pit is a localized lens of coarse glacial outwash surrounded above and below by clay-rich strata. The overlying fine-grained strata is likely clay till based on its heterolithic characteristics, while the underlying fine-grained strata is likely either a till or lacustrine deposit. For purposes of this study, both fine grained units are referred to as tills. Soils classified during soil boring activities were found to be consistent with this description and are described in more detail in Section 4.1. A review of publicly available driller's logs from nearby domestic water wells and two water supply wells on the Site indicates that a deeper (>200 feet depth) gravel unit is present beneath the lower till unit described above. The thickness of this gravel unit was not identified based on review of the domestic water well logs.

2.8.1 Bedrock

Bedrock was not encountered in borings advanced at the Site. A small number of domestic water wells in the area have been installed as open-hole completions in a sandstone or an unspecified but presumably productive consolidated formation encountered between approximately 240 and 270 feet below ground surface (bgs). This is most probably a sandy member of the Coldwater Shale, which has been previously noted as a sporadic, minor drinking water resource in Eastern Washtenaw County (Fleck, 1980). The EGLE Water Well Viewer (https://www.mcgi.state.mi.us/waterwellviewer/) also notes one private geothermal well on Joy Road initially advanced into a sandstone at 296 to 460 feet bgs; this was reported to be dry and the bedrock portion of the well was plugged with neat cement. Based on depth and geographic location, this was likely the Berea Sandstone which is not considered a drinking water resource in this part of Michigan.

2.9 GROUNDWATER

Review of nearby domestic water well logs indicates that the upper sand and gravel unit described in Section 2.8.1 is used as a drinking water source by several nearby properties (the "Upper Aquifer"). Soil borings completed for this hydrogeology investigation encountered this unit at thicknesses ranging from 81 feet in the southwest of the Site to 3 feet in the northeast. Other nearby residential and community water supply wells withdraw water from the deeper (>200 feet depth) gravel unit (the "Lower Aquifer"). The thickness of the Lower Aquifer is unknown as most wells producing from the deep aquifer do not fully penetrate that unit. The Upper Aquifer dips gently towards the south, while the Lower Aquifer appears nearly horizontal. The Upper Aquifer is likely under confined conditions where fully saturated and overlain by clay till, although the static water level in some driller's logs indicates that it may not be fully saturated in all locations. Primary recharge of the Upper Aquifer likely occurs where the main body of the coarse-grained sediments are at or near the ground surface in low lying areas, such as the Site and portions of the wetlands to the north and east of the Site. Removal of the clay overburden at the Site likely created or expanded the Upper Aquifer recharge area at the Site. The Lower Aquifer is confined, and the primary recharge area has not yet been identified. No evidence reviewed to date suggests the two aquifers are in hydraulic communication. The lateral extent of both aquifers has been investigated and refined but not fully delineated.

Figure 2 shows a resource map that includes wells in EGLE's Wellogic database that occur within 1 mile of the Site. Wellogic water well logs for the wells within 1 mile of the Site are included as Appendix E.

3. Field Investigations

3.1 TEST BORINGS AND MONITORING WELLS COMPLETED FOR HYDROGEOLOGIC INVESTIGATION

To evaluate geology and hydrogeology at the Site, five soil borings and monitoring wells were installed from 2 to 11 October 2023 in the locations shown on Figure 4. Consistent with the May 2023 Draft Guidance that existed at the time the investigation was performed, and the ILS Permit Application was submitted, four groundwater monitoring wells were placed outside the mine footprint (MW-2, MW-3, MW-4, and MW-5) and one monitoring well was placed within the mine footprint (MW-1).

The soil borings were advanced using sonic drilling methods and continuously sampled to the top of the intermediate clay unit separating the Upper and Lower Aquifers. Soil from the borings was logged and classified, including material descriptions and the presence of saturated or wet zones on the boring log, by an on-site Haley & Aldrich geologist. Test boring logs are included in Appendix F.

Upon reaching the target lower clay unit, the borings were converted to permanent 2-inch polyvinyl chloride (PVC) monitoring wells with gravel-packed screens set immediately above the clay unit, sealed in the annular space with bentonite clay and grout to the surface. The monitoring wells were constructed with 5-foot screens, except MW-5 which was constructed with a 10-foot screen to accommodate anticipated lower yield based on field observations during drilling. These observations indicated that the Upper Aquifer was thinner and contained finer grained material at this location compared with the others (see boring logs in Appendix F). Surface completion consisted of a concrete pad and stick-up protective casing. Monitoring wells were developed until the water was visibly clear after grouting. Total boring depth, well depth, and well construction information is summarized in Table 1. Monitoring well installation reports are also included in Appendix F.

3.2 SUPPLEMENTAL TEST BORING DATA

The May 2023 Draft Guidance that was in place on 29 November 2023, when the original ILS Permit Application was prepared and submitted, required a minimum of five monitoring wells for a proposed lake creation project, and did not specify requirements for additional soil borings or monitoring wells in the case of larger lakes. The December 2023 Draft Guidance that postdates the original ILS Permit Application submittal specifies a minimum of five soil borings for proposed lakes up to 50 acres and five groundwater monitoring wells for proposed lakes up to 65 acres, with one additional soil boring required for each 15 acres excavated beyond 50 acres.

Based on these revised requirements and the size of the proposed lake (approximately 59 acres; see Section 2.4), the number of monitoring wells at the Site is consistent with the December 2023 Draft Guidance. However, one additional soil boring would be needed for consistency with this guidance.

Unlike the May 2023 Draft Guidance, the December 2023 Draft Guidance does not specify requirements for the spatial distribution of test borings and monitoring wells within or outside of the mine footprint. However, EGLE's comments in the completeness review of the Original Hydrogeology Application stated that additional borings should be distributed through the extent of proposed excavation and a monitoring well and test boring should be placed in the wetland in the northern portion of the Site.

While the original hydrogeologic investigation was consistent with the guidance that existed at the time the original ILS Permit Application was submitted, additional test boring data available from exploratory borings performed in 2019 is being provided to address EGLE's additional requirements stated in the completeness review. A map of these test borings and data from the test borings are included as Appendix G. Specifically, test boring 2019-DF-10 provides geologic data for the wetland in the northern portion of the Site, and test borings 2019-DF-02, 2019-DF-03, 2019-DF-05, and 2019-DF-08 provide supplemental geologic data within the planned extent of future excavation to create the final lake. These test borings are also included in the updated cross sections referenced in Section 4.1.

EGLE's completeness review comments regarding the need for a monitoring well in the wetland at the Site state that this would aid in determining if the wetland is supported by the aquifer being pumped from during dewatering. However, as discussed in Section 2.4, future dewatering is not planned at the Site. Potential effects on the Site wetland are evaluated in this Revised Hydrogeology Report based on sufficient data available from the supplemental test borings described above, groundwater and surface water measurements at the Site, and the groundwater flow model described in subsequent sections.

3.3 STAFF GAUGES

To collect water level data in on-site ponds, the wetlands in the northern portion of the Site, and the nearby unnamed stream on the Site, seven staff gauges with attached PVC stilling wells were installed in the locations shown on Figure 4. Staff gauges consisting of a vertical scale measured in tenths of a foot were attached to a metal stake and driven into pond sediment or into the ground to visually measure water level at the five locations, with the exception of Pond 3. Pond 3 has three separate gauges to accommodate a larger range of water level elevations resulting from shut off of the dewatering pump in this pond. Additionally, a PVC pipe with drilled openings was attached to each stake to act as a stilling well for water level data collection via pressure transducer, with the exception of Pond 3, where a guidewire was installed to facilitate access and placement of a transducer in the pond from a higher elevation. Installation of the pressure transducers is described in detail in Section 3.5. Staff gauge construction information is summarized in Table 2.

3.4 SURVEYING

A licensed surveyor surveyed monitoring well locations, ground surface elevations, and top of riser elevations at each monitoring well. Surveyors also measured locations and top of gauge elevations at each staff gauge. The surveyed elevations are included in Table 1 and Table 2.

3.5 WATER LEVEL DATA COLLECTION AND PROCESSING

Haley & Aldrich personnel measured depth to water in each monitoring well manually from a known reference point on the top of the PVC casing using an electric water level meter. Water levels at staff gauges were measured by observing the height of water on the staff gauge ruler. Groundwater potentiometric surface elevations were calculated by subtracting the depth to water in each monitoring from the elevation of the surveyed reference point on the monitoring well's PVC casing. Surface water elevations were calculated by comparing the height of water on the staff gauge ruler to a surveyed reference point on the staff gauge ruler.

To obtain a more continuous record of water levels, Haley & Aldrich personnel installed In-Situ LevelTroll 400 unvented pressure transducers in the monitoring wells and staff gauge stilling wells. The transducers were calibrated to manual water level measurements and programmed to collect water

column depth readings at 15-minute intervals. To correct for the influence of barometric pressure on the unvented pressure transducers, barometric pressure readings were collected by a pressure transducer exposed to the atmosphere at the Site, and these pressure readings were subtracted from the transducer water level pressure readings during data processing. Transducer data were plotted and checked against manual measurements to confirm quality and accuracy of the data.

The transducers have been collecting hydrogeologic data continuously since deployment on 13 October 2023 to present. Haley & Aldrich personnel have also collected manual measurements on a regular basis to confirm the transducer measurements. Data from those measurements is included and discussed in subsequent sections of this report.

4. Data Analysis

4.1 GEOLOGIC CROSS SECTIONS

Cross sections were created from geology classifications made during soil boring activities and are provided as Figures 5A, 5B, 5C, 5D, and 5E. The supplemental test boring data discussed in Section 3.2 is included in these cross sections where applicable. The cross sections show planned limits of excavation and resources that intersect the cross sections. As shown in the cross-section plan and individual

Interpolation of geologic units between soil borings indicate that the Upper Aquifer is generally overlain by a substantial clay unit, including at the location of the wetland and streams in the northern portion of the Site. The Upper Aquifer exists in varying thicknesses across the Site, with varying percentages of fine-grained material. Geology encountered in soil borings at the Site was generally consistent with the description of overburden characteristics in this area as described in Section 2.8. The Upper Aquifer was encountered in soil borings as unconsolidated sands and gravels: generally fine to coarse sands with varying silt fractions and lenses of sand with higher gravel fractions. The Upper Aquifer was encountered at thicknesses ranging from 81 feet in the southwest of the Site (MW-2) to 3 feet in the northeast (MW-5). A clay unit was encountered below the Upper Aquifer, as expected based on geologic information available for the area (Section 2.8.1). Borings were terminated upon contacting the lower clay unit; therefore, the lower clay unit thickness was not evaluated during this investigation.

4.2 WATER ELEVATIONS

Quarterly groundwater potentiometric surface and surface water elevation measurements collected from manual readings are shown in Table 3. This table includes the initial rounds of water level monitoring completed in October and November 2023 that were included in the Original Hydrogeology Report. Plots of pressure transducer readings at the Site monitoring wells and staff gauges are included as Appendix H.

4.2.0 Site Monitoring Wells

Groundwater potentiometric surface elevations in the Site monitoring wells showed an overall increasing trend between deployment of pressure transducers on 13 October 2023 and the most recent measurements on 22 July 2024, as shown in the plots in Appendix H. The increase in potentiometric surface elevations in the wells over this time period ranged from 6.13 feet (MW-5) to 12.05 feet (MW-4). The increasing potentiometric surface elevations observed in these monitoring wells after shutdown of dewatering in Pond 3 correlates with rising surface water elevation in Pond 3, which is discussed in more detail below.

4.2.1 Site Ponds

Prior to the dewatering pump shut off on 10 October 2023, the surface water elevation of Pond 3 was approximately 858 feet above mean sea level (amsl), as indicated by the 2 October 2023 aerial survey included as Appendix I. By 3 November 2023, the Pond 3 water elevation had risen by approximately 7 feet from this prior elevation to 865.57 feet amsl. By 22 July 2024, the Pond 3 water elevation had risen another 11.21 feet to 876.78 feet amsl, for a total increase of approximately 19 feet since 2 October 2023.

Continuous data from the pressure transducer in Pond 3 shows an overall rise in elevation, as shown in the plot in Appendix H. Short-term fluctuations where the water level decreases temporarily and then recovers are associated with periods of active mining activities. These fluctuations appear to occur when removal of sand and gravel material from below the water surface during mining creates a temporary drop in water levels as the water fills in the void where material was excavated. Short-term fluctuations also appear to occur during periods when limited quantities of water (<2 mgd) are pumped to supply the wash plant. The water level in Pond 3 recovers relatively rapidly after these short-term drops. This is interpreted to be a result of quick equilibration between the pond and the surrounding aquifer and the recirculation of water from the wash plant back into Pond 3.

Surface water elevations in Pond 1 decreased steadily to below the staff gauge and transducer around 20 November 2023, and remained at or below this level for most of the time until the gauge and transducer were removed on 1 March 2024 during earth work to improve erosion control. This decrease in water level is associated with dewatering pump shut off, where excess water pumped from Pond 3 to Pond 2 formerly flowed into Pond 1. The steady decrease in water levels in Pond 1 indicates that with this source of flow to Pond 1 removed, the water level in the pond falls as a result of infiltration into the underlying aquifer and evaporation to the atmosphere.

Surface water elevations in Pond 2 decreased steadily, due to infiltration and evaporation, until intermittent closed-loop feeding of the wash plant was resumed via pumping limited quantities of water from Pond 3 to Pond 2.

Surface water elevations in Ponds 1 and 2 are consistently significantly higher than the groundwater potentiometric surface in the same area of the Site (see plots in Appendix H), indicating that the ponds are not fed by groundwater and are instead fed by pumping (when it occurs), surface water runoff, and precipitation.

Field observations by Haley & Aldrich personnel indicate that clay has accumulated at the bottom of these ponds, likely limiting their permeability. However, the observed decrease in surface water elevations during dry periods and periods of non-operation suggests that some infiltration from surface water to groundwater is occurring in these ponds.

4.2.2 Site Wetlands and Stream

Surface water elevations at the wetland and stream staff gauges exhibit short-term increases correlated with precipitation events (see plots in Appendix H). The wetland staff gauge location was typically dry except after precipitation events. The wetlands gauge and transducer housing was obstructed and buried by erosion control materials sometime between January and March 2024 and pooling of water in the housing has continued to occur. Except for precipitation events, the water level in the nearby unnamed stream has remained relatively stable since installation.

4.2.3 Groundwater Potentiometric Surface Maps

Groundwater potentiometric surface maps showing a 1-foot contour interval from the initial hydrogeology investigation in November 2023 are shown in Figures 6A and 6B. Groundwater potentiometric surface maps showing a 0.2-foot contour interval from subsequent quarters of groundwater measurements are shown in Figure 6C through Figure 6E.

These groundwater potentiometric surface contour maps were generated from monitoring well measurements collected on 3 and 20 November 2023 (Q4-2023), 21 February 2024 (Q1-2024), 26 April 2024 (Q2-2024), and 22 July 2024 (Q3-2024).[3] The surface water elevation of Pond 3 was also used in contouring because this pond has a direct hydraulic connection with the surrounding saturated portion of the Upper Aquifer. Pond 1, Pond 2, Wetlands, and Stream gauge measurements are shown but not used in contouring.

The 3 November 2023 potentiometric contours generally indicate that groundwater flows from northwest to southeast in the northern portion of the Site, and towards Pond 3 in the southern portion of the Site. The surface water elevation in Pond 3 on this date was approximately 0.7 and 0.4 feet lower than the groundwater potentiometric surface elevations in MW-3 to the south and MW-4 to the southeast, respectively.

The 20 November 2023 potentiometric contours also indicate groundwater flow from northwest to southeast in the northern portion of the Site. The surface water elevation in Pond 3 on this date was approximately 0.4 and 0.2 feet lower than the groundwater potentiometric surface elevations in MW-3 to the south and MW-4 to the southeast, respectively. While this surface water elevation is still lower than the groundwater potentiometric surface in the surrounding monitoring wells, indicating flow towards Pond 3, the smaller difference in elevations relative to those measured on 3 November 2023 indicates that Pond 3 is moving closer to equilibrium with the surrounding aquifer.

The 21 February 2024 contours continue to indicate flow toward Pond 3 with smaller elevation differences, indicating that the system is moving toward equilibrium. Contour curvature in the north of the site appears to indicate groundwater flow shifting toward the northeast as the influence from the prior pumping in Pond 3 is reduced over time.

The 26 April 2024 contours continue to indicate flow toward Pond 3 in the immediate vicinity of the pond from the direction of MW-1 and MW-2. The hydraulic gradient in the south and southeast of the site between Pond 3, MW-3, and MW-4 has reversed, indicating that pond 3 is no longer a local sink in the groundwater potentiometric surface, and groundwater flows out of Pond 3 and to the southeast away from the site. Reversal of the gradient between Pond 3 and MW-5 also indicates flow from the central portion of the Site toward MW-5. Contours in the northern portion of the site indicate continued rotation of the groundwater flow direction towards the northeast from MW-1 to MW-5 as the influence of prior pumping in Pond 3 continues to decrease.

The 22 July 2024 contours continue to indicate flow toward Pond 3 in the immediate vicinity of the pond from the direction of MW-1 and MW-2. Groundwater elevation differences in the south and southeast of the site between Pond 3, MW-3, and MW-4 continue to indicate groundwater flow out of Pond 3 and to the southeast away from the site. The hydraulic gradient between MW-1 and Pond 3 toward MW-5 in the northeast has steepened significantly, suggesting a zone of lower hydraulic conductivity in between.

[3] For consistency with the Original Hydrogeology Report, a preliminary groundwater potentiometric surface map for the Site, generated from data collected on 17 October 2023 and submitted to EGLE on 27 October 2023, is included in Appendix J. These preliminary contours were created from water level information gathered prior to the installation of new Pond 3 staff gauges, after the initial Pond 3 staff gauge was fully submerged due to the shutdown of the dewatering pump. Because the surface water elevation of Pond 3 was not available and Pond 3 is a key data point for contouring in the southern portion of the Site, these preliminary contours represent a partial dataset and are not compared directly with the contours from subsequent rounds of measurement.

5. Groundwater Model

5.1 BACKGROUND AND APPROACH

A preliminary evaluation of hydrological and hydrogeological conditions at the Site was submitted on 12 October 2023[4] as requested by EGLE in the 14 September 2023 Violation Notice. This preliminary evaluation included the results of preliminary numerical groundwater flow modeling of the Site and surrounding area. The preliminary modeling covered a domain of approximately 11,700 feet by 9,400 feet, with the Site at the approximate center of the model domain. Site-specific hydrogeological data had not been collected at the time and model geology was based on publicly available data in Wellogic water well logs and geologic cross sections based on those logs. The model included a steady-state baseline stress period calibrated to static water level elevations indicated in the water well logs and a transient dewatering stress period calibrated to observations from well health checks or repairs conducted in the area surrounding the Site. The 12 October 2023 submittal included figures showing the modeled potentiometric surface in the Upper Aquifer prior to and during dewatering. The preliminary modeling did not evaluate planned future conditions for the project. However, it was used as a starting point for the expanded modeling presented in this Revised Hydrogeology Report.

The updated modeling presented here includes an expanded model domain to reduce the potential for edge effects near the Site and evaluated resources. The domain was also expanded to include residential wells where potential effects of dewatering were reported, specifically wells south and southwest of the Site where Ann Arbor Charter Township's consultant, Tetra Tech, has been collecting monitoring data to evaluate water elevations.

The updated modeling also incorporates observations from Site-specific geological and hydrogeological data that is now available from the investigation described in Section 3. These data were used to refine the modeled geology at the Site and calibrate model parameters. Water level data from Tetra Tech's off-site measurements were also used for model calibration.

A high-level summary of the model development and scenarios modeled is provided below. Detailed information about these topics is included in the Groundwater Model Development report (Appendix K). Modeling results are discussed in Section 5.4 below, including evaluation of hydrogeological effects on both on-site and off-site resources.

5.2 MODEL DEVELOPMENT

The groundwater model domain covers dimensions of approximately 21,200 feet in the east-west direction and approximately 19,100 feet in the north-south direction, or roughly double the size of the preliminary groundwater model domain described above. To build the model geology and geometry of layers within this domain, Haley & Aldrich used lithologic descriptions from approximately 500 Wellogic water well logs from wells present within the model domain (see Attachment A in Appendix K for a visualization of the water well information used). These data were reviewed by a Haley & Aldrich hydrogeologist to interpret the depth and thickness of the primary geologic units (Upper Till, Upper Aquifer, Lower Till, and Lower Aquifer) described in Section 2.8, if present at a given well location. Data from the logs was then loaded into CTECH Earth Volumetric Studio (EVS) software to visualize the

[4] Attachment 6 to the letter *Response to Violation Notice No. VN-014898* dated 12 October 2023.

lithologic data and primary geologic units. EVS was also used to construct a three-dimensional model of the aquifer and till unit geometry. This three-dimensional model was then imported to MODFLOW to construct the finite difference model grid of the three model layers (Upper Till, Upper Aquifer, and Lower Till)[5].

Boundary conditions were added to define the locations and manner in which water exits and enters the active model domain. River boundaries, which in MODFLOW can simulate flow into or out of a surface water body, were used to simulate streams, ponds, and lakes. Drain boundaries, which assume groundwater only flows out of the model, were used to simulate streams and wetlands. A drain boundary was also used to simulate pumping in Pond 3 during dewatering, and the transient water level rise observed in Pond 3 after dewatering ceased. Well boundaries, which simulate flow out of (withdrawal) or into (injection) the aquifer were used to simulate the limited pumping from Pond 3 for use in the wash plant, and recirculation of that water from the wash plant back into the aquifer. Selection of boundary condition types for specific physical features is discussed further in Appendix K.

Recharge zones were established for the model domain based on topography and thickness of the Upper Till at a given location. The recharge term within MODFLOW accounts for precipitation and evaporation as well as other potential losses of water prior to recharging into the aquifer system. Recharge rates for each zone were determined through calibration of the groundwater model.

Hydraulic properties (hydraulic conductivity, specific storage, and specific yield) were initially assigned consistent with literature regarding soils in this area and were then iteratively varied during model calibration to achieve the best fit to observed hydrogeologic data.

Well boundaries were also added where model calibration indicated that pumping at the mine itself was not sufficient to explain observed water decreases, specifically at the off-Site water well at 2797 Trailwood Lane. Sensitivity testing during model calibration indicated that varying other hydraulic properties of the model would not reproduce observations at this location without causing deterioration in the calibration at other observation points. The best fit to observed conditions was produced by simulating pumping from wells identified in Wellogic at a greenhouse property west of this location (3825 Nixon Road) and at a residential subdivision northwest of this location (Westbrooke Circle), where the Wellogic database shows 43 separate wells clustered in one subdivision. This evaluation is discussed further in Appendix K. Calibration results comparing observed groundwater elevations at the Trailwood Lane property to modeled results with and without nearby pumping is shown in the first graph in Attachment B of Appendix K.

The model was calibrated using three stress periods: an initial steady-state stress period simulating pre-dewatering conditions, a transient stress period simulating dewatering conditions, and a transient stress period simulating conditions from the dewatering pump shutoff to present. Calibration for the steady-state stress period simulating pre-dewatering conditions used static water levels documented in Wellogic well logs from wells installed prior to dewatering. Observations from Site monitoring wells, the Pond 3 transducer, and off-Site measurements collected by Tetra Tech were used for transient model calibration.

[5] The Lower Aquifer was not included as a model layer because the geologic logs reviewed for the model domain indicated that the Lower Till unit is consistently present as a thick (100 to 200+ foot) aquitard separating these aquifer materials, and the mining activity is in the Upper Aquifer materials.

5.3 SCENARIOS MODELED

In addition to modeling prior conditions for calibration purposes, the calibrated model was used to evaluate hydrogeological conditions prior to dewatering, because Site-specific hydrogeologic measurements from this period are not available. The initial steady-state stress period simulates these pre-dewatering conditions. Modeled conditions were also evaluated for the dewatering period (first transient stress period) and the subsequent recovery period to present (second transient stress period).

To evaluate future conditions and the groundwater elevation change predictions required by EGLE's December 2023 Draft Guidance, the model was used to simulate conditions during current and future phases of mining and conditions predicted after final Site reclamation, using the conceptual reclamation plan of a large pond (see Sheet C-105 in Appendix C).

These periods were split into the following phases based on the mining plan indicated by MMM, each of which was simulated over a five-year period:

- Phase 1: Current mining activities and pond extent
- Phase 2: Mine expansion to the west
- Phase 3: Mine expansion to the north
- Phase 4: Final conceptual reclamation conditions and pond extent

Based on input from EGLE WRD staff during the 19 August 2024 teleconference, expansion of the mine and creation of a larger pond for each phase was simulated by setting the hydraulic conductivity to an extremely high value of 1,000 feet per day (ft/day) and setting the specific storage to 1, simulating an open pond. To simulate the limited pumping from Pond 3 to Pond 2 for use at the wash plant, and return water recirculating from the wash plant, extraction and injection wells were added to the model to simulate water withdrawal and recharge from this activity. To simulate the effects of evaporation from the final pond extent, recharge within the final pond extent was set to the average precipitation for the area and evaporation was simulated at a rate based on literature values.

This approach to simulating final conditions is likely to be conservative in that it will underestimate recharge to the aquifer during the simulated final reclamation period. Precipitation and evaporation are assumed to be uniform throughout the year, whereas in reality both will vary seasonally, with high precipitation periods (e.g., early spring) often occurring separately from high evaporation periods (e.g., late summer). This approach omits recharge that would occur from surface water runoff into the pond. It also omits the increase in recharge that would occur as a result of Upper Till layer removal over the expanded mining extent. The model calibration results indicate that this removal of the Upper Till has created high recharge conditions (approximately 200 inches per year) within the current extent of excavation. This high recharge value was conservatively not used in the expanded pond extent (Phase 2 through Phase 4) because it could not be calibrated and compared with observations, as the high modeled recharge in the current excavation extent was. Simulated drawdown during Phase 4 as a result of evaporation from the post-reclamation pond extent is therefore likely to conservatively represent an upper limit and actual drawdown in the aquifer is likely to be less.

5.4 MODELING RESULTS

5.4.0 Modeled Groundwater Potentiometric Surface Elevations

Figures 7A through 7G show modeled groundwater potentiometric surface contours in Layer 2 (the Upper Aquifer) for each stress period and phase of mine activity.

Modeled groundwater contours for the pre-dewatering stress period (Figure 7A) show groundwater elevations in the Upper Aquifer at the Site ranging from approximately to 875 to 888 feet amsl. The modeled contours indicate groundwater flow from west to east in the southern portion of the Site and from southwest to northeast in the northern portion of the Site. Regional contours in the area surrounding the Site show overall flow from west to east, towards the topographically lower area with streams and lakes east of the Site (see Figure 1 and Figure 2 for these features). Stacking of groundwater contours (i.e., close spacing indicating a higher hydraulic gradient) is observed in areas north and west of the Site where the geology review and calibration indicated zones of lower hydraulic conductivity materials.

Modeled contours for the dewatering stress period (Figure 7B) show similar regional patterns in the groundwater flow direction, with a localized depression in the groundwater potentiometric surface due to pumping from Pond 3. Effects of pumping at the off-site wells near Trailwood Lane are also visible in the groundwater potentiometric surface.

Modeled contours for the stress period from dewatering shutoff to present (Figure 7C) show that the depression in the potentiometric surface at the Site has decreased and is no longer a local sink, meaning that the contours show groundwater flow off site to the southeast from the area of Pond 3. This is consistent with the most recent groundwater contour maps from Site measurements discussed in Section 4.2.4.

Modeled contours for the Phase 1 stress period (Figure 7D) indicate elevations and flow directions similar to those in the pre-dewatering stress period, with groundwater elevations in the center of the Site approximately 1 to 2 feet lower than modeled elevations from the pre-dewatering steady-state stress period. Some or all of this difference may be attributable to a change in how Pond 3 is simulated. The initial steady-state stress period simulated high-conductivity (200 ft/day) geologic materials at the mine's pit, effectively simulating no pond at this location, whereas Phase 1 simulates the current pond extent as an open pond (i.e., 1,000 ft/day).

Modeled contours for the Phase 2 and Phase 3 stress periods (Figure 7E and 7F) are similar to those from Phase 1, with the locations of specific contours expanding outward around the pond as it expands.

Modeled contours for the Phase 4 stress period (Figure 7G) are approximately 1 to 2 feet lower in the vicinity of the Site than in the prior modeled phases, indicating the effect of the change in simulated boundary conditions for recharge and evaporation at the final post-reclamation pond. Figure 8 shows this final modeled condition as contours of drawdown relative to Phase 3 modeled conditions. The 1-foot drawdown contour extends to surrounding properties west of the Site. The 0.2-foot and 0-foot drawdown contours show the limits of this effect on the surrounding area[6].

[6] The 0.2-foot contour is shown as an indicator of negligible modeled drawdown because the 0-foot contour is not fully enclosed. Evaluation of the model indicates that this is likely a mathematical effect of model "noise" in the area east and north of the Site, where simulated drawdown is very slightly above zero.

5.4.1 Groundwater Elevation Change at Identified Resources

Modeled groundwater potentiometric surface values were exported for specific points corresponding to the resources identified in Section 2.6 (wetlands, streams, ponds, and lakes) and Section 2.9 (water wells). Figure 9 shows a plan view of the points where model output was evaluated. Plots of the model output at these points for each stress period and phase of mining are included as Appendix L.

The graphs indicate that the primary change in modeled groundwater elevation was during the prior dewatering period, where groundwater elevations in the Upper Aquifer at specific resource locations decreased. Those effects are indicated in the model in areas surrounding the Site, except in locations across the stream valley to the northeast of the Site where no effects of dewatering are indicated in the model.

At the on-site wetlands (see page 7 in Appendix L), modeled groundwater elevations are lower during the prior dewatering period but recover to their pre-dewatering elevations by Phase 1 and remain steady, indicating that effects from the expansion of mining and evaporation during final reclamation are negligible. Because these wetlands are situated on the Upper Till and that unit separates them from the Upper Aquifer, they are likely to be fed primarily by surface water. Therefore, even the simulated decrease in groundwater elevations during the past dewatering period is unlikely to have affected these wetlands.

At the on-Site stream (see page 8 in Appendix L), modeled groundwater elevations decrease by approximately 0.5 feet during the prior dewatering period, then recover and remain consistent with pre-dewatering elevations in the subsequent Phases 1 through 4. Modeled heads at the stream gauge location are above the surface water elevation measured at this location (see Appendix H). Therefore, if there is a hydraulic connection between the stream and the aquifer, the model results indicate that the stream continues to be a gaining stream (i.e., receiving water from the aquifer) throughout the modeled period, including the prior dewatering.

At Massey Lake, located off Site to the east, the model indicates no effects on the water levels from Site activities, including during the dewatering period (see page 8 in Appendix L).

At the wetland northeast of the Site (see Appendix L; Forested/Shrub Wetland 1), the model predicts negligible effects from Site activities. At the remaining off-site wetlands and ponds (see Appendix L; Freshwater Ponds 1-3, Emergent Wetlands 1-4, and Forested/Shrub Wetland 2), the model predicts a drawdown in elevations during the dewatering period, followed by recovery and final Phase 4 elevations that are approximately 2 to 4 feet lower than the pre-dewatering period. However, these wetlands are located on the Upper Till and are likely to be fed primarily by surface water. Therefore, anticipated effects on these wetlands are minimal.

At the water wells, graphed groundwater elevations in Phase 1 are similar to pre-dewatering elevations at individual resources, with differences of approximately 1 to 2 feet in some locations. The greatest difference between pre-dewatering and Phase 1 modeled groundwater elevations occurs at the water well location at 2797 Trailwood Lane. However, the initial steady-state stress period of the model does not include pumping from the other wells identified west and northwest of Trailwood, whereas it includes pumping from these wells in the future stress periods because it is assumed that pumping at these locations will continue.

The water well locations used to evaluate regional geology were limited in the area between the Site and the 2797 Trailwood Lane property (see Figure 1 in Attachment A of Appendix K). The aquifer was conservatively assumed to be continuous between these locations to evaluate potential effects at the Trailwood location. However, there is the potential for the aquifer to be discontinuous and for the effects observed at Trailwood to be from other pumping sources nearby. Even with the conservative assumption of a continuous aquifer connection, the modeled effects of Site dewatering at the Trailwood well (approximately 4 feet of maximum drawdown) were less than the effects of nearby pumping indicated during model calibration (approximately 9 feet of drawdown) (see the first graph in Attachment B of Appendix K).

Graphed groundwater elevations at the water wells in Phases 2 through 3 are generally similar to those observed in Phase 1. Phase 4 elevations show a slight decrease in groundwater elevations (approximately 1 to 2 feet) as a result of modeled evaporation from the pond after Site reclamation is complete. As discussed in Section 5.3, this simulated drawdown is conservative and is considered an upper limit, with actual drawdown values likely to be less.

6. Summary and Conclusions

Haley & Aldrich conducted a hydrogeological investigation at the Site to evaluate current groundwater and surface water conditions to assess whether adverse environmental impacts could occur from the creation of the proposed lake in accordance with written guidance, written comments, and verbal guidance provided by EGLE since December 2023.

The investigation included installation of five monitoring wells in the Upper Aquifer, five staff gauges (one in each of the three Site ponds, one in Site wetlands, one in an unnamed Site stream), and the development of a numerical groundwater flow model for groundwater elevation change predictions. Manual measurements of depth to water in the monitoring wells and surface water height on staff gauges were collected and compared with surveyed reference points at these features to calculate groundwater potentiometric surface elevations and surface water elevations. Pressure transducers were installed in the monitoring wells and at staff gauge locations to provide a more continuous record of changes in groundwater potentiometric surface elevations and surface water elevations.

The dewatering pump at Pond 3 was shut down on 10 October 2023, during installation of the monitoring wells, and the investigation therefore represents conditions starting shortly after this shutdown. The observed conditions include a rising surface water elevation in Pond 3 and corresponding increases in the groundwater potentiometric surface elevations at the Site monitoring wells. Surface water elevations generally decreased at Ponds 1 and 2, consistent with shut down of the Pond 3 pump that formerly fed these ponds and infiltration of surface water in these ponds to groundwater. Pond 2 surface water elevations have since varied due to limited and intermittent pump to supply washing and sorting operations on site.

Groundwater potentiometric surface contours indicate groundwater flow in the immediate vicinity of Pond 3 flowed inward toward the pond during the initial post-dewatering period. As the pond continues towards equilibrium with the surrounding aquifer, the inward gradient towards the pond has decreased. and groundwater flow from Pond 3 toward the east-southeast in the southern portion of the Site is indicated by recent contours. In the northern portion of the Site, recent contours indicate groundwater flow towards the northeast.

Numerical groundwater flow modeling indicates a decrease in groundwater elevations in the Upper Aquifer at both on-site and off-site resources during the dewatering period. However, effects on wetlands and off-Site surface water resources are likely to be limited because these are situated above the Upper Till, limiting their connection to the aquifer. The modeling results indicate future conditions with groundwater elevations similar to pre-dewatering elevations, with a slight decrease (approximately 1 foot near the Site) in the final reclamation condition due to evaporation from the expanded pond. This predicted evaporation effect on the aquifer is considered conservative, with actual values likely to be less, because of the conservative assumptions used to model future conditions, which likely underestimates future recharge to the aquifer at the Site.

Based on planned future conditions at the Site, the surface water elevation of Pond 3 is expected to continue to rise, as are the groundwater potentiometric surface elevations in the four monitoring wells surrounding Pond 3, based on the increasing water elevation trends observed at these locations during the study period to date. Pond 3 is expected to reach equilibrium with the surrounding Upper Aquifer materials, with decreasing groundwater flow towards Pond 3 and potentially increased flow from

Pond 3 into the Upper Aquifer as Pond 3 captures precipitation and surface water runoff. The Site is anticipated to continue to be a primary recharge area to the Upper Aquifer where the Upper Aquifer materials are exposed at the ground surface.

References

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2. Fleck, W. B., 1980. *Geology and hydrology for environmental planning in Washtenaw County, Michigan*. Michigan Water Science Center.

3. National Oceanic and Atmospheric Administration, NOWData: https://www.weather.gov/wrh/climate?wfo=dtx/ US Department of Commerce. Accessed August-November 2023

4. Quaternary Geology of Southern Michigan - W.R. Farrand, compiler, and D.L. Bell geologic cartographer, Department of Geological Sciences, The University of Michigan, Ann Arbor, 1982, 1:500,000-scale. https://mnfi.anr.msu.edu/resources/quaternary-geology

5. United States Geological Survey, 2017. 1/3 arc-second Digital Elevation Models (DEMs) – USGS National Map 3DEP Downloadable Data Collection: U.S. Geological Survey

TABLES

TABLE 1
SUMMARY OF MONITORING WELLS
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

Monitoring Well	Date Installed (mm/dd/yy)	X-coordinate	Y-coordinate	Ground Surface Elevation (ft amsl)	Reference (TOC) Elevation (ft amsl)	Borehole Total Depth (ft bgs)	Screen Length (ft)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Borehole Diameter (in)	Well Diameter (in)	Depth to Upper Aquifer Top (ft bgs)	Depth to Upper Aquifer Bottom (ft bgs)	Elevation of Upper Aquifer Top (ft amsl)	Elevation of Upper Aquifer Bottom (ft amsl)
MW-1	10/9/23	13309320.230062	307581.760042	946.4	949.67	120	5	105	110	6	2	40	110	906.4	836.4
MW-2	10/4/23	13308700.540028	306707.945844	965.34	868.6	138	5	125	130	6	2	48	129	917.34	836.34
MW-3	10/11/23	13309782.179925	306644.873136	947.6	864.7	110	5	85	90	6	2	27	97	920.6	850.6
MW-4	10/5/23	13310605.500129	306581.479890	929.8	864.5	95	5	85	90	6	2	24	85	905.8	844.8
MW-5	10/10/23	13309959.349847	308438.296058	902.68	869.0	70	10	35	45	6	2	36	39	866.68	863.68

ft amsl: feet above mean sea level
TOC: top of casing (PVC riser)
ft bgs: feet below ground surface

TABLE 2
SUMMARY OF STAFF GAUGES
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

Gauge ID	Date Installed (mm/dd/yy)	X-coordinate	Y-coordinate	Reference Elevation (ft amsl)	Top of Ruler (calculated) (ft amsl)	Bottom of ruler (calculated) (ft amsl)	Ruler Length (ft)	Description of Feature
POND-1	10/04/23	13309696.99	308363.512	903.05	903.05	899.05	4	Staff gauge affixed to green stake. Anchored to existing fixed catwalk.
POND-2	10/04/23	13309938.19	307825.367	904.65	904.65	900.65	4	Staff gauge affixed to green stake. Near pump catwalk.
POND-3-FAR	10/27/23	13310095.64	307267.37	868.97	876.97	864.97	12	Farthest from shore and lowest elevation Pond 3 staff gauge.
POND-3-MID	10/27/23	13310138.03	307221.06	875.62	883.62	871.62	12	Intermediate Pond 3 staff gauge.
POND-3-CLOSE	10/27/23	13310156.28	307230.05	881.8	889.8	877.8	12	Closest to shore and highest elevation Pond 3 staff gauge.
WETLANDS GAUGE	10/04/23	13309648.29	308475.006	881.89	881.89	879.93	1.96	Located in a wetland north of POND-1. Gauge is affixed to Fence running E-W on property.
STREAM GAUGE	10/04/23	13310071.49	308658.934	876.89	876.89	874.86	2.03	Located mid-channel of a natural stream, upstream of small debris/rocks that act as downstream control.

ft amsl: feet above mean sea level
Note: A staff gauge was installed in Pond 3 on 10/04/2023, and was submerged following pump shutoff on 10/10/2023

TABLE 3
GROUNDWATER AND SURFACE WATER ELEVATION MEASUREMENTS
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

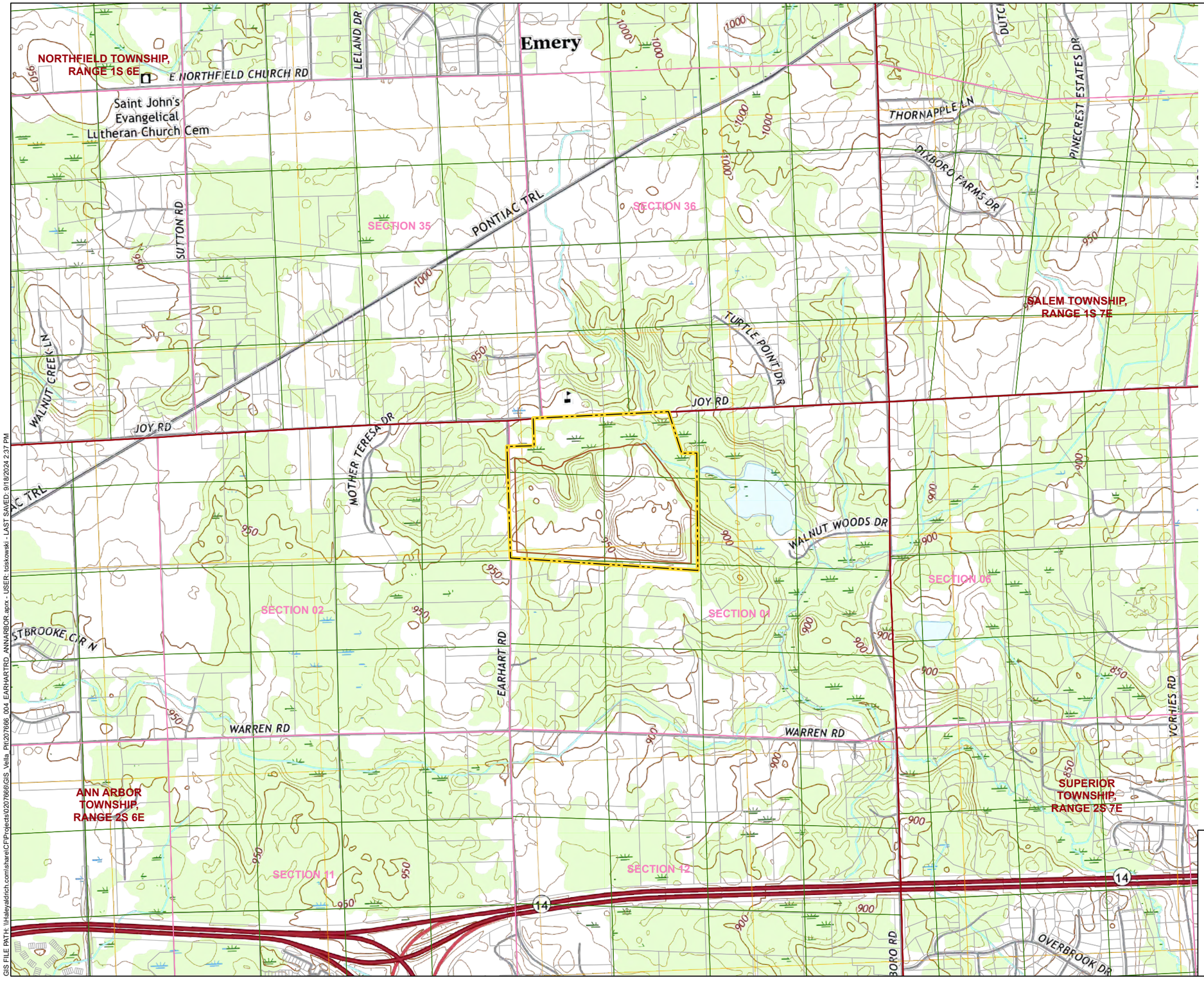
Location Identifier	Date of Measurement	Reference Elevation (ft amsl)	Depth to Water/Gauge Height[1] (ft)	Water Elevation (ft amsl)
MW-1	10/17/2023	949.67	83.88	865.79
MW-2	10/17/2023	968.31	99.68	868.63
MW-3	10/17/2023	950.67	85.98	864.69
MW-4	10/17/2023	933.23	68.78	864.45
MW-5	10/17/2023	905.78	36.83	868.95
Pond-1	10/17/2023	899.05	0.89	899.94
Pond-2	10/17/2023	900.65	0.96	901.61
Stream Gauge	10/17/2023	874.86	0.65	875.51
Wetlands Gauge	10/17/2023	879.93	0.70	880.63
MW-1	11/3/2023	949.67	82.55	867.12
MW-2	11/3/2023	968.31	99.01	869.30
MW-3	11/3/2023	950.67	84.40	866.27
MW-4	11/3/2023	933.23	67.22	866.01
MW-5	11/3/2023	905.78	36.86	868.92
Pond-1	11/3/2023	899.05	0.09	899.14
Pond-2	11/3/2023	900.65	0.30	900.95
Pond-3	11/3/2023	864.97	0.60	865.57
Stream Gauge	11/3/2023	874.86	0.68	875.54
Wetlands Gauge	11/3/2023	879.93	Below Gauge, Dry	Dry
MW-1	11/20/2023	949.67	81.62	868.05
MW-2	11/20/2023	968.31	98.65	869.66
MW-3	11/20/2023	950.67	83.30	867.37
MW-4	11/20/2023	933.23	66.05	867.18
MW-5	11/20/2023	905.78	36.70	869.08
Pond-1	11/20/2023	899.05	Below Gauge, Pond not dry	<899.05
Pond-2	11/20/2023	900.65	Below Gauge, Pond not dry	<900.65
Pond-3	11/20/2023	864.97	2.04	867.01
Stream Gauge	11/20/2023	874.86	0.68	875.54
Wetlands Gauge	11/20/2023	879.93	Below Gauge, Dry	Dry
MW-1	2/21/2024	949.67	77.03	872.64
MW-2	2/21/2024	968.31	94.98	873.33
MW-3	2/21/2024	950.67	78.32	872.35
MW-4	2/21/2024	933.23	33.64	899.59
MW-5	2/21/2024	905.78	61.31	844.47
Pond-1	2/21/2024	899.05	-	-
Pond-2	2/21/2024	900.65	0.20	900.85
Pond-3	2/21/2024	864.97	6.90	871.87
Stream Gauge	2/21/2024	874.86	0.68	875.54
Wetlands Gauge	2/21/2024	879.93	-	-
MW-1	4/26/2024	949.67	74.84	874.83
MW-2	4/26/2024	968.31	92.76	875.55
MW-3	4/26/2024	950.67	76.15	874.52
MW-4	4/26/2024	933.23	58.82	874.41
MW-5	4/26/2024	905.78	31.60	874.18
Pond-1[3]	4/26/2024	899.05	-	-
Pond-2	4/26/2024	900.65	0.00	900.65
Pond-3	4/26/2024	871.62[2]	2.94[2]	874.56[2]
Stream Gauge	4/26/2024	874.86	0.71	875.57
Wetlands Gauge[4]	4/26/2024	879.93	-	-
MW-1	7/22/2024	949.67	72.45	877.22
MW-2	7/22/2024	968.31	90.42	877.89
MW-3	7/22/2024	950.67	73.93	876.74
MW-4	7/22/2024	933.23	56.61	876.62
MW-5	7/22/2024	905.78	30.70	875.08
Pond-1[3]	7/22/2024	899.05	-	-
Pond-2	7/22/2024	900.65	0.50	901.15
Pond-3	7/22/2024	871.62[2]	5.16[2]	876.78[2]
Stream Gauge	7/22/2024	874.86	0.62	875.48
Wetlands Gauge[4]	7/22/2024	879.93	-	-

Notes and Abbreviations:

1. Gauge height shown as water level height above reference point.
2. 3 gauges are used at Pond 3 - A lower, middle, and upper gauge. Beginning 04/01/2024 and continuing thereafter, water level measurements on Pond 3 shift from lower gauge to middle gauge.
3. Pond 1 Transducer and gauge removed by construction February 2024
4. Wetlands gauge obstructed by erosion control February 2024

ft amsl: feet above mean sea level

FIGURES



LEGEND

- PROPOSED LIMIT OF EXCAVATION
- SITE BOUNDARY
- TOWNSHIP BOUNDARY
- PUBLIC LAND SURVEY SYSTEM (PLSS) SECTION
- PUBLIC LAND SURVEY SYSTEM (PLSS) INTERSECTED
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PARCEL DATA SOURCE: WASHTENAW COUNTY, MICHIGAN
3. TOWNSHIP, SECTION, AND INTERSECTED DATA SOURCE: BUREAU OF LAND MANAGEMENT (BLM) PUBLIC LAND SURVEY SYSTEM (PLSS)
4. WORLD TOPOGRAPHIC MAP SOURCE: USGS, 2019

N

0 1,500 3,000

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

SITE LOCUS

SEPTEMBER 2024

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CFProjects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_aprx - USER: tciskowski - LAST SAVED: 9/18/2024 2:37 PM

NORTHFIELD TOWNSHIP, RANGE 1S 6E

SALEM TOWNSHIP, RANGE 1S 7E

ANN ARBOR TOWNSHIP, RANGE 2S 6E

SUPERIOR TOWNSHIP, RANGE 2S 7E

SECTION 35

SECTION 36

SECTION 02

SECTION 01

SECTION 11

SECTION 12

SECTION 08

LEGEND

- RESIDENTIAL WELL
- DELINEATED STREAM
- DELINEATED WETLAND EXTENT
- PROPOSED LIMIT OF EXCAVATION
- 1 MILE RADIUS SURROUNDING SITE
- PUBLIC LAND SURVEY SYSTEM (PLSS) SECTION
- PUBLIC LAND SURVEY SYSTEM (PLSS) INTERSECTED
- TOWNSHIP BOUNDARY
- SITE BOUNDARY

MICHIGAN WETLAND TYPE

- RIVERINE
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ON-SITE DELINEATED WETLANDS DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
3. REGIONAL WETLANDS DATA SOURCE: UNITED STATES FISH AND WILDLIFE NATIONAL WETLANDS INVENTORY, 2023. WETLAND BOUNDARIES ARE APPROXIMATE
4. PARCEL DATA SOURCE: WASHTENAW COUNTY, MICHIGAN
5. RESIDENTIAL WELLS DATA SOURCE: STATE OF MICHIGAN GIS
6. TOWNSHIP, SECTION, AND INTERSECTED DATA SOURCE: BUREAU OF LAND MANAGEMENT (BLM) PUBLIC LAND SURVEY SYSTEM (PLSS)
7. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 1,300 2,600

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

REGIONAL SETTING

SEPTEMBER 2024

FIGURE 2

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LEGEND

- PROPOSED LIMIT OF EXCAVATION
- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PARCEL DATA SOURCE: WASHTENAW COUNTY, MICHIGAN
3. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 300 600

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DETAILED SITE MAP

SEPTEMBER 2024

FIGURE 3

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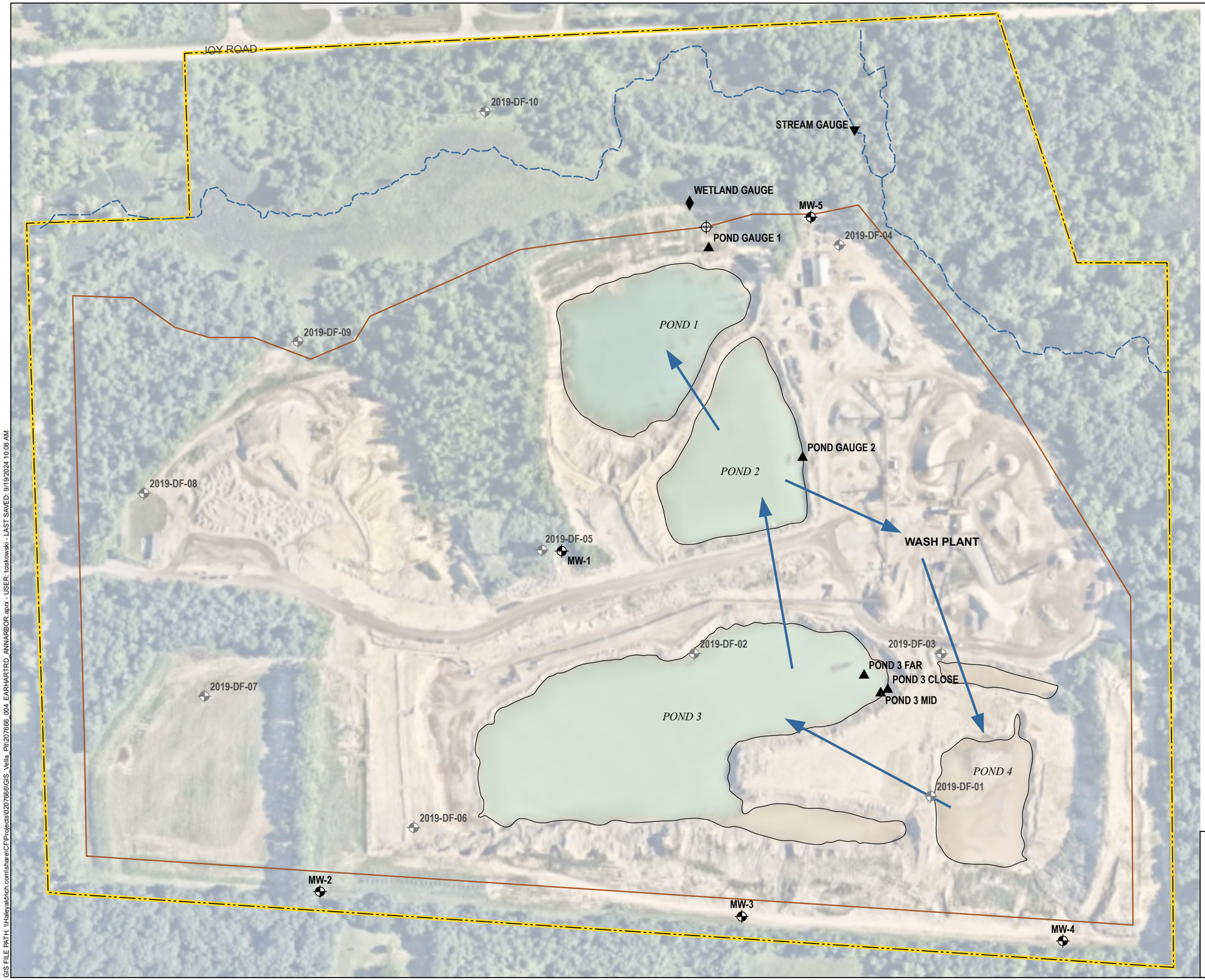

LEGEND

- MONITORING WELL
- POND GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITTED OUTFALL (NO CURRENT DISCHARGE)
- SOIL BORING (GZA, DECEMBER 2019)
- DELINEATED STREAM
- FLOW ARROW
- PROPOSED LIMIT OF EXCAVATION
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024

3. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 250 500

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

MONITORING WELL AND SURFACE WATER GAUGE LOCATIONS

SEPTEMBER 2024

FIGURE 4

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LEGEND

- SITE BOUNDARY
- WETLAND DELINEATION
- FRESHWATER FORESTED/SHRUB WETLAND (NWI)
- FRESHWATER EMERGENT WETLAND (NWI)
- FRESHWATER POND (NWI)
- STREAM DELINEATION
- EXCAVATION BOUNDARY
- MW-# — DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL INSTALLED BY CASCADE DRILLING AND OBSERVED BY HALEY & ALDRICH, INC. FROM 2 OCTOBER 2023 TO 11 OCTOBER 2023
- 2019-DF-# — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING INSTALLED BY GZA GEOENVIRONMENTAL INC. IN DECEMBER 2019

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED "TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. ON-SITE DELINEATED WETLANDS DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
4. REGIONAL WETLANDS DATA SOURCE: U.S. FISH AND WILDLIFE NATIONAL WETLANDS INVENTORY, 2023. WETLANDS BOUNDARY IS APPROXIMATE.

N

0 300 600

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5

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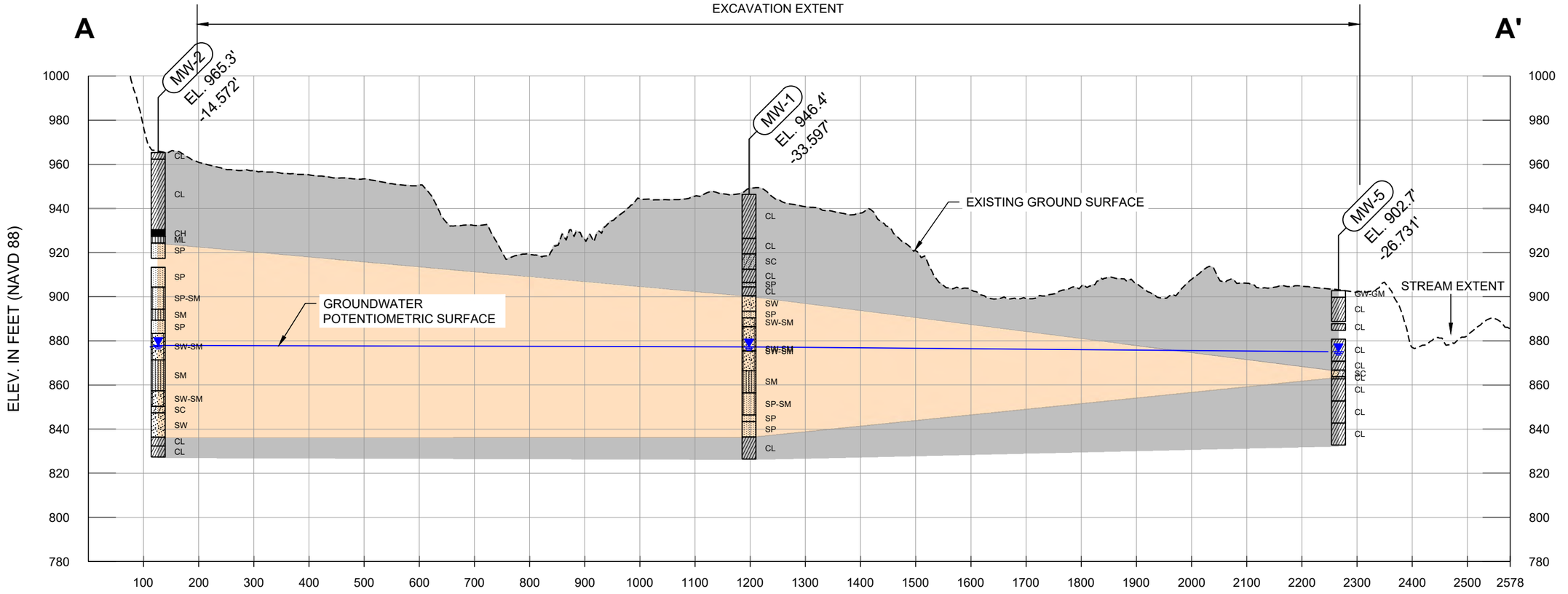
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\CAD\007-VELLA PIT\FIGURES\0207666 003 SECTIONS.DWG



SECTION A-A'

SCALE: AS SHOWN

PROFILE LEGEND

- EXISTING GROUND SURFACE
- CLAY
- SAND AND GRAVEL
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION MEASURED 22 JULY 2024
- MW-5 — LOCATION ID
- EL. 0.0' — APPROXIMATE GROUND SURFACE (NAVD88)
- 0.0' — OFFSET FROM ALIGNMENT (-) INDICATES LEFT OF ALIGNMENT (SEE NOTE 3)

- SP — POORLY-GRADED SAND
- SP-SM — POORLY-GRADED SAND WITH SILT AND GRAVEL
- SM — SILTY SAND OR SILTY SAND WITH GRAVEL
- SW — WELL GRADED SAND
- SW-SM — WELL GRADED SAND WITH SILT
- SC — CLAYEY SAND OR CLAYEY SAND WITH GRAVEL
- CL — LEAN CLAY OR SANDY CLAY
- ML — SILT OR SANDY SILT
- GW-GM — WELL GRADED GRAVEL WITH SILT
- GM — SILTY GRAVEL
- GC — CLAYEY GRAVEL

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED “TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE
4. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON THE INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ARE BASED UPON INTERPOLATION BETWEEN ADJACENT EXPLORATIONS.

HORIZ. 0 200 400
VERT. 0 50 100
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GEOLOGIC CROSS SECTION A-A'

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5A

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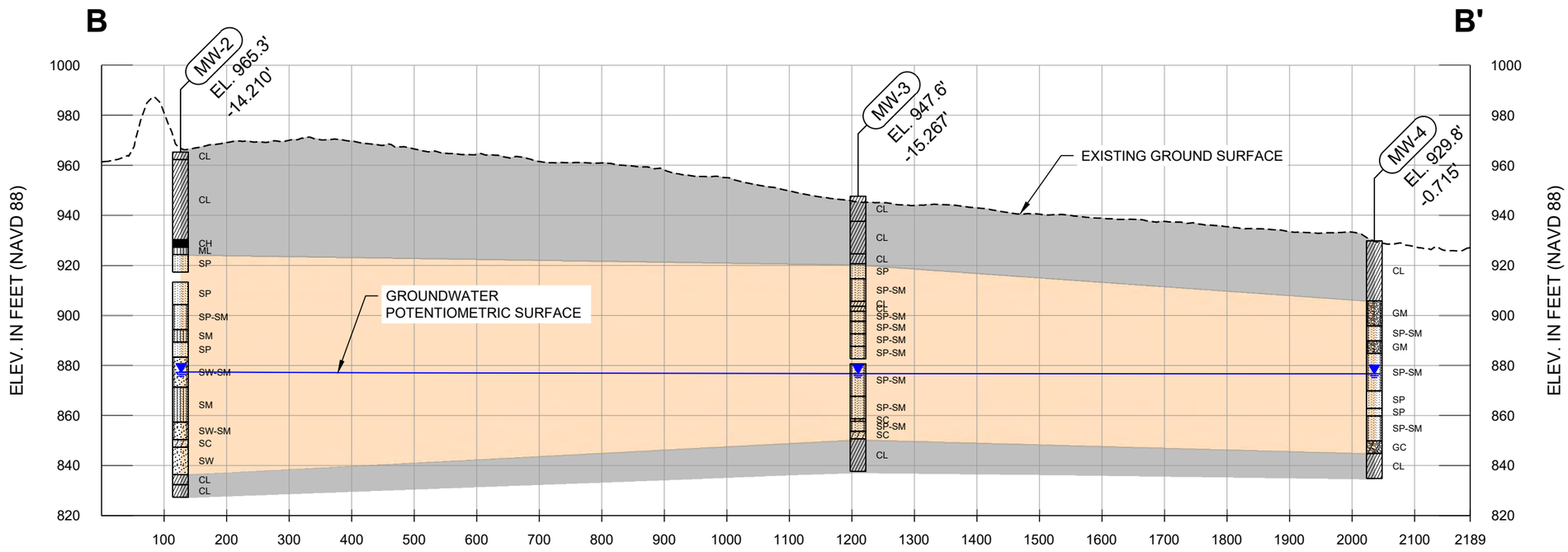

SECTION B-B'

SCALE: AS SHOWN

PROFILE LEGEND

- EXISTING GROUND SURFACE
- CLAY
- SAND AND GRAVEL
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION MEASURED 22 JULY 2024
- MW-5 / EL. 0.0' / 0.0' — LOCATION ID; APPROXIMATE GROUND SURFACE (NAVD88); OFFSET FROM ALIGNMENT (-) INDICATES LEFT OF ALIGNMENT (SEE NOTE 3)

- SP — POORLY-GRADED SAND
- SP-SM — POORLY-GRADED SAND WITH SILT AND GRAVEL
- SM — SILTY SAND OR SILTY SAND WITH GRAVEL
- SW — WELL GRADED SAND
- SW-SM — WELL GRADED SAND WITH SILT
- SC — CLAYEY SAND OR CLAYEY SAND WITH GRAVEL
- CL — LEAN CLAY OR SANDY CLAY
- ML — SILT OR SANDY SILT
- GW-GM — WELL GRADED GRAVEL WITH SILT
- GM — SILTY GRAVEL
- GC — CLAYEY GRAVEL

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED “TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE
4. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON THE INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ARE BASED UPON INTERPOLATION BETWEEN ADJACENT EXPLORATIONS.

HORIZ. 0 200 400
VERT. 0 50 100
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GEOLOGIC CROSS SECTION B-B'

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5B

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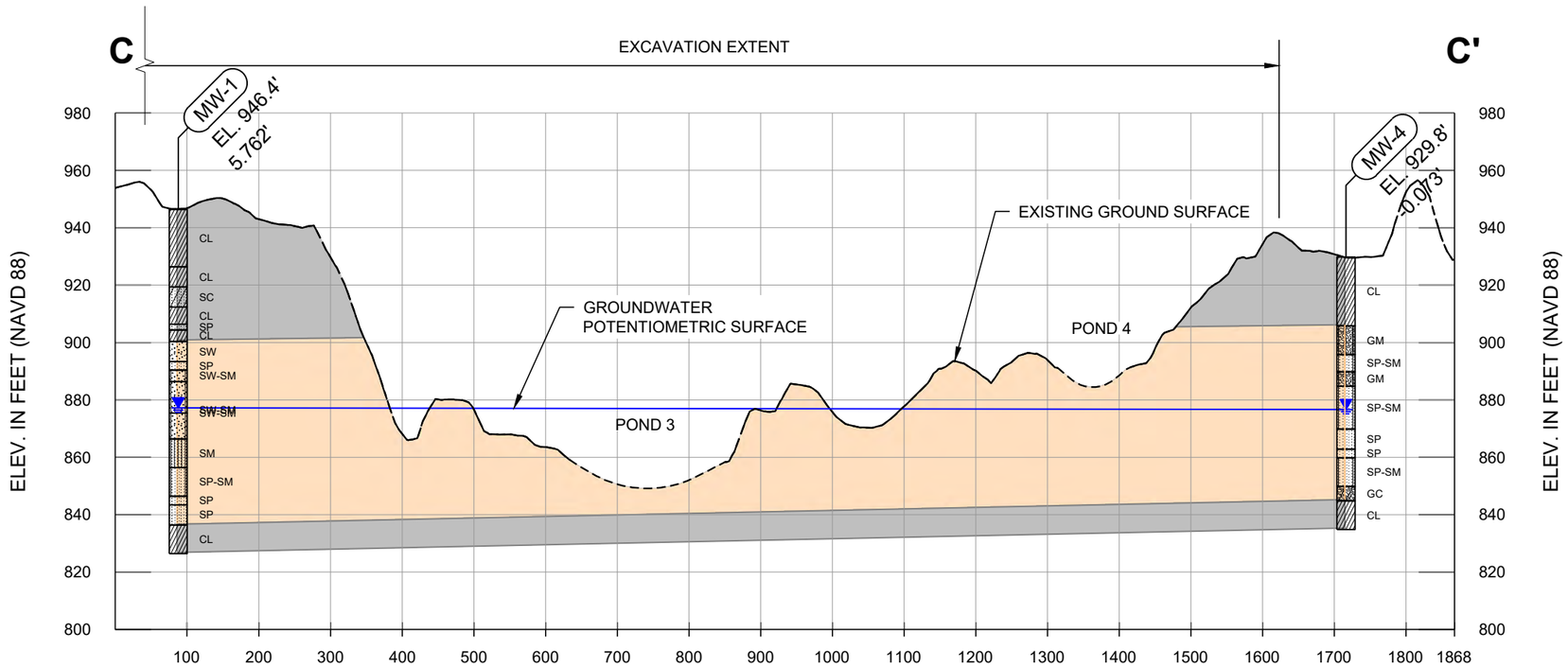

SECTION C-C'

SCALE: AS SHOWN

PROFILE LEGEND

- EXISTING GROUND SURFACE
- CLAY
- SAND AND GRAVEL
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION MEASURED 22 JULY 2024
- MW-5 / EL. 0.0' / 0.0' — LOCATION ID; APPROXIMATE GROUND SURFACE (NAVD88); OFFSET FROM ALIGNMENT (-) INDICATES LEFT OF ALIGNMENT (SEE NOTE 3)

- SP — POORLY-GRADED SAND
- SP-SM — POORLY-GRADED SAND WITH SILT AND GRAVEL
- SM — SILTY SAND OR SILTY SAND WITH GRAVEL
- SW — WELL GRADED SAND
- SW-SM — WELL GRADED SAND WITH SILT
- SC — CLAYEY SAND OR CLAYEY SAND WITH GRAVEL
- CL — LEAN CLAY OR SANDY CLAY
- ML — SILT OR SANDY SILT
- GW-GM — WELL GRADED GRAVEL WITH SILT
- GM — SILTY GRAVEL
- GC — CLAYEY GRAVEL

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED “TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE
4. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON THE INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ARE BASED UPON INTERPOLATION BETWEEN ADJACENT EXPLORATIONS.

HORIZ. 0 200 400
VERT. 0 50 100
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GEOLOGIC CROSS SECTION C-C'

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5C

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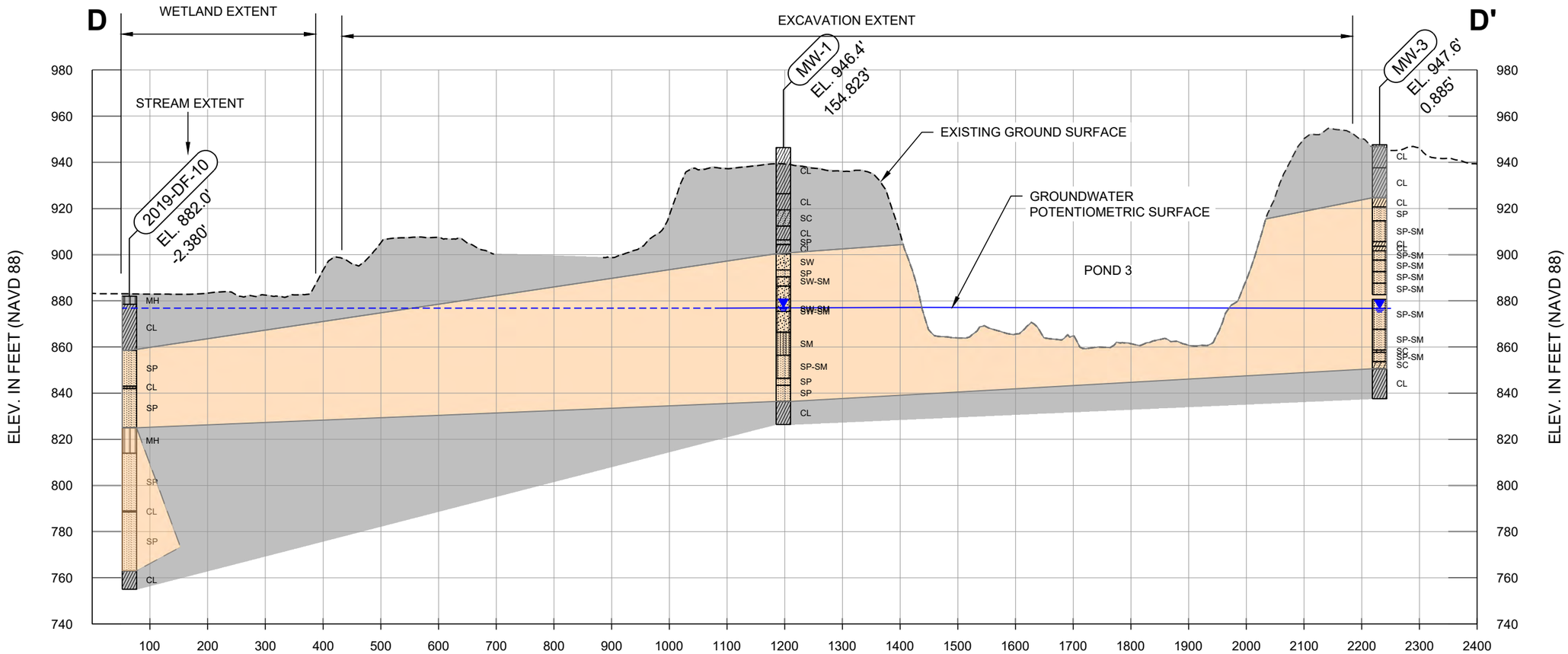

SECTION D-D'

SCALE: AS SHOWN

PROFILE LEGEND

- EXISTING GROUND SURFACE
- CLAY
- SAND AND GRAVEL
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION MEASURED 22 JULY 2024
- MW-5 — LOCATION ID
- EL. 0.0' — APPROXIMATE GROUND SURFACE (NAVD88)
- 0.0' — OFFSET FROM ALIGNMENT (-) INDICATES LEFT OF ALIGNMENT (SEE NOTE 3)

- SP — POORLY-GRADED SAND
- SP-SM — POORLY-GRADED SAND WITH SILT AND GRAVEL
- SM — SILTY SAND OR SILTY SAND WITH GRAVEL
- SW — WELL GRADED SAND
- SW-SM — WELL GRADED SAND WITH SILT
- SC — CLAYEY SAND OR CLAYEY SAND WITH GRAVEL
- CL — LEAN CLAY OR SANDY CLAY
- ML — SILT OR SANDY SILT
- GW-GM — WELL GRADED GRAVEL WITH SILT
- GM — SILTY GRAVEL
- GC — CLAYEY GRAVEL

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED “TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE
4. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON THE INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ARE BASED UPON INTERPOLATION BETWEEN ADJACENT EXPLORATIONS.

HORIZ. 0 200 400
VERT. 0 50 100
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GEOLOGIC CROSS SECTION D-D'

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5D

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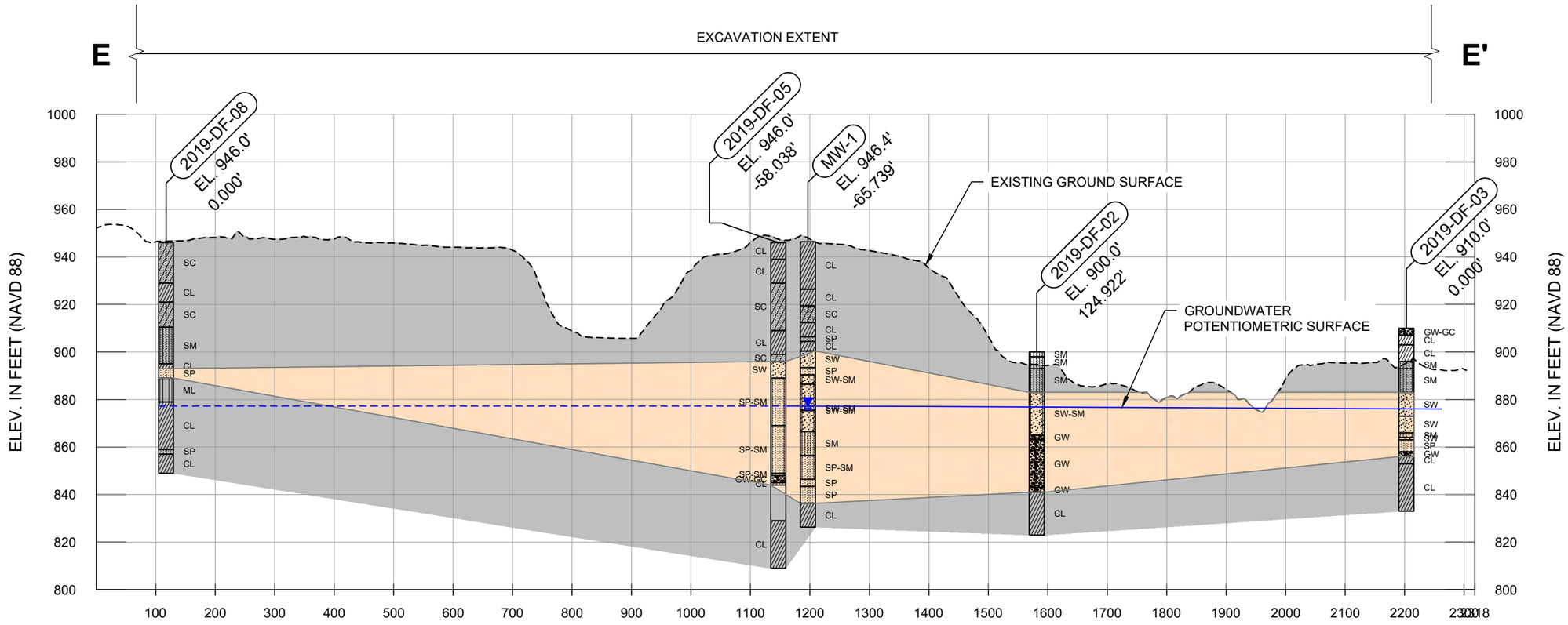

SECTION E-E'

SCALE: AS SHOWN

PROFILE LEGEND

- EXISTING GROUND SURFACE
- CLAY
- SAND AND GRAVEL
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION MEASURED 22 JULY 2024
- MW-5 / EL. 0.0' / 0.0' — LOCATION ID; APPROXIMATE GROUND SURFACE (NAVD88); OFFSET FROM ALIGNMENT (-) INDICATES LEFT OF ALIGNMENT (SEE NOTE 3)

- SP — POORLY-GRADED SAND
- SP-SM — POORLY-GRADED SAND WITH SILT AND GRAVEL
- SM — SILTY SAND OR SILTY SAND WITH GRAVEL
- SW — WELL GRADED SAND
- SW-SM — WELL GRADED SAND WITH SILT
- SC — CLAYEY SAND OR CLAYEY SAND WITH GRAVEL
- CL — LEAN CLAY OR SANDY CLAY
- ML — SILT OR SANDY SILT
- GW-GM — WELL GRADED GRAVEL WITH SILT
- GM — SILTY GRAVEL
- GC — CLAYEY GRAVEL

NOTES

1. BASE MAP TAKEN FROM ELECTRONIC CAD FILE TITLED “TOPOGRAPHIC SURVEY", DATED 20 OCTOBER 2023, PROVIDED BY PEA GROUP. SURVEY CONDUCTED ON 02 OCTOBER 2023.
2. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE HORIZONTAL CONTROL REFERENCES THE NORTH AMERICAN DATUM OF 1983, MICHIGAN SOUTH STATE PLANE.
3. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE
4. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON THE INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ARE BASED UPON INTERPOLATION BETWEEN ADJACENT EXPLORATIONS.

HORIZ. 0 200 400
VERT. 0 50 100
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GEOLOGIC CROSS SECTION E-E'

SCALE: AS SHOWN
SEPTEMBER 2024

FIGURE 5E

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LEGEND

- MONITORING WELL
- POND GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- 868.95 GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 868.95 SURFACE WATER ELEVATION MEASUREMENT
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- INFERRED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- DELINEATED STREAM
- SITE BOUNDARY
- POND 3 LIMITS

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 3 NOVEMBER 2023.
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. SURFACE WATER ELEVATIONS MEASUREMENTS NOT USED IN CONTOURING, EXCEPT FOR POND 3.
5. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
6. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023

N

0 250 500
SCALE IN FEET

HALEY ALDRICH

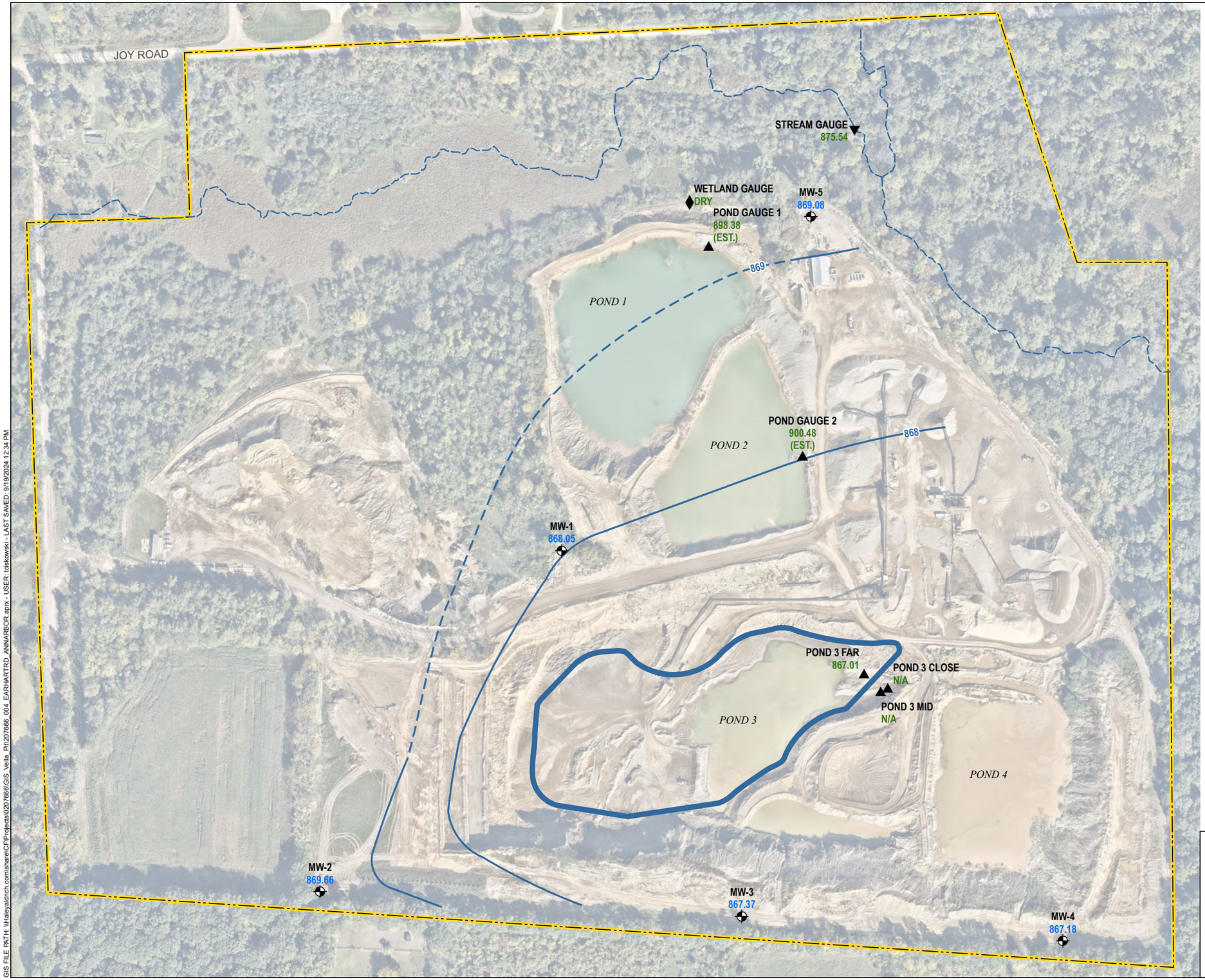
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP - 3 NOVEMBER 2023

SEPTEMBER 2024

FIGURE 6A

GIS FILE PATH: \\Haleyaldrich.com\share\CFIProjects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/19/2024 10:46 AM



LEGEND

- MONITORING WELL
- POND GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- 868.95 — GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 868.95 — SURFACE WATER ELEVATION MEASUREMENT
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- INFERRED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- DELINEATED STREAM
- SITE BOUNDARY
- POND 3 LIMITS

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 20 NOVEMBER 2023.
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. SURFACE WATER ELEVATIONS MEASUREMENTS NOT USED IN CONTOURING, EXCEPT FOR POND 3.
5. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
6. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023

N

0 250 500
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP - 20 NOVEMBER 2023

SEPTEMBER 2024

FIGURE 6B

GIS FILE PATH: \\haleyaldrich.com\share\CIP\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/19/2024 12:34 PM

JOY ROAD

STREAM GAUGE
875.48

WETLAND GAUGE
NA

MW-5
872.14

POND GAUGE 1
NA

POND 1

POND GAUGE 2
901.15

POND 2

MW-1
872.64

POND 3 FAR
876.78

POND 3

POND 4

872.6
872.4
872.8
873
873.2
872
872.2

MW-2
873.33

MW-3
872.35

MW-4
871.92

LEGEND

- MONITORING WELL
- PONG GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- 868.05 GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 875.54 SURFACE WATER ELEVATION MEASUREMENT
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR ,IN FEET, DASHED WHERE INFERRED
- POND 3 LIMITS
- DELINEATED STREAM
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 21 FEBRUARY 2024.
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. POND 1 AND POND 2 POTENTIOMETRIC SURFACE ELEVATIONS ESTIMATED FROM TRANSDUCER DATA.
5. SURFACE WATER ELEVATION MEASUREMENTS NOT USED IN CONTOURING, EXCEPT FOR POND 3.
6. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
7. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 250 500
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP - 21 FEBRUARY 2024

SEPTEMBER 2024

FIGURE 6C

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/20/2024 4:00 PM

LEGEND

- MONITORING WELL
- PONG GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- 868.05 — GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 875.54 — SURFACE WATER ELEVATION MEASUREMENT
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR ,IN FEET, DASHED WHERE INFERRED
- POND 3 LIMITS
- DELINEATED STREAM
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 26 APRIL 2024.
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. POND 1 AND POND 2 POTENTIOMETRIC SURFACE ELEVATIONS ESTIMATED FROM TRANSDUCER DATA.
5. SURFACE WATER ELEVATION MEASUREMENTS NOT USED IN CONTOURING, EXCEPT FOR POND 3.
6. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
7. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 250 500
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP - 26 APRIL 2024

SEPTEMBER 2024

FIGURE 6D

GIS FILE PATH: \\haleyaldrich.com\share\CFP\projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/19/2024 12:26 PM

LEGEND

- MONITORING WELL
- PONG GAUGE
- STREAM GAUGE
- WETLAND GAUGE
- 868.05 GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 875.54 SURFACE WATER ELEVATION MEASUREMENT
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR ,IN FEET, DASHED WHERE INFERRED
- POND 3 LIMITS
- DELINEATED STREAM
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 22 JULY 2024.
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. POND 1 AND POND 2 POTENTIOMETRIC SURFACE ELEVATIONS ESTIMATED FROM TRANSDUCER DATA.
5. SURFACE WATER ELEVATION MEASUREMENTS NOT USED IN CONTOURING, EXCEPT FOR POND 3.
6. ON-SITE DELINEATED STREAM DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
7. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 250 500
SCALE IN FEET

HALEY ALDRICH

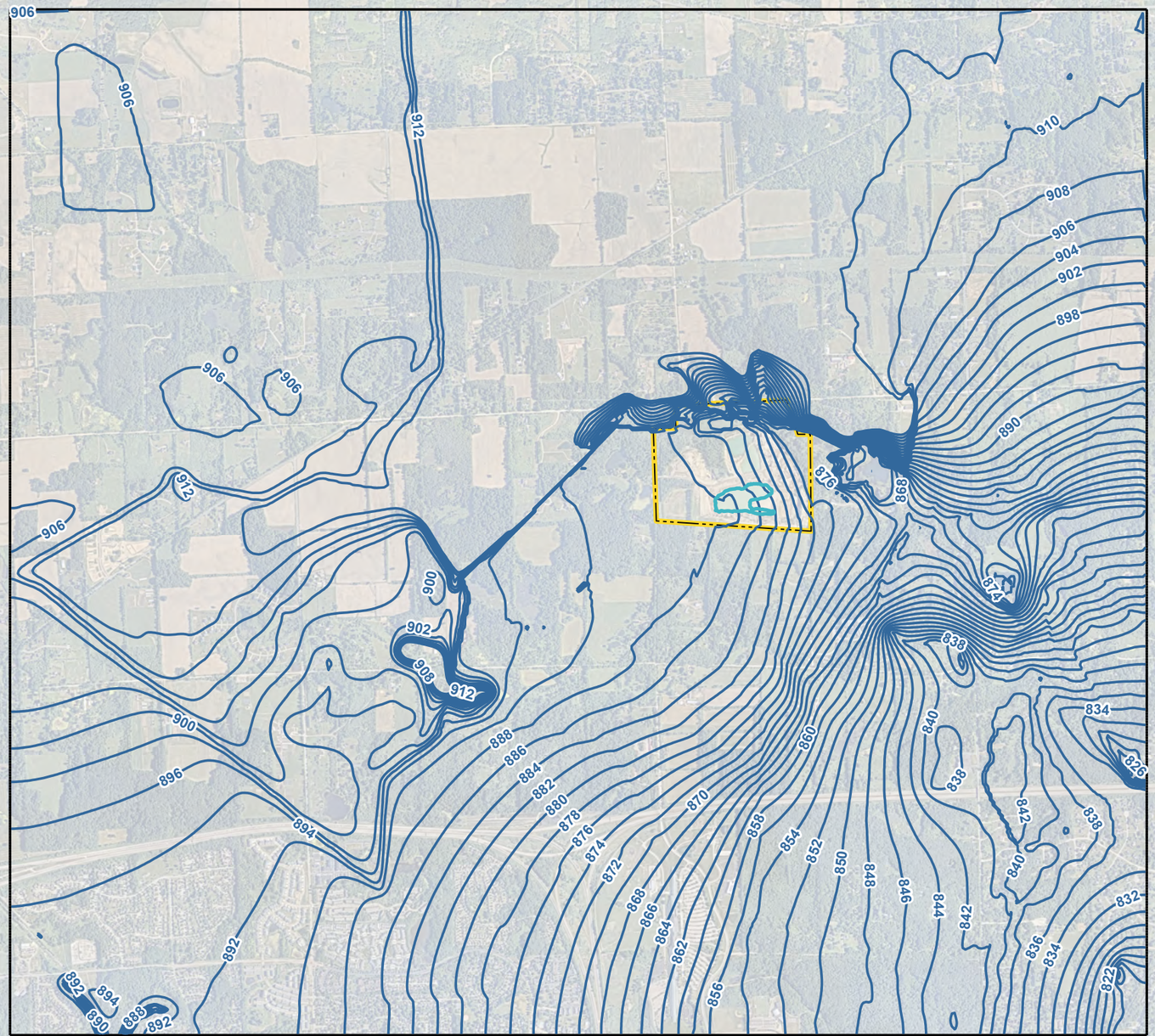
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP - 22 JULY 2024

SEPTEMBER 2024

FIGURE 6E

GIS FILE PATH: \\haleyaldrich.com\share\CFP\projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: tciskowski - LAST SAVED: 9/19/2024 12:26 PM



LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

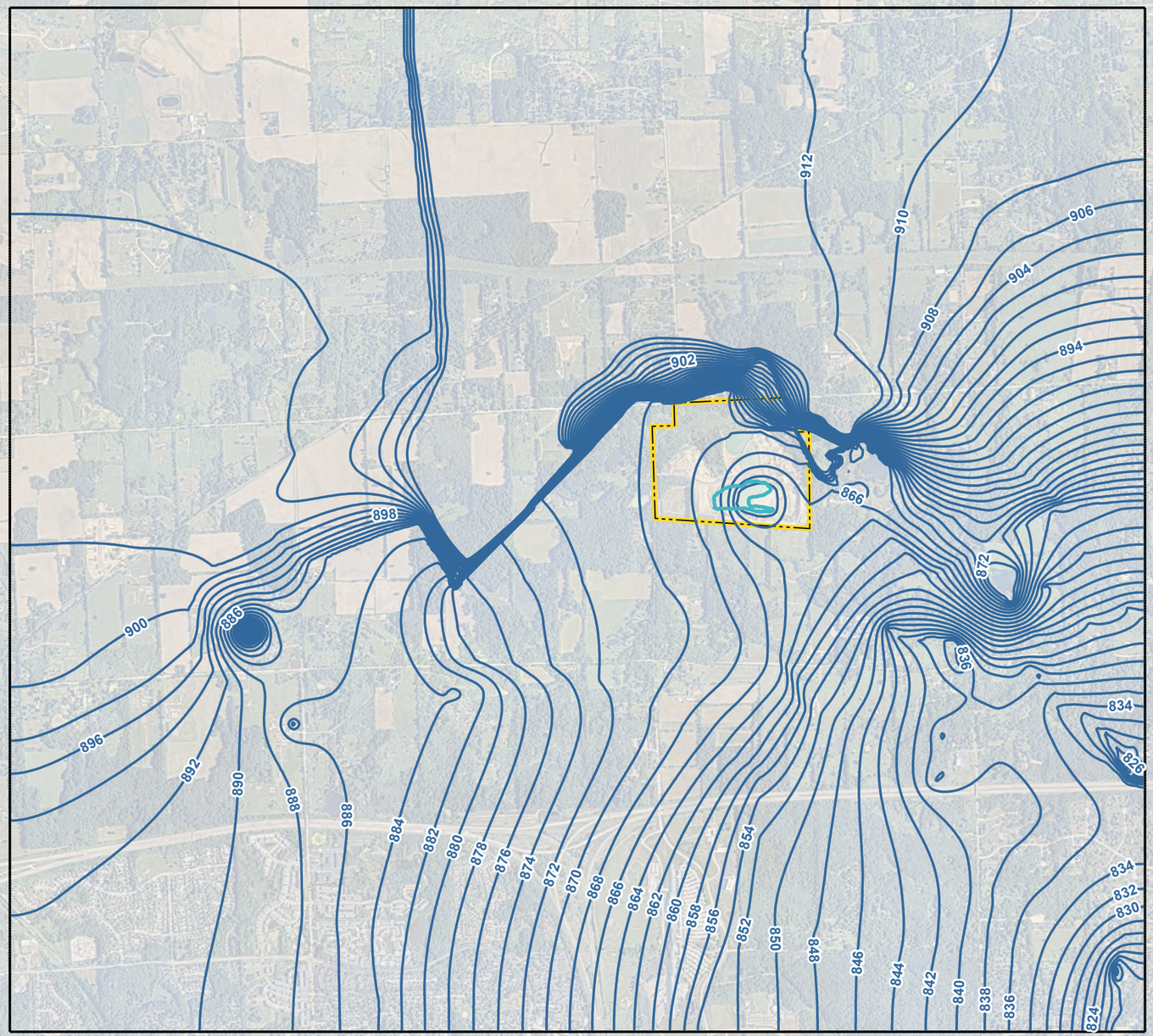
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 PRE-DEWATERING

SEPTEMBER 2024

FIGURE 7A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800
SCALE IN FEET

HALEY ALDRICH

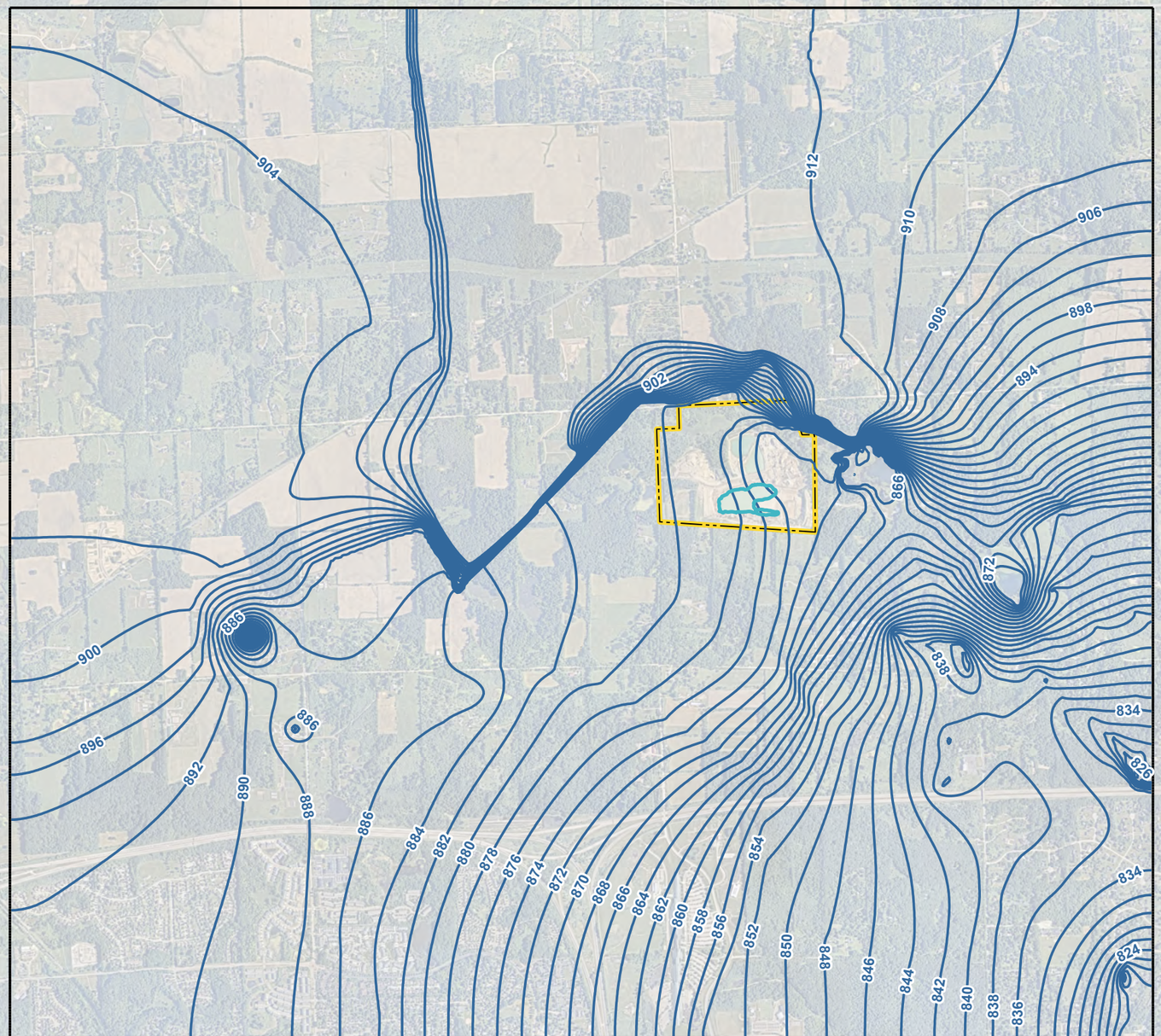
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 DEWATERING

SEPTEMBER 2024

FIGURE 7B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800
SCALE IN FEET

HALEY ALDRICH

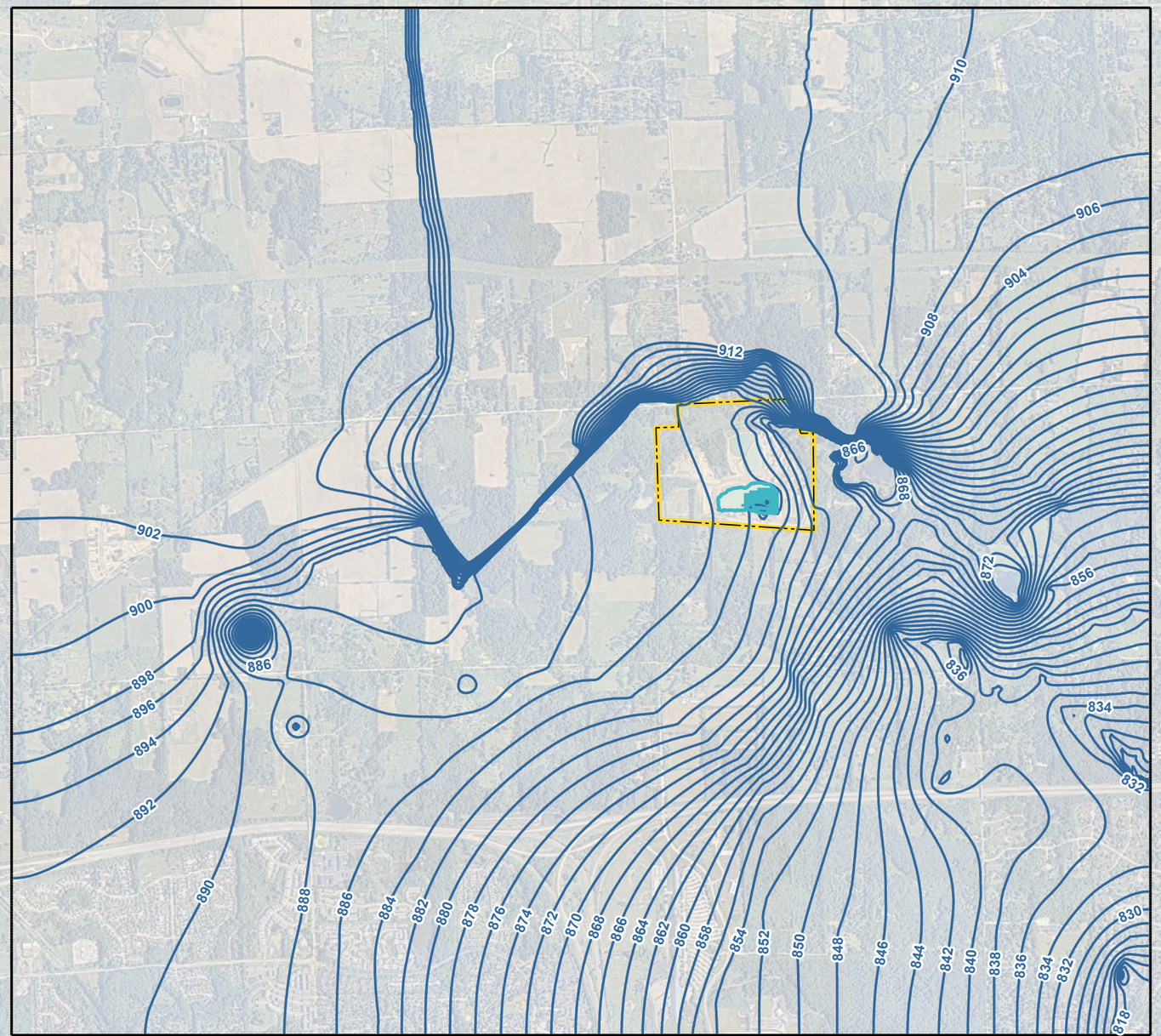
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 RECOVERY

SEPTEMBER 2024

FIGURE 7C

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SIMULATED POND EXTENT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 PHASE 1

SEPTEMBER 2024

FIGURE 7D

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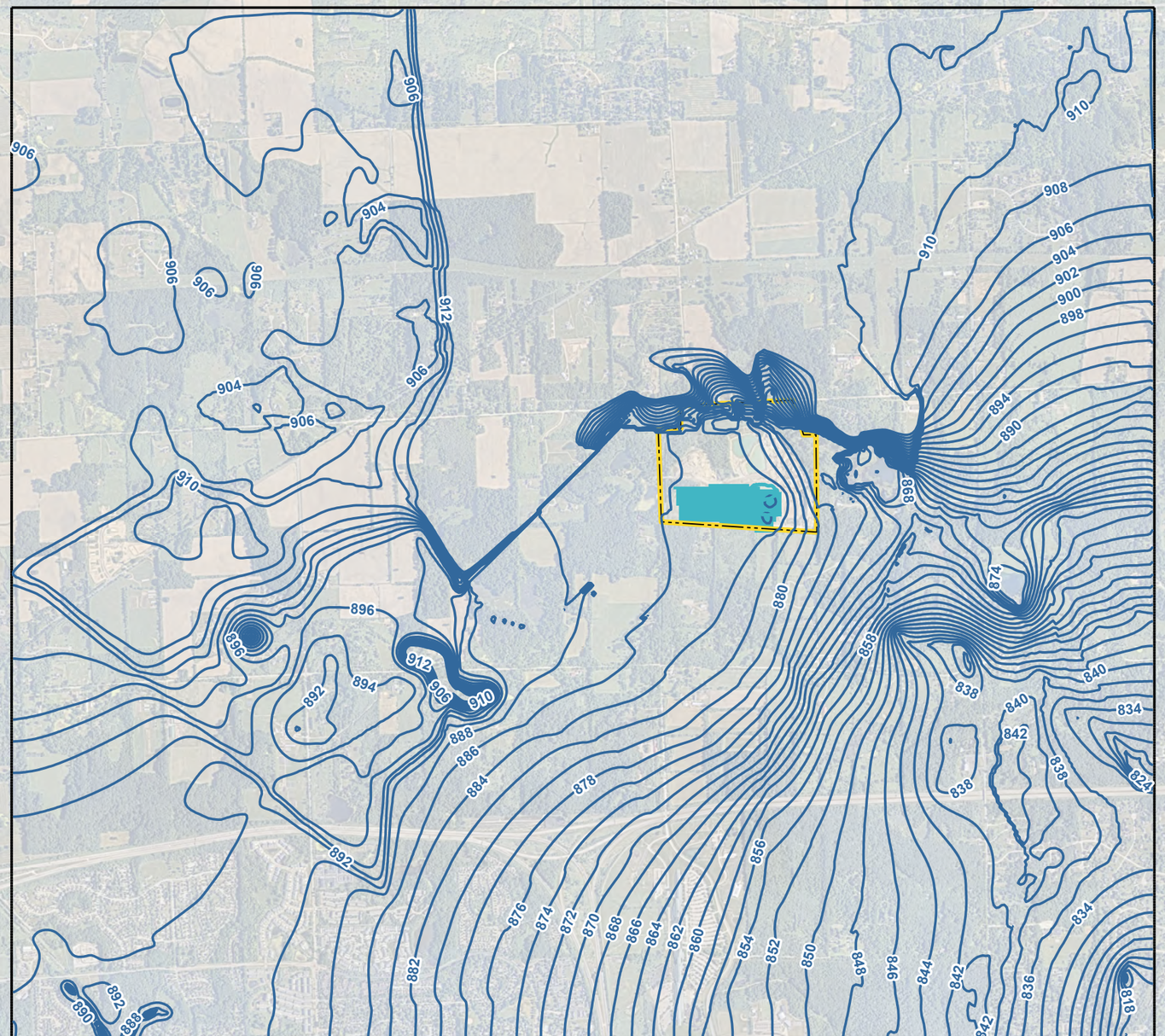

LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SIMULATED POND EXTENT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 PHASE 2

SEPTEMBER 2024

FIGURE 7E

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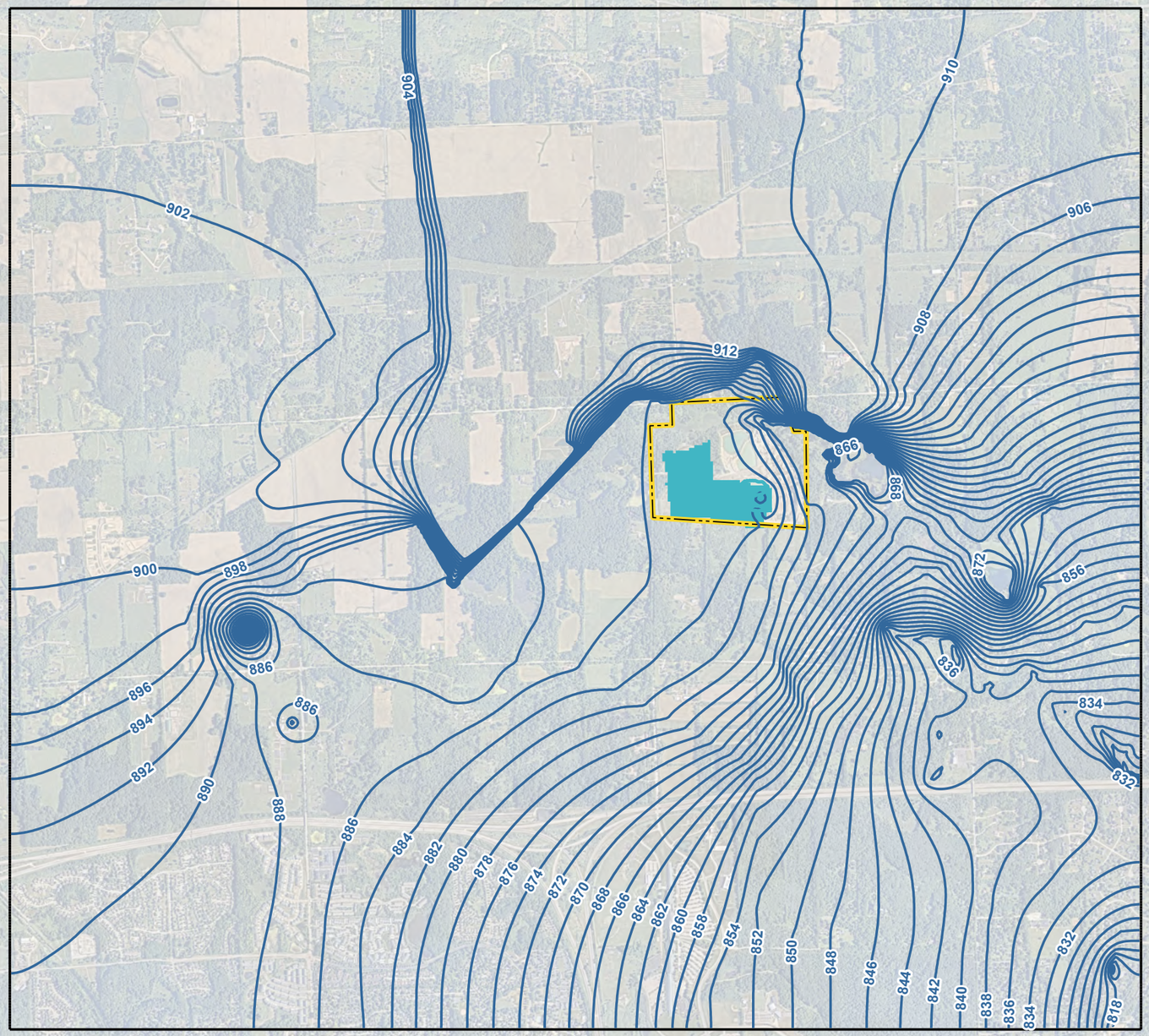

LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SIMULATED POND EXTENT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 PHASE 3

SEPTEMBER 2024

FIGURE 7F

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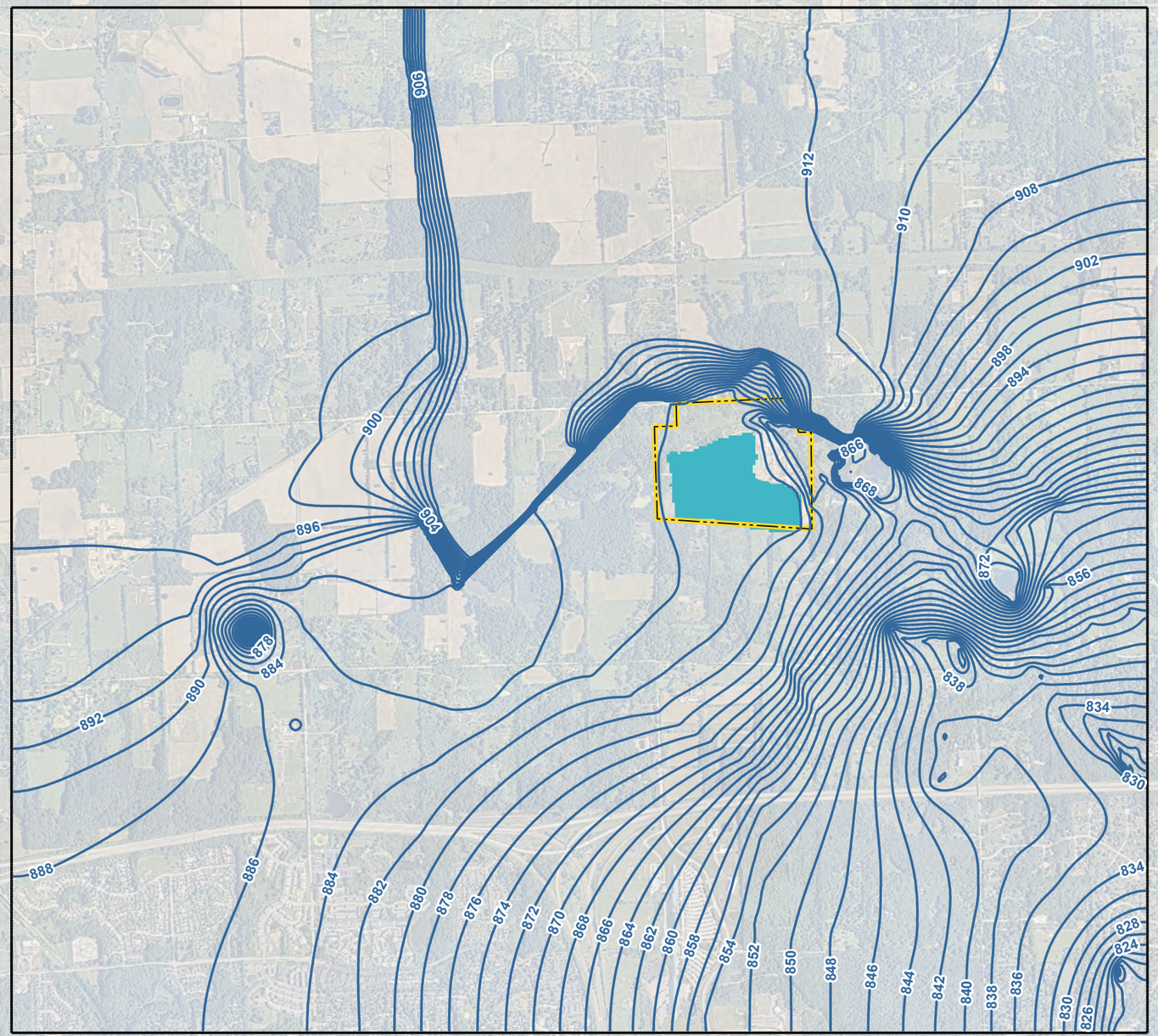


LEGEND

- MODELED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR, 2-FT INTERVAL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SIMULATED POND EXTENT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

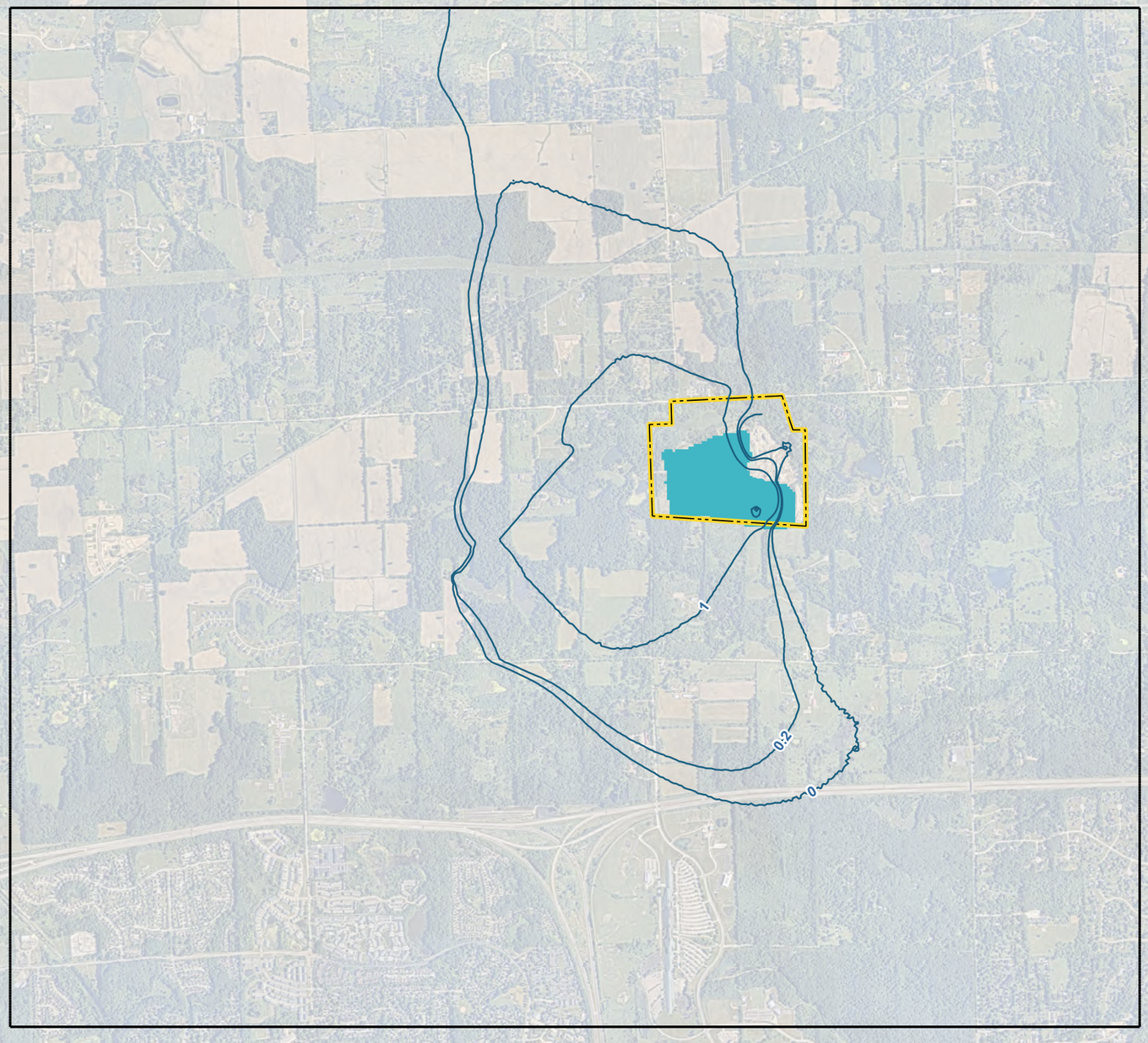
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

POTENTIOMETRIC SURFACE - LAYER 2 PHASE 4

SEPTEMBER 2024

FIGURE 7G

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- MODELED DRAWDOWN CONTOUR (FEET)
- POND 3 BOUNDARY
- MODEL DOMAIN
- SIMULATED POND EXTENT
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800
SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

MODELED DRAWDOWN IN LAYER 2 – PHASE 4 RECLAMATION

SEPTEMBER 2024

FIGURE 8

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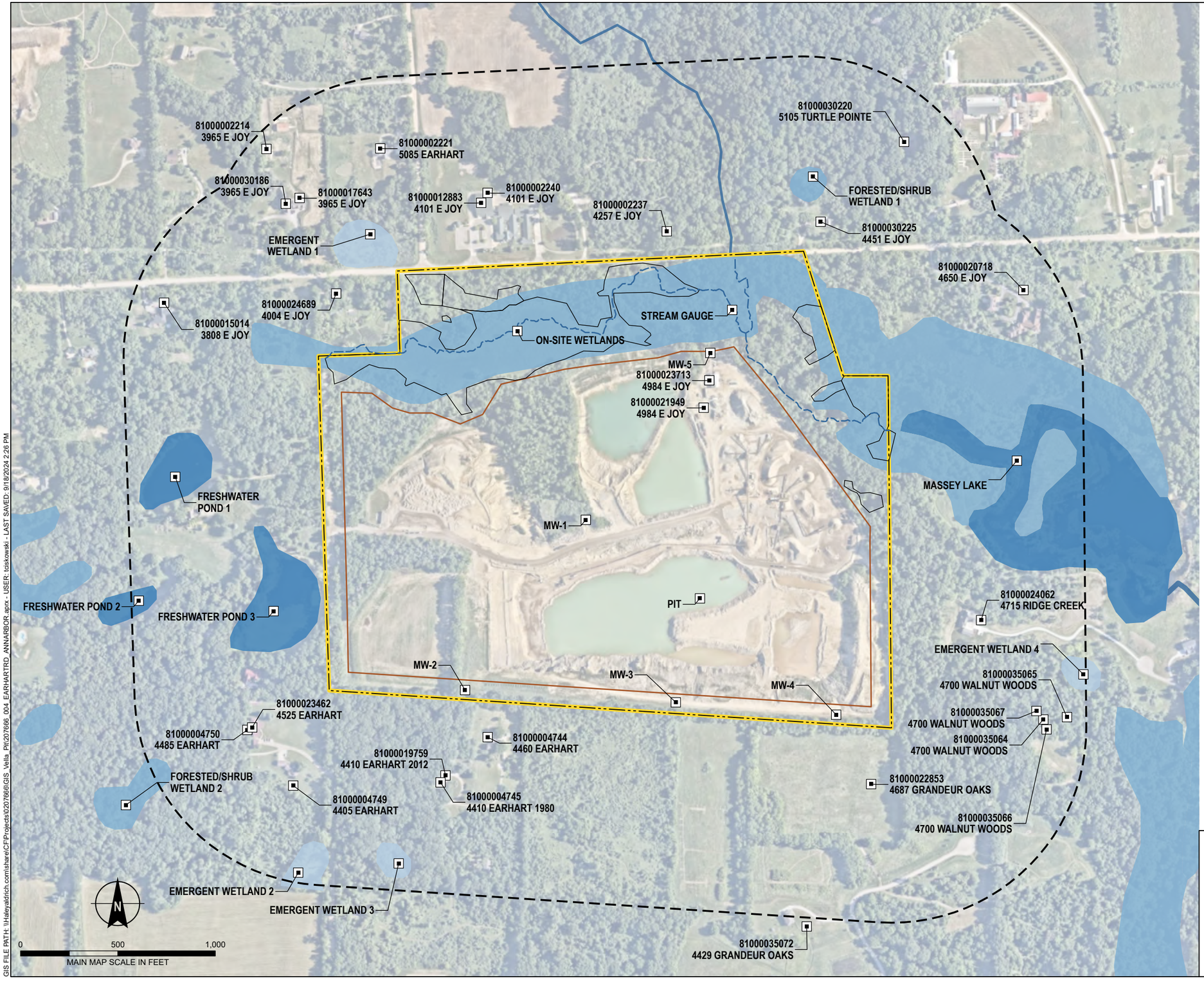

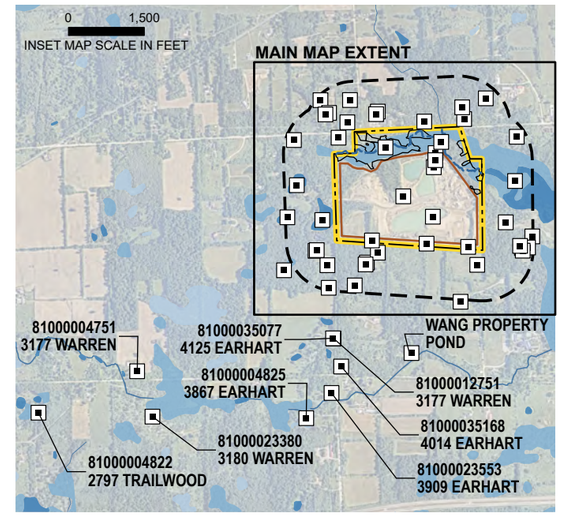

LEGEND

- PLOTTING LOCATION
- DELINEATED STREAM
- DELINEATED WETLAND EXTENT
- PROPOSED LIMIT OF EXCAVATION
- 1,000-FOOT RADIUS SURROUNDING SITE
- SITE BOUNDARY

MICHIGAN WETLAND TYPE

- RIVERINE
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ON-SITE DELINEATED WETLANDS DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ALDRICH, 6 MAY 2024
3. REGIONAL WETLANDS DATA SOURCE: UNITED STATES FISH AND WILDLIFE NATIONAL WETLANDS INVENTORY, 2023. WETLAND BOUNDARIES ARE APPROXIMATE
4. PARCEL DATA SOURCE: WASHTENAW COUNTY, MICHIGAN
5. RESIDENTIAL WELLS DATA SOURCE: STATE OF MICHIGAN GIS
6. TOWNSHIP, SECTION, AND INTERSECTED DATA SOURCE: BUREAU OF LAND MANAGEMENT (BLM) PUBLIC LAND SURVEY SYSTEM (PLSS)
7. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

MODEL OUTPUT PLOTTING LOCATIONS

SEPTEMBER 2024

FIGURE 9

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APPENDIX A
EGLE WRD Draft December 2023 Guidance

Water Resources Division

Hydrogeological Investigations Administrative Checklist for Lake Creation Projects

This checklist is for the Department of Environment, Great Lakes, and Energy (EGLE) internal use in determining if a Hydrogeologic Investigation for a proposed lake creation project is complete under Part 301, Inland Lakes and Streams; Part 303, Wetlands Protection; or Part 327, Great Lakes Preservation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), requires a permit to create an inland lake that is five (5) acres or larger. Part 303, Wetlands Protection, of the NREPA also requires a permit if the lake creation project impacts regulated wetlands. Large quantity surface or groundwater withdrawals greater than 100,000 gallons per day (gpd) [equivalent to a total pump capacity of 70 gallons per minute, (gpm)] must also be registered under Part 327, Great Lakes Preservation, of the NREPA. A separate permit is required under Part 327 for large quantity withdrawals greater than 2,000,000 gallons per day (total pump capacity greater than 1,389 gpm). This guidance applies to hydrogeological studies for lake creation projects regulated under Parts 301, 303, and 327 of the NREPA. Some examples include excavating for gravel pits or man-made lakes, and mining projects. These types of projects may alter the local hydrologic conditions either by diverting water, changing the groundwater level and flow direction, or impacting water quality. It may be necessary, before permits are issued, to determine existing hydrologic conditions at the proposed site and to assess whether adverse environmental impacts could occur if the proposed project was completed.

Use the following checklist to determine if a hydrogeologic investigation is complete for a lake creation project. Applicants should follow the Hydrogeologic Investigation Flowchart for Lake Creation Projects document to determine if a hydrogeologic investigation is required.

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Hydrogeologic Investigation Administrative Checklist

Below is a list of items required to consider a hydrogeologic investigation complete. Each piece should be present in the hydrogeologic investigation report, and a page number of the report can be indicated by the applicant. Additional information on each item is provided below. Contact the Water Resources Division's (WRD's) Water Use Assessment Unit (WUAU) for additional information on hydrogeologic investigation requirements. For questions regarding permitting of a lake creation project, contact the Land/Water Interface Permitting Staff for that geographic area.

	Hydrogeologic Investigation Component	Report Page(s)
1	Project Description	Incomplete
2	Site Maps & Tables	Incomplete
3	Geologic Cross Sections	Incomplete
4	Minimum Five Groundwater Monitoring Wells and Soil Borings	Incomplete
5	Wellogic Well Logs	Incomplete
6	Pumping Rate(s) and Water Withdrawal Assessment Tool (WWAT) Registration (if needed)	Incomplete
7	Parameter Calculation Sheets and Raw Data	Incomplete
8	Model Selection	Incomplete
9	Groundwater Elevation Change Predictions	Incomplete

Site Visit Date and Personnel: _____

_____

_____

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1. **Project Description** – Narrative of the planned project should be provided in the report. Specific project information should include the following:
   a. Final proposed lake boundary(s).
   b. Final lake depth(s). Must provide final expected excavation depths
   c. Annual solid and liquid material removal volume estimates, including excavation plan and staging location for excavated material.
   d. Estimated project schedule, specifying project duration in years and the number of days per year excavation is expected to take place. Include a timeline of the project.
   e. Description of overburden and water management plan, including the potential lining of any onsite artificial hydraulic structures. 1-2
   f. Discussion of effects to resources affected by the pit excavation.

2. **Site Maps & Tables** – The following detailed site maps and summary tables should be included in the report:
   a. Site Location Map showing the site boundaries on a regional topographic map. Figure 1
   b. Site Map showing the location of all test borings, piezometers, wells, site boundary, roads, current site structures, sorting or processing areas.
   c. Resource Map showing the location of all wetlands, streams, and Wellogic wells within 1.0 mile of the site.
   d. Project Map showing the final dimensions of the proposed lake, including topography of the final excavation.
   e. Hydraulic Flow Map showing the location of any aquifer testing completed and the source and endpoint for water used in any relevant process onsite, including production or injection wells, settling ponds, culverts, drainage ditches, or any other artificial structures.
   f. Potentiometric Surface Maps providing a map for each quarterly monitoring event completed. No Wellogic water data should be used in developing potentiometric surface maps. Maps should show the groundwater or surface water elevation values used in potentiometric surface development.
   g. Final Hydraulic Conditions Map showing the anticipated final potentiometric surface expected along with the final lake and site conditions. Maps should show the groundwater or surface water elevation values used in potentiometric surface development.
   h. Well Inventory Table summarizing all wells installed onsite, including the elevation of the top of casing, ground surface, and screen interval measured relative to the United States Geological Survey (USGS) datum. Table 3
   i. Groundwater Elevation Table summarizing the quarterly monitoring groundwater elevation data measured to the USGS datum for each well.
   j. Environmental Properties Table summarizing all properties used in groundwater change calculations either obtained through literature references or through onsite testing. If literature references are used to obtain parameters, they must be cited.

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k. Groundwater Elevation Change Table summarizing all baseline groundwater levels, as measured or estimated, and predicted changes in hydrologic conditions for each of the three considered phases (early excavation, late excavation, and long-term) at each Resource (stream, wetland, water body, or well) identified within 1,000 feet of the property boundary. Calculated changes should be reported in both elevation relative to the USGS datum and in depth below ground surface. If access is available to resource, a baseline measurement should be taken.

3. **Geologic Cross Sections** – The hydrogeologic settings of the project site should be shown in two-dimensional cross section diagrams. Cross sections ideally should intersect at right angles and be placed through the borings, proposed excavation, and any affected resources. To be considered complete, cross sections must include the following features:
   a. Cross section location map showing all structures identified in the Site Map, final excavation dimensions, all sensitive areas identified in the Resource Map, and hydraulic control structures depicted in the Hydraulic Flow Map.
   b. Cross sections must show the soil classified using the Unified Soil Classification System naming identified for any soil interval 1 foot or greater in boring logs used to develop the maps.
   c. Cross sections must show groundwater elevation using onsite monitoring groundwater elevation data only.
   d. Cross sections must use ground surface topography and not impose an assumed straight liner or interpolated surface as the ground surface.
   e. Cross sections must include a scale for vertical and horizontal reference and be clearly labeled.
   f. The limits of excavation and resources should be indicated on each cross section, as applicable.

4. **Minimum Five Groundwater Monitoring Wells and Soil Borings** – A minimum of five groundwater measurement points are required onsite to consider the investigation complete for a 50-acre lake. One additional soil boring will be required for each additional 15 acres excavated beyond 50 acres and one additional well will be required for each additional 30-acres excavated beyond 50 acres. The table below outlines guidelines for soil boring and monitoring point density for the first six lake size classes:

Proposed Lake Size	# Required Soil Borings	# Required Wells
50 acres	5	5
65 acres	6	5
80 acres	7	6
95 acres	8	6
110 acres	9	7

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125 acres	10	7

Groundwater measurements can include any of the following: permanent monitoring wells, piezometers, and hydraulically connected surface water elevations. All soil borings should be installed to 10 feet below the anticipated final lake depth at a minimum. If a deeper aquifer (either bedrock or glacial) is encountered during site characterization, three monitoring wells must be installed in the deeper aquifer.

5. **Wellogic Well Logs** – All Wellogic well logs present within 1.0 mile of the property boundary or the predicted maximum extent of hydraulic impact, whichever is greater, should be provided in the appendices of the report. All wells within this area should be shown on the Resource Map.

6. **Pumping Rate and WWAT Registration** – An estimated pumping rate for dewatered lake creation projects should be reported for each year of lake creation activities if the project includes dewatering. Additionally, projects in which water is pumped at 70 gpm or greater require a WWAT registration under Part 327 managed by the WUAU. The WWAT registration, if needed, should be included in the appendices of the report. A WWAT registration may be obtained online at EGLE.state.mi.us/wwat. New or increased large quantity withdrawals which pump 2,000,000 gallons per day (2 MGD), or 1,389 gpm or greater, require a separate Part 327 permit application.

7. **Parameter Calculation Sheets and Raw Data** – Step-by-step calculations, references, and raw data, as appropriate, for each parameter used in the groundwater change predictions should be included in the report for, at a minimum, the following parameters:
   a. Precipitation Rate
   b. Evaporation Rate
   c. Hydraulic Conductivity
   d. Storativity or Specific Yield
   e. Porosity
   f. Stream Bed Conductance
   g. Aquifer Thickness
   h. Groundwater Gradient
   i. Groundwater Flow Rate used in Analytical Approximation
   j. Excavation Rate

   All supporting data or test results used in the calculation of the above parameters should be present in the appendices of the report. All data must have units clearly labeled and used consistently throughout the report.

8. **Model Selection** – Drawdown estimates can be made using a variety of analytic or numerical models, depending on the site-specific hydrogeologic conditions present. The drawdown estimate model selected by the applicant should be specified and the justification for that selection should be provided. Examples of different hydrogeologic settings and appropriate solution types are provided in the table below.

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Site Hydrologic Conditions	Solution Type	Solution Examples
Unconfined homogeneous aquifer	Analytic	Theis for unconfined settings
Confined homogeneous aquifer	Analytic	Theis for confined settings
Confined or unconfined heterogeneous aquifer	Numeric	MODFLOW
Any proposed lake greater than 200 acres in size.	Numeric	MODFLOW

If a numeric model is used, the model files are required for the report to be reviewed.

9. **Groundwater Elevation Change Predictions** – Groundwater change estimates should be provided for all resources (wetland, lake, stream, or well) within 1,000 feet of the lake boundary by evaluating all three phases listed below:
   a. Early Excavation – effects resulting from groundwater seepage/material removal into/from the pit.
   b. Late Excavation – effects resulting from local hydraulic gradient flattening, groundwater seepage/material removal, and increased evaporation during final year of excavation.
   c. Long-Term – effects resulting from the local hydraulic gradient flattening and increased evaporation resulting from creation of the newly formed lake.

   If the total area of all proposed lakes onsite created without water diversion is smaller than 50 acres or larger than 200 acres, the hydrogeologic investigation will not require consideration of hydraulic effects resulting from material removal and only require consideration of the long-term impacts. All projects in which water is diverted for lake creation require consideration of dewatering effects. Calculations showing the estimation of each considered phase for all identified resources within 1,000 feet of the proposed lake boundary should be included in the report.

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This publication is intended for guidance only and may be impacted by changes in legislation, rules, policies, and procedures adopted after the date of publication. Although this publication makes every effort to teach users how to meet applicable compliance obligations, use of this publication does not constitute the rendering of legal advice.

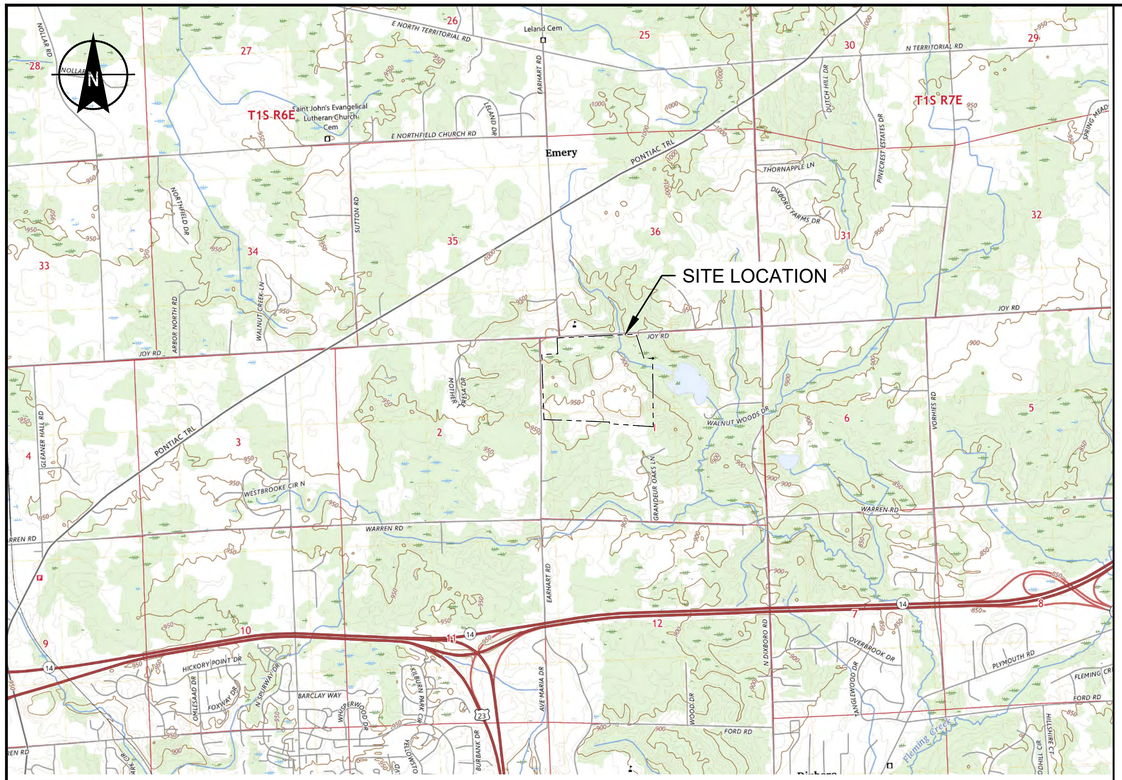
APPENDIX B
Response to EGLE Comments

DEC 2023 HYDROGEOLOGIC INVESTIGATION ADMINISTRATIVE CHECKLIST ITEM	EGLE COMMENTS	HALEY & ALDRICH, INC. RESPONSE
1a. Final proposed lake boundary(s)	Unclear if this application is for the purpose of excavating the remainder of Pond 3 or entire excavation within the proposed limit of excavation (Figure 3).	This application is for the entire excavation. Pond 3 final conceptual reclamation dimensions as shown on Appendix C Figure C-105 are representative of the final excavation within the limits of excavation as shown on Figure 1 through Figure 5.
1b. Final lake depth(s). Must provide final expected excavation depths	Missing final expected excavation depth(s).	Lake depth and expected excavation depth are included in Section 2.4 and shown in Appendix C Figure C-105.
1c. Annual solid and liquid material removal volume estimates, including excavation plan and staging location for excavated material.	Must include discussion on final extent of excavated area, total volume of excavation, and material removal rate throughout the project.	The wash plant where excavated materials are washed and staged is shown in Figure 3. The final excavation plan is shown in Appendix C Figure C-105 and Figure C-106. The approximate total volume and estimated removal rate are included in Section 2.4.
1d. Estimated project schedule, specifying project duration in years and the number of days per year excavation is expected to take place. Include a timeline of the project.	Missing estimated project schedule, specifying project duration in years and the number of days per year excavation is expected to take place.	The estimated number of years and number of days per year are included in Section 2.4.
1e. Description of overburden and water management plan, including the potential lining of any onsite artificial hydraulic structures.	None	Provided in Section 2.4 and 2.6.3, as well as Figure 3 and Figure 4.
2a. Site Location Map showing the site boundaries on a regional topographic map.	None	Included as Figure 1.
2b. Site Map showing the location of all test borings, piezometers, wells, site boundary, roads, current site structures, sorting or processing areas.	None	Shown on Figure 3 and Figure 4.
2c. Resource Map showing the location of all wetlands, streams, and Wellogic wells within 1.0 mile of the site.	None	The map showing resources within the 1-mile radius is included as Figure 2.
2d. Project Map showing the final dimensions of the proposed lake, including topography of the final excavation.	Map must include depth contours of final excavation depths after project is completed.	Provided in Appendix C Figure C-105 and Figure C-106.
2e. Hydraulic Flow Map showing the location of any aquifer testing completed and the source and endpoint for water used in any relevant process onsite, including production or injection wells, settling ponds, culverts, drainage ditches, or any other artificial structures.	None	Provided in Figure 4.
2f. Potentiometric Surface Maps providing a map for each quarterly monitoring event completed. No Wellogic water data should be used in developing potentiometric surface maps. Maps should show the groundwater or surface water elevation values used in potentiometric surface development.	Must include a potentiometric surface map created from sampling event that occurs after water levels have reached pre-pumping levels and are no longer recovering from dewatering.	The Site transducer measurements (Section 4.2.1) indicate water levels are still rising and have not fully reached equilibrium. Therefore, numerical modeling was used to simulate pre-dewatering and future equilibrium conditions (see Section 5.3). Potentiometric surface maps from quarterly measurements collected between November 2023 and July 2024 are provided as Figure 6A through Figure 6E. Continuous transducer readings collected between those dates are provided as Appendix H.
2g. Final Hydraulic Conditions Map showing the anticipated final potentiometric surface expected along with the final lake and site conditions. Maps should show the groundwater or surface water elevation values used in potentiometric surface development.	Missing final hydraulic conditions map.	Figure C-105 in Appendix C shows final conceptual reclamation conditions, including the final surface water elevation value. Modeled groundwater conditions after final reclamation are shown in the Phase 4 modeling contours in Figure 7G.
2h. Well Inventory Table summarizing all wells installed onsite, including the elevation of the top of casing, ground surface, and screen interval measured relative to the United States Geological Survey (USGS) datum.	None	Included as Table 1.
2i. Groundwater Elevation Table summarizing the quarterly monitoring groundwater elevation data measured to the USGS datum for each well.	Include one additional measurement event of groundwater monitoring wells after water levels have reached pre-pumping levels and are no longer recovering from dewatering.	Quarterly monitoring data is provided in Table 3. Because water levels are still rising at the Site and equilibrium has not been achieved yet, numerical modeling was used to simulate pre-dewatering and future equilibrium conditions (see Section 5.3).
2j. Environmental Properties Table summarizing all properties used in groundwater change calculations either obtained through literature references or through onsite testing. If literature references are used to obtain parameters, they must be cited.	Missing environmental properties table.	Environmental properties are addressed as follows: • Precipitation/evaporation are addressed as the calibrated recharge term in the numerical model (Appendix K) • Hydraulic conductivity was calibrated in the numerical model (Appendix K) • Storativity/specific yield were calibrated in the numerical model (Appendix K) • Porosity was based on literature values cited in Appendix K. • Stream bed conductance was a calibrated parameter in the model (Appendix K) • Aquifer thickness was evaluated based on review of 500+ geologic logs (Appendix K) • Groundwater gradient and flow rate were evaluated using the numerical model (Appendix K) • The excavation rate is described in Section 2.4 and simulated in Phase 1-4 of the numerical model (Appendix K)

DEC 2023 HYDROGEOLOGIC INVESTIGATION ADMINISTRATIVE CHECKLIST ITEM	EGLE COMMENTS	HALEY & ALDRICH, INC. RESPONSE
2k. Groundwater Elevation Change Table summarizing all baseline groundwater levels, as measured or estimated, and predicted changes in hydrologic conditions for each of the three considered phases (early excavation, late excavation, and long-term) at each Resource (stream, wetland, water body, or well) identified within 1,000 feet of the property boundary. Calculated changes should be reported in both elevation relative to the USGS datum and in depth below ground surface. If access is available to resource, a baseline measurement should be taken.	Missing groundwater elevation change table.	Per the 19 August 2024 phone call with EGLE, we understand that a table is required for analytical approximations, and that this information is presented differently for a numerical model. Figure 7D through Figure 7G show predicted changes in hydrologic conditions for each of these phases (modeled as Phase 1 through Phase 4, as discussed in Appendix K). Appendix L presents graphed modeled output for identified resources within 1,000 feet of the property boundary and additional graphs for off-Site wells where potential effects have been reported and are being evaluated. Baseline conditions were evaluated using the numerical model (initial steady-state pre-dewatering stress period).
3. The hydrogeologic settings of the project site should be shown in two-dimensional cross section diagrams. Cross sections ideally should intersect at right angles and be placed through the borings, proposed excavation, and any affected resources. To be considered complete, cross sections must include the following features:	Need to include monitoring well and boring data in wetland area north of Pond 1. Unclear if the current permit application is for the remainder of the excavation of Pond 3 or entire excavation within proposed limit of excavation (Figure 3). In the latter case, borings are not currently distributed through the extent of proposed excavation. Borings and cross sections will need to extend through the limit of the planned excavation.	The supplemental data discussed in Section 3.2 addresses the additional data requested, including data from the on-Site wetland area and borings distributed throughout the limit of the planned excavation.
3a. Cross section location map showing all structures identified in the Site Map, final excavation dimensions, all sensitive areas identified in the Resource Map, and hydraulic control structures depicted in the Hydraulic Flow Map.	Cross section location map must show all structures identified in the Site Map, final excavation dimensions, all sensitive areas identified in the Resource Map, and hydraulic control structures depicted in the Hydraulic Flow Map	The cross section location map is shown on Figure 5A. The cross sections do not intersect Site structures, but these structures are shown on Figure 3. Resources and excavation limits are shown on the cross sections in Figure 5A through Figure 5D.
3b. Cross sections must show the soil classified using the Unified Soil Classification System naming identified for any soil interval 1 foot or greater in boring logs used to develop the maps.	None	Shown on above-referenced cross sections.
3c. Cross sections must show groundwater elevation using onsite monitoring groundwater elevation data only.	None	Shown on above-referenced cross sections.
3d. Cross sections must use ground surface topography and not impose an assumed straight liner or interpolated surface as the ground surface.	None	Shown on above-referenced cross sections.
3e. Cross sections must include a scale for vertical and horizontal reference and be clearly labeled	None	Shown on above-referenced cross sections.
3f. The limits of excavation and resources should be indicated on each cross section, as applicable.	None	Shown on above-referenced cross sections.
4. Minimum Five Groundwater Monitoring Wells and Soil Borings – A minimum of five groundwater measurement points are required onsite to consider the investigation complete for a 50-acre lake. One additional soil boring will be required for each additional 15 acres excavated beyond 50 acres and one additional well will be required for each additional 30-acres excavated beyond 50 acres. Groundwater measurements can include any of the following: permanent monitoring wells, piezometers, and hydraulically connected surface water elevations. All soil borings should be installed to 10 feet below the anticipated final lake depth at a minimum. If a deeper aquifer (either bedrock or glacial) is encountered during site characterization, three monitoring wells must be installed in the deeper aquifer.	If entire excavation for this permit application is within proposed limit of excavation (Figure 3), additional borings will need to be distributed through extent of excavation. Monitoring wells in the wetland north of Pond 1 would aid in determining if the wetland is supported by the aquifer being pumped from during dewatering.	See Section 3.2 for a discussion of the supplemental data provided to address the request for additional borings throughout the excavation and additional data regarding the on-Site wetland. The on-Site wetland and potential effects from proposed activities are discussed in Section 2.6, Section 4.1, Section 4.2.3, and Section 5.4.2. The project does not propose future dewatering.
5. Wellogic Well Logs – All Wellogic well logs present within 1.0 mile of the property boundary or the predicted maximum extent of hydraulic impact, whichever is greater, should be provided in the appendices of the report. All wells within this area should be shown on the Resource Map.	All wellogic well logs present within 1.0 mile of the property boundary or the predicted maximum extent of hydraulic impact, whichever is greater, should be provided in the appendices of the report.	The radius expanded to 1 mile on Figure 2 consistent with the December 2023 Draft Guidance. The requested logs are attached in Appendix E.
6. Pumping Rate and WWAT Registration – An estimated pumping rate for dewatered lake creation projects should be reported for each year of lake creation activities if the project includes dewatering. Additionally, projects in which water is pumped at 70 gpm or greater require a WWAT registration under Part 327 managed by the WUAU. The WWAT registration, if needed, should be included in the appendices of the report. A WWAT registration may be obtained online at EGLE.state.mi.us/wwat. New or increased large quantity withdrawals which pump 2,000,000 gallons per day (2 MGD), or 1,389 gpm or greater, require a separate Part 327 permit application.	Estimated pumping rate for dewatered lake creation projects should be reported for each year of lake creation activities if the project includes dewatering.	The proposed project does not include future dewatering. Limited pumping (<2 mgd) to Pond 2 for use at the wash plant is discussed in Section 2.3 and included in the numerical modeling evaluation of future conditions (Appendix K).

DEC 2023 HYDROGEOLOGIC INVESTIGATION ADMINISTRATIVE CHECKLIST ITEM	EGLE COMMENTS	HALEY & ALDRICH, INC. RESPONSE
7. Parameter Calculation Sheets and Raw Data – Step-by-step calculations, references, and raw data, as appropriate, for each parameter used in the groundwater change predictions should be included in the report for, at a minimum, the following parameters: a. Precipitation Rate b. Evaporation Rate c. Hydraulic Conductivity d. Storativity or Specific Yield e. Porosity f. Stream Bed Conductance g. Aquifer Thickness h. Groundwater Gradient i. Groundwater Flow Rate used in Analytical Approximation j. Excavation Rate All supporting data or test results used in the calculation of the above parameters should be present in the appendices of the report. All data must have units clearly labeled and used consistently throughout the report.	a. Must include table describing average monthly precipitation rates. b. Missing evaporation rates data. c. Missing hydraulic conductivity data. d. Missing storativity data. e. Missing porosity data. f. Missing stream bed conductance data. g. Missing aquifer thickness data. h. Missing ground water gradient data. i. Missing pumping rate(s) in dewatering well. j. Missing excavation rate.	See response to Item 2j above indicating how the required information has provided using either literature values, measurements from available data, or model calibrated values.
8. Model Selection – Drawdown estimates can be made using a variety of analytic or numerical models, depending on the site-specific hydrogeologic conditions present. The drawdown estimate model selected by the applicant should be specified and the justification for that selection should be provided. Examples of different hydrogeologic settings and appropriate solution types are provided in the table below. If a numeric model is used, the model files are required for the report to be reviewed.	Due to presence of surface water and aquifer pinch out (A-A'), impact characterization will be required using a numeric model. Model files are required for the report to be reviewed.	As requested by EGLE in these comments, a numerical model was developed and used to evaluate predicted effects on resources, as described in Section 5 and Appendix K.
9. Groundwater Elevation Change Predictions – Groundwater change estimates should be provided for all resources (wetland, lake, stream, or well) within 1,000 feet of the lake boundary by evaluating all three phases listed below: a. Early Excavation – effects resulting from groundwater seepage/material removal into/from the pit. b. Late Excavation – effects resulting from local hydraulic gradient flattening, groundwater seepage/material removal, and increased evaporation during final year of excavation. c. Long-Term – effects resulting from the local hydraulic gradient flattening and increased evaporation resulting from creation of the newly formed lake. If the total area of all proposed lakes onsite created without water diversion is smaller than 50 acres or larger than 200 acres, the hydrogeologic investigation will not require consideration of hydraulic effects resulting from material removal and only require consideration of the long-term impacts. All projects in which water is diverted for lake creation require consideration of dewatering effects. Calculations showing the estimation of each considered phase for all identified resources within 1,000 feet of the proposed lake boundary should be included in the report.	Groundwater change estimates throughout the excavation and in the long term must be estimated to nearby resources using a numeric model.	See response to Item 2k above indicating how the requested information has been provided. As requested by EGLE in these comments, a numerical model was developed and used to evaluate predicted effects on resources, as described in Section 5 and Appendix K.

APPENDIX C
ILS Permit Application Sheets



SITE LOCUS

TOPO SOURCE: USGS TOPOGRAPHIC MAP, ANN ARBOR EAST, MICHIGAN QUADRANGLE (2023).

0 2000 4000
SCALE IN FEET

SITE AERIAL

MAP SOURCE: NEARMAP, 2023

0 500 1000
SCALE IN FEET

VELLA PIT PART 301
APPLICATION FOR PERMIT

SITE ADDRESS:
4984 EARHART RD.
ANN ARBOR, MICHIGAN
TOWNSHIP 02 SOUTH, RANGE 06 EAST

DRAWING INDEX		
SHEET NO.	SHEET TITLE	DESCRIPTION
1	G-100	TITLE SHEET AND DRAWING INDEX
2	C-100	EXISTING CONDITIONS
3	C-101	PRE-2020 CONDITIONS
4	C-102	CROSS SECTIONS
5	C-103	WETLAND LOCATION PLAN
6	C-104	WELL LOCATION PLAN
7	C-105	CONCEPTUAL RECLAMATION PLAN
8	C-106	RECLAMATION CROSS SECTIONS

HALEY ALDRICH

HALEY & ALDRICH OF MICHIGAN, INC
455 E. Eisenhower Parkway,
Suite 210
Ann Arbor, MI 48108-3323
Tel: 734.887.8400
www.haleyaldrich.com

PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666_003
Scale:	AS SHOWN
Date:	23 OCTOBER 2023
Drawn By:	JD
Designed By:	JD
Checked By:	OS
Approved By:	LN

Stamp:

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

TITLE SHEET AND DRAWING INDEX

G-100

Sheet: 1 of 8

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LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- TOPOGRAPHIC CONTOURS 5-FT INTERVAL
- ORDINARY HIGH WATER MARK
- 1 / C-102 — CROSS SECTION

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
3. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023.
4. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105.
5. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.

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APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

EXISTING CONDITIONS

C-100

Sheet: 2 of 8

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SITE BOUNDARY

JOY ROAD

POND 1
WATER EDGE EL. = 898 FT
BOTTOM OF POND EL. = 880 FT

MAINTENANCE SHOP

MAINTENANCE OFFICE BUILDING

1
C-102

EARHART ROAD

ENTRANCE ROAD

WASH PLANT

POND 2
WATER EDGE EL. = 900 FT
BOTTOM OF POND EL. = 878 FT

2
C-102

3
C-102

POND 4
WATER EDGE EL. = 892 FT
FILLED WITH SEDIMENT

LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- TOPOGRAPHIC CONTOURS 5-FT INTERVAL
- ORDINARY HIGH WATER MARK
- 1 / C-102 — CROSS SECTION

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.
3. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2019.
4. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE. UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105.
5. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.

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0 150 300 450 600
SCALE IN FEET

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APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

PRE-2020 CONDITIONS

C-101

Sheet: 3 of 8

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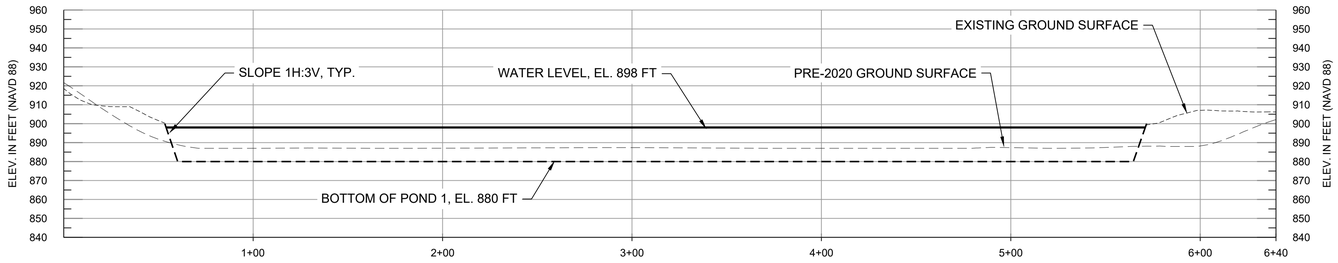

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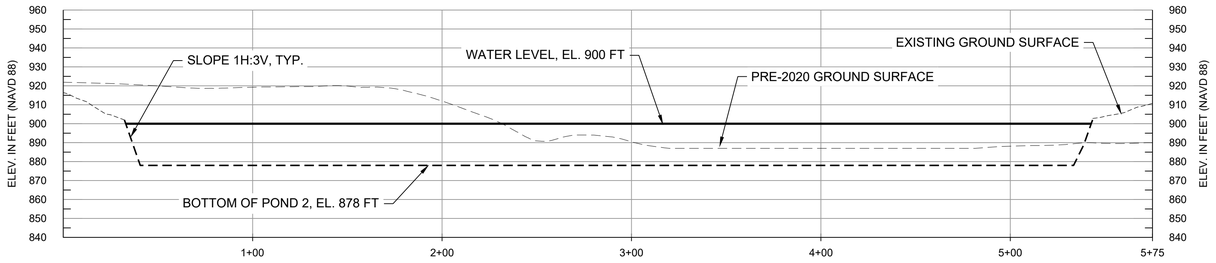

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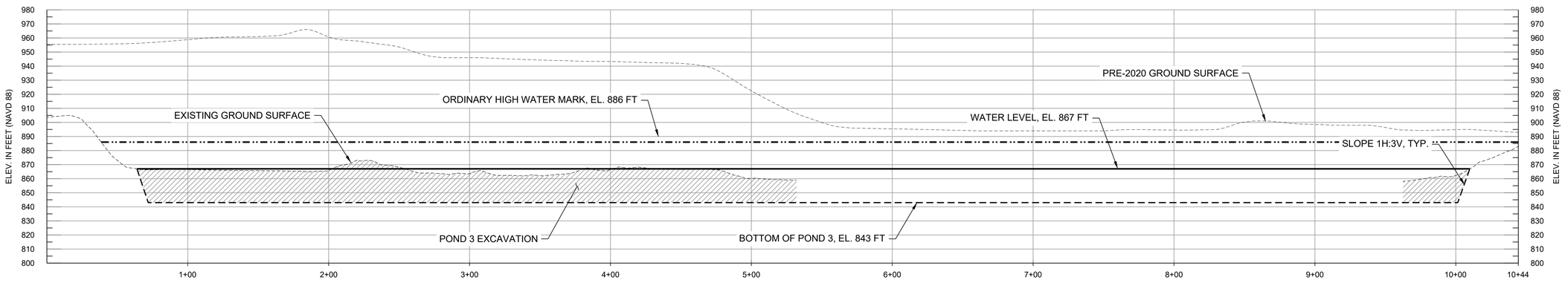
SCALE: AS SHOWN



3 / C-100 CROSS SECTION - POND 3
SCALE: AS SHOWN

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VERT. 0 50 100 150 200
SCALE IN FEET

NOTES

1. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
2. PRE-2020 GROUND SURFACE DATA SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.
3. SLOPES AND BATHYMETRIC CONDITIONS OF PONDS 1 AND 2 ARE NOT EXPECTED TO CHANGE UNTIL FUTURE MINING OF THESE AREAS TO REACH FINAL EXTENT SHOWN IN SHEET C-105. SLOPE AND BATHYMETRIC CONDITIONS OF PONDS 3 AND 4 ARE EXPECTED TO CHANGE DUE TO CURRENT MINING ACTIVITIES.
4. POND 3 EXCAVATION VOLUME IS 158,406 CU YD.

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6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

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VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

CROSS SECTIONS

C-102

Sheet: 4 of 8

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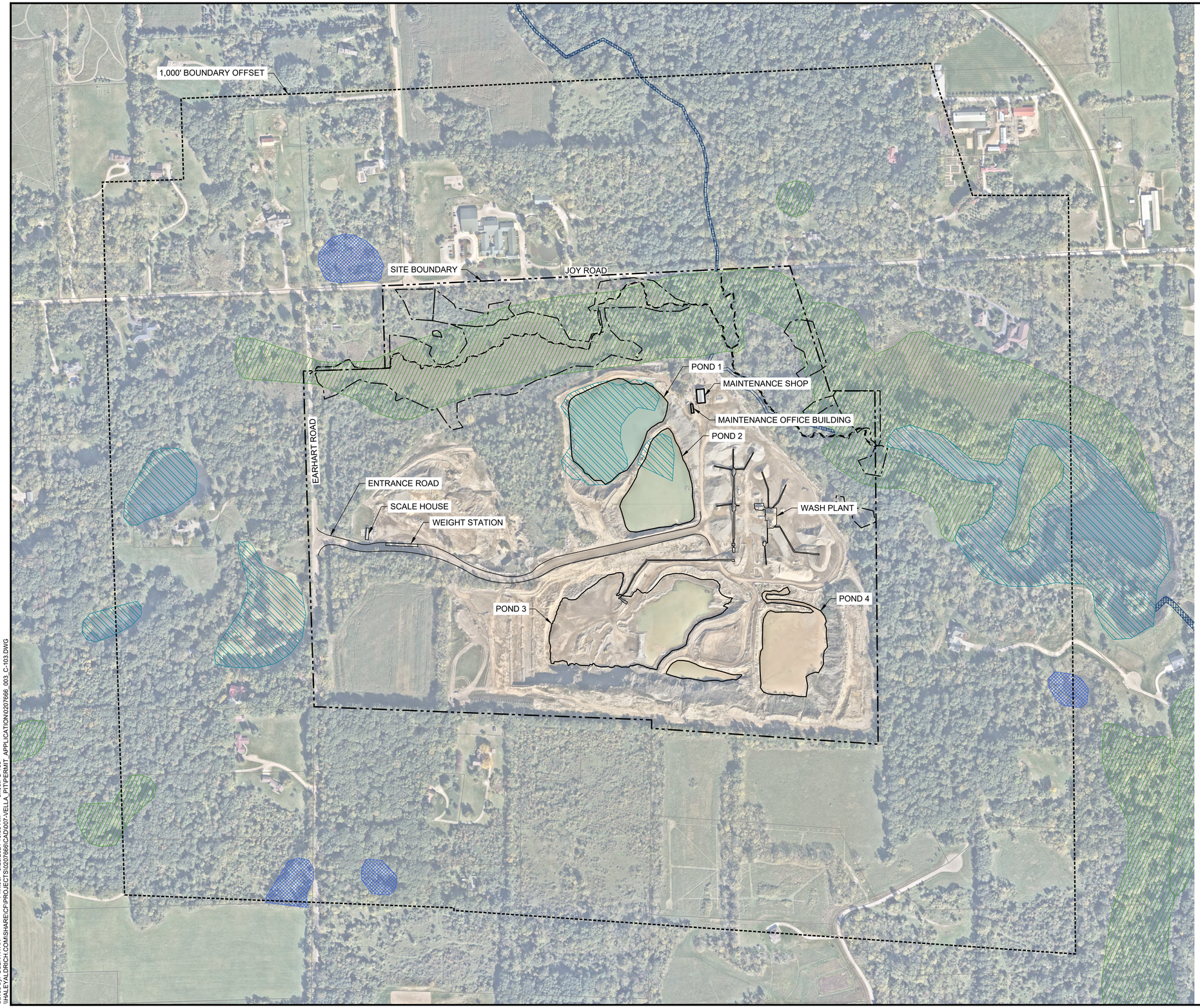

LEGEND

- SITE BOUNDARY
- 1,000-FT BOUNDARY OFFSET
- PARCEL BOUNDARY
- WETLAND DELINEATION
- STREAM DELINIATION
- FRESHWATER FORESTED/SHRUB WETLAND (USGS)
- FRESHWATER EMERGENT WETLAND (USGS)
- FRESHWATER POND (USGS)
- RIVERINE (USGS)

NOTES

1. LOCATIONS OF BUILDINGS AND STRUCTURES ARE APPROXIMATE.
2. REGIONAL WETLANDS DATA SOURCE: U.S. FISH AND WILDLIFE NATIONAL WETLANDS INVENTORY, 2023. WETLAND BOUNDARY IS APPROXIMATE.
3. ON-SITE DELINEATED WETLANDS DATA SOURCE: WETLAND AND STREAM DELINEATION REPORT FOR MID-MICHIGAN MATERIALS - VELLA PIT, HALEY & ADRICH, 6 MAY 2024
4. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023.

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VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

WETLAND LOCATION PLAN

C-103

Sheet: 5 of 8

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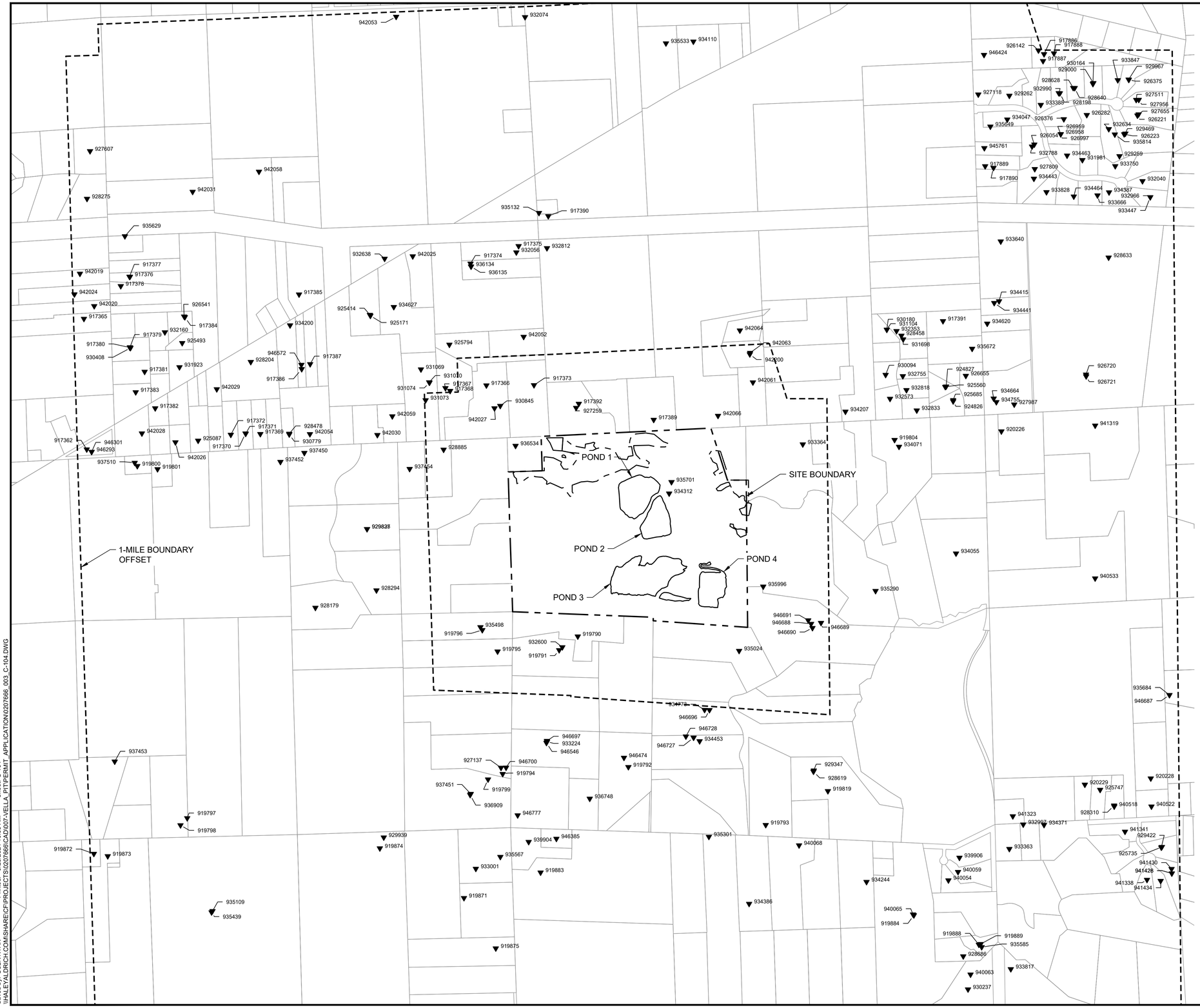
POND 1
POND 2
POND 3
POND 4
SITE BOUNDARY
1-MILE BOUNDARY OFFSET
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932074
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926142
917888
917887
946424
930164
933847
929967
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942020
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946743

JOY ROAD (66' WIDE, DIRT)

EARHART ROAD (66' WIDE, DIRT)

EARHART ROAD (66' WIDE, DIRT)

WASHTENAW SAND AND GRAVEL PROPERTY AREA SUBJECT TO CONDITIONAL USE PERMIT

POTENTIAL RESIDENTIAL SITE *11 ACRES*

RECLAMATION AREA WATER BODY
WATER ELEVATION: 886 FT
BOTTOM ELEVATION OF FINAL EXCAVATION: 836 FT

ORDINARY HIGH WATER MARK, EL. 886 FT

A-A' C-106

B-B' C-106

LEGEND:

- TOPOGRAPHIC MAJOR CONTOUR INTERVAL (25 FOOT)
- TOPOGRAPHIC MINOR CONTOUR INTERVAL (5 FOOT)
- PROPERTY BOUNDARY
- WETLANDS
- WATERWAY
- POTENTIAL RESIDENTIAL SITE(S) *APPROXIMATELY 10 ACRES*
- ORDINARY HIGH WATER MARK, EL. 886 FT
- RECLAMATION AREA (WATER BODY)
- POTENTIAL RESIDENTIAL SITE *(11 ACRES)*

NOTES

1. THIS PLAN IS BASED ON A FIGURE THAT WAS PREPARED BY PEA INC. AND REVISED BY GZA GEOENVIRONMENTAL, INC. IN OCTOBER 2020.

0 150 300 450 600
SCALE IN FEET

HALEY ALDRICH

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PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666_003
Scale:	AS SHOWN
Date:	23 OCTOBER 2023
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Checked By:	OS
Approved By:	LN
Stamp:	

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

CONCEPTUAL RECLAMATION PLAN

C-105

Sheet: 7 of 8

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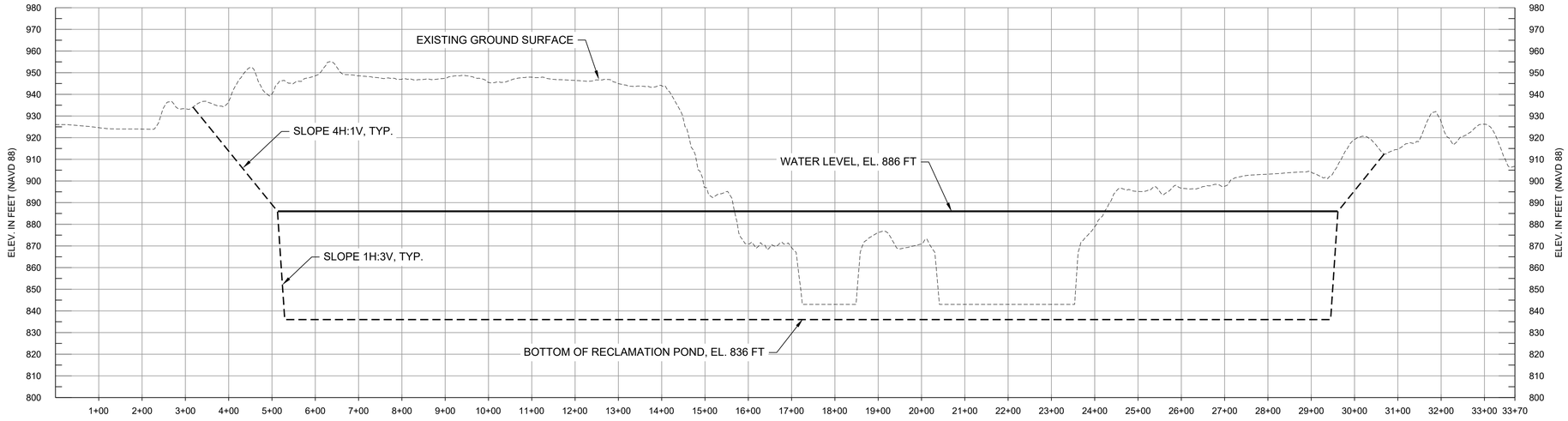
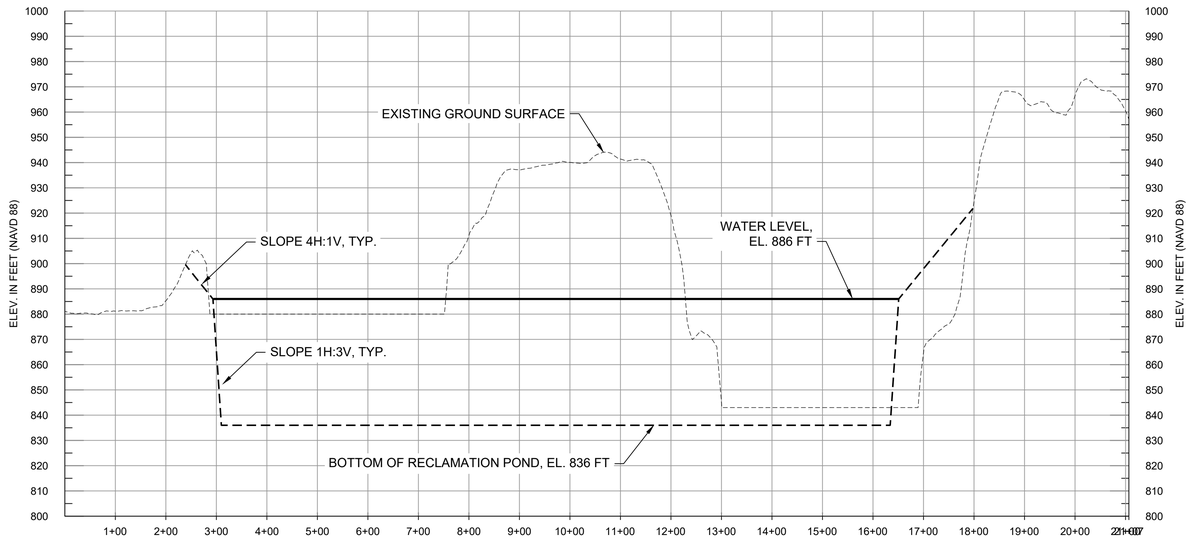
Sheet: C-105



1 C-105 **CROSS SECTION A-A'**

SCALE: AS SHOWN



2 C-105 **CROSS SECTION B-B'**

SCALE: AS SHOWN

NOTES

1. TOPOGRAPHIC CONTOUR SOURCE: SURVEY PERFORMED BY PEA GROUP, 20 OCTOBER 2023. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT.
2. PRE-2020 GROUND SURFACE DATA SOURCE: 2016 - 2017 NRCS 30 COUNTY MI LIDAR. HORIZONTAL DATUM IS NAD83 MICHIGAN STATE PLANES, SOUTH ZONE, INTERNATIONAL FOOT. VERTICAL DATUM IS NAVD88.

HORIZ. 0 150 300 450 600

VERT. 0 30 60 90 120

SCALE IN FEET

HALEY ALDRICH

HALEY & ALDRICH OF MICHIGAN, INC
455 E. Eisenhower Parkway,
Suite 210
Ann Arbor, MI 48108-3323
Tel: 734.887.8400
www.haleyaldrich.com

PREPARED FOR:

AMC-WSG LLC
6966 FISHER ROAD
JEDDO, MI

FOR PERMITTING PURPOSES ONLY

Project No.:	0207666_003
Scale:	AS SHOWN
Date:	23 OCTOBER 2023
Drawn By:	JD
Designed By:	JD
Checked By:	OS
Approved By:	LN
Stamp:	

Rev.	Description	By	Date

VELLA PIT PART 301
APPLICATION FOR PERMIT

4984 EARHART RD.
ANN ARBOR, MICHIGAN

RECLAMATION CROSS SECTIONS

C-106

Sheet: 8 of 8

Saved by: OSLIVNYAK Printed: 9/23/2024 10:39 AM Sheet: C-106
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APPENDIX D
Wetland Delineation Report

HALEY & ALDRICH OF MICHIGAN, INC
455 Eisenhower Pkwy, Ste 210
Ann Arbor, MI 48108
734.887.8400

6 May 2024
File No. 0207666-010

Mid Michigan Materials
6966 Fisher Road
Jeddo, Michigan 48032

Attention: Rob Wilson
President

Subject: Wetland and Stream Delineation Report for
Mid Michigan Materials – Vella Pit
Ann Arbor Township, Michigan

Dear Mr. Wilson:

This Wetland and Stream Delineation Report summarizes the results of field work performed by Haley & Aldrich of Michigan, Inc. (Haley & Aldrich) on behalf of Mid Michigan Materials (MMM) to locate and identify wetlands and streams at the Vella Pit located at 4984 Earhart Road in Ann Arbor Township, Washtenaw County, Michigan (Site; see Figure 1).

The Site "Study Area" includes the undeveloped area north and northeast of the mining operations at the Site, which extends to East Joy Road (Figure 1). The Study Area was defined based on a meeting with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on 10 January 2024 in which EGLE requested wetland delineation in the Study Area to verify the wetlands boundary shown in United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps.

Regulatory Authorities

WATERS OF THE UNITED STATES

As defined by the U.S. Army Corps of Engineers (USACE), Waters of the United States include lakes, ponds, streams, (intermittent and perennial), and wetlands which are regulated under Sections 401 and 404 of the Clean Water Act. Federally jurisdictional wetlands are defined as "those that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

The USACE also regulates navigable waters under Section 10 of the Rivers and Harbor Act (33 U.S.C. 401 et seq.), which requires a permit from the USACE to construct any structure in or over any navigable water of the United States, as well as any proposed action that would alter or disturb (such as excavation/dredging or deposition of materials) these waters. If the proposed structure or activity affects the course, location, condition, or capacity of the navigable water, even if the proposed activity is outside the boundaries of the water body, a permit from the USACE is required.

MICHIGAN WETLANDS AND STREAMS

EGLE regulates wetlands pursuant to Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, and defines a wetland as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh." This definition applies to public and private lands regardless of zoning or ownership.

EGLE has authorization from the federal government to administer Section 404 of the Clean Water Act in most areas of the state. A state-administered 404 program must be consistent with the requirements of the federal Clean Water Act and associated regulations set forth in the Section 404(b)(1) guidelines. A permit is required from the Water Resources Division (WRD) of EGLE for activities resulting in disturbance to regulated wetlands including placing fill, dredging or removal of soils, draining surface water, or other construction and development activities in a designated wetland.

EGLE is responsible for protecting Michigan's inland lakes and streams under the authority of Part 301, Inland Lakes and Streams, of the NREPA, 1994 PA 451, as amended. The program oversees activities including dredging, filling, constructing, or placing a structure on bottomlands, constructing or operating a marina, interfering with natural flow of water, or connecting a ditch or canal to an inland lake or stream. EGLE WRD also administers the federal permit program, which regulates the dredging or filling of inland lakes and streams under Section 404 of the Clean Water Act (except in coastal areas where the USACE retains this authority). Thus, in most parts of the state, issuance of a construction permit by the EGLE WRD under Part 301 of the NREPA also authorizes this type of activity under federal law.

Methodology

Prior to initiating field investigations, Haley & Aldrich conducted a desktop review of publicly available data to evaluate the presence of mapped wetlands and streams within the Study Area. Data consulted included United States Geological Survey (USGS) topographic quadrangle maps, USFWS NWI maps, Natural Resources Conservation Service (NRCS) County Soil survey, Federal Emergency Management Agency (FEMA) Flood Insurance maps, the National Hydrography Dataset (NHD), Michigan Resource Inventory System (MIRIS), and recent aerial photography.

The wetland and stream delineation field survey was performed in accordance with criteria set forth in the *Corps of Engineers Wetland Delineation Manual* (1987) and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest* (Version 2.0). Haley and Aldrich collected data from one or more sample plots in each delineated wetland (depending on the size of the delineated area) and recorded the data on USACE Routine Wetland Determination forms. The boundaries of wetlands were demarcated with pink survey ribbon (flagging) and located with a Trimble Geo 7X GPS unit with reported sub-meter accuracy.

Hydrology was evaluated based on indicators that are divided into two categories, primary and secondary. The 1987 manual and 2012 supplement define hydrology as present when at least one primary indicator or two secondary indicators are identified. One primary indicator is sufficient to evaluate if hydrology is present; however, if primary indicators are absent then two or more of the secondary indicators are required to evaluate hydrology. If other probable hydrology evidence was found, then this was subsequently documented on the Routine Wetland Determination Form.

Hydrophytic vegetation was assessed by identifying plant species and their assigned wetland indicator rating of obligate, facultative wet, facultative, facultative upland, and upland according to the *2020 National Wetland Plant List*. Vegetation in both upland and wetland communities was characterized using areal dominance method, with a radius of 30-feet around the soil sample location for trees, 15-foot radius for saplings/shrubs, and five feet for herbaceous plants.

Hydric soil indicators were evaluated using soil characteristics as defined in *Field Indicators of Hydric Soils in the United States (Version 8.2, 2018)*. Evidence of hydric soil indicators were recorded based on the presence of color matrix, hue, and redoximorphic features such as saturation, gleyed matrix, mottling, hydrogen sulfide odor, and organic/peat layers. Soil test pits were dug using a shovel to a depth of approximately 18-inches or refusal due the presence of hard pan layer, rock, or hard fill materials. Soil color was described using the Munsell Color book, texture using USDA hand-texture methods, and the presence/absence of redoximorphic features, including depletions and concentrations.

Additional surface waters, including stream channels and drainage ways, found during field work were investigated, flagged, located with GPS and characterized on the Stream Inventory Data Form. To the extent practicable, these surface waters were investigated to evaluate drainage patterns and potential connections to other Waters of the United States.

Site Setting

PHYSIOGRAPHY AND SOILS

The Study Area is located in the Clayey High Lime Till Plains of the Eastern Corn Belt Plains Ecoregion. This region is characterized by rolling ground moraines and deep clay loam soils. Elevation in the Study Area ranges from approximately 870 to 890 feet above mean sea level (amsl). A topographic map of the Study Area and surrounding region is provided as Figure 2.

Soil series units mapped by the NRCS web soil survey are listed in Table 1 and provided as Figure 2. Approximate acreage within the Study Area, drainage class, and whether the soil unit is classified as hydric are also summarized in Table 1. Soils are primarily muck and sandy loam that are poorly drained or very poorly drained. Three (3) soil map units are classified as hydric.

Table 1. Study Area Soils

Soil Map Unit Symbol	Soil Map Unit Name	Approximate Acres within Study Area	Drainage Class	Hydric Conditions[1]
BnF	Boyer Loamy Sand, 25 to 50 percent slopes	3.4	Well drained	Not Hydric
Br	Brookston Loam	0.02	Very poorly drained	Hydric
Gf	Gilford Sandy Loam, Till Plain, 0 to 2 percent slopes	8.8	Poorly drained	Hydric
Gp	Gravel Pit	0.3	NA	NA
HgtahA	Houghton Muck, 0 to 1 percent slopes	15.0	Very poorly drained	Hydric
WawabB	Wawasee Loam, 2 to 6 percent slopes	6.4	Well drained	Not Hydric
WawabC	Wawasee Loam, 6 to 12 percent slopes	4.1	Well drained	Not Hydric
WawabE	Wawasee Loam, 18 to 25 percent slopes	0.9	Well drained	Not Hydric

Notes:

[1] Soils mapping source: USDA, Natural Resource Conservation Service (NRCS) web soil survey.

HYDROLOGY

The Study Area is located within the Huron watershed (HUC 04100013). The major streams located in this watershed include the Huron River, Arms Creek, Fleming Creek, Hay Creek, Mill Creek, Swift Run Creek, and Woods Creek.

The majority of surface hydrology within the Study Area is generated by precipitation, runoff from other portions of the Site, or overflow from the nearby wetland complexes and the tributary to Fleming Creek, with a total average annual precipitation of 37.56 inches, (Source: http://usclimatedata.com as measured in nearby Ann Arbor).

There are two mapped NWI wetlands within the Study Area, including two palustrine shrub/scrub and emergent wetland systems. Two MIRIS wetlands are mapped within the Study Area, including two shrub/scrub wetlands. One NHD mapped stream and Michigan DNR mapped stream is located within the Study Area. The stream is mapped as a warm transitional stream. The Study Area is not located within a mapped floodplain. State and federal mapped wetlands and streams within the Study Area are included on Table 2 and are depicted on Figure 3.

Berms around the mining operations area at the Site direct process water and stormwater back into the mining operations area. Therefore, wetlands in the Study Area do not receive water from mining operations.

Table 2. State and Federal Mapped Wetland and Streams within Study Area

Name	Classification[1]	Status
PSS1/EM1B	Palustrine, shrub/scrub, broad-leaved deciduous; emergent, persistent, seasonally saturated	No official state or federal status
PSS1C/EM1C	Palustrine, shrub/scrub, broad-leaved deciduous, seasonally flooded; emergent, persistent, seasonally flooded	No official state or federal status
Unnamed Tributary to Fleming Creek (R5UBFx)	Warm Transitional Stream	No official state or federal status

Notes:

[1] Michigan DNR

Results

Field investigations to delineate wetlands and streams within and adjacent to the Study Area were completed by two Haley & Aldrich wetland scientists on 25-26 March 2024. A total of five (5) wetlands and two (2) streams were identified. These features are summarized in Table III below and are depicted on Figure 4.

Table 3. Delineated Wetlands and Streams

Wetland/ Stream ID	Wetland Community[1]	Stream Type[2]	Length/Area within Study Area[3]	Jurisdiction[4]
AWA	PEM	NA	10.6 acres	Jurisdictional
	PSS	NA	0.9 acres	Jurisdictional
AWB	PSS	NA	0.03 acres	Jurisdictional
AWC	PEM	NA	0.3 acres	Jurisdictional
AWD	PEM	NA	0.3 acres	Jurisdictional
AWE	PFO	NA	1.8 acres	Jurisdictional
	PUB	NA	0.2 acres	Jurisdictional
AW1	N/A	Perennial	4,135 feet	Jurisdictional
AW2	N/A	Perennial	495 feet	Jurisdictional

Notes:

[1] Wetland classifications are based on the Cowardin classification system whereby: (P = Palustrine; EM = Emergent; SS = Shrub Scrub; FO = Forested).

[2] Waterbody type may include perennial, intermittent or ephemeral. A perennial stream has flowing water year-round during a typical year. Perennial streams are identified as solid blue lines on the USGS Topographic maps. An intermittent stream has flowing water during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Intermittent streams are identified as dashed blue lines on the USGS Topographic maps. An ephemeral drainage feature has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral drainage features are not identified on the USGS Topographic map.

[3] Linear feet for stream length and acres for wetlands area. Area of wetlands presented is area mapped (shown on Figure 4) during field delineation and may vary from area within Study Area limits.

[4] Based on field observations of hydrologic connections. If necessary, final federal and state jurisdiction can only be confirmed through consultation with USACE and EGLE staff.

Representative photos of each delineated feature and associated dryland areas are included as Attachment A. Completed routine wetland determination and stream inventory forms are included as Attachment B. Wetland types were classified according to the Cowardin classification (Cowardin, et al., 1979).

WETLAND DESCRIPTIONS

Wetland AWA is a 11.5-acre PEM/PSS wetland complex that is located north of the mining operations area and the northernmost pond within that area (Pond 1). The wetland receives surface runoff from the adjacent upland forested areas of the Site and formerly received direct discharge from Pond 1 though a National Pollutant Discharge Elimination System permitted outfall, which is currently inactive. The wetland continues northwest of the Study Area onto another property that adjoins the Site. The observed indicators of wetland hydrology in this wetland were Surface Water (A1), High Water Table (A2), Saturation (A3), and FAC-Neutral Test (D5). The dominant vegetation included Narrow-leaf cattail (*Typha angustifolia*), European blackthorn (*Rhamnus cathartica)*, slippery elm (*Ulmus rubra)*, and common fox sedge (*Carex vulpinoidea)* at the time of the site visit. The observed hydric soil indicator was Loamy Mucky Mineral (12), Saturation Visible on Aerial Imagery (D1), Geomorphic Position (D2), and Depleted Matrix (F3).

Wetland AWB is an 0.03-acre PSS wetland that is within a small depressional area within a transmission line right-of-way (ROW). The wetland receives precipitation and surface runoff from the surrounding upland areas. The observed indicators of wetland hydrology in this wetland were Surface Water (A1), High Water Table (A2), Saturation (A3), and FAC-Neutral Text (D5). The dominant vegetation included European blackthorn, black hawthorn (*Crataegus douglasii)*, and pinkweed (*Persicaria pensylvanica)* at the time of the site visit. The observed hydric soil indicator was Depleted Matrix (F3).

Wetland AWC is a 0.3-acre PEM wetland that is within a depressional area east of the mining operation area. The wetland receives surface runoff from the adjacent upland forested areas of the Site and overflow from the large wetland pond complex outside of the Study Area on a property that adjoins the Site. The wetland continues outside of the Study Area and off the Site to the east. The observed indicators of wetland hydrology in this wetland were High Water Table (A2), Saturation (A3), and FAC-Neural Text (D5). The dominant vegetation included lamp rush (*Juncus effusus),* and common fox sedge at the time of the site visit. The observed hydric soil indicator was Sandy Redox (S5).

Wetland AWD is a 0.3-acre PEM wetland that is within a depressional area east of the mining operation area. The wetland receives surface runoff from the adjacent upland forested areas of the Site. The observed indicators of wetland hydrology in this wetland were Surface Water (A1), High Water Table (A2), Saturation (A3), and FAC-Neutral Test (D5). The dominant vegetation included Narrow-leaf cattail, and dark green bulrush (*Scirpus atrovirens*) at the time of the site visit. The observed hydric soil indicator was Depleted Matrix (F3).

Wetland AWE is a 2.0-acre PFO/PUB wetland complex that continues east and north outside of the Study Area and off the Site. The wetland receives surface runoff from the adjacent upland forested areas of the Site and overflow from the large wetland pond complex outside of the Study Area and off the Site to the east. The PUB portion of the wetland has berms on the northwest and southeast edges of the pond. The observed indicators of wetland hydrology in this wetland were Surface Water (A1), High Water Table (A2), Saturation (A3), and FAC-Neutral Test (D5). The dominant vegetation included Eastern cottonwood (*Populus deltoides*), slippery elm, American elm (*Ulmus americana*), silky dogwood (*Cornus*

amomum), garlic mustard (*Alliaria petiolata*), and reed canary grass (*Phalaris arundinacea)* at the time of the site visit. The observed hydric soil indicator was Depleted Matrix (F3).

STREAM DESCRIPTIONS

AW1 is a perennial stream that flows generally east and southeast from a culvert along Earhart Road. The stream flows east through the emergent wetland, turning south along the mining operation area of the Site, and eventually through a culvert outside of the Study Area into a large wetland/pond complex located off Site to the east. The average stream width at the ordinary high-water mark is approximately 1.5 to 4 feet with a sand, silt, and gravel substrate. The water was flowing and was approximately 4 to 10 inches deep at the time of observation. The stream had *Typha angustifolia, Phalaris arundinacea, Lonicera morrowii,* and *Ulmus rubra* along the edge of the stream channel. See Figure 4, Sheets 1 to 6.

AW2 is a perennial stream that flows generally south from a culvert along East Joy Road. The stream flows south through an upland forested area, then into stream AW1. The average stream width at the ordinary high-water mark is approximately 3 feet with a sand, and gravel substrate. The water was flowing and was approximately 4 inches deep at the time of observation. The stream had *Lonicera morrowii, Salix nigra,* and *Ulmus rubra* along the edge of the stream channel. See Figure 4, Sheets 4 to 5.

Conclusions

A total of five (5) wetlands and two (2) streams were delineated during March 2024 as part of an on-site wetland and stream delineation. It is anticipated that both streams and all five wetlands would be considered jurisdictional through USACE and EGLE. If needed, final determination of jurisdictional status can only be made through consultation with the USACE and EGLE.

Sincerely yours,
HALEY & ALDRICH OF MICHIGAN, INC.

Audrey West
Assistant Project Manager

Jon Becker
Project Manager

Enclosures:
References
Figure 1 – Study Area Overview
Figure 2 – Topography and Soils Series
Figure 3 – Federal and State Mapped Aquatic Resources
Figure 4 – Delineated Wetlands and Streams
Attachment A – Photo Log
Attachment B – Routine Wetland Determination and Stream Inventory Data Forms

References

1. U.S. Army Corps of Engineers. 1987. *Corps of Engineers Wetland Delineation Manual*. Environmental Laboratory, Vicksburg, MS, 92 pp.

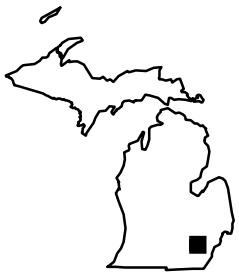
2. U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest*. U.S. Army Engineer Research and Development Center, Vicksburg, MS, 162 pp.

3. Cowardin, L.M., et al. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. 131 pp.

4. U.S. Environmental Protection Agency. 2024. Level III and IV Ecoregions of Michigan.

5. Huron River Watershed Council. 2024. Explore the Huron River Watershed. https://www.hrwc.org/our-watershed/maps/. Accessed 1 April 2024.

FIGURES



0 1 2
SCALE IN MILES

MAP SOURCE: ESRI
SITE COORDINATES: 42°20'38"N, 83°40'42"W

HALEY ALDRICH

MID MICHIGAN MATERIALS , INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

STUDY AREA OVERVIEW

APPROXIMATE SCALE: 1 IN = 2 MI
APRIL 2024

FIGURE 1

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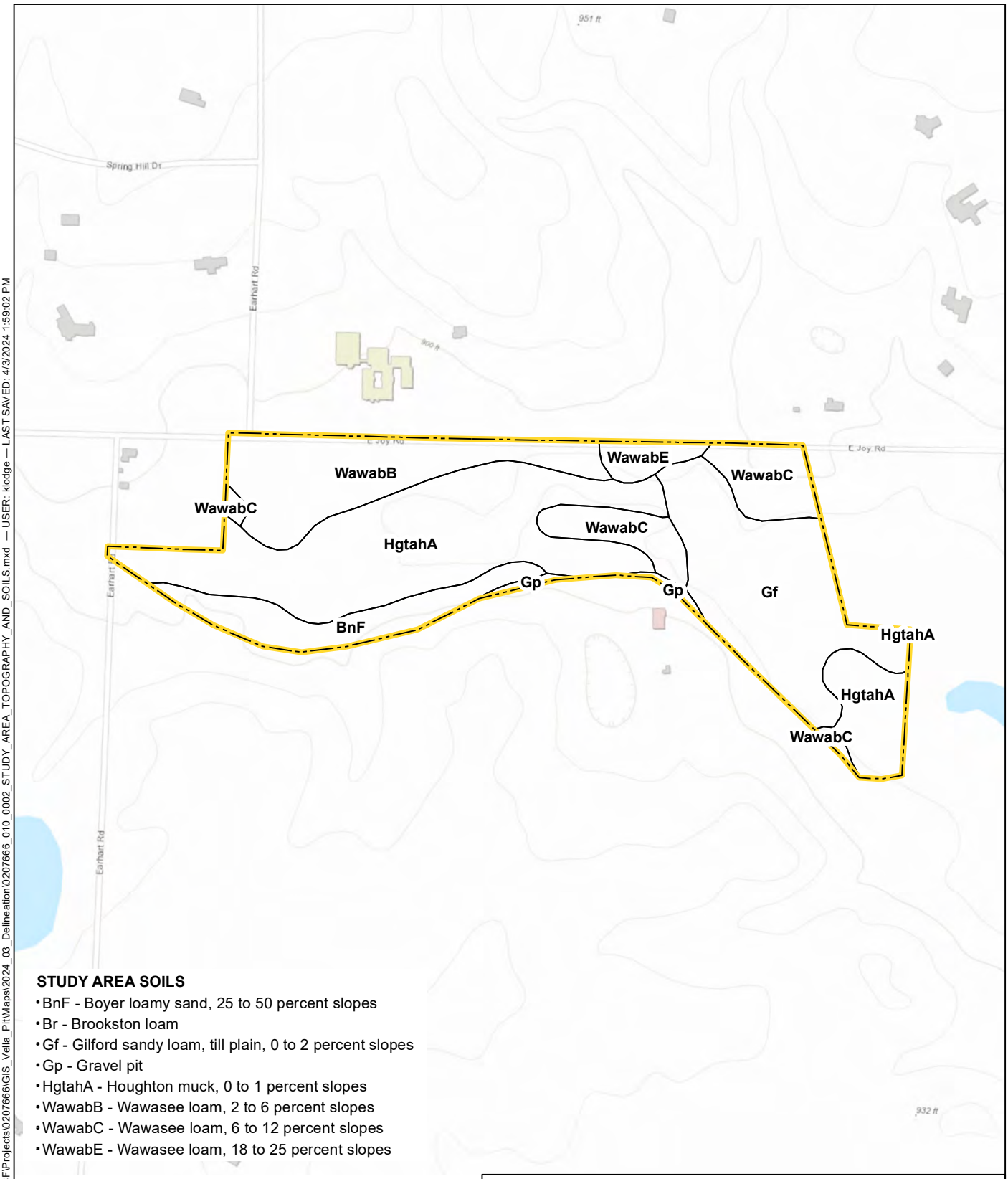

STUDY AREA SOILS

- BnF - Boyer loamy sand, 25 to 50 percent slopes
- Br - Brookston loam
- Gf - Gilford sandy loam, till plain, 0 to 2 percent slopes
- Gp - Gravel pit
- HgtahA - Houghton muck, 0 to 1 percent slopes
- WawabB - Wawasee loam, 2 to 6 percent slopes
- WawabC - Wawasee loam, 6 to 12 percent slopes
- WawabE - Wawasee loam, 18 to 25 percent slopes

LEGEND

STUDY AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE MAP SOURCE: ESRI
3. SOIL DATA SOURCE: USDA, NRCS WEB SOIL SURVEY

N

0 250 500

SCALE IN FEET

HALEY ALDRICH

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4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

STUDY AREA TOPOGRAPHY AND SOILS

SCALE: AS SHOWN
APRIL 2024

FIGURE 2

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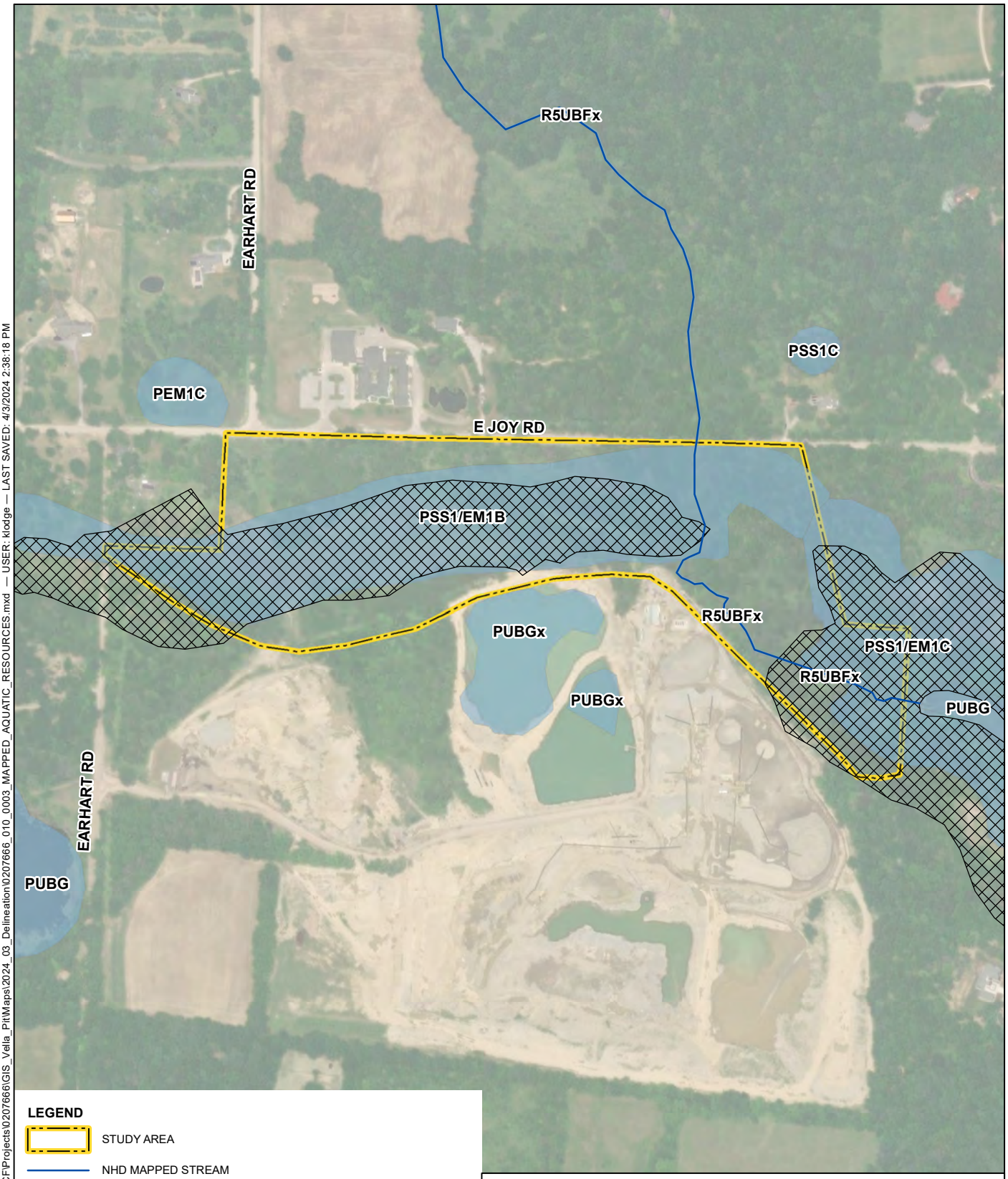

LEGEND

- STUDY AREA
- NHD MAPPED STREAM
- STATE MAPPED WETLAND
- NWI MAPPED WETLAND

NOTES

1. STATE WETLAND DATA SOURCE: MICHIGAN RESOURCE INVENTORY SYSTEM
2. NWI WETLAND DATA SOURCE: U.S. FISH AND WILDLIFE SERVICE
3. NHD STREAM DATA SOURCE: USGS NATIONAL HYDROGRAPHY DATASET
4. AERIAL IMAGERY SOURCE: ESRI WORLD IMAGERY

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0 250 500

SCALE IN FEET

HALEY ALDRICH

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4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

FEDERAL AND STATE MAPPED AQUATIC RESOURCES

SCALE: AS SHOWN
APRIL 2024

FIGURE 3

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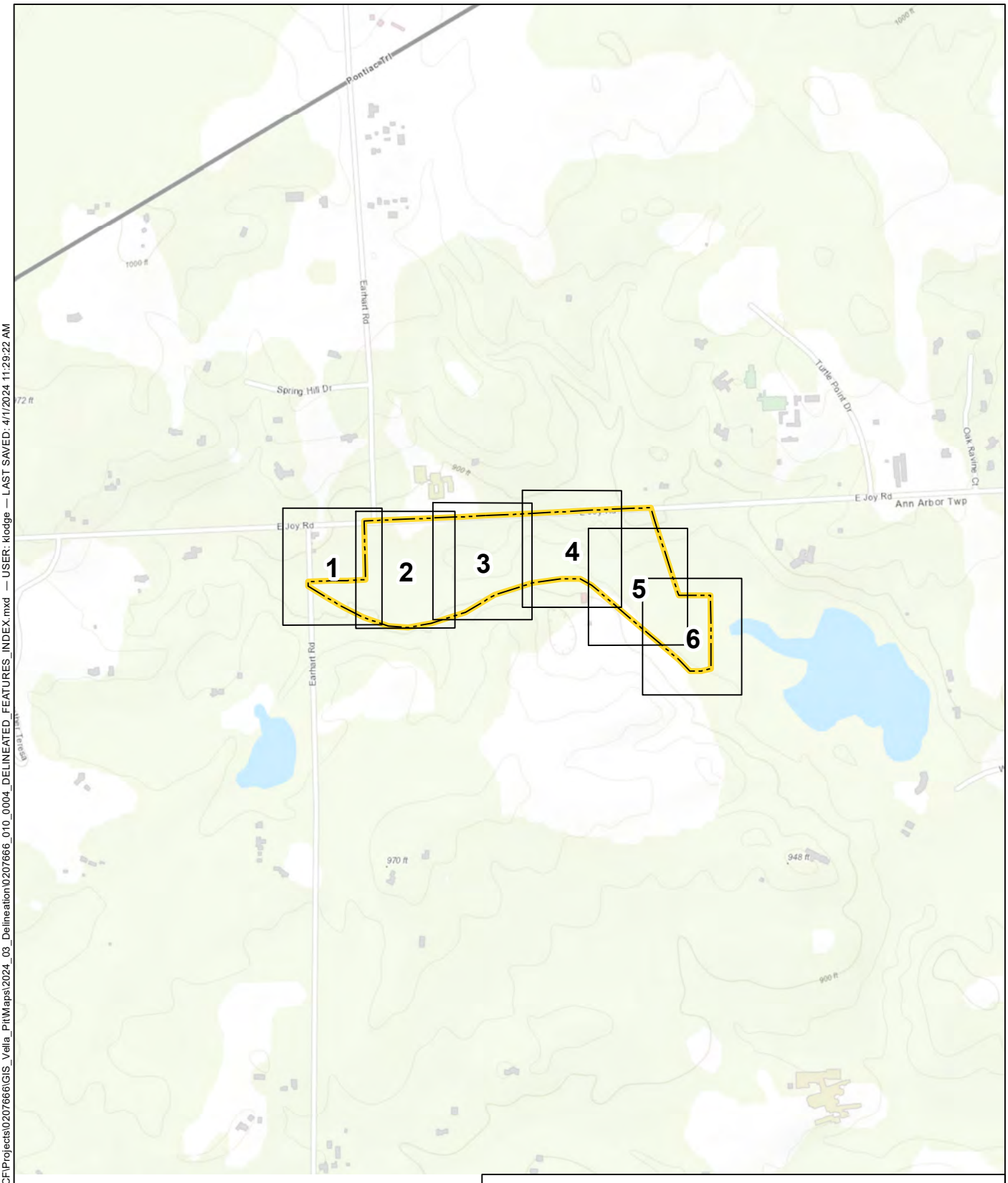

LEGEND

STUDY AREA

MAP SHEET

NOTES
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE MAP SOURCE: ESRI

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SCALE IN FEET

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4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

INDEX MAP
FIGURE 4

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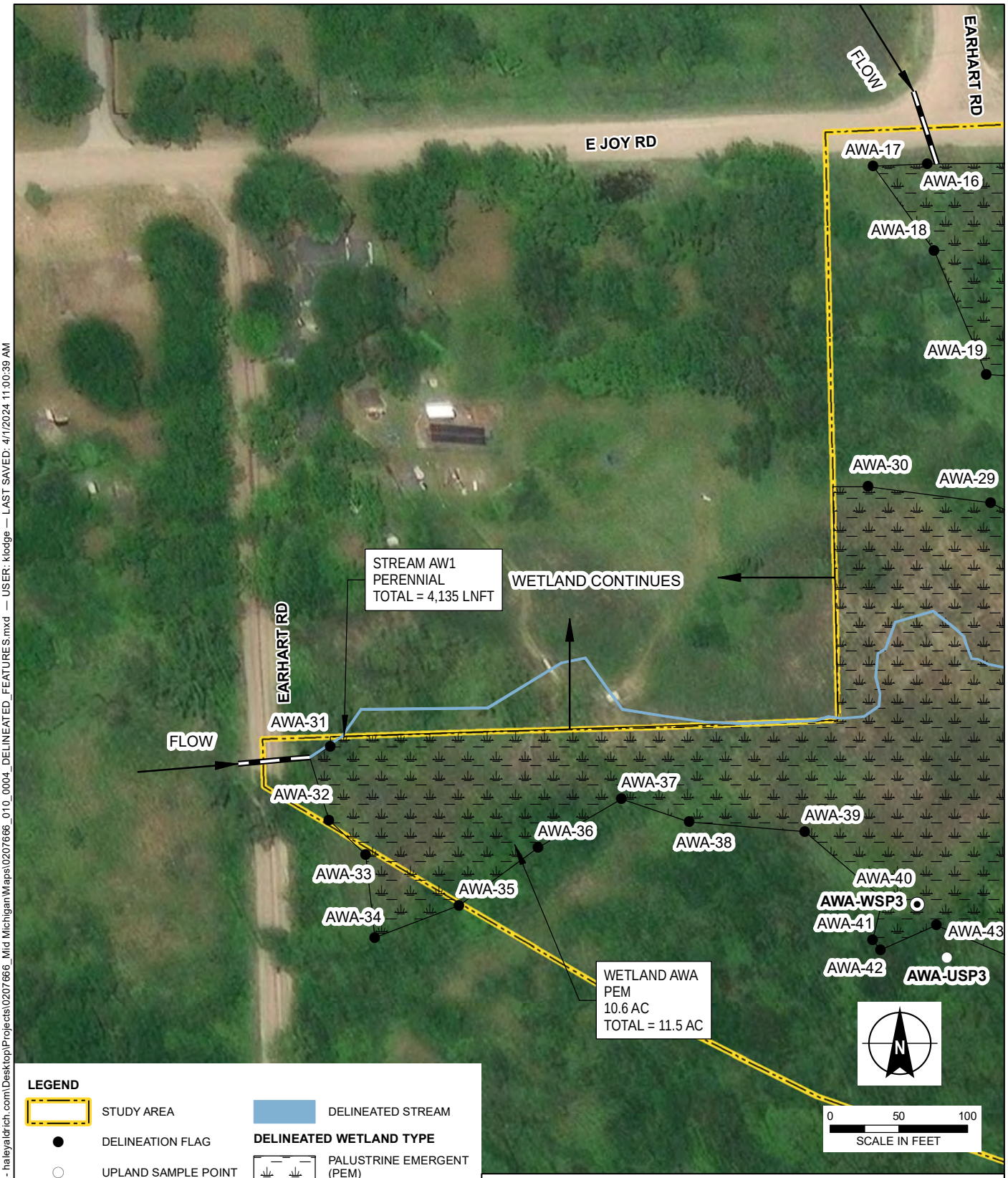

LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

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ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 1 OF 6

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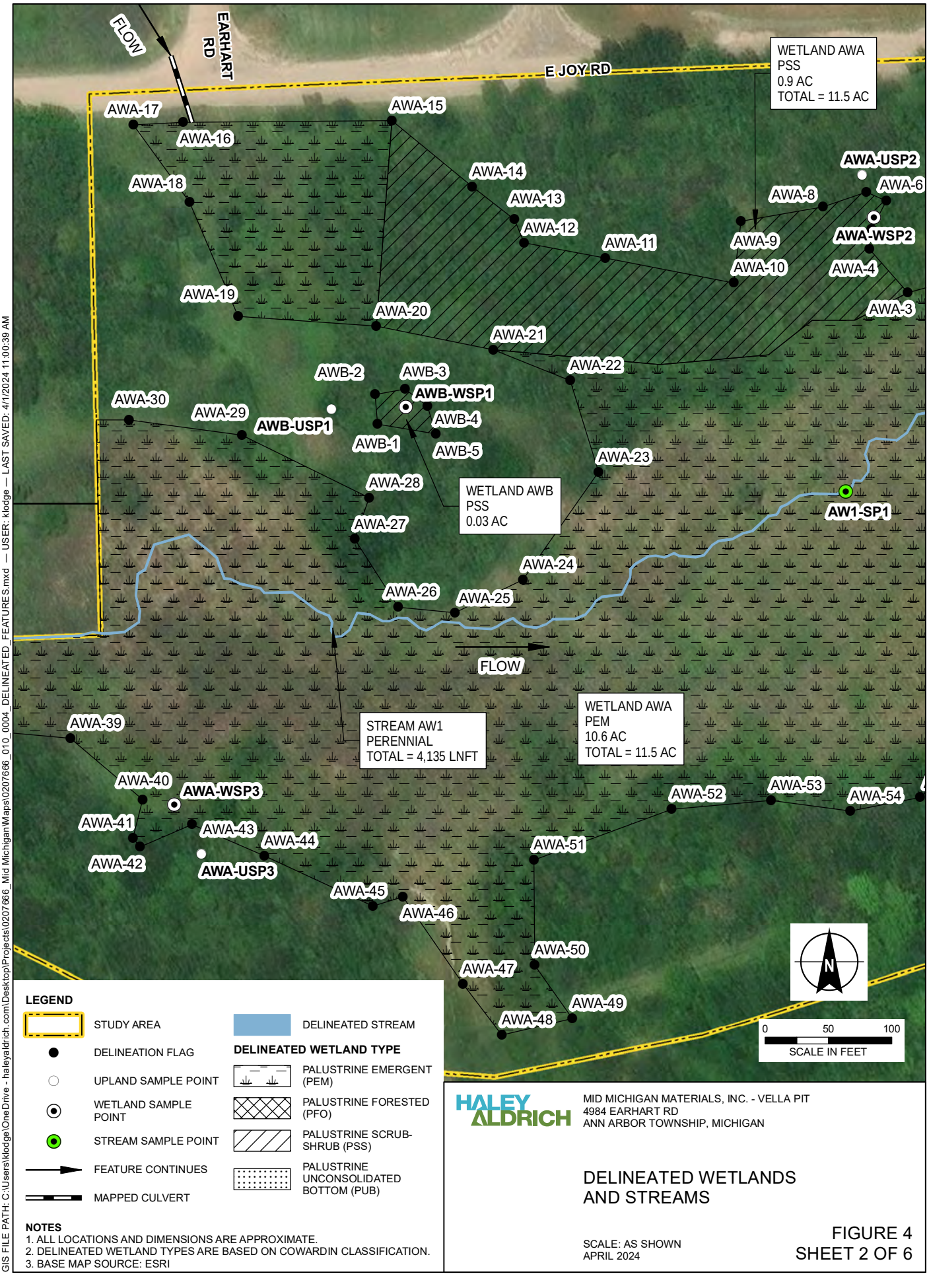


LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

HALEY ALDRICH

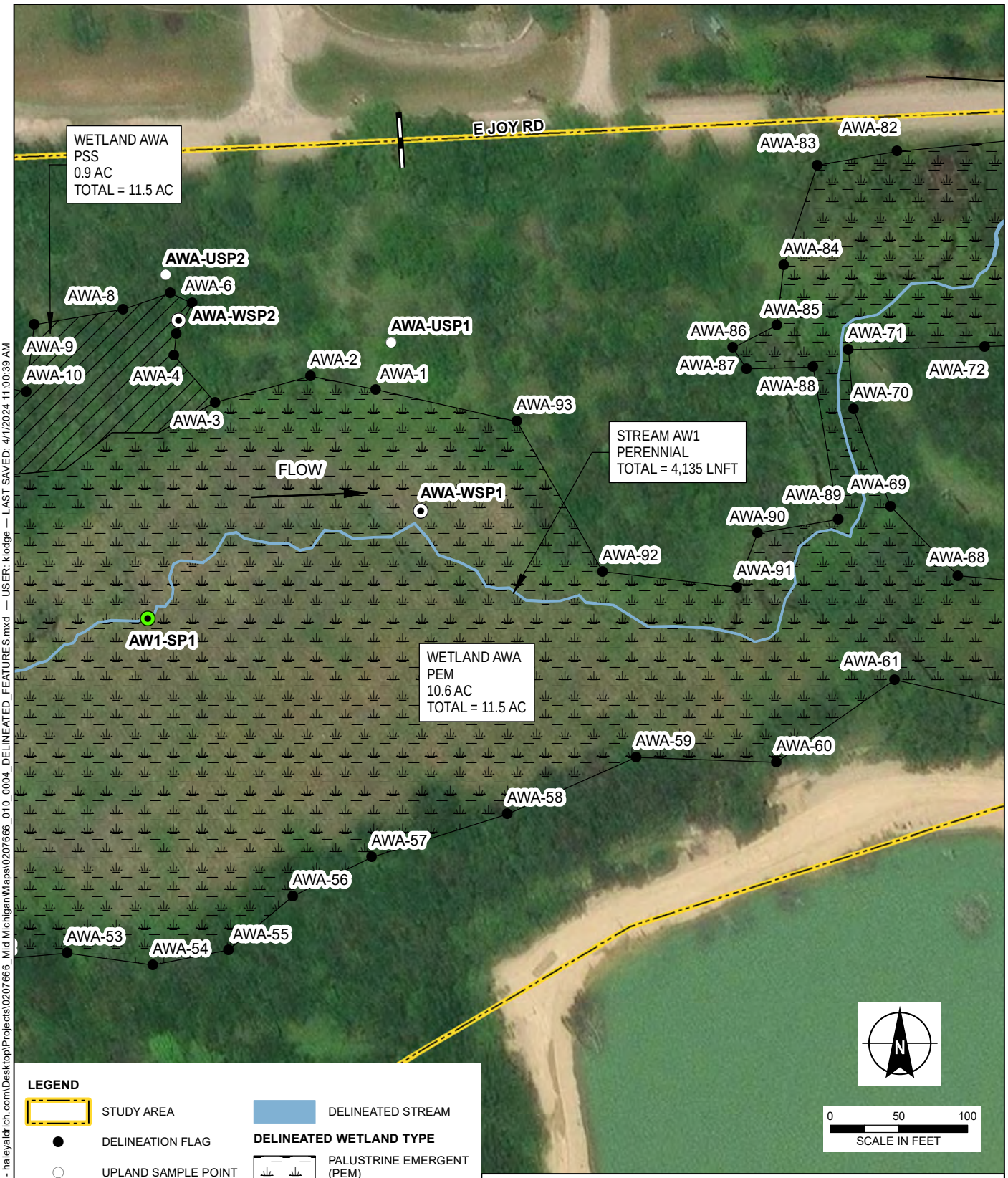
MID MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 2 OF 6

GIS FILE PATH: C:\Users\klodge\OneDrive - haleyaldrich.com\Desktop\Projects\0207666_Mid Michigan\Maps\0207666_010_0004_DELINEATED_FEATURES.mxd — USER: klodge — LAST SAVED: 4/1/2024 11:00:39 AM



LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

HALEY ALDRICH

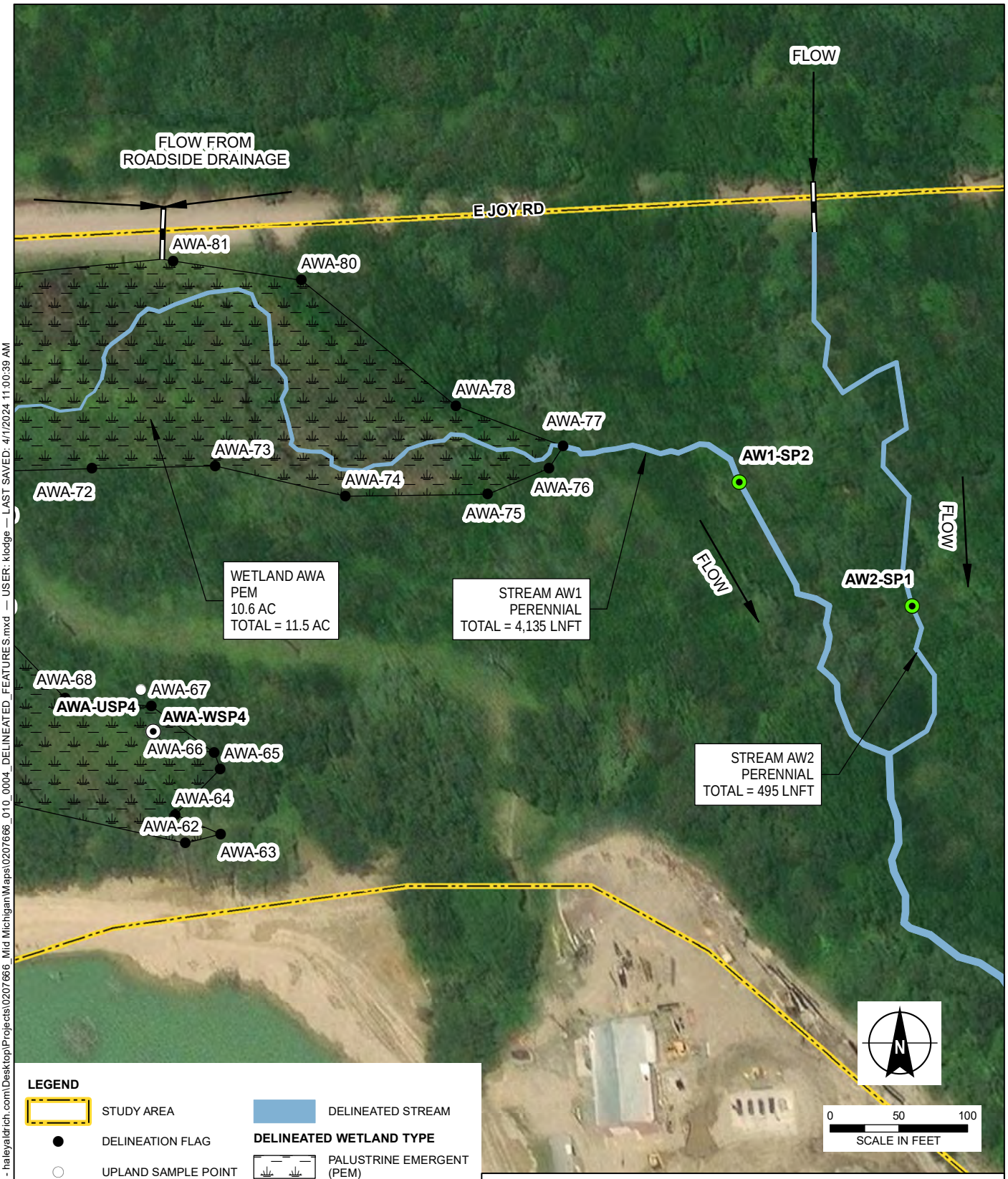
MID MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 3 OF 6

GIS FILE PATH: C:\Users\klodge\OneDrive - haleyaldrich.com\Desktop\Projects\0207666_Mid Michigan\Maps\0207666_010_0004_DELINEATED_FEATURES.mxd — USER: klodge — LAST SAVED: 4/1/2024 11:00:39 AM



LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

HALEY ALDRICH

MID MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 4 OF 6

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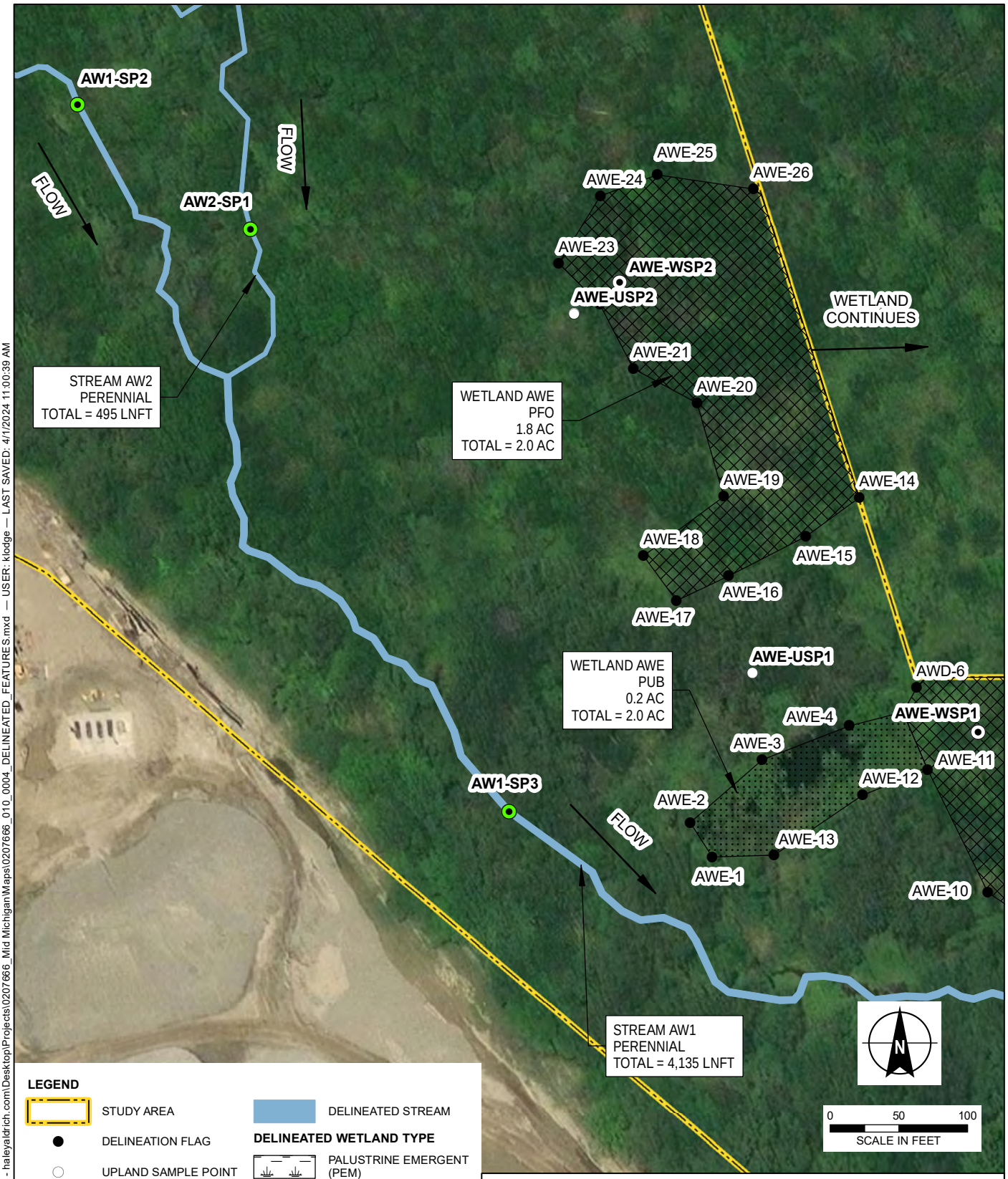


LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

HALEY ALDRICH

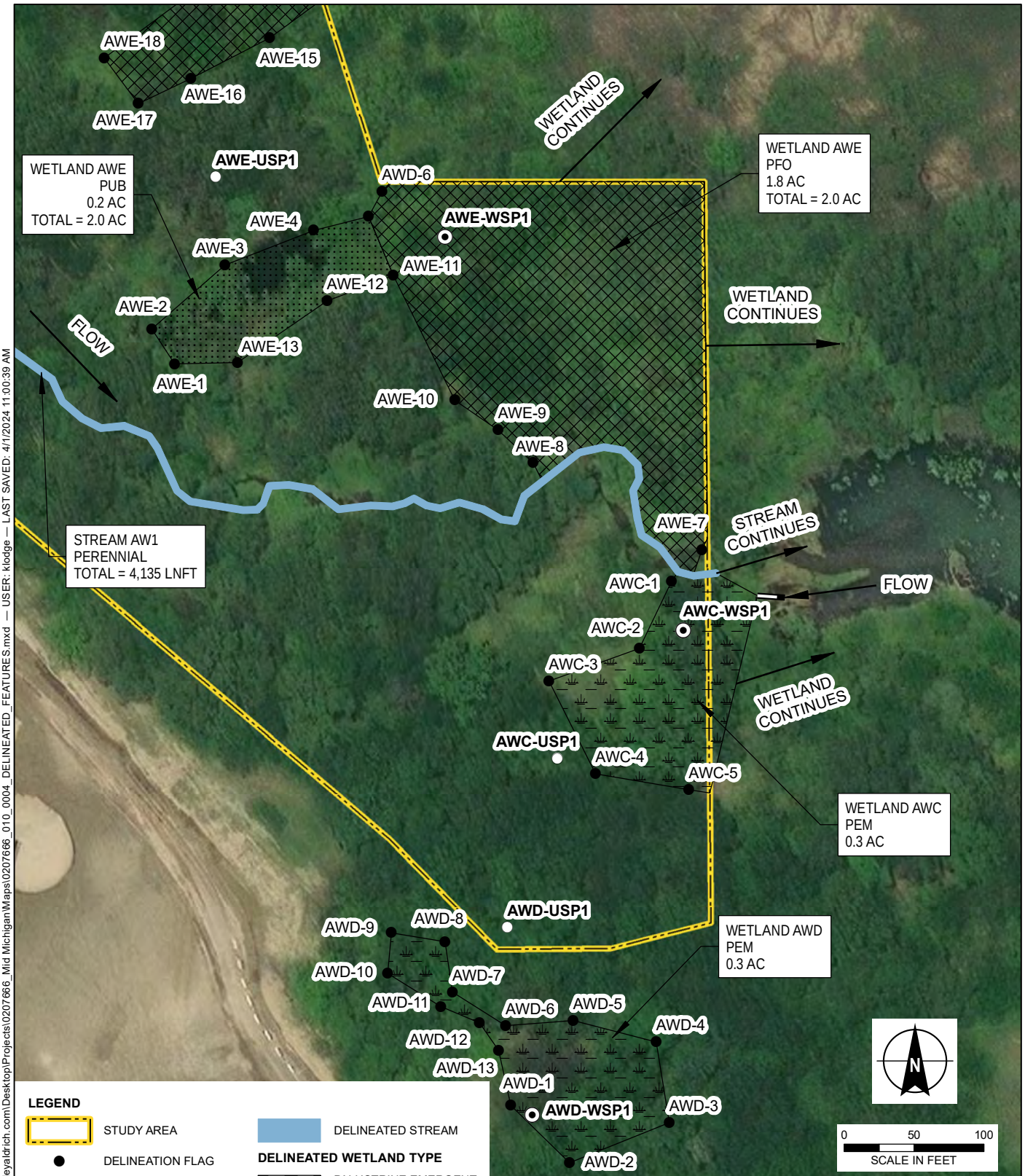
MID MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 5 OF 6

GIS FILE PATH: C:\Users\klodge\OneDrive - haleyaldrich.com\Desktop\Projects\0207666_Mid Michigan\Maps\0207666_010_0004_DELINEATED_FEATURES.mxd — USER: klodge — LAST SAVED: 4/1/2024 11:00:39 AM



LEGEND

- STUDY AREA
- DELINEATION FLAG
- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- STREAM SAMPLE POINT
- FEATURE CONTINUES
- MAPPED CULVERT
- DELINEATED STREAM

DELINEATED WETLAND TYPE

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.
3. BASE MAP SOURCE: ESRI

HALEY ALDRICH

MID MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

DELINEATED WETLANDS AND STREAMS

SCALE: AS SHOWN
APRIL 2024

FIGURE 4
SHEET 6 OF 6

GIS FILE PATH: C:\Users\klodge\OneDrive - haleyaldrich.com\Desktop\Projects\0207666_Mid Michigan\Maps\0207666_010_0004_DELINEATED_FEATURES.mxd — USER: klodge — LAST SAVED: 4/1/2024 11:00:39 AM

ATTACHMENT A
Photo Log

Photo 1: View looking west at wetland AWA-PEM near WSP1.

Photo 2: View looking north at AWA-PSS near flag AWA-11.

Photo 3: View looking west at AWB near WSP1.

Photo 4: View looking southeast at AWC near flag AWC-4.

Photo 5: View looking northwest at AWD near flag AWD-7.

Photo 6: View looking south at AWE-PUB near flag AWE-2.

Photo 7: View looking west at AWE-PFO near WSP-2-.

Photo 8: View looking east at stream AW1 (perennial) through wetland AWA near SP1.

Photo 9: View looking south at stream AW1 (perennial) through upland forest near SP2.

Photo 10: View looking south at stream AW2 (perennial) through upland forest near SP1.

Photo 11: View looking southeast toward inactive outlet into wetland AWA-PEM near flag AWA-63.

Photo 12: View looking southwest at Pond 1 within the mining operations area.

Photo 13: View looking north at typical upland forest throughout the Study Area.

Photo 14: View looking southeast at typical upland habitat throughout the Study Area.

ATTACHMENT B
Routine Wetland Determination and Stream Inventory Data Forms

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-USP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Flat | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34526797 | Long: -83.67970471 | Datum: WGS 84

Soil Map Unit Name: WawabB - Wawasee loam, 2 to 6 percent slopes | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, scrub-shrub cover type.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Crataegus douglasii	15	✔	FAC
2. Lonicera morrowii	10	✔	FACU
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Schedonorus arundinaceus	50	✔	FACU
2. Juncus tenuis	15	✔	FAC
3. Rubus idaeus	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1. Vitis vulpina	5	✔	FAC
2.			
	5 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	100 (A)		365 (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-USP2

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Hillslope | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34523972 | Long: -83.67999421 | Datum: WGS 84

Soil Map Unit Name: WawabB - Wawasee loam, 2 to 6 percent slopes | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, scrub-shrub cover type, slight hillslope. Some redox features within the soil, but vegetation and hydrology generally does not support wetland habitat. May temporarily hold some water as stormwater runs off the slope.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya ovata	10	✔	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Crataegus douglasii	50	✔	FAC
2. Lonicera morrowii	30	✔	FACU
3. Rhamnus cathartica	10		FAC
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	100 (A)		340 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-USP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	95	10YR 6/6	5	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-USP3

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Hillslope | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34381826 | Long: -83.68202287 | Datum: WGS 84

Soil Map Unit Name: BnF - Boyer loamy sand, 25 to 50 percent slopes | NWI classification: PSS1/EM1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, scrub-shrub cover type. In an area that looks like it may have been previously disturbed, apparent fill material placed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prunus serotina	10	✔	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Rhamnus cathartica	60	✔	FAC
2. Malus coronaria	10		UPL
3. Ulmus rubra	10		FAC
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1. Vitis vulpina	10	✔	FAC
2.			
	10 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	80	x 3 =	240
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	100 (A)		330 (B)

Prevalence Index = B/A = 3.30

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-USP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 16	10YR 4/2	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-USP4

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Flat | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34470773 | Long: -83.67775527 | Datum: WGS 84

Soil Map Unit Name: WawabC - Wawasee loam, 6 to 12 percent slopes | NWI classification: PSS1/EM1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, scrub-shrub cover type.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prunus serotina	10	✔	FACU
2.			
3.			
4.			
5.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Lonicera morrowii	40	✔	FACU
2. Rhamnus cathartica	25	✔	FAC
3. Crataegus douglasii	15		FAC
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Rosa multiflora	10	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-USP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-WSP1

Investigator(s): Audrey W., K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34484264 | Long: -83.67942582 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: PSS1/EM1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PEM sample point. Bottom of hillslope, adjacent and downslope of active sand/gravel mine. Perennial stream flowing eastward through wetland. Multiple culverts providing hydrologic input into wetland from roadside drainage and other waterbodies located across the street to the north and west of the wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Typha angustifolia	90	✔	OBL
2. Lythrum salicaria	5		OBL
3. Phalaris arundinacea	5		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		105 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 16	10YR 3/1	100					Mucky Loam/Clay	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✔ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No _____ Depth (inches): 2

Water Table Present? Yes ✔ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-WSP2

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34520276 | Long: -83.68006398 | Datum: WGS 84

Soil Map Unit Name: WawabB - Wawasee loam, 2 to 6 percent slopes | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PSS sample point. Toe of slope. More marginal vegetation, but soils are hydric.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus rubra	5	✔	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Rhamnus cathartica	40	✔	FAC
2. Ulmus rubra	10		FAC
3. Crataegus douglasii	5		FAC
4.			
5.			
	55 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Carex vulpinoidea	35	✔	FACW
2. Ranunculus acris	5		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		265 (B)

Prevalence Index = B/A = 2.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-WSP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/1	100					Silt Loam	
10 - 16	10YR 5/1	95	10YR 6/8	5	C	M	Silt Loam	
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No ___ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 10

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-WSP3

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34399263 | Long: -83.68209675 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: PSS1/EM1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

PEM sample point. Bottom of hillslope. Hummock mounds, undulating microtopography.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Cornus alba	5	✔	FACW
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Typha angustifolia	50	✔	OBL
2. Carex vulpinoidea	40	✔	FACW
3. Symplocarpus foetidus	5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	45	x 2 =	90
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		145 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-WSP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					Mucky Loam/Clay	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✔ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✔ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWA-WSP4

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 10 | Lat: 42.34460369 | Long: -83.6777902 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: PSS1/EM1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PEM sample point. Directly adjacent to steep, partially unstabilized slope from adjacent active mining operations. Erosion and sediment sloughing observed; straw bales observed along base of slope to help prevent sedimentation into wetland, however there did appear to be sedimentation into wetland from erosion of the slope. Brighter color of soil in sample point matched that of slope soil.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Carex vulpinoidea	90	✔	FACW
2. Equisetum hyemale	5		FACW
3. Iris pseudacorus	5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		195 (B)

Prevalence Index = B/A = 1.95

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWA-WSP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/1	60	10YR 6/8	5	C	M	Clay Loam	
0 - 16	10YR 6/6	35					Clay Loam	
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 6

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWB-USP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34479728 | Long: -83.68162621 | Datum: WGS 84

Soil Map Unit Name: WawabB - Wawasee loam, 2 to 6 percent slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, herbaceous cover type. Apparent previously disturbed area from overhead utility line.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Elaeagnus angustifolia	15	✔	FACU
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Schedonorus arundinaceus	40	✔	FACU
2. Juncus tenuis	30	✔	FAC
3. Solidago canadensis	15		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	100 (A)		370 (B)

Prevalence Index = B/A = 3.70

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWB-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-25

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWB-WSP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34480944 | Long: -83.68139903 | Datum: WGS 84

Soil Map Unit Name: WawabB - Wawasee loam, 2 to 6 percent slopes | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PSS sample point. Isolated wetland, no apparent surface water connection to other wetland complex (wetland AWA). Appears wetland may have been formed from previous disturbances from installation of overhead utility line. Vegetation is marginal, but area is holding water and soils are hydric.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Rhamnus cathartica	45	✔	FAC
2. Crataegus douglasii	40	✔	FAC
3.			
4.			
5.			
	85 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Persicaria pensylvanica	15	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	15 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	85	x 3 =	255
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		285 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWB-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 4/1	95	10YR 6/8	5	RM	M	Silt Loam	
10 - 16	10YR 5/1	95	10YR 6/8	5	C	M		
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No ____ Depth (inches): 1

Water Table Present? Yes ✔ No ____ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✔ No ____ Depth (inches): 6

Wetland Hydrology Present? Yes ✔ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWC-USP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Hillslope | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34282076 | Long: -83.67353879 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: PSS1/EM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	
Hydric Soil Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, forested cover type. Redox features at bottom of soil profile, but vegetation and hydrology does not support wetland habitat.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus falcata	30	✔	FACU
2. Acer rubrum	15	✔	FAC
3. Carya ovata	10		FACU
4. Ulmus rubra	10		FAC
5.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Ulmus rubra	15	✔	FAC
2. Lonicera morrowii	10	✔	FACU
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Alliaria petiolata	10	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	100 (A)		350 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWC-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 4/2	100					Sand	
12 - 16	10YR 4/1	80	7.5YR 4/6	20	C	M	Sandy Loam	
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWC-WSP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34304707 | Long: -83.67311548 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: PSS1/EM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

PEM sample point. Portion of wetland connects to perennial stream flowing east-southeasterly along its southern bank. Connects to large wetland complex located east of site. Culvert provides outlet point for large wetland complex and flows to wetland AWC. Sandy substrate of stream may contribute to sandy soil characteristics of this wetland when stream overflows creating a floodplain wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Juncus effusus	50	✔	OBL
2. Carex vulpinoidea	40	✔	FACW
3. Phalaris arundinacea	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWC-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 4/2	75	10YR 6/8	15	C	M	Sand	
0 - 10	10YR 4/1	10					Sand	This color is in striated lines across layer
10 - 16	10YR 4/1	85	7.5YR 4/6	15	C	M	Sandy Loam	
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ✔ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No ____ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes ✔ No ____ Depth (inches): 10

Wetland Hydrology Present? Yes ✔ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWD-USP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Bench | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34252712 | Long: -83.67357563 | Datum: WGS 84

Soil Map Unit Name: HgtahA - Houghton muck, 0 to 1 percent slopes | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, forested cover type. Slope bench.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya ovata	40	✔	FACU
2. Quercus falcata	15	✔	FACU
3. Acer rubrum	10		FAC
4. Ulmus rubra	10		FAC
5.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Lonicera morrowii	10	✔	FACU
2. Ulmus rubra	10	✔	FAC
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Alliaria petiolata	5	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	100 (A)		365 (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWD-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/1	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWD-WSP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Bench | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34210856 | Long: -83.67358575 | Datum: WGS 84

Soil Map Unit Name: WawabC - Wawasee loam, 6 to 12 percent slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Located on a bench of slope, directly adjacent to active mine. May hold stormwater runoff. Does not appear to have a surface water connection to other nearby wetland complexes, likely isolated.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Typha angustifolia	50	✔	OBL
2. Scirpus atrovirens	40	✔	OBL
3. Phalaris arundinacea	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWD-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/1	90	7.5YR 4/6	10	C	M	Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No _____ Depth (inches): 1

Water Table Present? Yes ✔ No _____ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 6

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWE-USP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Flat | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34399596 | Long: -83.6742926 | Datum: WGS 84

Soil Map Unit Name: Gf - Gilford sandy loam, till plain, 0 to 2 percent slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✔ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✔

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✔	
Hydric Soil Present?	Yes ____	No ✔	**Is the Sampled Area within a Wetland?** Yes ____ No ✔
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

Upland sample point, forested cover type. Marginal vegetation but soils and hydrology do not support wetland habitat.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	30	✔	FAC
2. Acer negundo	20	✔	FAC
3.			
4.			
5.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Lonicera morrowii	40	✔	FACU
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Alliaria petiolata	10	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	100 (A)		340 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWE-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 16	10YR 4/1	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWE-USP2

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Upland, Flat | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34464702 | Long: -83.67484718 | Datum: WGS 84

Soil Map Unit Name: Gf - Gilford sandy loam, till plain, 0 to 2 percent slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	
Hydric Soil Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland sample point, forested cover type.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus rubra	5	✔	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Lonicera morrowii	60	✔	FACU
2. Rhamnus cathartica	25	✔	FAC
3. Acer negundo	10		FAC
4.			
5.			
	95 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	100 (A)		365 (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWE-USP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/2	100					Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWE-WSP1

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34390661 | Long: -83.67359221 | Datum: WGS 84

Soil Map Unit Name: Gf - Gilford sandy loam, till plain, 0 to 2 percent slopes | NWI classification: PSS1/EM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PFO sample point. PUB section transitions to PFO to large wetland complex located east of site. Upland berm around north and south edge of PUB section, previous disturbances appear evident in this area in historical aerial imagery from 1999-2000. Portion of PFO section connects to perennial stream flowing east-southeasterly along its northern bank.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	30	✔	FAC
2. Ulmus rubra	20	✔	FAC
3.			
4.			
5.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Cornus amomum	15	✔	FACW
2. Salix nigra	5	✔	OBL
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Alliaria petiolata	15	✔	FAC
2. Phalaris arundinacea	10	✔	FACW
3. Symplocarpus foetidus	5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	25	x 2 =	50
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		255 (B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWE-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 4/1	100					Silty Clay Loam	
2 - 16	10YR 4/2	80	10YR 6/6	20	C	M	Silty Clay Loam	
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No _____ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 4

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Vella Pit Site | City/County: Washtenaw County | Sampling Date: 2024-03-26

Applicant/Owner: Mid Michigan Materials | State: Michigan | Sampling Point: AWE-WSP2

Investigator(s): A. West, K. Lodge | Section, Township, Range: S01 T2S R6E

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave

Slope (%): 2 | Lat: 42.34477152 | Long: -83.67467953 | Datum: WGS 84

Soil Map Unit Name: Gf - Gilford sandy loam, till plain, 0 to 2 percent slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

PFO sample point. Standing water and sparsely vegetated concave surface. Bottom of hillslope up to road. Connected to large wetland complex located east.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	60	✔	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Ulmus americana	25	✔	FACW
2. Fraxinus pennsylvanica	5		FACW
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Carex vulpinoidea	5	✔	FACW
2. Ranunculus acris	5	✔	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	95	x 2 =	190
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		205 (B)

Prevalence Index = B/A = 2.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: AWE-WSP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/2	90	7.5YR 5/6	10	C	M	Silt Loam	
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No ___ Depth (inches): 1

Water Table Present? Yes ✔ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ecobot Universal Stream Assessment

Sampling Date: 2024-03-26

Project/Site: Vella Pit Site

Stream ID: AW1-SP1

Investigator: A. West, K. Lodge

Applicant/Owner: Mid Michigan Materials

City/County: Washtenaw County

State: Michigan

Section, Township, Range: S01 T2S R6E

Latitude: 42.34462079

Longitude: -83.68013911

Datum: WGS 84

NWI Classification: PSS1/EM1B

Stream Identification

Classification

- ○ Ephemeral
- ○ Intermittent
- ◉ Perennial

NHD Named Stream

- ○ Yes
- ◉ No

GNIS Name of Stream:

Stream Morphology

Left Bank Height: 0.5 ft

Width at OHWM: 1.5 ft

Average Water Depth: 0.8 ft

Right Bank Height: 0.5 ft

Width at TOB: 2 ft

Stream Flow Present? ◉ Yes ○ No

Primary Substrate

- ○ Silt/Clay/Mud
- ◉ Sand
- ○ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Secondary Substrate

- ◉ Silt/Clay/Mud
- ○ Sand
- ○ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Bank Type/Shape

- ○ Vertical/Undercut
- ○ Steeply Sloping
- ◉ Gradual Sloping
- ○ Artificial
- ○ Other

Stream Habitats

- ☐ Riffles
- ☐ Runs
- ☐ Pools
- ☐ Glides
- ☐ Other

Riparian Zone

Dominant vegetation species within the riparian area of the stream.

1. Typha angustifolia
2. Phalaris arundinacea
3.
4.
5.
6.
7.
8.

Notes

Flows eastward through a wetland. Within Study Area begins at 36" CMP culvert that crosses Earhart Road, flows within wetland on other side of road as well. Other stream habitat is aquatic vegetation/wetland. Sinuous channel. Bank substrate is mucky silt loam. Clear water, rain event in last 24 hr, water overflowing banks in some areas. Erosion along banks is low.

Generated with ecobot

Ecobot Universal Stream Assessment

Sampling Date: 2024-03-26

Project/Site: Vella Pit Site

Stream ID: AW1-SP2

Investigator: A. West, K. Lodge

Applicant/Owner: Mid Michigan Materials

City/County: Washtenaw County

State: Michigan

Section, Township, Range: S01 T2S R6E

Latitude: 42.34505443

Longitude: -83.67616909

Datum: WGS 84

NWI Classification: PSS1/EM1B

Stream Identification

Classification

- ○ Ephemeral
- ○ Intermittent
- ◉ Perennial

NHD Named Stream

- ◉ Yes
- ○ No

GNIS Name of Stream: Unnamed

Stream Morphology

Left Bank Height: 2 ft

Width at OHWM: 4 ft

Average Water Depth: 0.3 ft

Right Bank Height: 2 ft

Width at TOB: 8 ft

Stream Flow Present? ◉ Yes ○ No

Primary Substrate

- ○ Silt/Clay/Mud
- ◉ Sand
- ○ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Secondary Substrate

- ◉ Silt/Clay/Mud
- ○ Sand
- ○ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Bank Type/Shape

- ◉ Vertical/Undercut
- ○ Steeply Sloping
- ○ Gradual Sloping
- ○ Artificial
- ○ Other

Stream Habitats

- ☑ Riffles
- ☐ Runs
- ☐ Pools
- ☐ Glides
- ☐ Other

Riparian Zone

Dominant vegetation species within the riparian area of the stream.

1. Lonicera morrowii
2. Ulmus rubra
3. Rhamnus cathartica
4.
5.
6.
7.
8.

Notes

Flowing through upland forested area. Flowing southeasterly. Cobbles and gravel in channel as well. Bank substrate is a silt loam. Heavy erosion on banks, channel has widened. Overhanging veg.

Generated with ecobot

Ecobot Universal Stream Assessment

Sampling Date: 2024-03-26

Project/Site: Vella Pit Site

Stream ID: AW1-SP3

Investigator: A. West, K. Lodge

Applicant/Owner: Mid Mochigan Materials

City/County: Washtenaw County

State: Michigan

Section, Township, Range: S01 T2S R6E

Latitude: 42.34367306

Longitude: -83.67488917

Datum: WGS 84

NWI Classification:

Stream Identification

Classification

- ( ) Ephemeral
- ( ) Intermittent
- (•) Perennial

NHD Named Stream

- (•) Yes
- ( ) No

GNIS Name of Stream: Unnamed

Stream Morphology

Left Bank Height: 2.5 ft

Width at OHWM: 4 ft

Average Water Depth: 0.5 ft

Right Bank Height: 2.5 ft

Width at TOB: 10 ft

Stream Flow Present? (•) Yes ( ) No

Primary Substrate

- ( ) Silt/Clay/Mud
- (•) Sand
- ( ) Gravel
- ( ) Cobbles
- ( ) Boulders
- ( ) Bedrock

Secondary Substrate

- ( ) Silt/Clay/Mud
- ( ) Sand
- (•) Gravel
- ( ) Cobbles
- ( ) Boulders
- ( ) Bedrock

Bank Type/Shape

- (•) Vertical/Undercut
- ( ) Steeply Sloping
- ( ) Gradual Sloping
- ( ) Artificial
- ( ) Other

Stream Habitats

- [x] Riffles
- [x] Runs
- [x] Pools
- [ ] Glides
- [ ] Other

Riparian Zone

Dominant vegetation species within the riparian area of the stream.

1. Lonicera morrowii
2. Quercus falcata
3. Carpinus caroliniana ssp. caroliniana
4.
5.
6.
7.
8.

Notes

Upland forest area, flowing southeasterly into large wetland complex east of Study Area. Sand/gravel bars within channel. Top of bank widened significantly, high erosion potential.

Generated with ecobot

Ecobot Universal Stream Assessment

Sampling Date: 2024-03-26

Project/Site: Vella Pit Site

Stream ID: AW2-SP1

Investigator: A. West, K. Lodge

Applicant/Owner: Mid Mochigan Materials

City/County: Washtenaw County

State: Michigan

Section, Township, Range: S01 T2S R6E

Latitude: 42.34477141

Longitude: -83.67570966

Datum: WGS 84

NWI Classification: PSS1/EM1B

Stream Identification

Classification

- ○ Ephemeral
- ○ Intermittent
- ◉ Perennial

NHD Named Stream

- ◉ Yes
- ○ No

GNIS Name of Stream: Unnamed

Stream Morphology

Left Bank Height: 2 ft

Width at OHWM: 3 ft

Average Water Depth: 0.3 ft

Right Bank Height: 2 ft

Width at TOB: 6 ft

Stream Flow Present? ◉ Yes ○ No

Primary Substrate

- ○ Silt/Clay/Mud
- ◉ Sand
- ○ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Secondary Substrate

- ○ Silt/Clay/Mud
- ○ Sand
- ◉ Gravel
- ○ Cobbles
- ○ Boulders
- ○ Bedrock

Bank Type/Shape

- ◉ Vertical/Undercut
- ○ Steeply Sloping
- ○ Gradual Sloping
- ○ Artificial
- ○ Other

Stream Habitats

- ☑ Riffles
- ☑ Runs
- ☑ Pools
- ☐ Glides
- ☐ Other

Riparian Zone

Dominant vegetation species within the riparian area of the stream.

1. Lonicera morrowii
2. Salix nigra
3. Quercus falcata
4. Cornus amomum
5. Ulmus rubra
6.
7.
8.

Notes

Within Study Area begins at 36" CMP culvert that crosses East Joy Rd. Flows south through upland forested area and flows into AW1. Overghanging veg and heavy bank erosion observed. Bank substrate is silty loam.

Generated with ecobot

APPENDIX E
EGLE Wellogic Logs within 1 Mile

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810234400008	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002210

Elevation: 962 ft.
Latitude: 42.345144
Longitude: -83.702892
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
50' SE OF PONTIAC TRAIL, 50' N OF JOY RD. CORNER OF PONTIAC TRL AND JOY RD

Well Owner: KERRIGAN, WILLIAM

Well Address:	**Owner Address:**
3025 JOY RD. ANN ARBOR, MI 48105	620 S. PONTIAC TRAIL WALLED LAKE, MI 48088

Drilling Method: Rotary
Well Depth: 106.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 12/20/1984

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 106.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 61.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 63.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	8.00	8.00
Sand	4.00	12.00
Clay	45.00	57.00
Sand	9.00	66.00
Mud W/Clay	27.00	93.00
Sand Water Bearing	13.00	106.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	8.00 ft.	98.00 ft. and 106.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 38-84WR LOC DESC SCRN MAT LAT LONG GEO CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235400017	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002214

Elevation: 919 ft.
Latitude: 42.347194
Longitude: -83.684712
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
675'W OF EARHART,150'N OF JOY,150'W OF EARHART(S OF JOY NW CORNER OF EARHART AND JOY

Well Owner: BOLGOS, CHARLES

Well Address:	**Owner Address:**
3965 E. JOY RD. ANN ARBOR, MI 48105	3965 E. JOY RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 216.00 ft. **Well Use:** Other
Well Type: Replacement **Date Completed:** 1/19/1972

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 213.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 189.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 44.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 65.00 ft. after 24.00 hrs. at 10 GPM
Pumping level 0.00 ft. after 21.00 hrs. at 13 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 2.38 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	**Length**	**Set Between**
12.00	3.00 ft.	213.00 ft. and 216.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Yellow Clay	16.00	16.00
Blue Clay	9.00	25.00
Blue Clay Hard	7.00	32.00
Clay W/Sand	26.00	58.00
Sand Fine Silty	13.00	71.00
Sand Very Fine	14.00	85.00
Sand Fine Silty	20.00	105.00
Clay & Gravel Hard	52.00	157.00
Sand Fine Silty	4.00	161.00
Blue Clay & Stones	52.00	213.00
Sand Fine To Medium Silty	3.00	216.00

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	**Distance**	**Direction**
Septic tank	1000 ft.	South

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0019
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL; USE IS FOR "STOCK WATERING" GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22

Other Remarks: Well Use:Type Use Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235400020	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002215

Elevation: 913 ft.
Latitude: 42.347114
Longitude: -83.686574
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1200' W OF EARHART RD., 250' N OF JOY RD. 1/4 MI W OF EARHART

Well Owner: DREYFUSS, ALLEN

Well Address:	**Owner Address:**
3801 JOY RD. ANN ARBOR, MI 48105	3801 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 52.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/29/1986

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 48.00 ft. depth
4.00 in. to 52.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 20.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 2.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 5.00 ft. after 2.00 hrs. at 20 GPM
Pumping level 6.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	14.00	14.00
Gray Clay	32.00	46.00
Sand Water Bearing	6.00	52.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	4.00 ft.	48.00 ft. and 52.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	300 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 3-85 S/WN LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: 81717635003

Tax No: 810235400020	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:**
		WSSN:	**Source ID/Well No:**	

Well ID: 81000002216

Elevation: 961 ft.
Latitude: 42.3470174313
Longitude: -83.6863617515
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1100' W OF EARHART RD., 650' N OF JOY RD.

Well Owner: DREYFUSS, ALLEN

Well Address:	**Owner Address:**
3801 JOY RD. ANN ARBOR, MI 48105	3801 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 296.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 5/28/1986

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Unknown
Casing Fitting: None

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 999.99 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: No **Intake:** Bedrock Well

Formation Description	Thickness	Depth to Bottom
Yellow Clay	14.00	14.00
Gray Clay	282.00	296.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	0.00	None	0.00 ft. to 0.00 ft.

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	0 ft.	

Abandoned Well Plugged: No

Reason Not Plugged:

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Unknown **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 3-85 S/WN; THIS WELL WAS ABANDONED AND GROUTED WITH CEMENT.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300034	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002217

Elevation: 967 ft.
Latitude: 42.345616
Longitude: -83.695001
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2400' E OF PONTIAC TRAIL, 150' N OF JOY RD. 1/2 MI E OF PONTIAC TRL

Well Owner: TUCKER, ROBERT

Well Address:	**Owner Address:**
3493 JOY RD. ANN ARBOR, MI 48105	3493 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 60.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 3/3/1978

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 60.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 47.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 47.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 47.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Sand	4.00	4.00
Clay	10.00	14.00
Sand	21.00	35.00
Clay & Gravel	15.00	50.00
Sand Water Bearing	10.00	60.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	56.00 ft. and 60.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	90 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 31-77 LOC DESC SCRN MAT GEO LAT LONG CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300033	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002218

Elevation: 968 ft.
Latitude: 42.34564
Longitude: -83.695674
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2150' S OF PONTIAC TRAIL, 250' N OF JOY RD. 3/4 MI E OF PONTIAC TRL ON JOY

Well Owner: TSUI, LOUIS

Well Address:	**Owner Address:**
3457 JOY RD. ANN ARBOR, MI 48105	3457 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 74.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 3/28/1978

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 74.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 61.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 49.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 49.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 50.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay Sandy	7.00	7.00
Clay	18.00	25.00
Gravel	37.00	62.00
Sand Water Bearing	12.00	74.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	4.00 ft.	70.00 ft. and 74.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	70 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 18-77 LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300033	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002219

Elevation: 968 ft.
Latitude: 42.345632
Longitude: -83.695664
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2150' E OF PONTIAC TRAIL, 300' N OF JOY RD. 3/4 MI E OF PONTIAC TRL ON JOY

Well Owner: TSUI, LOUIS

Well Address:	**Owner Address:**
3457 JOY RD. ANN ARBOR, MI 48105	3457 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 56.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/20/1979

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 56.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 41.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 42.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Topsoil	2.00	2.00
Clay Gravely	5.00	7.00
Sand	35.00	42.00
Clay	8.00	50.00
Sand Water Bearing	6.00	56.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	5.00 ft.	51.00 ft. and 56.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	80 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 25-79 LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300032	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002220

Elevation: 969 ft.
Latitude: 42.3456
Longitude: -83.696342
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1950' E OF PONTIAC TRAIL, 150' N OF JOY RD. 1/2 MI E OF PONTIAC TRL

Well Owner: ERICKSEN, S.

Well Address:	**Owner Address:**
3421 JOY RD. ANN ARBOR, MI 48105	3421 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 67.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/29/1978

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 67.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 47.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 48.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 49.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	7.00	7.00
Sand	13.00	20.00
Clay	5.00	25.00
Sand	23.00	48.00
Sand Water Bearing	19.00	67.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	4.00 ft.	63.00 ft. and 67.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	75 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 6-78 LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235400018	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002221

Elevation: 950 ft.
Latitude: 42.347188
Longitude: -83.68255
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
850' N OF JOY RD., 100' W OF EARHART RD. 1/4 MI N OF JOY

Well Owner: BOLGOS, GARTH

Well Address:	**Owner Address:**
5085 EARHART RD. ANN ARBOR, MI 48105	3570 E. JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 60.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/27/1987

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 52.00 ft. depth
4.00 in. to 60.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 38.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 33.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 36.00 ft. after 2.00 hrs. at 20 GPM
Pumping level 37.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Clay	30.00	30.00
Sand Hard	18.00	48.00
Sand Water Bearing	12.00	60.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
15.00	8.00 ft.	52.00 ft. and 60.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 22-86 S/WN LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235400015	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002222

Elevation: 975 ft.
Latitude: 42.351301
Longitude: -83.685388
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2250'N OF JOY,750'S OF PONTIAC TRAIL,400'W OF EARHART

Well Owner: DOWNING, V.J.

Well Address:	**Owner Address:**
5305 EARHART RD. ANN ARBOR, MI 48105	5305 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 88.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/11/1976

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 84.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 67.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 43.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 65.00 ft. after 1.50 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Gray Clay	22.00	22.00
Sand	3.00	25.00
Gray Clay & Gravel	47.00	72.00
Gray Gravel	5.00	77.00
Gray Clay Sandy	4.00	81.00
Gray Sand	7.00	88.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	4.00 ft.	84.00 ft. and 88.00 ft.

Fittings: Other

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	75 ft.	

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-0026
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Screen Fittings:Type Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235400016	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002223

Elevation: 980 ft.
Latitude: 42.351878
Longitude: -83.683197
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2250'N OF JOY,750'S OF PONTIAC TR.,200'W OF EARHART 1/4 MI S INT OF EARHART AND PONTIAC TRL ABOUT 300 FT W

Well Owner: PIEHUTKOSKI, LEROY

Well Address:	**Owner Address:**
5311 EARHART RD. ANN ARBOR, MI 48105	5311 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 82.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/2/1968

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 78.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 63.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 34.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 0.00 ft. after 2.00 hrs. at 60 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay Hard	4.00	4.00
Blue Clay Yellow	70.00	74.00
Gray Sand	2.00	76.00
Gravel Medium Water Bearing	6.00	82.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.75 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	78.00 ft. and 82.00 ft.

Fittings: Other

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	Northeast

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0019
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 9-68; DEPTH FIGURED FROM FINAL GRADE, WHICH WILL BE APT 3' HIGHER THAN GRADE FROM WHICH WELL WAS DRILLED. LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22

Other Remarks: Screen Fittings:Type Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300011	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002224

Elevation: 955 ft.
Latitude: 42.35095
Longitude: -83.700867
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1600' N OF PONTIAC TRAIL, 200'E OF SUTTON RD. 500 ft N OF PONTIAC

Well Owner: GAYESKI, ED. W.

Well Address:	**Owner Address:**
5320 SUTTON RD. ANN ARBOR, MI 48105	5320 SUTTON RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 78.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 2/24/1972

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 78.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Sta-Rite **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 45.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 60.00 ft. after 0.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Topsoil	2.00	2.00
Red Mud	23.00	25.00
Hardpan	47.00	72.00
Sand Water Bearing	4.00	76.00
Sand Water Bearing Silty	2.00	78.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.50 in. **Blank:** 0.00 ft. Above
Screen Material Type: Other
Screen Installation Type: Unknown

Slot	Length	Set Between
16.00	4.00 ft.	74.00 ft. and 78.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	0.00	None	

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	75 ft.	

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-0248
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL LOC DESC GEO SCRN MAT LAT LONG CONTRCT REG NUM DM 5/8/22

Other Remarks: Screen Material:MONEL STEEL

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300011	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002225

Elevation: 953 ft.
Latitude: 42.350952
Longitude: -83.700889
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1500' N OF PONTIAC TRAIL, 100' E OF SUTTON RD. S OF NORTHFIELD S OF N TERR W OF EARHART

Well Owner: GAYESKE, EDWARD

Well Address:	**Owner Address:**
5320 SUTTON RD. ANN ARBOR, MI 48105	5320 SUTTON RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 113.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/11/1985

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 113.00 ft. depth

Borehole: 7.88 in. to 113.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 21.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 21.00 ft. after 1.00 hrs. at 12 GPM
Pumping level 21.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	7.00	7.00
Gray Clay	67.00	74.00
Gray Clay & Gravel	4.00	78.00
Gray Clay	18.00	96.00
Sand Water Bearing Medium	7.00	103.00
Sand Coarse	10.00	113.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
8.00	16.00 ft.	105.00 ft. and 113.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	125 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1872
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 38-85 WR LOC DESC SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Pump Manufacturer:OWNERS

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300019	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002227

Elevation: 950 ft.
Latitude: 42.348575
Longitude: -83.70089
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
950' N OF PONTIAC TRAIL, 150' E OF SUTTON RD.

Well Owner: GODINIER, JULE

Well Address:
5196 SUTTON RD.
ANN ARBOR, MI 48105

Owner Address:
5196 SUTTON RD.
ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 97.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/19/1977

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 94.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 63.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 37.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 0.00 ft. after 0.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay & Sand	16.00	16.00
Brown Gravel Dry	56.00	72.00
Blue Clay	6.00	78.00
Gray Sand Fine Water Bearing	19.00	97.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	3.00 ft.	94.00 ft. and 97.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0657
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 16-77; FINAL SENT IN DEC. 6 1977 LAT LONG SCRN MAT REG NUM CONTRCT DM 5/8/22

Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300019	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002228

Elevation: 950 ft.
Latitude: 42.348565
Longitude: -83.700902
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
950' N OF PONTIAC TRAIL, 200' E OF SUTTON RD. 1/2 MI N OF PONTIAC TRL

Well Owner: GORDONIERE, JULE

Well Address:	**Owner Address:**
5196 SUTTON RD. ANN ARBOR, MI 48105	5196 SUTTON RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 97.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/15/1977

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 94.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 42.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 27.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 0.00 ft. after 0.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay & Gravel	45.00	45.00
Blue Clay & Sand	31.00	76.00
Gray Sand Water Bearing	21.00	97.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	3.00 ft.	94.00 ft. and 97.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0657
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 16-77 LOC DESC SCRN MAT LAT LONG CONTRCT REG NUM DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300020	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002229

Elevation: 951 ft.
Latitude: 42.347745
Longitude: -83.700234
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
450' N OF PONTIAC TRAIL, 300' E OF SUTTON RD. 1/4 MI N OF PONTIAC TRL ON E SIDE

Well Owner: WEIDNER, HAL

Well Address:	**Owner Address:**
5146 SUTTON RD. ANN ARBOR, MI 48105	5146 SUTTON RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 71.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/11/1984

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 67.00 ft. depth

Borehole: 7.88 in. to 67.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 55.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 33.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 46.00 ft. after 1.00 hrs. at 9 GPM
Pumping level 49.00 ft. after 2.00 hrs. at 9 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	10.00	10.00
Gravel Coarse	41.00	51.00
Gray Clay & Sand	16.00	67.00
Gravel Medium	4.00	71.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	67.00 ft. and 71.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1872
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 11-83 S/WN LOC DESC SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300024	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002230

Elevation: 950 ft.
Latitude: 42.346512
Longitude: -83.699767
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
450' E OF SUTTON RD., 100' S OF PONTIAC TRAIL 20 YARDS E OF SUTTON ON PONTIAC TRL

Well Owner: BARROW, DICK

Well Address:	**Owner Address:**
5124 PONTIAC TRAIL ANN ARBOR, MI 48105	5124 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 83.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/26/1975

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 0.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Webtrol **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 63.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 20.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 40.00 ft. after 3.00 hrs. at 25 GPM

Screen Installed: No **Intake:** Unknown

Formation Description	Thickness	Depth to Bottom
Clay	50.00	50.00
Clay & Sand Fine	20.00	70.00
Clay	10.00	80.00
Gravel Water Bearing	3.00	83.00

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	West

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0361
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL LOC DESC GEO SCRN MAT LAT LONG CONTRCT REG NUM 5/8/22 DM

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300021	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002231

Elevation: 952 ft.
Latitude: 42.347057
Longitude: -83.700647
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
300' E OF SUTTON RD., 100' N OF PONTIAC TRAIL 400 FT N OF SUTTON 200 FT W OF PONTIAC TRL

Well Owner: KNOEDLER, LEONARD

Well Address:	**Owner Address:**
5119 PONTIAC TRAIL ANN ARBOR, MI 48105	5119 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 58.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/1/1980

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 58.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 18.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 40.00 ft. after 2.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Clay	6.00	6.00
Sand	22.00	28.00
Clay	10.00	38.00
Sand	20.00	58.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	4.00 ft.	54.00 ft. and 58.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	75 ft.	West

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1236
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 24-79 LOC DESC SCRN MAT LAT LONG CONTRCT REG NUM DATE DM 5/8/22
Other Remarks: Pump Manufacturer:GEORGIA PACIFIC

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300017	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002232

Elevation: 960 ft.
Latitude: 42.349575
Longitude: -83.698387
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
900' E OF SUTTON RD., 750' N OF PONTIAC TRAIL CORNER OF PONTIAC TRL AND SUTTON

Well Owner: BAUGHNER, WESLEY

Well Address:	**Owner Address:**
5137 PONTIAC TRAIL ANN ARBOR, MI 48105	1327 LEVENA RD. YSPILANTI, MI 48198

Drilling Method: Cable Tool
Well Depth: 62.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/8/1969

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 58.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 38.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 45.00 ft. after 2.00 hrs. at 10 GPM

Formation Description	Thickness	Depth to Bottom
Clay	33.00	33.00
Sand & Clay	5.00	38.00
Sand	24.00	62.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.75 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	58.00 ft. and 62.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 34-69 ADD SCRN MAT LOC DESC LAT LONG CONTRCT DM 5/8/22
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300001	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002233

Elevation: 982 ft.
Latitude: 42.350308
Longitude: -83.693191
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2600' NE OF SUTTON RD., 150' N OF PONTIAC TRAIL 1/2 MI E OF SUTTON

Well Owner: STEVENS, JOHN

Well Address:	**Owner Address:**
5229 PONTIAC TRAIL ANN ARBOR, MI 48105	5229 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 109.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/6/1987

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 103.00 ft. depth
4.00 in. to 109.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 53.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 54.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	65.00	65.00
Sand	2.00	67.00
Clay	29.00	96.00
Sand Water Bearing	13.00	109.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	6.00 ft.	103.00 ft. and 109.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	80 ft.	West

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 57-86; THIS IS A REPLACMENT WELL. THE WELL WAS ABANDONED AND GROUTED WITH CEMENT. LOC DESC SCRN MAT LAT LONG CONTRCT DM 5/8/22

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300038	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002234

Elevation: 980 ft.
Latitude: 42.347794
Longitude: -83.693097
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2550' NE OF SUTTON RD., 650' S OF PONTIAC TRAIL 1/2 MI NE OF SUTTON 1/2 MI SW OF EARHART ON N SIDE OF PONTIAC TRL

Well Owner: BURNHAM, JEAN E.

Well Address:	**Owner Address:**
5220 PONTIAC TRAIL ANN ARBOR, MI 48105	5220 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 294.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/2/1971

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 290.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Webtrol **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 120.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 80.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Gravel & Clay	100.00	100.00
Sand & Clay	50.00	150.00
Clay	140.00	290.00
Gravel	4.00	294.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
30.00	4.00 ft.	290.00 ft. and 294.00 ft.

Fittings: Other

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Contractor Type: Water Well Drilling Contractor **Reg No:** 46-0551
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL LOC DESC SCRN MAT LAT LONG CONTRCT DM 5/8/22

Other Remarks: Screen Fittings:Type Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810235300039	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002235

Elevation: 981 ft.
Latitude: 42.347957
Longitude: -83.692711
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2650' NE OF SUTTON RD., 650' S OF PONTIAC TRAIL 1/2 MI W OF EARHART RD ON PONTIAC TRL

Well Owner: NEWBY, PHILIP

Well Address:	**Owner Address:**
5226 PONTIAC TRAIL ANN ARBOR, MI 48105	5226 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 136.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/29/1981

Casing Type: Unknown **Height:**
Casing Joint: Welded
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 136.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 45.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 45.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	4.00	4.00
Sand	12.00	16.00
Clay	9.00	25.00
Sand	7.00	32.00
Clay	13.00	45.00
Mud Sandy	26.00	71.00
Sand Fine	41.00	112.00
Clay	7.00	119.00
Sand Water Bearing	17.00	136.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	5.00 ft.	131.00 ft. and 136.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: PUMP USED FROM OLD WELL LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22

Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810236300014	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002237

Elevation: 900 ft.
Latitude: 42.3459882539
Longitude: -83.6771238243
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1300' E OF EARHART RD., 150' N OF JOY RD. HOUSE NO LONGER THERE

Well Owner: COBURN, JIM

Well Address:
4257 JOY RD.
ANN ARBOR, MI 48105

Owner Address:
5602 N. DIXBORO RD.
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 57.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/8/1987

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 48.00 ft. depth
4.00 in. to 57.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 33.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 34.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	28.00	28.00
Sand	6.00	34.00
Clay	11.00	45.00
Sand Water Bearing	12.00	57.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	9.00 ft.	48.00 ft. and 57.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	85 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 25-87 S/WN GEO SCRN MAT CONTRCT DM 5/8/22
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810236200004	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002238

Elevation: 980 ft.
Latitude: 42.352879
Longitude: -83.681837
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
600' S OF PONTIAC TRAIL, 100' E OF EARHART RD. 500 FT S OF PONTIAC

Well Owner: ZEEB, KENNETH

Well Address:	**Owner Address:**
5370 EARHART RD. ANN ARBOR, MI 48105	5370 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 198.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/12/1974

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 198.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 126.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 90.00 ft. after 2.00 hrs. at 10 GPM
Pumping level 110.00 ft. after 2.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Clay	46.00	58.00
Mud	7.00	65.00
Gray Sand Fine	10.00	75.00
Clay	28.00	103.00
Gravel	3.00	106.00
Clay	82.00	188.00
Sand Water Bearing	10.00	198.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	7.00 ft.	191.00 ft. and 198.00 ft.

Fittings: Other

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	80 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0036
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACMENT WELL LOC DESC GEO SCRN MAT LAT LONG CONTRCT DM 5/8/22
Other Remarks: Grouting Material 1:Listed as other in Wellkey, Pump Manufacturer:REDA, Screen Fittings:Type Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810236	**Permit No:**	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002239

Elevation: 951 ft.
Latitude: 42.349232
Longitude: -83.663944
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1150' N OF JOY RD., 450' W OF DIXBORO RD.

Well Owner: ZAHNER, ROBERT

Well Address:	**Owner Address:**
5175 DIXBORO RD. ANN ARBOR, MI 48105	5175 DIXBORO RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 121.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/26/1966

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 0.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 95.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Topsoil	2.00	2.00
Yellow Clay	10.00	12.00
Yellow Sand	14.00	26.00
Yellow Sand	26.00	52.00
Hardpan	63.00	115.00
Gravel	6.00	121.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
25.00	4.00 ft.	

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 82-0111
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO 579; PUMPED 20 GPM. SCRN MAT LAT LONG CONTRCT REG NUM 5/8/22 DM

Other Remarks: Pump Manufacturer:FAIRBANKS MORSE

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Northfield

Well ID: 81000002240

Elevation: 899 ft.
Latitude: 42.34655
Longitude: -83.68052
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active	2046281	001

Distance and Direction from Road Intersection:
2046281; 1 SPIRITUS SANCTUS ACADEMY NE CORNER OF JOY AND EARHART

Well Owner: SPIRITUS SANCTUS ACADEMY

Well Address:	Owner Address:
4101 JOY ANN ARBOR, MI 48105	30 FRANK LLOYD WRIGHT ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 232.00 ft. **Well Use:** Type II public
Well Type: New **Date Completed:** 8/30/1997

Casing Type: Other **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 4.00 in. to 222.00 ft. depth

Borehole: 8.50 in. to 334.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 10.90 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 207.00 ft. after 4.00 hrs. at 63 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 3.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	8.00 ft.	223.00 ft. and 232.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Topsoil	1.00	1.00
Brown Clay	22.00	23.00
Brown Sand	3.00	26.00
Gray Clay	45.00	71.00
Gray Sand & Gravel	12.00	83.00
Gray Clay & Gravel	76.00	159.00
Silt Silty	6.00	165.00
Gray Clay	8.00	173.00
Gravel	9.00	182.00
Gray Clay	8.00	190.00
Gray Clay & Gravel	6.00	196.00
Gray Clay	25.00	221.00
Gravel	11.00	232.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	0.00 ft. to 190.00 ft.

Geology Remarks:

Wellhead Completion: Other, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: BRENT HERRON
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2072
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: CASING TYPE:A53B GEO SCRN MAT CONTRCT DM 5/8/22
Other Remarks: Casing Type:Casing Type unknown, Wellhead Completion:12 inch Above Grade

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: 81717731010

Tax No: 810131200011	**Permit No:**	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:**	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002754

Elevation: 980 ft.
Latitude: 42.3544392584
Longitude: -83.6619694461
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
300' N OF JOY RD., 100' E OF DIXBORO RD.

Well Owner: PAGE, DONALD

Well Address:
5414 DIXBORO RD.
ANN ARBOR, MI 48105

Owner Address:
5414 DIXBORO RD.
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 180.00 ft. **Well Use:** Unknown
Well Type: Dry Hole **Date Completed:** 10/16/1979

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 999.99 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 126.00 ft. after 2.00 hrs. at 2 GPM

Screen Installed: No **Intake:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Blue Clay Hard	30.00	45.00
Blue Clay & Sand Soft	40.00	85.00
Blue Clay & Gravel Hard	14.00	99.00
Blue Clay Hard	22.00	121.00
Gray Sand Fine	5.00	126.00
Blue Clay Hard	54.00	180.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	0.00	None	0.00 ft. to 0.00 ft.

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	0 ft.	

Contractor Type: Unknown **Reg No:** 81-0388
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO PERMIT #; CALLED DRY , FILLED WITH CUTTINGS AND BENTONITE.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: 81717731011

Tax No: 810131200011	**Permit No:**	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:**	**WSSN:**	**Source ID/Well No:**

Well ID: 81000002755

Elevation: 980 ft.
Latitude: 42.3543823061
Longitude: -83.6615917774
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
3000' N OF JOY RD.,150' E OF DIXBORO RD.

Well Owner: PAGE, DAVID

Well Address:
5414 DIXBORO RD.
ANN ARBOR, MI 48105

Owner Address:
5414 DIXBORO RD.
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 335.00 ft. **Well Use:** Unknown
Well Type: Dry Hole **Date Completed:** 10/30/1979

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 999.99 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 103.00 ft. after 2.00 hrs. at 2 GPM

Screen Installed: No **Intake:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	14.00	14.00
Blue Clay & Gravel Hard	46.00	60.00
Blue Clay Soft	33.00	93.00
Sand Fine	3.00	96.00
Gravel Fine	7.00	103.00
Blue Clay & Gravel Hard	37.00	140.00
Blue Clay Soft	50.00	190.00
Blue Clay Hard	115.00	305.00
Blue Clay Hard	29.00	334.00
Blue Shale	1.00	335.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	0.00	None	0.00 ft. to 0.00 ft.

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	0 ft.	

Contractor Type: Unknown **Reg No:** 81-0388
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NO PERMIT #; CALLLED DRY, FILLED WITH CUTTINGS AND BENTONITE. REPLACEMENT WELL.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810901300012	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004744

Elevation: 970 ft.
Latitude: 42.3387093214
Longitude: -83.6806529686
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2350' N OF WARREN RD., 800' E OF EARHART RD.

Well Owner: DIMCHOFF, DON

Well Address:	**Owner Address:**
4460 EARHART RD. ANN ARBOR, MI 48105	4460 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 124.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/8/1983

Casing Type: Unknown **Height:** 2.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 124.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 85.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 85.00 ft. after 2.00 hrs. at 12 GPM

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Gray Clay	55.00	67.00
Sand	57.00	124.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
16.00	4.00 ft.	120.00 ft. and 124.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1586
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: STILL IN SAND-BUT BOTTOMED OUT ON BOULDER. AA 8-83 S/W SCREEN MATERIAL AND CONTRACTOR TYPE MB 04/07/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810901300011	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004745

Elevation: 970 ft.
Latitude: 42.3382536437
Longitude: -83.681504711
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2200' N OF WARREN RD., 600' E OF EARHART RD. 1 MILE S. OF JOY W. SIDE OF EARHART

Well Owner: GILLILAND, DAN

Well Address:	**Owner Address:**
4410 EARHART RD. ANN ARBOR, MI 48105	8738 NEAL RD. MANCHESTER, MI 48158

Drilling Method: Rotary
Well Depth: 95.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/22/1980

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 95.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 61.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 63.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	44.00	44.00
Sand	41.00	85.00
Sand Water Bearing	10.00	95.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	8.00 ft.	87.00 ft. and 95.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	55 ft.	South

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: AA-15-80. 3" PLUG AND K-PACKER. WELL GROUTED WITH MUD. SOURCE, GEOLOGY MB 04/07/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000004746

Elevation: 922 ft.
Latitude: 42.3342953898
Longitude: -83.6784033206
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
1400' E OF EARHART RD., 700' N OF WARREN RD.

Well Owner: WANG, JAMES

Well Address:	Owner Address:
4165 WARREN RD. ANN ARBOR, MI 48105	2234 NEEDMAN RD. ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 65.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/12/1979

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 65.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 32.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 34.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	55.00	55.00
Sand Water Bearing	10.00	65.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	4.00 ft.	61.00 ft. and 65.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	100 ft.	Southeast

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN: 3" PLUG & K-PACKER. AA-3-79. WELL GROUTED WITH MUD GEOLOGY AND SCREEN MATERIAL MB 04/07/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810901300007	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004747

Elevation: 900 ft.
Latitude: 42.332306
Longitude: -83.672186
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1950' E OF EARHART RD., 800' N OF WARREN RD.

Well Owner: DOMINO'S FARMS HOLDING

Well Address:	**Owner Address:**
4505 WARREN RD. ANN ARBOR, MI 48105	P.O. BOX 974 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 66.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/12/1987

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 58.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 42.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 32.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 45.00 ft. after 2.00 hrs. at 70 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay Sandy	12.00	12.00
Yellow Sand	4.00	16.00
Blue Clay	18.00	34.00
Gray Sand	7.00	41.00
Blue Clay Hard	10.00	51.00
Sand & Gravel Fine	15.00	66.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
15.00	8.00 ft.	58.00 ft. and 66.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0388
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: NEAREST SOURCE OF CONTAMINATION: NONE WITHIN 1000' SOURCE, CONTRACTOR TYPE, SCREEN MATERIAL MB 04/07/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: 81727602001

Tax No: 810902400002	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:**
		WSSN:	**Source ID/Well No:**	

Well ID: 81000004748

Elevation: 932 ft.
Latitude: 42.3340976287
Longitude: -83.6841156641
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
700' N OF WARREN RD., 150' W OF EARHART RD.

Well Owner: ZERWECK, HERMAN

Well Address:
4125 EARHART RD.
ANN ARBOR, MI 48105

Owner Address:
920 ABERDEEN DR.
ANN ARBOR, MI 48104

Drilling Method: Driven Hand
Well Depth: 96.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/18/1977

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 92.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 80.00 ft. after 4.00 hrs. at 10 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type:
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	4.00 ft.	92.00 ft. and 96.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Yellow Sand	14.00	14.00
Yellow Clay	21.00	35.00
Blue Clay Hard	20.00	55.00
Yellow Sand Fine	25.00	80.00
Sand & Gravel Fine	16.00	96.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	0.00 ft. to 0.00 ft.

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southwest

Contractor Type: Unknown **Reg No:** 81-0388
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810902400004	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004749

Elevation: 952 ft.
Latitude: 42.3382255798
Longitude: -83.6843020741
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2200' N OF WARREN RD., 100' W OF EARHART RD. BETWEEN WARREN & JOY

Well Owner: DOMINORS CHILD CARE CENTER

Well Address:
4405 EARHART RD.
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Rotary
Well Depth: 114.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/2/1978

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 110.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 70.00 ft. after 2.00 hrs. at 20 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	4.00 ft.	110.00 ft. and 114.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Yellow Clay & Gravel	8.00	23.00
Blue Clay Hard	37.00	60.00
Blue Clay & Gravel Hard	36.00	96.00
Sand & Gravel Fine	18.00	114.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Other, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	125 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0388
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: AA 8-78. SOURCE, SCREEN MATERIAL 04/11/2022 MB
Other Remarks: Wellhead Completion:12 inch Above Grade

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000004750

Elevation: 950 ft.
Latitude: 42.3389516441
Longitude: -83.6849880263
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
2450' N OF WARREN RD., 300' W OF EARHART RD.

Well Owner: MILLER, RICHARD

Well Address:
4485 EARHART RD.
ANN ARBOR, MI 48105

Owner Address:
WESTLAND, MI

Drilling Method: Cable Tool
Well Depth: 113.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/2/1978

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 109.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 84.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 66.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 66.00 ft. after 2.00 hrs. at 12 GPM

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Clay	20.00	20.00
Sand & Gravel	65.00	85.00
Clay	2.00	87.00
Sand	26.00	113.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.75 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
30.00	4.00 ft.	109.00 ft. and 113.00 ft.

Fittings: Neoprene packer

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: BOTTOMED ON CLAY. AA1-78. SCREEN MATERIAL, CONTRACTOR TYPE, SOURCE 04/11/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810902300005	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004751

Elevation: 940 ft.
Latitude: 42.3326926957
Longitude: -83.6984610799
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1/4 MILE E OF NIXON RD. N SIDE ON WARREN RD

Well Owner: AMO, RICHARD

Well Address:	**Owner Address:**
3177 WARREN RD. ANN ARBOR, MI 48105	3177 WARREN RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 91.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 12/1/1982

Casing Type: Unknown **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 91.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 27.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 29.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 30.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	14.00	14.00
Sand	17.00	31.00
Clay	47.00	78.00
Sand Wet/Moist	4.00	82.00
Sand Water Bearing	9.00	91.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 5.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	87.00 ft. and 91.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	South

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: AA-10-71. REPLACEMENT? WELL GROUTED WITH MUD. GEOLOGY, LOCATION ACCURACY, SCREEN MATERIAL, LOCATION DESCRIPTION 04/11/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810902300005	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004752

Elevation: 940 ft.
Latitude: 42.3324575435
Longitude: -83.6987685761
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1/2 MILES E. OF NIXON RD, N. OF WARREN RD

Well Owner: AMO, RICHARD

Well Address:	**Owner Address:**
3177 WARREN RD. ANN ARBOR, MI 48105	ANN ARBOR, MI

Drilling Method: Auger/Bored
Well Depth: 84.00 ft. **Well Use:** Irrigation
Well Type: Replacement **Date Completed:** 6/8/1970

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 84.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 69.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 27.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 29.00 ft. after 1.00 hrs. at 10 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay Soft	63.00	78.00
Sand Water Bearing	6.00	84.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
28.00	4.00 ft.	80.00 ft. and 84.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Other	100 ft.	North

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0036
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WASHT. CO. HEALTH PERMIT AA3-69. WELL GROUTED WITH MUD. USE: FARM. WELL GROUTED WITH MUD. SCREEN:3" X 16" NIPPLE & 3" PLUG. SOURCE, WELL USE, SCREEN MATERIAL 04/11/2022 MB

Other Remarks: Grouting Material 1:Listed as other in Wellkey, Contamination Source 1:Type Unknown, Pump Manufacturer:REDA

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810902400002	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004753

Elevation: 929 ft.
Latitude: 42.3339175848
Longitude: -83.6847823135
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
700' N OF WARREN RD., 250' W OF EARHART RD.

Well Owner: ZERWECK, HERMAN

Well Address:	**Owner Address:**
4125 EARHART RD. ANN ARBOR, MI 48105	4125 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 92.00 ft. **Well Use:** Irrigation
Well Type: Replacement **Date Completed:** 11/20/1983
Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 87.00 ft. depth

Borehole: 7.88 in. to 84.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 39.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 41.00 ft. after 1.00 hrs. at 12 GPM
Pumping level 43.00 ft. after 2.00 hrs. at 12 GPM

Unrestricted Flow Rate:

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	8.00 ft.	84.00 ft. and 92.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	41.00	41.00
Gravel	16.00	57.00
Gray Clay	12.00	69.00
Sand	20.00	89.00
Gravel	2.00	91.00
Gray Clay	1.00	92.00

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	160 ft.	North

Abandoned Well Plugged: Unknown

Casing Removed:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1872
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: THIS WELL IRRIGATES POND. 2 ANCHOR. WELL HEAD COMPLETION: 12" ABOVE GRADE ALSO CHECKED. SCREEN MATERIAL, LOCATION ACCURACY 04/11/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000004754

Elevation: 973 ft.
Latitude: 42.3445709788
Longitude: -83.700600414
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
1/2 MILE E. OF PONTIAC TRAIL AND NIXON RD, S. OF E JOY RD

Well Owner: KAPP, ORMOND

Well Address:
3180 JOY RD.
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Rotary
Well Depth: 72.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/15/1980

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 72.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 55.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 25.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 46.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 48.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	12.00	12.00
Sand	2.00	14.00
Clay	16.00	30.00
Clay Sandy	33.00	63.00
Sand Water Bearing	9.00	72.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	5.00 ft.	67.00 ft. and 72.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	75 ft.	East

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN: 3" PLUG & K-PACKER. WATER QUALITY NOT KNOWN. WELL GROUTED WITH MUD. SCREEN MATERIAL, LOCATION DESCRIPTION, SOURCE, LOCATION ACCURACY 04/11/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000004755

Elevation: 970 ft.
Latitude: 42.3444599388
Longitude: -83.6996832699
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
1100' E OF PONTIAC TRAIL., 100' S OF JOY RD. 1/2 MILE E OF PONTIAC TRAIL, S. OF JOY RD

Well Owner: BRAUN

Well Address:	Owner Address:
3200 JOY RD. ANN ARBOR, MI 48105	3200 JOY RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 74.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/13/1980

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 74.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 47.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 56.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 58.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Clay	32.00	32.00
Sand	2.00	34.00
Clay	30.00	64.00
Sand Water Bearing	10.00	74.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	5.00 ft.	69.00 ft. and 74.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	75 ft.	East

Abandoned Well Plugged: Unknown

Casing Removed:

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL GROUTED WITH MUD. SCREEN: 3" PLUG AND K-PACKER. LOCATION DESCRIPTION, GEOLOGY, SCREEN MATERIAL, LOCATION ACCURACY, SOURCE, 04/11/2022 MB

Other Remarks: Grouting Material 1:Listed as other in Wellkey

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810903100003	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Unknown	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004758

Elevation: 971 ft.
Latitude: 42.345243
Longitude: -83.666189
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
350' S OF JOY RD., 30' E OF PONTIAC TRAIL

Well Owner: KERN, M.

Well Address:
4820 JOY RD.
ANN ARBOR, MI 48105

Owner Address:
3690 NORTH FIELD CHURCH RD.
ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 98.00 ft. **Well Use:** Other
Well Type: Replacement **Date Completed:** 12/18/1973

Casing Type: Unknown **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 98.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 84.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 55.00 ft. after 3.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Clay Sandy	12.00	12.00
Clay	63.00	75.00
Sand Fine	12.00	87.00
Sand Medium	11.00	98.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Unknown
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	4.00 ft.	94.00 ft. and 98.00 ft.

Fittings: Neoprene packer

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Contractor Type: Unknown **Reg No:** 82-0064
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: USE: FARM. WATER QUALITY: UNKNOWN.
Other Remarks: Well Use:Type Use Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: 81727605401

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Inactive	2047081	001

Well ID: 81000004773

Elevation: 853 ft.
Latitude: 42.33343
Longitude: -83.66935
Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
2047081; 1 THE SETTLEMENT

Well Owner: D.F. HOLDING

Well Address:
4505 WARREN
ANN ARBOR, MI

Owner Address:
24 FRANK LLOYD WRIGHT
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 60.00 ft. **Well Use:** Type II public
Well Type: New **Date Completed:** 12/8/1997

Casing Type: Unknown **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 6.00 in. to 51.00 ft. depth

Borehole: 10.00 in. to 122.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 75 GPM
Drop Pipe Length: 42.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 0.83 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 60.00 ft. after 2.00 hrs. at 200 GPM

Formation Description	Thickness	Depth to Bottom
No Lithology Information	60.00	60.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 3.00 ft. Above
Screen Material Type:
Screen Installation Type: Unknown

Slot	Length	Set Between
35.00	13.00 ft.	47.00 ft. and 60.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other	0.00	None	0.00 ft. to 47.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Other	450 ft.	Southeast

Geology Remarks:

Drilling Machine Operator Name: BROWN DRILLING CO
Employment: Unknown

Contractor Type: Unknown **Reg No:** 47-2072
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:
Other Remarks: Grouting Material 1:Listed as other in Wellkey, Contamination Source 1:Type Unknown, Pump Manufacturer:J-LINE

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810911100001	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 11	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004825

Elevation: 905 ft.
Latitude: 42.329927
Longitude: -83.685919
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
400' S OF WARREN RD., 300' W OF EARHART RD.

Well Owner: KORZON, MARK

Well Address:	**Owner Address:**
3867 EARHART RD. ANN ARBOR, MI 48105	3867 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 63.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/6/1983

Casing Type: Unknown **Height:** 1.00 ft. above grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 59.00 ft. depth
3.00 in. to 63.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: A.Y. McDonald **Pump Type:** Submersible
Model Number: **Pump Capacity:** 10 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 20.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 30.00 ft. after 1.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Sand	10.00	10.00
Yellow Clay	20.00	30.00
Gray Sand	5.00	35.00
Gray Clay	5.00	40.00
Gray Sand Fine	10.00	50.00
Gray Sand Medium	13.00	63.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	5.00 ft.	59.00 ft. and 63.00 ft.

Fittings: Neoprene packer

Well Grouted: No

Geology Remarks:

Wellhead Completion: Other, 12 inches above grade

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1692
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL STATUS, SCREEN MATERIAL, HP, VOLTS, GPM, CONT. TYPE, SOURCE, 04/25/2022 MB

Other Remarks: Wellhead Completion:12 inch Above Grade

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810907100002	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 11	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004828

Elevation: 915 ft.
Latitude: 42.3316251181
Longitude: -83.6897219628
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1600' W OF EARHART RD., 50' S OF WARREN RD.

Well Owner: M.S.C. PARTNERSHIP

Well Address:
3670 WARREN RD.
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Cable Tool
Well Depth: 83.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/27/1985

Casing Type: Steel - black **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 83.00 ft. depth

Borehole: 6.00 in. to 74.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: CN6CC **Pump Capacity:** 15 GPM
Drop Pipe Length: 42.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 44.00 ft. after 2.00 hrs. at 18 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	59.00	74.00
Sand	9.00	83.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	4.00 ft.	79.00 ft. and 83.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southeast

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: AA 14-84 WR MODEL #, HP, VOLTS, GPM, WELL STATUS, SCREEN MATERIAL, CONT. TYPE, SOURCE, 04/25/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Well ID: 81000004829

Elevation: 929 ft.
Latitude: 42.328223
Longitude: -83.684493
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2200' S OF WARREN RD., 750' W EARHART RD.

Well Owner: DOMINO'S FARMS HOLDING

Well Address:	Owner Address:
3767 EARHART RD. ANN ARBOR, MI 48105	P.O. BOX 974 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 96.00 ft. **Well Use:** Unknown
Well Type: Replacement **Date Completed:** 7/2/1987

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 84.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 5.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: 4ST-70-500 **Pump Capacity:** 64 GPM
Drop Pipe Length: 67.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 48.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 70.00 ft. after 2.00 hrs. at 80 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	16.00	16.00
Blue Clay Hard	51.00	67.00
Sand & Gravel Fine	29.00	96.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	12.00 ft.	84.00 ft. and 96.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1760
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN MATERIAL, STATUS, CONT. TYPE, MODEL #, HP, VOLTS, GPM, LONGITUDE/LATITUDE 04/25/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810912200004	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000004837

Elevation: 912 ft.
Latitude: 42.330766
Longitude: -83.68243
Method of Collection: Interpolation-Map

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
02S 06E	12	Active		

Distance and Direction from Road Intersection:
600' E OF EARHART RD., 150' S OF WARREN RD.

Well Owner: KOCH, KEN

Well Address:
3900 EARHART RD.
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Cable Tool
Well Depth: 73.00 ft. **Well Use:** Other
Well Type: Replacement **Date Completed:** 4/8/1970

Casing Type: Unknown **Height:** 1.00 ft. above grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 69.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Other **Pump Type:** Submersible
Model Number: 9D9P051 **Pump Capacity:** 12 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 16.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 23.00 ft. after 1.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Red Clay	7.00	7.00
Clay Water Bearing	6.00	13.00
Clay Gravely	12.00	25.00
Blue Clay Soft	30.00	55.00
Cobbles	10.00	65.00
Sand Water Bearing	8.00	73.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Other
Screen Installation Type: Unknown

Slot	Length	Set Between
25.00	4.00 ft.	69.00 ft. and 73.00 ft.

Fittings: None

Well Grouted: No

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Animal yard/Feedlot	55 ft.	North

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1075
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: REPLACEMENT WELL. USE, STATUS, CONT. TYP, LONG/LAT, MODEL #, HP, GPM, SCREEN MATERIAL 04/26/2022 MB

Other Remarks: Well Use:POULTRY HOUSE, Pump Manufacturer:REDA, Screen Material:COOK RED BRASS

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: 96-04282	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Well ID: 81000004838

Elevation: 905 ft.
Latitude: 42.329223
Longitude: -83.665492
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
S OF WARREN ON W SIDE OF THORNWOOD CT

Well Owner: RJM CONSTRUCTION

Well Address:
3993 THORNWOOD CT
ANN ARBOR, MI 48105

Owner Address:
10166 COLONIAL INDUSTRIL
SOUTH LYON, MI 48178

Drilling Method: Rotary
Well Depth: 192.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/22/1997
Casing Type: Unknown **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 64.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:** Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		189.00 ft. and 192.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	16.00	16.00
Gray Clay	32.00	48.00
Gravel & Cobbles	7.00	55.00
Gray Clay	13.00	68.00
Gravel Water Bearing	5.00	73.00
Gray Clay	113.00	186.00
Gravel	6.00	192.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	110 ft.	Southeast

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1580
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL DETAILS, GEOLOGY, CONTRACTOR, LATITUDE/LONGITUDE MB 4/4/2022
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810912100018	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 12	**Well Status:** Unknown	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004842

Elevation: 870 ft.
Latitude: 42.328214
Longitude: -83.662552
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1100' S OF WARREN RD., 350' W OF DIXBORO RD.

Well Owner: WARREN, LAURA

Well Address:
4964 WALNUT WOODS
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Rotary
Well Depth: 301.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 11/3/1986

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: None

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 999.99 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: No **Intake:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	18.00	18.00
Yellow Clay Sandy	26.00	44.00
Blue Clay Hard	38.00	82.00
Sand Fine	5.00	87.00
Blue Clay Hard	72.00	159.00
Blue Clay & Gravel Hard	122.00	281.00
Sandstone	20.00	301.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Unknown **Reg No:** 81-1760
Business Name:
Business Address:

Abandoned Well Plugged: No

Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: CALLED DRY HOLE. FILLED WITH CUTTINGS AND BENTONITE. LAST LITHOLOGY RECORDED: BLUE SHALE, NO THK, NO BOT.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810912100018	**Permit No:** AA-26-86WN	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 12	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004843

Elevation: 880 ft.
Latitude: 42.328235
Longitude: -83.662469
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1100' S OF WARREN RD., 300' W OF DIXBORO RD. N. OF M-14

Well Owner: WARREN, LAURA

Well Address:
4964 WALNUT WOODS DR.
ANN ARBOR, MI 48105

Owner Address:

Drilling Method: Rotary
Well Depth: 88.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/7/1986

Casing Type: Steel - black **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 80.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: SD20 **Pump Capacity:** 20 GPM
Drop Pipe Length: 68.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 75.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	18.00	18.00
Yellow Sand	20.00	38.00
Blue Clay	19.00	57.00
Yellow Sand	4.00	61.00
Gray Sand & Gravel	27.00	88.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	8.00 ft.	80.00 ft. and 88.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	West

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1760
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: AA 26-86 SCREEN: HEMP PACKER & PLUG. STAUS, PERMIT #, CONT. TYPE, SOURCE, LONG/LAT, MODEL #, HP, VOLTS, GPM 04/26/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 811006200001	**Permit No:**	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000005181

Elevation: 934 ft.
Latitude: 42.3455010264
Longitude: -83.6613331144
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
200' S OF JOY RD., 125' E OF DIXBORO RD.

Well Owner: SPENCER, H.B.

Well Address:
5024 JOY RD.
ANN ARBOR, MI 48105

Owner Address:
7018 WILDWOOD RD.
WESTLAND, MI 48155

Drilling Method: Rotary
Well Depth: 287.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/24/1985

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 283.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 140.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 80.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 140.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Blue Clay	41.00	53.00
Sand Fine	14.00	67.00
Blue Clay Hard	88.00	155.00
Blue Clay Soft	110.00	265.00
Sand & Gravel Coarse	22.00	287.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	283.00 ft. and 287.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1760
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SU 33-85WR DF 4/28/22 Screen
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 811006300009	**Permit No:**	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000005183

Elevation: 861 ft.
Latitude: 42.333765
Longitude: -83.65468
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1600' E OF DIXBORO RD., 400' N OF WARREN RD.

Well Owner: DICKS, DON

Well Address:	**Owner Address:**
5401 WARREN RD. ANN ARBOR, MI 48105	5401 WARREN RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 260.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/3/1986

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter:

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 100.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 60.00 ft. after 2.00 hrs. at 20 GPM
Pumping level 60.00 ft. after 2.00 hrs. at 20 GPM

Screen Installed: No **Intake:** Bedrock Well

Formation Description	Thickness	Depth to Bottom
Clay	10.00	10.00
Sand	4.00	14.00
Clay	21.00	35.00
Sand	3.00	38.00
Clay	104.00	142.00
Sand	2.00	144.00
Clay	83.00	227.00
Unidentified Consolidated Fm	33.00	260.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SU 40-86; ROCK WELL--3"LINER (35' LENGTH); 10' BLANK ABOVE SCREEN.(?) DF 4/28/22 Screen, Coords
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 811006300004	**Permit No:**	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000005184

Elevation: 881 ft.
Latitude: 42.333575
Longitude: -83.657676
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1200' E OF DIXBORO RD., 450' N OF WARREN RD.

Well Owner: COLANER, GERALD

Well Address:
5209 WARREN RD.
ANN ARBOR, MI 48105

Owner Address:
5209 WARREN RD.
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 202.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/29/1986

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 202.00 ft. depth

Borehole: 8.00 in. to 191.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 185.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 150.00 ft. after 2.00 hrs. at 12 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
25.00	8.00 ft.	192.00 ft. and 200.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Brown Clay W/Boulders	27.00	27.00
Gray Clay	13.00	40.00
Gravel	7.00	47.00
Gray Clay	85.00	132.00
Gray Clay Sandy	43.00	175.00
Gray Clay	16.00	191.00
Gravel	9.00	200.00
Gray Clay	2.00	202.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: DF 4/28/22 Screen
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	**Permit No:** 00-02587	**County:** Washtenaw			**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**

Source ID/Well No:

Well ID: 81000010222

Elevation: 934 ft.
Latitude: 42.346527
Longitude: -83.663512
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
CORNER OF JOY & ERIC LOT 1

Well Owner: CHIZEK BUILDERS

Well Address:
5033 ERIC CT.
MI

Owner Address:
5135 SCIO CHURCH
ANN ARBOR, MI 48107

Drilling Method: Rotary
Well Depth: 277.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/19/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 189.00 ft. depth
5.00 in. to 269.00 ft. depth

Borehole: 8.50 in. to 277.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 80.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 277.00 ft. after 2.00 hrs. at 85 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	11.00	11.00
Gray Clay	39.00	50.00
Gravel	5.00	55.00
Gray Clay	107.00	162.00
Unidentified Consolidated Fm	7.00	169.00
Gray Clay & Gravel	111.00	280.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Unknown
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	8.00 ft.	269.00 ft. and 277.00 ft.

Fittings: Neoprene packer, Bottom plug

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	23.00	None	0.00 ft. to 260.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: WAYNE O'BRIEN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-2125
Business Name: O'BRIEN WELL DRILLING
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN=STAINLESS / SLOT=2-15'S
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 00-02669	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000010223

Elevation: 930 ft.
Latitude: 42.347029
Longitude: -83.663825
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
NEAR INTERSECTION OF JOY AND DIXSBORO LOT 2

Well Owner: CJOZEL BIO;DERS

Well Address:
5053 ERIE COURT
MI

Owner Address:
5135 SCIO CHURCH RD
ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 290.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 4/28/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 200.00 ft. depth
200.00 in. to 290.00 ft. depth

Borehole: 8.50 in. to 290.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 31.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 290.00 ft. after 2.00 hrs. at 55 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	9.00	9.00
Gray Clay	26.00	35.00
Brown Sand	18.00	53.00
Gray Clay	227.00	280.00
Sandstone W/Gravel	10.00	290.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Unknown
Screen Installation Type: Unknown

Slot	Length	Set Between
15.00	8.00 ft.	280.00 ft. and 290.00 ft.

Fittings: Neoprene packer, Bottom plug

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	31.00	None	0.00 ft. to 200.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name: BRUCE W. O'BRIEN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-2125
Business Name: O'BRIEN WELL DRILLING
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN= STAINLESS / SLOT=2 - 15DS
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: Wel2001-05664	County: Washtenaw	Township: Northfield

Well ID: 81000010523

Elevation: 958 ft.
Latitude: 42.34541
Longitude: -83.697828
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
1/4 mile east of Pontiac Trail north side of Joy Road

Well Owner: Brian Byrne

Well Address:	Owner Address:
3323 Joy Road Ann Arbor, MI 48105	3323 Joy Road Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 285.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 12/13/2001

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 275.00 ft. depth

Borehole: 8.50 in. to 290.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 12/17/2001 **HP:** 0.50
Manufacturer: Sta-Rite **Pump Type:** Submersible
Model Number: 10P4C0J **Pump Capacity:** 10 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 180.00 ft. after 1.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Clay	51.00	51.00
Sand Silty	9.00	60.00
Clay	48.00	108.00
Sand	2.00	110.00
Clay	160.00	270.00
Gravel Coarse	15.00	285.00
Shale	5.00	290.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	10.00 ft.	275.00 ft. and 285.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite dry granular	20.00	Other	0.00 ft. to 270.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name: Scott Griffin
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southeast

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-1607
Business Name: Ed Birkmeier Well Drilling Ltd
Business Address: 10655 Easton Road, New Lothrop, MI, 48460

Abandoned Well Plugged: Yes

Casing Removed: Unknown

Plugging Material: Other
No. of Bags: 999.00

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: Pump - Bruce Hofsess Pumped 2 hrs 8" drawdown at 10 gpm
Other Remarks: Plugging Material:UNK, Grouting Additive 1:EZ-MUD

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 00-04601	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000010613

Elevation:

Latitude: 42.349571

Longitude: -83.689958

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: B.D. DONOVAN

Well Address:	Owner Address:
5280 PONTIAC TRAIL MI	7785 HAMBURG ROAD BRIGHTON, MI 48116

Drilling Method: Rotary
Well Depth: 74.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/7/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: None

Diameter: 5.00 in. to 66.00 ft. depth

Borehole: 8.50 in. to 74.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 57.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 65.00 ft. after 2.00 hrs. at 13 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
7.00	8.00 ft.	66.00 ft. and 74.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Brown Clay Hard	14.00	14.00
Gray Clay Hard	11.00	25.00
Brown Sand W/Clay Gray	13.00	38.00
Gray Clay	8.00	46.00
Gray Clay Sandy	14.00	60.00
Gray Sand Fine Coarse	4.00	64.00
Gray Sand Fine	10.00	74.00
Gray Clay Sandy	1.00	75.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	Other	0.00 ft. to 65.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: ADAMS WELL DRILLING INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: EMPLOYEE: ERIC LOSKILL; PUMP TEST 18.2GPM
Other Remarks: Grouting Additive 1:T-100

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 00-04601	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000010879

Elevation:
Latitude: 42.349601
Longitude: -83.68998
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: B D DONOVAN

Well Address:	Owner Address:
5280 PONTIAC TRAIL MI	7785 HAMBURG ROAD BRIGHTON, MI 48116

Drilling Method: Rotary
Well Depth: 74.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/22/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: None

Diameter: 5.00 in. to 66.00 ft. depth

Borehole: 8.50 in. to 74.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Sta-Rite **Pump Type:** Submersible
Model Number: 100F211126 **Pump Capacity:**
Drop Pipe Length: 58.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-X-Trol
Model Number: 250 **Tank Capacity:**
Pressure Relief Valve Installed: No

Static Water Level: 57.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 65.00 ft. after 2.00 hrs. at 18 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay Hard	14.00	14.00
Gray Clay Hard	11.00	25.00
Brown Sand W/Clay Gray	13.00	38.00
Gray Clay	8.00	46.00
Gray Clay Sandy	14.00	60.00
Gray Sand Fine To Coarse	4.00	64.00
Gray Clay Sandy	10.00	74.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
7.00	8.00 ft.	66.00 ft. and 74.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	Other	0.00 ft. to 65.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: ADAMS WELL DRLG INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: EMPLOYEE: ERIC LOSKILL; PUMP TEST 18.2 GPM
Other Remarks: Grouting Additive 1:T-100

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	**Permit No:** 02-00246	**County:** Washtenaw	**Township:** Northfield

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 06E	35	Active		

Well ID: 81000010966

Elevation:

Latitude: 42.348703

Longitude: -83.698517

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:
NEAREST CROSSROAD-PONTIAC TRAIL

Well Owner: STORY DEVELOPMENT/D. BARNES

Well Address:	**Owner Address:**
5290 Tamarack Trail MI 48105	2025 S. NEWBURG WESTLAND, MI 48185

Drilling Method: Rotary
Well Depth: 75.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/16/2002

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 68.00 ft. depth

Borehole: 8.50 in. to 80.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 75.00 ft. after 4.00 hrs. at 20 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	**Length**	**Set Between**
15.00	8.00 ft.	67.00 ft. and 75.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Topsoil Fill	2.00	2.00
Brown Clay	6.00	8.00
Sand Fine	2.00	10.00
Brown Clay	7.00	17.00
Sand	23.00	40.00
Gravel	9.00	49.00
Gray Clay	15.00	64.00
Sand Water Bearing	11.00	75.00
Gray Clay	5.00	80.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	**Bags**	**Additives**	**Depth**
Bentonite slurry	8.00	None	0.00 ft. to 65.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	**Distance**	**Direction**
Septic tank	130 ft.	East
None		

Drilling Machine Operator Name: STEVE WHEELER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2215
Business Name: ANN ARBOR WELL DRILLING INC
Business Address: 7446 JOY ROAD/PO BOX 163, DEXTER, MI

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST
Other Remarks: Coordinate Source:Google well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 00-02669	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000011043

Elevation:

Latitude: 42.347016

Longitude: -83.663866

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
near the intersection of Joy and Dixboro

Well Owner: Nancy Barr

Well Address:	Owner Address:
5053 Eric Court MI	3359 Landings Dr. Ann Arbor , MI 48103

Drilling Method: Rotary
Well Depth: 290.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/24/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 200.00 ft. depth
290.00 ft. depth

Borehole: 8.78 in. to 290.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2NFL-152-2 **Pump Capacity:** 20 GPM
Drop Pipe Length: 165.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Elbi
Model Number: DV 200 **Tank Capacity:** 53.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 81.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 290.00 ft. after 2.00 hrs. at 55 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	9.00	9.00
Gray Clay	26.00	35.00
Brown Sand	18.00	53.00
Gray Clay	227.00	280.00
Sandstone W/Gravel	10.00	290.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
15.00	8.00 ft.	280.00 ft. and 290.00 ft.

Fittings: Bottom plug

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	31.00	None	0.00 ft. to 260.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	West

Geology Remarks:

Drilling Machine Operator Name: John Stepp
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-2125
Business Name: O'Brien Well Drilling
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 00-02587	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000011177

Elevation:

Latitude: 42.346567

Longitude: -83.663512

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
CORNER OF JOY RD & ERIC COURT

Well Owner: NANCY BARR

Well Address:	Owner Address:
5033 ERIC COURT MI	3359 LANDINGS DRIVE ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 277.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/19/2000

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 180.00 ft. depth
5.00 in. to 269.00 ft. depth

Borehole: 8.50 in. to 277.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/14/2000 **HP:** 1.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2NFL15220 **Pump Capacity:** 20 GPM
Drop Pipe Length: 165.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Elbi
Model Number: DV200 **Tank Capacity:** 14.9 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 80.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 277.00 ft. after 2.00 hrs. at 85 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	11.00	11.00
Gray Clay	39.00	50.00
Gravel	5.00	55.00
Gray Clay	107.00	162.00
Stones	7.00	169.00
Gray Clay W/Gravel	111.00	280.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	8.00 ft.	269.00 ft. and 277.00 ft.

Fittings: Bottom plug

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	23.00	None	0.00 ft. to 260.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Geology Remarks:

Drilling Machine Operator Name: JOHN STEPP
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-2125
Business Name: O'BRIEN WELL DLG
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST; SLOT: 2-15'S
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 00-05-607	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000011242

Elevation:

Latitude: 42.333397

Longitude: -83.656984

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: JIM BINDER BUILDING AND CONSTR

Well Address:	**Owner Address:**
5277 WARREN ANN ARBOR, MI 48103	4537 PRATT RD. ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 243.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 1/4/2001

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 238.00 ft. depth

Borehole: 9.00 in. to 230.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T20100 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Amtrol
Model Number: WX251 **Tank Capacity:** 19.2 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 34.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 44.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 243.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	24.00	24.00
Gray Clay	35.00	59.00
Sand	4.00	63.00
Gray Clay	174.00	237.00
Sand & Gravel	6.00	243.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	5.00 ft.	238.00 ft. and 243.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	16.00	None	0.00 ft. to 230.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	North

Geology Remarks:

Drilling Machine Operator Name: KEN PEARCE
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRILLING
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 600 LB. SAND PACK
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: WEL2001-05347	County: Washtenaw	Township: Northfield

Well ID: 81000011292

Elevation:

Latitude: 42.348575

Longitude: -83.686378

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
CROSSROADS: JOY & PONTIAC TRAIL

Well Owner: HOLLEY DEVELOPMENT/KNEPPER

Well Address:	Owner Address:
3801 Spring Hill Ann Arbor, MI 48105	3317 HOMESTEAD CT. SALINE, MI 48176

Drilling Method: Rotary
Well Depth: 64.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/8/2002

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 60.00 ft. depth

Borehole: 8.50 in. to 70.00 ft. depth

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 64.00 ft. after 4.00 hrs. at 30 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
25.00	5.00 ft.	59.00 ft. and 64.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 57.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	300 ft.	East
None		

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 11/13/2012 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20fv1P4 **Pump Capacity:** 20 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:** 81000011292
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL-28 **Tank Capacity:** 82.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gray Clay	13.00	25.00
Sand	4.00	29.00
Clay & Gravel	7.00	36.00
Gray Clay	22.00	58.00
Sand Water Bearing	6.00	64.00
Gray Clay	6.00	70.00

Geology Remarks:

Drilling Machine Operator Name: STEVE WHEELER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2215
Business Name: ANN ARBOR WELL DRILLING INC
Business Address: PO BOX 163, DEXTER, MI, 48130

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST. PUMP & TANK INSTALLED NOV. 13, 2012. ORIGINAL ADDRESS WAS 5155 EARHART RD. RELIEF VALVE & BOILER DRAIN INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0105270	**County:** Washtenaw		**Township:** Salem
Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000011575

Elevation:

Latitude: 42.355157

Longitude: -83.659728

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
LOT 6

Well Owner: PHILIP CONLIN

Well Address:	**Owner Address:**
5166 DIXBORO FARMS DRIVE MI	ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 85.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 8/10/2001

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 66.00 ft. depth

Borehole: 8.50 in. to 90.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 85.00 ft. after 4.00 hrs. at 10 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	20.00 ft.	65.00 ft. and 85.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	14.00	14.00
Gray Clay	7.00	21.00
Gravel	2.00	23.00
Gray Clay	13.00	36.00
Sand	4.00	40.00
Gray Clay	20.00	60.00
Sand Water Bearing	25.00	85.00
Gray Clay	5.00	90.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 60.00 ft.

Wellhead Completion: Other

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	Southwest

Geology Remarks:

Drilling Machine Operator Name: TIM DUNAVIN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name: ANN ARBOR WELL DRLG
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST
Other Remarks: Wellhead Completion:NONE

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 010 53 40	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000012114

Elevation:

Latitude: 42.349596

Longitude: -83.698421

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: John Hufford

Well Address:
5137 Pontiac Trail
MI

Owner Address:
Ann Arbor, MI 48104

Drilling Method: Rotary
Well Depth: 65.00 ft. **Well Use:** Household
Well Type: New **Date Completed:**

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 61.00 ft. depth

Borehole: 8.50 in. to 70.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 65.00 ft. after 4.00 hrs. at 25 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
25.00	5.00 ft.	60.00 ft. and 65.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gravel	13.00	25.00
Brown Clay	7.00	32.00
Stones	2.00	34.00
Gravel	7.00	41.00
Gray Clay	14.00	55.00
Clay W/Gravel	5.00	60.00
Sand Water Bearing	5.00	65.00
Gray Clay	5.00	70.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 58.00 ft.

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	North

Geology Remarks:

Drilling Machine Operator Name: Tim Dunavin
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name: Ann Arbor Well Drilling
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0200058	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000012235

Elevation:

Latitude: 42.347383

Longitude: -83.662927

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
NEAR THE N/W CORNER OF DIXBORO & JOY

Well Owner: CHIZEK BUILDERS

Well Address:	**Owner Address:**
5040 ERIC COURT MI	5135 SCIO CHURCH RD ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 302.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/18/2002

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting: Unknown

Diameter: 5.00 in. to 294.00 ft. depth

Borehole: 8.50 in. to 302.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 109.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 302.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	18.00	18.00
Gray Clay	78.00	96.00
Gray Clay & Gravel	26.00	122.00
Gray Clay	169.00	291.00
Gray Sand W/Sandstone	11.00	302.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	8.00 ft.	294.00 ft. and 302.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	27.00	None	0.00 ft. to 290.00 ft.

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		
Unknown		

Geology Remarks:

Drilling Machine Operator Name: WAYNE O BRIEN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-2125
Business Name: OBRIEN WELL DRLG
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 0105440	County: Washtenaw	Township: Salem

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Well ID: 81000012306

Elevation:

Latitude: 42.347392

Longitude: -83.657467

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: SOCCER USA

Well Address:
5295 JOY
MI

Owner Address:
ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 120.00 ft. **Well Use:** Other
Well Type: New **Date Completed:**

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 111.00 ft. depth

Borehole: 8.50 in. to 128.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 65.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 120.00 ft. after 4.00 hrs. at 50 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	110.00 ft. and 120.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gray Clay	3.00	15.00
Brown Clay	2.00	17.00
Gravel	1.00	18.00
Gray Clay	5.00	23.00
Sand	12.00	35.00
Gray Clay	12.00	47.00
Gray Clay & Gravel	3.00	50.00
Gray Clay	9.00	59.00
Sand	6.00	65.00
Gray Clay	7.00	72.00
Sand	6.00	78.00
Gray Clay	14.00	92.00
Sand Water Bearing	28.00	120.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	14.00	None	0.00 ft. to 109.00 ft.

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	North

Drilling Machine Operator Name: TIM DUNAVIN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name: ANN ARBOR WELL DRILLING
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:listed type2 unconfirmed

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0105441	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000012307

Elevation:

Latitude: 42.347332

Longitude: -83.657461

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: SOCCER USA

Well Address:
5295 joy rd
MI

Owner Address:
ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 121.00 ft. **Well Use:** Other
Well Type: New **Date Completed:**

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 117.00 ft. depth

Borehole: 8.50 in. to 128.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 65.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 12.00 ft. after 4.00 hrs. at 50 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
25.00	4.00 ft.	115.00 ft. and 120.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gray Clay	29.00	41.00
Gravel	3.00	44.00
Brown Clay	3.00	47.00
Sand	2.00	49.00
Clay & Sand	7.00	56.00
Gray Clay	13.00	69.00
Sand	2.00	71.00
Gray Clay	23.00	94.00
Sand Water Bearing	26.00	120.00
Gray Clay	8.00	128.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	15.00	None	0.00 ft. to 115.00 ft.

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	North

Geology Remarks:

Drilling Machine Operator Name: TIM DUNAVIN
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name: ANN ARBOR WELL DRILLING
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:listed type2 unconfirmed

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0200606	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000012729

Elevation:

Latitude: 42.356858

Longitude: -83.662254

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:

Well Owner: ROBERT HLAVACK

Well Address:
5598 DIXBORO
ANN ARBOR, MI 48105

Owner Address:
5598 DIXBORO
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 80.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/16/2002

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 70.00 ft. depth

Borehole: 9.00 in. to 65.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1250230 **Pump Capacity:** 12 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Amtrol
Model Number: WX203 **Tank Capacity:** 10.8 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 39.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 42.00 ft. after 2.00 hrs. at 7 GPM
Pumping level 80.00 ft. after 2.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	17.00	17.00
Sand	21.00	38.00
Gray Clay	29.00	67.00
Sand	13.00	80.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	70.00 ft. and 80.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 65.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Abandoned Well Plugged: Yes

Casing Removed:

Geology Remarks:

Drilling Machine Operator Name: TROY REVILL
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: PUMPING LEVEL EST WITH AIR 15 GPM; 700 #SAND PACK; TANK: OWNERS

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 2002-00642	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Well ID: 81000012751

Elevation:

Latitude: 42.334308

Longitude: -83.684189

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: DOMINO'S FARM CORP

Well Address:
4125 EARHART ROAD
ANN ARBOR, MI

Owner Address:
24 FRANK LLOYDS WRIGHT DR PO BOX 445

Drilling Method: Rotary
Well Depth: 78.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/11/2002

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 70.00 ft. depth

Borehole: 7.88 in. to 78.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Jacuzzi **Pump Type:** Submersible
Model Number: TSHVR8-52 **Pump Capacity:** 10 GPM
Drop Pipe Length: 63.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Sta-Rite Signature
Model Number: **Tank Capacity:** 86.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 69.00 ft. after 2.00 hrs. at 10 GPM

Formation Description	Thickness	Depth to Bottom
Gravel	22.00	22.00
Blue Clay	14.00	36.00
Sand & Gravel	42.00	78.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.25 ft.
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	8.00 ft.	70.00 ft. and 78.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 70.00 ft.

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Abandoned Well Plugged: Yes

Casing Removed: Unknown

Geology Remarks:

Drilling Machine Operator Name: BRIAN SUNDE
Employment: Subcontractor

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-0025
Business Name: OO CORSAUT INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SUB-CONT: GIL SUNDE WELL DRLG 1710

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Northfield

Well ID: 81000012883

Elevation: 902 ft.
Latitude: 42.346411
Longitude: -83.680643
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
NORTH EAST CORNER OF DIXBORO AND JOY ROAD.

Well Owner: BOUMA CORP.

Well Address:
4101 JOY ROAD
ANN ARBOR, MI 48105

Owner Address:
4101 ROGER B, CHAFFEE SE
GRAND RAPIDS, MI 49548

Drilling Method: Rotary
Well Depth: 91.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 8/28/2002

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 70.00 ft. depth

Borehole: 8.00 in. to 90.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 9/23/2002 **HP:** 1.00
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 52JF-J1025 **Pump Capacity:** 25 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 31.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 91.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	2.00	2.00
Brown Sand	46.00	48.00
Gray Clay	15.00	63.00
Gray Sand Fine	12.00	75.00
Gravel Coarse	6.00	81.00
Gray Sand Fine	10.00	91.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	20.00 ft.	70.00 ft. and 90.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 65.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	West

Geology Remarks:

Drilling Machine Operator Name: BRIAN KELLER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: KELLER WELL DRILLING, INC.
Business Address: 3766 NOBLE DRIVE, BRIGHTON, MI, 48116

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: WEL2003-00548	County: Washtenaw	Township: Salem

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Well ID: 81000013540

Elevation:

Latitude: 42.354331

Longitude: -83.659717

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:
NEAREST CROSSROADS: N. TERRITORIAL AND JOY

Well Owner: CONLIN, PHILIP

Well Address:
5202 Dixboro Farms Dr
ANN ARBOR, MI 48105

Owner Address:
2455 S. INDUSTRIAL, SUITE K
ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 8/11/2003

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 91.00 ft. depth

Borehole: 8.50 in. to 112.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
4.00 hrs. at 20 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	15.00 ft.	90.00 ft. and 105.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Clay	2.00	2.00
Clay Sandy	15.00	17.00
Gray Clay	4.00	21.00
Sand	8.00	29.00
Gray Clay	32.00	61.00
Sand	23.00	84.00
Clay	4.00	88.00
Sand Water Bearing	17.00	105.00
Clay	7.00	112.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 88.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Drainfield/Dry well	150 ft.	Northwest
None		

Drilling Machine Operator Name: STEVE WHEELER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2215
Business Name: Ann Arbor Well Drilling, Inc.
Business Address: Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 2003-00566	County: Washtenaw	Township: Salem

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Well ID: 81000013788

Elevation:

Latitude: 42.346403

Longitude: -83.66074

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
PARCEL 2

Well Owner: BOB MURRAY

Well Address:	Owner Address:
5130 DIXBORO ANN ARBOR, MI	46037 CONCORD PLYMOUTH, MI 48170

Drilling Method: Rotary
Well Depth: 360.00 ft. **Well Use:** Test well
Well Type: New **Date Completed:** 9/8/2003

Casing Type: PVC plastic **Height:**
Casing Joint: Threaded & coupled
Casing Fitting: None

Diameter: 5.00 in. to 352.00 ft. depth

Borehole: 8.50 in. to 360.00 ft. depth

Static Water Level: 86.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 87.20 ft. after 4.00 hrs. at 17 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	8.00 ft.	352.00 ft. and 360.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	31.00	None	0.00 ft. to 345.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/11/2010 **HP:** 1.50
Manufacturer: Other **Pump Type:** Submersible
Model Number: T15L4Y22P9 **Pump Capacity:** 22 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Challenger
Model Number: PC211R **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom
Brown Clay Sandy	2.00	2.00
Unidentified Consolidated Fm	1.00	3.00
Brown Clay	10.00	13.00
Gray Clay	18.00	31.00
Brown Clay Sandy	8.00	39.00
Brown Clay	14.00	53.00
Brown Clay Sandy	19.00	72.00
Gray Clay Sandy	4.00	76.00
Brown Sand Fine To Medium	16.00	92.00
Gray Clay Sandy	68.00	160.00
Gray Clay	42.00	202.00
Gray Sand	2.00	204.00
Gray Clay	11.00	215.00

(Continued On Page 2)

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS RYAN WACHT
Employment: Employee
Pump Installer: CRIBLEY'S

(Continued on page 2)

General Remarks: SLOT 20-18
Other Remarks: Pump Manufacturer:SCHAEFER

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 2003-00566	County: Washtenaw	Township: Salem

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Well ID: 81000013788

Elevation:

Latitude: 42.346403

Longitude: -83.66074

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
PARCEL 2

Well Owner: BOB MURRAY

Well Address:	Owner Address:
5130 DIXBORO ANN ARBOR, MI	46037 CONCORD PLYMOUTH, MI 48170

(Continued from Page 1)

Formation Description	Thickness	Depth to Bottom
Unidentified Consolidated Fm	1.00	216.00
Gray Clay	114.00	330.00
Gray Sand Silty	18.00	348.00
Blue Sandstone W/Gravel	12.00	360.00

OTHER REMARKS:
Pump Manufacturer:SCHAEFER

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: ADAMS WELL DRLG INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810902100002	**Permit No:** 0101774	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000014028

Elevation:

Latitude: 42.339747

Longitude: -83.692561

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
EARHART & NIXON JOY RD

Well Owner: SOVA BLDRS

Well Address:	**Owner Address:**
4915 MOTHER THERESA ANN ARBORM, MI	PO BOX 589 HARTLAND, MI 48353

Drilling Method: Rotary
Well Depth: 245.00 ft. **Well Use:** Heat Pump - Open Loop
Well Type: New **Date Completed:** 10/29/2002

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 240.00 ft. depth

Borehole: 8.75 in. to 251.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T20-100 **Pump Capacity:** 20 GPM
Drop Pipe Length: 120.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: A.O. Smith
Model Number: V-200 **Tank Capacity:** 64.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 120.00 ft. after 1.00 hrs. at 35 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	4.00 ft.	240.00 ft. and 245.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay Sandy	9.00	9.00
Brown Clay Hard	13.00	22.00
Gray Clay Soft	18.00	40.00
Sand & Gravel	3.00	43.00
Gray Clay Sandy	34.00	77.00
Gravel	3.00	80.00
Gray Clay Hard	55.00	135.00
Gray Clay Sandy	36.00	171.00
Gray Clay Hard	22.00	193.00
Gravel	2.00	195.00
Gray Clay Hard	43.00	238.00
Gravel	9.00	247.00
Gray Clay	3.00	250.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 236.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	80 ft.	East

Geology Remarks:

Drilling Machine Operator Name: GARY SCHOWBER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2072
Business Name: BROWN DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: 0300681	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	34	Active		

Well ID: 81000014053

Elevation: 958 ft.
Latitude: 42.348047
Longitude: -83.695408
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: CHANNING SNEYD

Well Address:	Owner Address:
5188 PONTIAC TRAIL ANN ARBOR, MI 48105	5188 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 70.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/23/2003

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 60.00 ft. depth

Borehole: 9.00 in. to 50.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1275230 **Pump Capacity:** 12 GPM
Drop Pipe Length: 112.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR120 **Tank Capacity:** 10.8 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 44.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 44.00 ft. after 2.00 hrs. at 10 GPM
Pumping level 70.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Sand & Gravel W/Clay Gray	70.00	70.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	60.00 ft. and 70.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 50.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Northeast

Abandoned Well Plugged: Yes

Casing Diameter: 3 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets

Geology Remarks:

Drilling Machine Operator Name: KEN PEARCE
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: PUMP STUCK AT 47' DROP PIPE REMOVED CASING TERMINATES IN OFFSET PIT; WELL PRODUCTION EST WITH AIR 30 GPM; 700 #SAND PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0300064	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000014165

Elevation:

Latitude: 42.340318

Longitude: -83.689782

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: ROSEMARY DIDONATO

Well Address:	**Owner Address:**
4912 MOTHER THERESA ANN ARBOR, MI 48105	3640 BRIARLEE WAY ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 221.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/10/2003

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 216.00 ft. depth

Borehole: 9.00 in. to 210.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T20100230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 125.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 19.2 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 85.00 ft. after 2.00 hrs. at 9 GPM
Pumping level 221.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Sand & Gravel	31.00	31.00
Gray Clay	184.00	215.00
Sand W/Clay Gray	6.00	221.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	5.00 ft.	216.00 ft. and 221.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 210.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Geology Remarks:

Drilling Machine Operator Name: KEN PEARCE
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL PRODUCTION EST WITH AIR 40 GPM; 700 # SAND PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 0300677	County: Washtenaw	Township: Superior

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 07E	6	Active		

Well ID: 81000014183

Elevation: 850 ft.
Latitude: 42.332865
Longitude: -83.656356
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: PAUL HOAG

Well Address:	Owner Address:
5305 WARREN ANN ARBOR, MI 48105	5305 WARREN ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 245.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/19/2003

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 205.00 ft. depth

Borehole: 9.00 in. to 205.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1275230 **Pump Capacity:** 12 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR120 **Tank Capacity:** 10.8 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 75.00 ft. after 2.00 hrs. at 7 GPM
Pumping level 100.00 ft. after 2.00 hrs. at 25 GPM

Screen Installed: No **Intake:** Bedrock Well

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Sand W/Gravel	30.00	38.00
Gray Clay	70.00	108.00
Gravel	2.00	110.00
Gray Clay	93.00	203.00
Sandstone	15.00	218.00
See Comments	21.00	239.00
Gray Shale	6.00	245.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 205.00 ft.

Geology Remarks:
#7 CRUBLE ROCK

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southwest

Drilling Machine Operator Name: TROY REVILL
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO INC
Business Address:

Abandoned Well Plugged: Yes

Casing Removed: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: USED SDR 17 FROM 185'-205'; WELL PRODUCTION EST WITH AIR 25 GPM; 300 # GRAVEL PACK; PUMPING EQUIPMENT REMOVED CASING TERMINATES 1' BELOW

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 04-00021	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000014373

Elevation:

Latitude: 42.348754

Longitude: -83.665838

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
OAKWOOD HILLS LOT 8; 0 JOY

Well Owner: DHR DEV LLC

Well Address:
ANN ARBOR, MI

Owner Address:
78400 NORTHWESTERN HWY
FARMINGTON HILLS, MI 48034

Drilling Method: Rotary
Well Depth: 135.00 ft. **Well Use:** Test well
Well Type: New **Date Completed:**

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 125.00 ft. depth

Borehole: 9.00 in. to 120.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 68.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 135.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	3.00	3.00
Yellow Clay	18.00	21.00
Gray Clay	14.00	35.00
Gravel	1.00	36.00
Gray Clay	5.00	41.00
Yellow Sand	45.00	86.00
Gray Clay	36.00	122.00
Gravel	13.00	135.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	10.00 ft.	125.00 ft. and 135.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 120.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: TROY REVILL
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1872
Business Name: CRIBLEY DRLG CO INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: TEST WELL DRLD 2/2/04; 700 # SAND PACK
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0400007	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000014393

Elevation: 955 ft.
Latitude: 42.345618
Longitude: -83.693687
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: SHINMING SHYU

Well Address:	**Owner Address:**
3541 JOY ANN ARBOR, MI 48105	3151 RUMSEY DRIVE ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 90.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/4/2004

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 80.00 ft. depth

Borehole: 9.00 in. to 80.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 48.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 67.00 ft. after 2.00 hrs. at 9 GPM

Formation Description	Thickness	Depth to Bottom
Clay	6.00	6.00
Sand & Gravel	54.00	60.00
Sand	30.00	90.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	80.00 ft. and 90.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	12.00	None	0.00 ft. to 80.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: KURT WING
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO INC
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST; WELL DRLG 2/3/04; 700 # SAND PACK
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000014571

Elevation:

Latitude: 42.334091

Longitude: -83.669998

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active	6074	Well 2 West

Distance and Direction from Road Intersection:
NORTH SIDE OF WARREN 1/2 MILE WEST OF DIXBRO; 8" WELL 2 WEST

Well Owner: THE SETTLEMENT

Well Address:	Owner Address:
4597 WARREN ROAD ANN ARBOR, MI 48105	4597 WARREN ROAD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 78.00 ft. **Well Use:** Type I public
Well Type: New **Date Completed:** 9/12/2003

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 42.00 ft. depth

Borehole: 8.50 in. to 80.00 ft. depth
12.50 in. to 82.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 38.43 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 75.00 ft. after 11.00 hrs. at 150 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay Silty	18.00	18.00
Gray Clay Silty	25.00	43.00
Gray Clay & Gravel Sandy	19.00	62.00
Gravel & Sand	14.00	76.00
Sand	4.00	80.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Attached

Slot	Length	Set Between
90.00	10.00 ft.	65.00 ft. and 75.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	25.00	Unknown	0.00 ft. to 70.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	475 ft.	East

Geology Remarks:

Drilling Machine Operator Name: CHRIS POWELL
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2072
Business Name: BROWN DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-100-033	**Permit No:** WEL2003-00924	**County:** Washtenaw	**Township:** Salem

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 07E	31	Active		

Well ID: 81000014591

Elevation:

Latitude: 42.351327

Longitude: -83.656394

Method of Collection: QQQ - Centroid

Distance and Direction from Road Intersection:
3/4 of mile south of N Territorial Rd on the West side of Pine Crest

Well Owner: Yuri Tarasovets

Well Address:	**Owner Address:**
5491 Pine Ridge Ct Salem, MI 48168	2811 Golfside Ypsilanti, MI 48197

Drilling Method: Rotary
Well Depth: 307.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/11/2004

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 297.00 ft. depth

Borehole: 8.75 in. to 310.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/11/2005 **HP:** 1.00
Manufacturer: Berkeley **Pump Type:** Submersible
Model Number: 10SP4E02J **Pump Capacity:** 10 GPM
Drop Pipe Length: 140.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Mate
Model Number: WM 25 **Tank Capacity:** 87.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 260.00 ft. after 1.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	20.00	20.00
Gray Clay	40.00	60.00
Gravel	20.00	80.00
Gray Clay	220.00	300.00
Gravel	10.00	310.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
25.00	10.00 ft.	297.00 ft. and 307.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	28.00	None	0.00 ft. to 297.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: Barry Brown & Bruce Hofsess
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-1607
Business Name: Ed Birkmeier Well Drilling
Business Address: 9471 Genesee Street, New Lothrop, MI, 48460

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: Test pumped for 2 hours at 20 gpm @ 120' with 11' of draw down Pump installed by Brucepool Water Well & Pump Repair

Other Remarks: Coordinate Source:Google well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 0200740	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 12	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000014702

Elevation:

Latitude: 42.327825

Longitude: -83.663265

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
PARCEL A-3

Well Owner: MURRAY BUILDERS INC.

Well Address:	**Owner Address:**
4932 WALNUT WOODS ANN ARBOR, MI 48105	2020 HOGBACK RD, STE 5 ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 78.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 3/8/2004

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 66.00 ft. depth

Borehole: 9.00 in. to 60.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T20-100-23 **Pump Capacity:** 18 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 19.2 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 57.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 57.00 ft. after 2.00 hrs. at 6 GPM
Pumping level 78.00 ft. after 2.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	14.00	14.00
Gray Clay	7.00	21.00
Sand	5.00	26.00
Gray Clay	3.00	29.00
Sand	5.00	34.00
Gray Clay	27.00	61.00
Sand & Gravel	17.00	78.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	12.00 ft.	66.00 ft. and 78.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 60.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Northwest

Geology Remarks:

Drilling Machine Operator Name: TROY REVILL
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRILLING CO., INC.
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 700# SAND PACK
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 03-00528	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000015014

Elevation:

Latitude: 42.34504

Longitude: -83.68668

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: MARK PETERS

Well Address:	**Owner Address:**
3808 JOY RD ANN ARBOR, MI	1622 YORK TERRACE SALINE, MI 48176

Drilling Method: Rotary
Well Depth: 192.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/9/2004

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 187.00 ft. depth

Borehole: 9.00 in. to 180.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T25150230 **Pump Capacity:**
Drop Pipe Length: 95.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR260-03 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 65.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 192.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	17.00	17.00
Gravel	14.00	31.00
Gray Clay	155.00	186.00
Gravel	6.00	192.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	5.00 ft.	187.00 ft. and 192.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	15.00	None	0.00 ft. to 180.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Drilling Machine Operator Name: TROY REVILL
Employment: Subcontractor

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 600# SAND PACK; NO DRAWDOWN AFTER 1/2 HR @ 7 GPM

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 9706903	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active	6074	Well 1 East

Well ID: 81000015522

Elevation:

Latitude: 42.33413

Longitude: -83.669982

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
8" WELL 1 EAST

Well Owner: D.F. HOLDING

Well Address:	Owner Address:
4597 WARREN RD ANN ARBOR, MI 48105	24 FRANK LLOYD WRIGHT ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 60.00 ft. **Well Use:** Type I public
Well Type: New **Date Completed:** 12/8/1997

Casing Type: Unknown **Height:**
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 6.00 in. to 51.00 ft. depth

Borehole: 10.00 in. to 122.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 83.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 60.00 ft. after 2.00 hrs. at 200 GPM

Unrestricted Flow Rate:

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 5.00 in. **Blank:** 6.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
35.00	13.00 ft.	47.00 ft. and 60.00 ft.

Fittings: Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	30.00	None	0.00 ft. to 62.00 ft.

Wellhead Completion: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay Silty	3.00	3.00
Gray Clay & Boulders Silty	9.00	12.00
Gray Gravel Sandy Coarse	1.00	13.00
Gray Clay	21.00	34.00
Gray Sand & Gravel Sandy	8.00	42.00
Sand & Gravel	18.00	60.00
Gray Clay	62.00	122.00

Geology Remarks:

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown	475 ft.	East

Drilling Machine Operator Name: CHRIS POWELL
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-0026
Business Name: BROWN DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: ACCURACY, SCREEN, WELL DETAILS MB 4/4/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 09-02-100-008	**Permit No:** WEL2005-00450	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000016189

Elevation:

Latitude: 42.342386

Longitude: -83.690188

Method of Collection: Address Matching-House Number

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
1/4 MILE SOUTH OF MOTHER THERESA AND JOY RD

Well Owner: DAVID KENDZICKY

Well Address:	Owner Address:
4954 MOTHER THERESA ANN ARBOR, MI 48105	9910 SUNFLOWER LANE SOUTH LYON, MI 48178

Drilling Method: Rotary
Well Depth: 84.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/8/2005

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 76.00 ft. depth

Borehole: 8.75 in. to 84.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 84.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	7.00	7.00
Brown Sand & Gravel	44.00	51.00
Gray Sand & Gravel W/Stones	33.00	84.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-gauze
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	8.00 ft.	76.00 ft. and 84.00 ft.

Fittings: Other

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 76.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	West

Geology Remarks:

Drilling Machine Operator Name: DAVE KELLET
Employment: Employee
Pump Installer: RODNEY SINDLINGER

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling, Inc.
Business Address: 3766 Noble Dr, Brighton, MI, 48116

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Screen Fittings:3" PLUG, Coordinate Source:Google Well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 09-02-100-008	**Permit No:** WEL2005-00450	**County:** Washtenaw		**Township:** Ann Arbor
Town/Range: 02S 06E	**Section:** 25	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000016218

Elevation:

Latitude: 42.342386

Longitude: -83.690188

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:
1/4 MILE S. OF MOTHER THERESA AND JOY RD.

Well Owner: DAVID KENDZICKY

Well Address:	**Owner Address:**
4954 MOTHER THERESA ANN ARBOR, MI 48105	9910 SUNFLOWER LANE SOUTH LYON, MI 48178

Drilling Method: Rotary
Well Depth: 84.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/8/2005

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 76.00 ft. depth

Borehole: 9.00 in. to 84.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/30/2005 **HP:** 2.00
Manufacturer: Other **Pump Type:** Submersible
Model Number: 3JF202125B **Pump Capacity:** 30 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Champion
Model Number: CH22050 **Tank Capacity:** 119.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 84.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	7.00	7.00
Brown Sand & Gravel	44.00	51.00
Gray Sand & Gravel W/Stones	33.00	84.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	8.00 ft.	76.00 ft. and 84.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 76.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	West

Geology Remarks:

Drilling Machine Operator Name: DAVE KELLER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling, Inc.
Business Address: 3766 Noble Dr, Brighton, MI, 48116

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: TWO (2) 119 GALLON PRESSURE TANKS INSTALLED

Other Remarks: Pump Manufacturer:myers, Coordinate Source:Google Well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 05 00488	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Well ID: 81000016401

Elevation:

Latitude: 42.33199

Longitude: -83.68954

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: DOMINOS FARMS DEV

Well Address:	Owner Address:
3670 WARREN ANN ARBOR, MI	PO BOX 445 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 88.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/28/2005

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 78.00 ft. depth

Borehole: 9.00 in. to 78.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1250230 **Pump Capacity:**
Drop Pipe Length: 65.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 33.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 88.00 ft. after 2.00 hrs. at 60 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	78.00 ft. and 88.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Sand	8.00	8.00
Yellow Clay	4.00	12.00
Gray Clay	7.00	19.00
Sand	3.00	22.00
Gray Clay	51.00	73.00
Sand	7.00	80.00
Gravel	8.00	88.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 78.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	Southeast

Drilling Machine Operator Name: KEN PEARCE
Employment: Subcontractor

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 2.00 **Well Depth:** 83 ft.

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 800 # SAND PACK NO DRAWDOWN AT 12 GPM; PUMP EQUIP REMOVED CASING TERM BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 02-36-402-009	**Permit No:** 2005-00953	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000016578

Elevation:

Latitude: 42.347437

Longitude: -83.666571

Method of Collection: Address Matching-House Number

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
1/8 MILE WEST OF DIXBORO OFF JOY RD IN OAK RIDGE CT.

Well Owner: DHR Estate Development LLC

Well Address:
5123 Oak Ravine Ct
ANN ARBOR, MI 48105

Owner Address:
28400 Northwestern Hwy
Southfield, MI 48076

Drilling Method: Rotary
Well Depth: 146.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 11/21/2005

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 142.00 ft. depth
3.50 in. to 146.00 ft. depth

Borehole: 8.75 in. to 146.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 3/12/2007 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: soqp25-215 **Pump Capacity:** 25 GPM
Drop Pipe Length: 100.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Other
Model Number: ft1855 **Tank Capacity:** 5.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 60.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	13.00	13.00
Brown Clay & Gravel	19.00	32.00
Gray Clay & Gravel	13.00	45.00
Brown Sand	65.00	110.00
Gray Clay	31.00	141.00
Gray Sand	5.00	146.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
10.00	4.00 ft.	142.00 ft. and 146.00 ft.

Fittings: Bottom plug

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 142.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Geology Remarks:

Drilling Machine Operator Name: RICH MINER
Employment: Employee
Pump Installer: RODNEY SINDLINGER

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling, Inc.
Business Address: 3766 Noble Dr, Brighton, MI, 48116

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Tank Manufacturer:flexcon, Coordinate Source:Google well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 05 00621	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000016697

Elevation:

Latitude: 42.34896

Longitude: -83.6665

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
NEAR JOY & DIXBORO RD; LOT 7

Well Owner: ALAN STEWART

Well Address:
5163 OAK RIDGE CT
ANN ARBOR, MI

Owner Address:
48115 BAYSHORE DR
DELLEVILLE, MI 48111

Drilling Method: Rotary
Well Depth: 133.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 12/30/2005

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 123.00 ft. depth

Borehole: 9.00 in. to 123.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 133.00 ft. after 2.00 hrs. at 60 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	13.00	13.00
Sand	6.00	19.00
Gray Clay	39.00	58.00
Sand & Gravel	75.00	133.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. *u
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	10.00 ft.	123.00 ft. and 133.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	11.00	None	0.00 ft. to 123.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name: KEN PEARCE
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL ONLY AT THIS TIME; USED 1000# #1 SAND PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 09-12-100-023	**Permit No:** 2005-00889	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 12	**Well Status:** Active	**WSSN:** 2055881	**Source ID/Well No:** 001

Well ID: 81000016760

Elevation:

Latitude: 42.32671

Longitude: -83.663061

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:
JUST SOUTH OF WARREN ROAD OFF OF DIXBORO

Well Owner: SOLID ROCK CHURCH

Well Address:
3823 N Dixboro Rd
ANN ARBOR, MI 48105

Owner Address:
7375 STEEPLECHASE DR
SALINE, MI 48176

Drilling Method: Rotary
Well Depth: 80.00 ft. **Well Use:** Type II public
Well Type: New **Date Completed:** 12/5/2005

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 70.00 ft. depth
4.00 in. to 80.00 ft. depth

Borehole: 8.75 in. to 80.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/20/2006 **HP:** 3.00
Manufacturer: Fairbanks-Morse **Pump Type:** Submersible
Model Number: 35B30212 **Pump Capacity:** 35 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 2.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: US Tank
Model Number: UST 119 **Tank Capacity:** 119.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 67.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 67.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	17.00	17.00
Brown Sand	6.00	23.00
Gray Clay	27.00	50.00
Gray Sand & Clay	18.00	68.00
Gray Sand & Gravel	12.00	80.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	70.00 ft. and 80.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 68.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southwest

Geology Remarks:

Drilling Machine Operator Name: RICH MINER
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling, Inc.
Business Address: 3766 Noble Dr, Brighton, MI, 48116

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Coordinate Source:Google well address geocoding

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 0600180	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000017066

Elevation:

Latitude: 42.34855

Longitude: -83.70087

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: TERRY GORDINIER

Well Address:	Owner Address:
5196 SUTTON RD ANN ARBOR, MI 48105	5196 SUTTON RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 110.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/19/2006

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 100.00 ft. depth

Borehole: 9.00 in. to 110.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 50F21112G9 **Pump Capacity:** 0 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-X-Trol
Model Number: WX203 **Tank Capacity:** 32.0 Gallons
Pressure Relief Valve Installed: No

Static Water Level: 28.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 110.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Sand	16.00	16.00
Gravel & Cobbles	25.00	41.00
Gray Clay	57.00	98.00
Sand	12.00	110.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	100.00 ft. and 110.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	19.00	Unknown	0.00 ft. to 100.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Drilling Machine Operator Name: KEN PEARCE
Employment: Employee
Pump Installer: KARL SWARTHOUT

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRILLING COMPANY
Business Address: 8300 DEXTER - CHELSEA RD -, DEXTER, MI, 48130

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 2.00 **Well Depth:** 97 ft.

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 700# SAND PACK USE EXIST TANK & RED JACKET 1/2 HP PUMP IN WELL, ABANDON OLD WELL 4" X 97' WITH 2-50# BAGS BENTONITE, PUMP EQUIPMENT REMOVED, CASING BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

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Import ID:

Tax No:	Permit No: 04 00 007	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000017571

Elevation:

Latitude: 42.345595

Longitude: -83.693687

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:

Well Owner: CUSTOM MODULAR HOMES

Well Address:	Owner Address:
3541 JOY ANN ARBOR, MI	12009 JACKSON RD DEXTER, MI 48130

Drilling Method: Rotary
Well Depth: 90.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/31/2006

Casing Type: PVC plastic **Height:**
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 80.00 ft. depth

Borehole: 9.00 in. to 90.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1250230 **Pump Capacity:** 12 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR120 **Tank Capacity:** 33.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 48.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 67.00 ft. after 2.00 hrs. at 9 GPM

Formation Description	Thickness	Depth to Bottom
Clay	6.00	6.00
Sand & Gravel	54.00	60.00
Sand	30.00	90.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	80.00 ft. and 90.00 ft.

Fittings: Unknown

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	12.00	None	0.00 ft. to 80.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Northeast

Geology Remarks:

Drilling Machine Operator Name: KURT WING
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: CRIBLEY DRLG CO
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST DRLD 2/3/04
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-028	**Permit No:** 2006-00395	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017643

Elevation:

Latitude: 42.3465

Longitude: -83.68409

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EARHART & JOY RD.

Well Owner: DEJAN & CRISTINA GUBERINICH

Well Address:	**Owner Address:**
3965 JOY RD. ANN ARBOR , MI 48105	3965 JOY RD. ANN ARBOR , MI 48105

Drilling Method: Rotary
Well Depth: 205.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 3/26/2007

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 201.00 ft. depth

Borehole: 8.50 in. to 208.00 ft. depth

Static Water Level: 29.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
1.00 hrs. at 50 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
18.00	4.00 ft.	201.00 ft. and 205.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	18.00	None	0.00 ft. to 197.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	South

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 5/10/2007 **HP:** 35.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: SD435-8XM **Pump Capacity:** 35 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR-120 **Tank Capacity:** 32.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom
Brown Clay	11.00	11.00
Gray Clay	11.00	22.00
Gray Sand & Gravel	8.00	30.00
Gray Clay	35.00	65.00
Gray Clay & Sand	45.00	110.00
Gray Clay	53.00	163.00
Gray Gravel & Clay	3.00	166.00
Gray Clay	1.00	167.00
Sand	3.00	170.00
Gray Gravel & Clay	5.00	175.00
Gray Clay	19.00	194.00
Gray Sand	2.00	196.00
Gray Gravel	4.00	200.00

(Continued On Page 2)

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

(Continued on page 2)

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-028	**Permit No:** 2006-00395	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017643

Elevation:

Latitude: 42.3465

Longitude: -83.68409

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EARHART & JOY RD.

Well Owner: DEJAN & CRISTINA GUBERINICH

Well Address:	**Owner Address:**
3965 JOY RD. ANN ARBOR , MI 48105	3965 JOY RD. ANN ARBOR , MI 48105

(Continued from Page 1)

Formation Description	Thickness	Depth to Bottom
Gray Gravel W/Sandstone	3.00	203.00
Blue Sandstone	5.00	208.00

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-031	**Permit No:** 2006-00022	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017931

Elevation:

Latitude: 42.34775

Longitude: -83.68768

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: ALFRED KHATTAR

Well Address:
3775 JOY RD.
ANN ARBOR, MI 48105

Owner Address:
1118 ST. JOHNS BLVD
LINCOLN PARK , MI 48146

Drilling Method: Rotary
Well Depth: 460.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 8/23/2007

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 306.00 ft. depth SDR: 21.00

Borehole: 8.50 in. to 306.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**
at 0 GPM

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gray Clay	33.00	45.00
Brown Clay & Sand Sandy Silty	7.00	52.00
Gray Sand Fine	5.00	57.00
Gray Clay & Sand	3.00	60.00
Gray Clay	8.00	68.00
Gray Clay Sandy	4.00	72.00
Gray Sand Silty	9.00	81.00
Gray Clay	8.00	89.00
Sand Silty Medium	3.00	92.00
Gray Sand Fine	28.00	120.00
Gray Clay	114.00	234.00
Gray Sand	2.00	236.00

(Continued On Page 2)

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	20.00	None	0.00 ft. to 306.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

(Continued on page 2)

Abandoned Well Plugged: Yes

Casing Removed:

General Remarks: ABANDONED ROCK FORMATION FROM 306' TO 460' WITH NEAT CEMENT. WELL IS TO BE USED FOR GEO LOOP IN FUTURE PER HOMEOWNER.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-031	**Permit No:** 2006-00022	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017931

Elevation:

Latitude: 42.34775

Longitude: -83.68768

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: ALFRED KHATTAR

Well Address:	**Owner Address:**
3775 JOY RD. ANN ARBOR, MI 48105	1118 ST. JOHNS BLVD LINCOLN PARK , MI 48146

(Continued from Page 1)

Formation Description	Thickness	Depth to Bottom
Gray Clay	60.00	296.00
Blue Sandstone	152.00	448.00
Brown Shale	4.00	452.00
Blue Sandstone	8.00	460.00

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-031	**Permit No:** 2006-00022	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017933

Elevation:

Latitude: 42.347313

Longitude: -83.687313

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection: UNK

Well Owner: ALFRED KHATTAR

Well Address:	**Owner Address:**
3775 JOY RD. ANN ARBOR , MI 48105	1118 ST. JOHNS BLVD LICOLN PARK , MI 48146

Drilling Method: Rotary
Well Depth: 320.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 8/31/2007
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole: 8.50 in. to 320.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Brown Topsoil Sandy Clayey	8.00	8.00
Brown Clay	5.00	13.00
Brown Sand & Clay	8.00	21.00
Gray Clay Gravely	27.00	48.00
Gray Sand & Gravel	8.00	56.00
Gray Clay	9.00	65.00
Gray Sand & Clay	125.00	190.00
Gray Clay	30.00	220.00
Gray Clay Sandy	4.00	224.00
Gray Clay & Gravel W/Sandstone	36.00	260.00
Gray Clay Hard	30.00	290.00
Blue Sandstone	30.00	320.00

Well Grouted: No

Geology Remarks:

Wellhead Completion: 12 inches above grade

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Abandoned Well Plugged: No

Reason Not Plugged: Well still in use for non-drinking water purposes

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL TO BE USED FOR GEO LOOP PER HOMEOWNER
Other Remarks: Casing Type:UNK

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-031	**Permit No:** 2006-00022	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017936

Elevation:

Latitude: 42.34671

Longitude: -83.68748

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EAST JOY RD.

Well Owner: ALFRED KHATTAR

Well Address:
3775 JOY RD.
ANN ARBOR , MI 48105

Owner Address:
1118 ST. JOHNS BLVD
LINCOLN, MI 48146

Drilling Method: Rotary
Well Depth: 118.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/7/2007

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 53.00 ft. depth

Borehole: 8.50 in. to 93.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 36.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
1.00 hrs. at 5 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:** Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	40.00 ft.	53.00 ft. and 93.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	14.00	14.00
Brown Sand & Gravel	4.00	18.00
Brown Clay Sandy	2.00	20.00
Gray Clay Sandy	45.00	65.00
Sand Fine To Coarse	9.00	74.00
Gray Clay Gravely	3.00	77.00
Sand Coarse	1.00	78.00
Gray Clay	8.00	86.00
Gray Sand Coarse	2.00	88.00
Gray Clay	2.00	90.00
Gray Sand Medium To Coarse	3.00	93.00
Gray Clay Sandy	25.00	118.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 50.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-031	**Permit No:** 2006-00022	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017937

Elevation:

Latitude: 42.347303

Longitude: -83.687295

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
EAST JOY RD.

Well Owner: ALFRED KHATTAR

Well Address:
3775 JOY RD.
ANN ARBOR , MI 48105

Owner Address:
1118 ST. JOHNS BLVD
LICOLN PARK , MI 48146

Drilling Method: Rotary
Well Depth: 50.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/14/2007

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 42.00 ft. depth

Borehole: 8.50 in. to 50.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 6.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
1.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	14.00	14.00
Gray Clay	12.00	26.00
Gray Sand Fine To Medium	8.00	34.00
Gray Clay	6.00	40.00
Gray Sand Fine To Medium	10.00	50.00
Gray Clay	3.00	53.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:** Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
7.00	8.00 ft.	42.00 ft. and 50.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	11.00	None	0.00 ft. to 45.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	**Permit No:** 05-00621	**County:** Washtenaw			**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000017972

Elevation:

Latitude: 42.34896

Longitude: -83.6665

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
NEAR JOY & DIXBORO ROAD, LOT 7

Well Owner: ALAN STEWART

Well Address:	**Owner Address:**
5163 OAK RIDGE COURT ANN ARBOR, MI 48105--939	5163 OAK RIDGE COURT ANN ARBOR, MI 48105--939

Drilling Method:
Well Depth: 0.00 ft. **Well Use:** Other
Well Type: Replacement **Date Completed:** 10/2/2007

Casing Type: **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Static Water Level:
Well Yield Test: **Yield Test Method:**

Unrestricted Flow Rate:

Screen Installed: **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type:
Screen Installation Type:
Slot **Length** **Set Between**

Fittings:

Wellhead Completion: Pitless adapter

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 10/2/2007 **HP:** 1.00
Manufacturer: Berkeley **Pump Type:** Submersible
Model Number: 15SP4 **Pump Capacity:** 15 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR-200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom

Geology Remarks:

Nearest Source of Possible Contamination:

Type	**Distance**	**Direction**
None		

Abandoned Well Plugged: Yes

Casing Removed: No

Plugging Material: Other
No. of Bags: 0.00

Drilling Machine Operator Name: KEN PEARCE
Employment: Subcontractor
Pump Installer: BRODY ADAMS
Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:Unknown, Plugging Material:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-402-004	**Permit No:** 2009-00209	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000018716

Elevation:

Latitude: 42.34863

Longitude: -83.66576

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
WEST OF DIXBORO ROAD & NORTH OFF JOY ROAD.

Well Owner: ENERGY EFFICIENT HEALTHY CONST

Well Address:	**Owner Address:**
5156 OAK RAVINE COURT ANN ARBOR, MI 48169	5156 OAK RAVINE COURT ANN ARBOR, MI 48169

Drilling Method: Rotary
Well Depth: 123.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/23/2009

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 119.00 ft. depth SDR: 21.00

Borehole: 8.50 in. to 123.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 8/10/2010 **HP:** 1.00
Manufacturer: Berkeley **Pump Type:** Submersible
Model Number: 15sp4d02j **Pump Capacity:** 15 GPM
Drop Pipe Length: 60.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR-140 **Tank Capacity:** 44.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 47.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
2.00 hrs. at 45 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	28.00	28.00
Brown Clay & Sand	10.00	38.00
Brown Sand & Gravel	22.00	60.00
Gray Clay & Gravel	32.00	92.00
Gray Clay Hard	18.00	110.00
Gray Sand Fine To Coarse	13.00	123.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	4.00 ft.	119.00 ft. and 123.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	19.00	None	0.00 ft. to 113.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee
Pump Installer: BRODY ADAMS

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: WM48507

Tax No:	Permit No: 2010 00113	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000018991

Elevation:

Latitude: 42.34789

Longitude: -83.69865

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5145 PONTIAC TRAIL

Well Owner: VICTOR VOLKMAN

Well Address:	Owner Address:
5145 PONTIAC TRAIL ANN ARBOR, MI	5145 PONTIAC TRAIL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 56.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/30/2010

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.67 in. to 51.00 ft. depth

Borehole: 9.00 in. to 56.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/30/2010 **HP:** 0.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: T5M4C12P7S **Pump Capacity:** 10 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: PC 122R **Tank Capacity:** 32.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 56.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Black Topsoil	12.00	12.00
Sand & Gravel	15.00	27.00
Gray Clay	14.00	41.00
Gravel	15.00	56.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	5.00 ft.	51.00 ft. and 56.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 51.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Tod Stevens

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 1.00 **Well Depth:** 47 ft.

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 600 #1 SAND PACK ABANDON OLD WELL 4 X 47 WITH 1-50# BAG BENTONITE SLURRY, PUMP EQUIPMENT REMOVED, CASING CUT OFF BELOW GRADE

Other Remarks: Tank Type:If Other See remarks, Tank Manufacturer:See Remarks if other

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-016	**Permit No:** WEL2010-00261	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000019149

Elevation:

Latitude: 42.351666

Longitude: -83.683303

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
S. OF PONTIAC TRAIL

Well Owner: PIEHUTKOSKI, LEROY (TRUST)

Well Address:	Owner Address:
5311 EARHART ANN ARBOR, MI 48105	5311 EARHART ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 86.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/23/2010

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 78.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 88.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/8/2010 **HP:** 1.50
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE15220 **Pump Capacity:** 25 GPM
Drop Pipe Length: 60.00 ft. **Pump Voltage:**
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FT 8 **Tank Capacity:** 2.1 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
4.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Clay Sandy	6.00	6.00
Brown Clay	25.00	31.00
Gravel	5.00	36.00
Gray Clay	35.00	71.00
Sand	2.00	73.00
Gray Clay	3.00	76.00
Sand Water Bearing	10.00	86.00
Sand Fine W/Clay	4.00	90.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	8.00 ft.	78.00 ft. and 86.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 76.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Drainfield/Dry well	150 ft.	East

Drilling Machine Operator Name: STEVE WHEELER
Employment: Employee
Pump Installer: J. STEPP

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2215
Business Name: Ann Arbor Well Drilling, Inc.
Business Address: Box 163, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000002223

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 8.00 **Well Depth:** 82 ft.

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: PLUGGED OLD 4" WELL/PUMP STUCK @70'. CASING CUT 5' BELOW GRADE.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: 02-35-100-001	**Permit No:** WEL2010-00397	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000019172

Elevation:

Latitude: 42.35959

Longitude: -83.68282

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
Southwest corner of Earhart & northfield Church Rd

Well Owner: Remax platinum

Well Address:	Owner Address:
5681 Earhart Ann Arbor, MI 48105	5589 E M-36 Pinckeny, MI 48169

Drilling Method: Rotary
Well Depth: 83.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/17/2010

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting:

Diameter: 5.00 in. to 73.00 ft. depth

Borehole: 8.00 in. to 83.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/17/2010 **HP:** 0.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2FM52-10 **Pump Capacity:** 10 GPM
Drop Pipe Length: 68.00 ft. **Pump Voltage:** 115
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 38.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 38.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay & Gravel	15.00	15.00
Gray Clay	17.00	32.00
Brown Sand & Gravel	23.00	55.00
Gray Clay	13.00	68.00
Gray Sand & Gravel	15.00	83.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	73.00 ft. and 83.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	11.00	None	0.00 ft. to 70.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	60 ft.	South

Abandoned Well Plugged: No
Reason Not Plugged: Well inaccessible for plugging

Geology Remarks:

Drilling Machine Operator Name: Brian Keller
Employment: Employee
Pump Installer: Rodney Sindlinger

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling, Inc.
Business Address: 3766 Noble Dr, Brighton, MI, 48116

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: used existing tank
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B02-35-300-051	**Permit No:** WEL2011-	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000019269

Elevation:

Latitude: 42.34907

Longitude: -83.6993

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
East of Sutton Road, north of Pontiac on the northside of Tamarack

Well Owner: Larence and Etheli Phill

Well Address:	**Owner Address:**
5295 Tamarack Drive Ann Arbor, MI 48105	5137 Pontiac Trail Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 163.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/13/2011

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 153.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 163.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 163.00 ft. after 1.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	7.00	7.00
Brown Clay Sandy	3.00	10.00
Brown Gravel	30.00	40.00
Gray Clay	110.00	150.00
Gray Gravel Sandy	13.00	163.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	53.00 ft. and 163.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 153.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	125 ft.	Southwest

Geology Remarks:

Drilling Machine Operator Name: Matt Trnka
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-1607
Business Name: Ed Birkmeier Well Drilling
Business Address: 9471 Genesee Street, New Lothrop, MI, 48460

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: Well 1st area - Test pump at 10gpm, draw down to 60' TOC

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 2011 00465	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000019487

Elevation:

Latitude: 42.34891

Longitude: -83.66606

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5160 OAK RAVINE CT

Well Owner: MEADOWLARK BUILDERS

Well Address:	**Owner Address:**
5160 OAK RAVINE CT ANN ARBOR, MI	711 FOUNTAIN ST ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 121.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 12/13/2011

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 111.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 121.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 5/15/2012 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1 P4 230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Challenger
Model Number: PC 211 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 58.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 121.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	16.00	16.00
Gray Clay	12.00	28.00
Sand	3.00	31.00
Gray Clay	43.00	74.00
Gray Clay	11.00	85.00
Clay	22.00	107.00
Gravel	14.00	121.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	111.00 ft. and 121.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 105.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Geology Remarks:

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: KARL SWARTHOUT

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST DRILLED: 12/13/2011 700# GRAVEL PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 2012 00286	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000019730

Elevation:

Latitude: 42.34663

Longitude: -83.66638

Method of Collection: Address Matching-House Number

Distance and Direction from Road Intersection:
5035 OAK RAVINE CT

Well Owner: MAIN ST HOMES

Well Address:	**Owner Address:**
5035 OAK RAVINE CT ANN ARBOR, MI 48105	1345 WHISPERING MAPLES CT ANN ARBOR, MI 48108

Drilling Method: Rotary
Well Depth: 153.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/24/2012

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 146.00 ft. depth SDR: 21.00
0.00 in. to 146.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 153.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/24/2012 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: PC 266 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 153.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Gray Clay	49.00	59.00
Sand & Gravel	22.00	81.00
Gray Clay	65.00	146.00
Sand	7.00	153.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	7.00 ft.	146.00 ft. and 153.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	11.00	None	0.00 ft. to 146.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 700# SAND PACK
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 2012 00525	County: Washtenaw	Township: Ann Arbor

Well ID: 81000019759

Elevation:
Latitude: 42.33835
Longitude: -83.68136
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4410 Earhart

Well Owner: Betty Gilliland

Well Address:	Owner Address:
4410 Earhart Rd Ann Arbor, MI 48105	4410 Earhart Rd Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 120.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/14/2012

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 105.00 ft. depth SDR: 21.00
0.00 in. to 105.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 115.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/30/2012 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FV07P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 85.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 85.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	22.00	22.00
Gray Clay	23.00	45.00
Sand	70.00	115.00
Gray Clay	5.00	120.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	105.00 ft. and 115.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 105.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	Southwest

Abandoned Well Plugged: Yes

Latitude: 42.33835 **Longitude:** -83.68136
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 3.00 **Well Depth:** 92 ft.

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Tod Stevens

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 5 TAILPIPE 900# SAND PACK ABANDON OLD WELL 5 X 92 WITH 3-50# BAGS BENTONITE SLURRY, PUMP EQUIPMENT REMOVED, CASING CUT OFF BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID: WM50716

Tax No:	Permit No: 2012 00624	County: Washtenaw	Township: Northfield

Well ID: 81000019803

Elevation:
Latitude: 42.35149
Longitude: -83.68929
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
5301 PONTIAC TRAIL

Well Owner: JOE BEAGLE

Well Address:	Owner Address:
5301 PONTIAC TRAIL ANN ARBOR, MI 48105	5101 TURTLE POINT DR ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 128.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 11/9/2012

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 115.00 ft. depth SDR: 21.00
0.00 in. to 115.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 128.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/6/2012 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FV07P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 140 **Tank Capacity:** 44.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 51.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 128.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	16.00	16.00
Gray Clay	13.00	29.00
Sand	5.00	34.00
Gray Clay	27.00	61.00
Sand & Gravel	32.00	93.00
Sand	32.00	125.00
Gray Clay	3.00	128.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	115.00 ft. and 125.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 115.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Abandoned Well Plugged: Yes

Latitude: 42.35149 **Longitude:** -83.68929
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 7.00 **Well Depth:** 66 ft.

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Dan Rowe

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 800# SAND PACK 3 TAILPIPE ABANDON OLD WELL 4 X 66 WITH 7- BAGS HOLE PLUG, PUMP IS STUCK IN THE WELL, PIPE CUT OFF BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B 02 36 402 003	**Permit No:** 2013 00051	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active
		WSSN:		**Source ID/Well No:**

Well ID: 81000019946

Elevation:

Latitude: 42.34739

Longitude: -83.66579

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5110 OAK RAVINE

Well Owner: MAIN ST HOMES

Well Address:
5110 OAK RAVINE
ANN ARBOR, MI 48109

Owner Address:
1345 WHISPERING MAPLES CT
ANN ARBOR, MI 48108

Drilling Method: Rotary
Well Depth: 117.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 3/20/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 107.00 ft. depth SDR: 21.00
0.00 in. to 107.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 117.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 6/26/2013 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV 1 P4 230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 260 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 46.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 117.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Debris	2.00	2.00
Brown Clay	15.00	17.00
Yellow Sand	35.00	52.00
Gravel	16.00	68.00
Gray Clay	38.00	106.00
Sand & Gravel	11.00	117.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	107.00 ft. and 117.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 105.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 700# SAND PACK WELL FIRST DRILLED 3/20/2013

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A 01 31 210 006	**Permit No:** 2013 00112	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000019991

Elevation:

Latitude: 42.35509

Longitude: -83.659833

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5166 DIXBORO FARMS

Well Owner: BRIAN KIM KENNEDY

Well Address:	**Owner Address:**
5166 DIXBORO FARMS ANN ARBOR, MI 48105	5166 DIXBORO FARMS ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 317.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/9/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 200.00 ft. depth SDR: 21.00
5.68 in. to 307.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 317.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/9/2013 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 260-03 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 201.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	6.00	6.00
Gray Clay	86.00	92.00
Sand	5.00	97.00
Gray Clay	207.00	304.00
Gravel	13.00	317.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	307.00 ft. and 317.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	20.00	None	0.00 ft. to 300.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	South

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.35509 **Longitude:** -83.659833
Casing Diameter: 5 in. **Casing Removed:** Yes
Plugging Material: Bentonite slurry
No. of Bags: 4.00 **Well Depth:** 90 ft.

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 800# GRAVEL PACK ABANDONED 5 X 90 WELL WITH 4-50# BAGS BENTONITE SLURRY, PUMP EQUIPMENT REMOVED, CASING CUT OFF BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-300-002	**Permit No:** WEL2013-00142	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000020022

Elevation:

Latitude: 42.3518

Longitude: -83.68191

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
SOUTH OF PONTIAC TRAIL, NORTH OF JOY ROAD

Well Owner: ZEEB, KENNETH

Well Address:
5310 EARHART ROAD
ANN ARBOR, MI 48105

Owner Address:
5310 EARHART ROAD
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 58.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/15/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 50.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 65.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 5/30/2013 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 20 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL-22 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 58.00 ft. after 4.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	10.00	10.00
Gravel & Stones	2.00	12.00
Gray Clay	29.00	41.00
Sand Water Bearing W/Gravel	17.00	58.00
Gray Clay	7.00	65.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	8.00 ft.	50.00 ft. and 58.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 48.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Drainfield/Dry well	120 ft.	South

Drilling Machine Operator Name: STEVE WHEELER
Employment: Employee
Pump Installer: E. WHEELER/J. STEPP

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2215
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 13.00 **Well Depth:** 150 ft.

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: REMOVED 120' DROP PIPE & PUMP FROM OLD 4" WELL. OLD WELL LOCATED APPROX. 40' S.W. OF NEW WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B 02 36 402 002	**Permit No:** 2013 00141	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active
		WSSN:		**Source ID/Well No:**

Well ID: 81000020029

Elevation:

Latitude: 42.34692

Longitude: -83.66563

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5052 OAK RAVINE

Well Owner: RICH MONTMORENCY

Well Address:
5052 OAK RAVINE
ANN ARBOR, MI 48105

Owner Address:
2797 SEMINOLE RD
ANN ARBOR, MI 48108

Drilling Method: Rotary
Well Depth: 117.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/16/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 107.00 ft. depth SDR: 21.00
0.00 in. to 107.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 117.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 10/24/2013 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20 SV 1 P4 230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-X-Trol
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 43.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 117.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Sand	30.00	38.00
Gray Clay	52.00	90.00
Clay	15.00	105.00
Sand	12.00	117.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	107.00 ft. and 117.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	14.00	None	0.00 ft. to 100.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	South

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 700# SAND WELL FIRST DRILLED: 5-16-13

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B 02 36 402 001	**Permit No:** 2013 00224	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active
		WSSN:		**Source ID/Well No:**

Well ID: 81000020054

Elevation:

Latitude: 42.34623

Longitude: -83.66517

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5030 OAK RAVINE

Well Owner: JOHN HAUPTMANN

Well Address:	**Owner Address:**
5030 OAK RAVINE ANN ARBOR, MI 48103	22753 NANCY AVE SOUTHFIELD, MI 48033

Drilling Method: Rotary
Well Depth: 232.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/7/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 192.00 ft. depth SDR: 21.00
5.00 in. to 222.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 232.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 11/21/2013 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20 FV 1 P4 230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 61.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 195.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	2.00	2.00
Yellow Clay	11.00	13.00
Sand & Gravel	13.00	26.00
Gray Clay	15.00	41.00
Sand	20.00	61.00
Gray Clay	159.00	220.00
Gravel	12.00	232.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	222.00 ft. and 232.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	19.00	None	0.00 ft. to 215.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	115 ft.	West

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST DRILLED: 6-7-2013 700# GRAVEL PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: J 10 07 200 019	**Permit No:** 2013 00474	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 7	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000020289

Elevation:

Latitude: 42.33225

Longitude: -83.66049

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
LOT 19

Well Owner: ESSEX HOMES LLC

Well Address:
5092 WARREN RD
ANN ARBOR, MI 48105

Owner Address:
P. O. BOX 81084
ROCHESTER, MI 48308

Drilling Method: Rotary
Well Depth: 150.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/25/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 140.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 150.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 4/10/2014 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20 FV 1 P4 230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 26.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 150.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	11.00	11.00
Sand	3.00	14.00
Gray Clay	124.00	138.00
Yellow Sand	12.00	150.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	140.00 ft. and 150.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	16.00	None	0.00 ft. to 140.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST DRILLED: 10/25/2013 700# SAND PACK

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I 09 11 100 001	**Permit No:** 2013 00437	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 11	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000020293

Elevation:

Latitude: 42.33091

Longitude: -83.68537

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
3909 EARHART RD

Well Owner: HOLLIS DAYTON

Well Address:
3909 EARHART RD
ANN ARBOR TWP, MI 48105

Owner Address:
3909 EARHART RD
ANN ARBOR TWP, MI 48105

Drilling Method: Rotary
Well Depth: 63.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 10/15/2013

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 53.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 63.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/15/2013 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 25FV15P4 **Pump Capacity:** 15 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 15.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 63.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	8.00	8.00
Sand	2.00	10.00
Gray Clay	14.00	24.00
Gravel	6.00	30.00
Gray Clay	18.00	48.00
Sand	5.00	53.00
Gravel	10.00	63.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	53.00 ft. and 63.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 53.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	250 ft.	Northeast

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Dan Rowe

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: NO PRESSURE TANK, PUMPING INTO POND FREE FLOW

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-0901-300-021	**Permit No:** 2014 00259	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000020559

Elevation:

Latitude: 42.33517

Longitude: -83.68209

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
4014 EARHART RD

Well Owner: JARED RUNDELL

Well Address:	**Owner Address:**
4210 EARHART RD ANN ARBOR, MI 48105	7770 WEBSTER CHURCH RD WHITMORE LAKE, MI 48189

Drilling Method: Rotary
Well Depth: 84.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/16/2014

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 74.00 ft. depth SDR: 21.00
0.00 in. to 74.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 84.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 6/22/2016 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4-230 **Pump Capacity:** 18 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR-200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 44.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 84.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	34.00	49.00
Yellow Sand	23.00	72.00
Gray Gravel	12.00	84.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	74.00 ft. and 84.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	11.00	None	0.00 ft. to 74.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	Southeast

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: ADDRESS FORMERLY WAS 4014 EARHART RD. WELL FIRST - 700# SAND PACK.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: J 10 07 200 018	**Permit No:** 2014 00385	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 7	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000020716

Elevation:

Latitude: 42.33143

Longitude: -83.66113

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5020 WARREN RD

Well Owner: BELANGER BUILDERS INC

Well Address:	**Owner Address:**
5020 WARREN RD ANN ARBOR, MI 48105	5095 S. OLD US 23 STE A BRIGHTON, MI 48114

Drilling Method: Rotary
Well Depth: 146.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/12/2014

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 138.00 ft. depth SDR: 21.00
0.00 in. to 138.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 146.00 ft. depth

Static Water Level: 23.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 50.00 ft. after 2.00 hrs. at 60 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	8.00 ft.	138.00 ft. and 146.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	15.00	None	0.00 ft. to 135.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 11/24/2014 **HP:** 0.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10 FB 05 P4 239 **Pump Capacity:** 10 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 120 **Tank Capacity:** 32.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Gray Clay	3.00	13.00
Yellow Sand & Clay	3.00	16.00
Gray Clay	118.00	134.00
Sand & Gravel	12.00	146.00

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: DAN ROWE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: WELL DRILLED: 9-12-14
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: I 09 01 100 007	**Permit No:** 2012 00649	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000020718

Elevation:

Latitude: 42.34512

Longitude: -83.67036

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4650 JOY RD

Well Owner: JOE BEAGLE

Well Address:	Owner Address:
4650 JOY RD ANN ARBOR, MI 48105	11019 WATERLOO MUNITH RD WATERLOO, MI 49257

Drilling Method: Rotary
Well Depth: 222.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 8/15/2014

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 200.00 ft. depth SDR: 21.00
5.68 in. to 202.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 222.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/15/2014 **HP:** 5.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 90FA3S4 PE **Pump Capacity:** 90 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 2.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 140 **Tank Capacity:** 44.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 43.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 100.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	26.00	26.00
Clay & Gravel	12.00	38.00
Gravel	9.00	47.00
Gray Clay	152.00	199.00
Sand	23.00	222.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	20.00 ft.	202.00 ft. and 222.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	15.00	None	0.00 ft. to 195.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southeast

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Tod Stevens

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: PUMP EQUIP INSTALLED 8-15-14
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: A 01 31 300 008	**Permit No:** 2014 00250	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:** 2062281	**Source ID/Well No:** 001

Well ID: 81000021072

Elevation:

Latitude: 42.3519

Longitude: -83.66129

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5191 DIXBORO RD

Well Owner: ST MARY COPTIC ORTHODOX CHURCH

Well Address:	**Owner Address:**
5191 DIXBORO RD ANN ARBOR, MI 48103	P. O. BOX 130983 ANN ARBOR, MI 48113

Drilling Method: Rotary
Well Depth: 370.00 ft. **Well Use:** Type II public
Well Type: New **Date Completed:** 6/5/2015

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 6.25 in. to 180.00 ft. depth SDR: 21.00
6.25 in. to 360.00 ft. depth SDR: 17.00

Borehole: 11.50 in. to 370.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 68.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 360.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	54.00	69.00
Sand	12.00	81.00
Gray Clay	269.00	350.00
Gravel	20.00	370.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 6.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	360.00 ft. and 370.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	51.00	None	0.00 ft. to 360.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	South

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST NO PUMP EQUIP INSTALLED TO DATE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-210-008	**Permit No:** WEL2015-00408	**County:** Washtenaw	**Township:** Salem

Well ID: 81000021311

Elevation:

Latitude: 42.353549

Longitude: -83.659194

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Distance and Direction from Road Intersection:
5222 Dixboro Farms Dr

Well Owner: ESSEX HOMES LLC

Well Address:	Owner Address:
5222 Dixboro Farms Dr Ann Arbor, MI 48105	27267 CAMBRIDGE LANE FARMINGTON HILLS, MI 48331

Drilling Method: Rotary
Well Depth: 293.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/16/2015

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 185.00 ft. depth SDR: 21.00
5.00 in. to 285.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 293.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 3/16/2016 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 20 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 69.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 293.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Sand	12.00	12.00
Brown Clay	7.00	19.00
Gray Clay	66.00	85.00
Sand & Clay	11.00	96.00
Gray Clay	188.00	284.00
Gravel	9.00	293.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	8.00 ft.	285.00 ft. and 293.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	27.00	None	0.00 ft. to 280.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	135 ft.	Southeast

Geology Remarks:

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Dan Rowe

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: There is 100 ft of SDR17 used on this well.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 1-31-210-004	**Permit No:** 2016-156	**County:** Washtenaw	**Township:** Salem

Well ID: 81000021616

Elevation:

Latitude: 42.356006

Longitude: -83.660947

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Distance and Direction from Road Intersection:
the south east corner of dixboro farms and dixboro

Well Owner: Timothy Patrick

Well Address:
5080 Dixboro Farms
Ann Arbor, MI 48105

Owner Address:
30600 Northwestern Highway ste 105
Farminton Hills, MI 48334

Drilling Method: Rotary
Well Depth: 133.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/12/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 125.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 133.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/24/2016 **HP:** 1.00
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2nfl102 **Pump Capacity:** 20 GPM
Drop Pipe Length: 108.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: fl22 **Tank Capacity:** 65.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 133.00 ft. after 2.00 hrs. at 40 GPM

Formation Description	Thickness	Depth to Bottom
Topsoil W/Boulders	2.00	2.00
Brown Clay	13.00	15.00
Brown Sand	21.00	36.00
Gray Clay	32.00	68.00
Sand Wet/Moist	25.00	93.00
Gray Clay	25.00	118.00
Gravel	15.00	133.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.75 in. **Blank:** 2.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	8.00 ft.	125.00 ft. and 133.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	12.00	Retarder	0.00 ft. to 120.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Geology Remarks:

Drilling Machine Operator Name: Brian Keller
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling Inc
Business Address: 5615 Chilson, Howell, MI, 48843

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-101-001	**Permit No:** WEL2016-00180	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000021630

Elevation:

Latitude: 42.3414

Longitude: -83.66344

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4975 Ridge Creek Lane

Well Owner: CRANBROOK CUSTOM HOMES

Well Address:	Owner Address:
4975 Ridge Creek Lane ANN ARBOR, MI 48104	51237 DANVIEW TECHNOLOGY CT SHELBY TWP, MI 48315

Drilling Method: Rotary
Well Depth: 80.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/19/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 66.00 ft. depth SDR: 21.00
0.00 in. to 66.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 80.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/15/2017 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 25SSD1S4 **Pump Capacity:** 22 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR60 **Tank Capacity:** 20.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 11.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 55.00 ft. after 2.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	9.00	9.00
Gray Clay	23.00	32.00
Gravel & Stones	16.00	48.00
Gray Clay	17.00	65.00
Sand & Gravel	11.00	76.00
Gray Clay	4.00	80.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	66.00 ft. and 76.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 60.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	130 ft.	East

Drilling Machine Operator Name: Troy Revill, Travis Ostrowski
Employment: Employee
Pump Installer: Tod Stevens, Jack Wynn

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000 LBS OF SAND PACK AND A 4' TAIL PIPE. FORMER ADDRESS: 4951 DIXBORO ROAD. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-100-011	**Permit No:** WEL2016-00148	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000021646

Elevation:

Latitude: 42.345012

Longitude: -83.665989

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4860 JOY RD.

Well Owner: DOUGLAS OR JODI LOUTH

Well Address:	Owner Address:
4860 JOY RD. ANN ARBOR, MI 48105	8698 WARNER RD. SALINE, MI 48176

Drilling Method: Rotary
Well Depth: 258.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/1/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 188.00 ft. depth SDR: 21.00
5.68 in. to 248.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 258.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/23/2017 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 140.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 190.00 ft. after 2.00 hrs. at 60 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	248.00 ft. and 258.00 ft.

Fittings: Coupling

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Dark Gray Clay	18.00	30.00
Sand	32.00	62.00
Gray Clay	52.00	114.00
Gravel & Clay	6.00	120.00
Black Stones	2.00	122.00
Gray Clay	73.00	195.00
Clay & Gravel	50.00	245.00
Sand & Gravel	13.00	258.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	19.00	None	0.00 ft. to 240.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	Northeast

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing, Patrick Wing
Employment: Employee
Pump Installer: TOD STEVEN, JACK WYNN, DAN ROW

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 1,000 LBS OF SAND PACK,
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-200-008	**Permit No:** WEL2016-00254	**County:** Washtenaw		**Township:** Northfield

Well ID: 81000021698

Elevation:

Latitude: 42.35872

Longitude: -83.67518

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 06E	36	Active		

Distance and Direction from Road Intersection:
5585 PONTIAC TRAIL

Well Owner: CHARLES STEFANKO

Well Address:	**Owner Address:**
5585 PONTIAC TRAIL ANN ARBOR, MI 48105	12587 LATERON DR. PLYMOUTH, MI 48170

Drilling Method: Rotary
Well Depth: 289.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/7/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 181.00 ft. depth SDR: 21.00
5.68 in. to 281.00 ft. depth SDR: 17.00

Borehole: 8.50 in. to 289.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/9/2017 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 35SD15S4 **Pump Capacity:** 35 GPM
Drop Pipe Length: 145.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 2.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR60 **Tank Capacity:** 20.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 95.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 115.00 ft. after 1.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	7.00	7.00
Gray Clay	262.00	269.00
Sand & Gravel	5.00	274.00
Gravel	15.00	289.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	8.00 ft.	281.00 ft. and 289.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	14.00	None	0.00 ft. to 275.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	South

Drilling Machine Operator Name: Troy Revill, Travis Ostrowski
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: CASING SET TO 281'. WELL PUMPING AT 200 FT AFTER 1 HOUR 100 GPM EST. W/AIR. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED. FRANKLIN ELECTRIC SUBDRIVE 35SDQP 3.0 HP-3R INSTALLED WITH SUBMERSIBLE PUMP. THIS PUMPING SYSTEM WILL PUMP 35 GPM.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-300-037	**Permit No:** WEL2016-00401	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000021807

Elevation:

Latitude: 42.34927

Longitude: -83.69361

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
NORTH OF EAST JOY RD WEST OF EARHART

Well Owner: ADAM PIEHUTKOSKI

Well Address:	Owner Address:
5214 PONTIAC TRAIL ANN ARBOR , MI 48105	5311 EARHART RD ANN ARBOR , MI 48105

Drilling Method: Rotary
Well Depth: 142.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/15/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 138.00 ft. depth SDR: 21.00

Borehole: 8.50 in. to 142.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 9/15/2016 **HP:** 0.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 12FV05P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 60.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 56.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 142.00 ft. after 1.50 hrs. at 35 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	10.00	10.00
Gray Clay	13.00	23.00
Brown Sand Coarse	5.00	28.00
Gray Clay	47.00	75.00
Gray Sand Fine To Medium	7.00	82.00
Gray Clay Sandy	34.00	116.00
Gray Clay	13.00	129.00
Gray Sand Fine To Medium	13.00	142.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
10.00	4.00 ft.	138.00 ft. and 142.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	18.00	None	0.00 ft. to 135.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	60 ft.	South

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 7.00 **Well Depth:** 84 ft.

Geology Remarks:

Drilling Machine Operator Name: GREG ADAMS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling, Inc.
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: HOMEOWNERS 35 GALLON PRESSURE TANK INSTALLED. PUMP STUCK IN OLD WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-400-015	**Permit No:** WEL2016-00241	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000021817

Elevation:

Latitude: 42.34621

Longitude: -83.66841

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
4715 E. JOY RD.

Well Owner: DOMINOS FARMS DEVELOPMENT

Well Address:	Owner Address:
4715 E. JOY RD. ANN ARBOR, MI 48105	P. O. BOX 445 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 167.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/10/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 157.00 ft. depth SDR: 21.00
0.00 in. to 157.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 167.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 6/14/2016 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 167.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	8.00	8.00
Gray Clay	21.00	29.00
Sand & Gravel	42.00	71.00
Gray Clay	86.00	157.00
Sand	5.00	162.00
Gravel	5.00	167.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	157.00 ft. and 167.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	14.00	None	0.00 ft. to 157.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	130 ft.	East

Abandoned Well Plugged: Yes

Latitude: 42.34621 **Longitude:** -83.66841
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 2.00 **Well Depth:** 55 ft.

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce, Troy Shelhart
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700 LBS OF SAND PACK.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-12-100-004	**Permit No:** WEL2015-00452	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000021868

Elevation:

Latitude: 42.33036

Longitude: -83.66763

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
4686 WARREN RD.

Well Owner: CHUCK SHAVER & CAROL FLORENCE

Well Address:	Owner Address:
4686 WARREN RD. ANN ARBOR, MI 48105	1321 LINDEN ST. PLYMOUTH, MI 48170

Drilling Method: Rotary
Well Depth: 86.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/26/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 71.00 ft. depth SDR: 21.00
0.00 in. to 71.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 86.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 9/14/2017 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 15FV1P4 **Pump Capacity:** 15 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 86.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Gray Clay	19.00	31.00
Gravel	1.00	32.00
Gray Clay	38.00	70.00
Sand	11.00	81.00
Sand & Clay	5.00	86.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	71.00 ft. and 81.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 71.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	North

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce, Troy Shelhart
Employment: Employee
Pump Installer: Tod Stevens, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1000# SAND PACK AND A 5 FT. TAIL PIPE.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-200-002	**Permit No:** WEL2016-00493	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000021949

Elevation:

Latitude: 42.3435

Longitude: -83.67645

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4984 E. JOY RD.

Well Owner: WASHTENAW SAND GRAVEL CO.

Well Address:	Owner Address:
4984 E. JOY RD. ANN ARBOR, MI 48105	4989 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 212.00 ft. **Well Use:** Type III public
Well Type: Replacement **Date Completed:** 11/7/2016

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 192.00 ft. depth SDR: 21.00
0.00 in. to 192.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 212.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/17/2016 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FB07P4S2 **Pump Capacity:** 10 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 60.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Gravel & Stones	51.00	51.00
Gray Clay	155.00	206.00
Gravel	6.00	212.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	5.00 ft.	207.00 ft. and 212.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	15.00	None	0.00 ft. to 207.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	North

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Jack Wynn, Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.3435 **Longitude:** -83.67645
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 4.50 **Well Depth:** 36 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 600# SAND PACK. ABANDONED OLD WELL, PUMP AND DROP PIPE BROKE OFF, UNABLE TO REMOVE.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: J-10-07-200-020	**Permit No:** WEL2016-00590	**County:** Washtenaw	**Township:** Superior

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
02S 07E	7	Active		

Well ID: 81000022013

Elevation:

Latitude: 42.332231

Longitude: -83.659546

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5188 WARREN RD.

Well Owner: STEPHEN & KRISTA HENLEY

Well Address:	**Owner Address:**
5188 WARREN RD. ANN ARBOR, MI 48105	2405 MEADOWRIDGE CT. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 144.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/1/2017

Casing Type: PVC plastic **Height:**
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 140.00 ft. depth SDR: 21.00

Borehole: 8.50 in. to 144.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/9/2017 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 10.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 16.00 ft. after 1.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Black Clay	3.00	3.00
Yellow Clay	5.00	8.00
Sand	13.00	21.00
Gray Clay	97.00	118.00
Clay & Sand	14.00	132.00
Sand	12.00	144.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Attached

Slot	**Length**	**Set Between**
12.00	4.00 ft.	140.00 ft. and 144.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	**Bags**	**Additives**	**Depth**
Bentonite slurry	8.00	None	0.00 ft. to 135.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	**Distance**	**Direction**
Septic tank	125 ft.	Southeast

Geology Remarks:

Drilling Machine Operator Name: TROY REVILL
Employment: Employee
Pump Installer: Dan Rowe, Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Co Inc
Business Address: 8300 Dexter Chelsea, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: NO SAND PACK USED.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-12-100-007	**Permit No:** WEL2016-00541	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000022033

Elevation:

Latitude: 42.329654

Longitude: -83.67297

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
4550 WARREN RD.

Well Owner: DENNIS & MICHELE HENDERSON II

Well Address:	Owner Address:
4550 WARREN RD. ANN ARBOR, MI 48105	2458 DIXBORO RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 208.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/15/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 198.00 ft. depth SDR: 21.00
0.00 in. to 198.00 ft. depth SDR: 0.00

Borehole: 8.50 in. to 208.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 6/15/2017 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10190 **Pump Capacity:** 22 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 73.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 73.00 ft. after 1.00 hrs. at 18 GPM
Pumping level 120.00 ft. after 1.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	14.00	14.00
Gray Clay	180.00	194.00
Gravel	14.00	208.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	198.00 ft. and 208.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	16.00	None	0.00 ft. to 193.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-300-007	**Permit No:** WEL2017-00070	**County:** Washtenaw		**Township:** Salem
Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000022072

Elevation:

Latitude: 42.349885

Longitude: -83.66139

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
5172 N. DIXBORO RD.

Well Owner: EMANUEL HERMAN

Well Address:	**Owner Address:**
5172 N. DIXBORO RD. ANN ARBOR, MI 48105	20246 SUNSET ST. LIVONIA, MI 48154

Drilling Method: Rotary
Well Depth: 189.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 4/4/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 179.00 ft. depth SDR: 21.00
0.00 in. to 179.00 ft. depth SDR: 0.00

Borehole: 8.50 in. to 189.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 74.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 189.00 ft. after 1.00 hrs. at 30 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	179.00 ft. and 189.00 ft.

Fittings: Coupling

Formation Description	Thickness	Depth to Bottom
Yellow Clay	9.00	9.00
Gray Clay	37.00	46.00
Clay Gravely	3.00	49.00
Gray Clay	129.00	178.00
Sand	11.00	189.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 170.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	East

Geology Remarks:

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK - WELL FIRST - NO PUMPING EQUIPMENT INSTALLED.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-300-007	**Permit No:** WEL2017-00070	**County:** Washtenaw		**Township:** Salem

Well ID: 81000022104

Elevation:

Latitude: 42.34983

Longitude: -83.66161

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 07E	31	Active		

Distance and Direction from Road Intersection:
5172 DIXBORO RD.

Well Owner: EMANUEL HERMAN

Well Address:	**Owner Address:**
5172 DIXBORO RD. ANN ARBOR, MI 48105	20246 SUNSET ST. LIVONIA, MI 48154

Drilling Method: Rotary
Well Depth: 368.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 4/19/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 188.00 ft. depth SDR: 21.00
0.00 in. to 358.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 368.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/2/2017 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 25SD1S4 **Pump Capacity:** 25 GPM
Drop Pipe Length: 140.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 2.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR60 **Tank Capacity:** 20.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 90.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 368.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Sand	11.00	21.00
Gray Clay	157.00	178.00
Sand & Gravel	14.00	192.00
Gray Clay	160.00	352.00
Gravel	16.00	368.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	358.00 ft. and 368.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	30.00	None	0.00 ft. to 358.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southeast

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1200# SAND PACK. LAST STRATUM - GRAVEL HAD A MIX OF SEDIMENTARY ROCK AND GRAINY SHALE. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: WEL2003-00548	County: Washtenaw	Township: Salem

Well ID: 81000022106

Elevation:

Latitude: 42.354005

Longitude: -83.6597589

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Distance and Direction from Road Intersection:
5202 DIXBORO FARMS DR.

Well Owner: J.E. BROWN BUILDING, INC.

Well Address:	Owner Address:
5202 DIXBORO FARMS DDR. ANN ARBOR, MI 48105	3978 MICHAEL ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 8/11/2003

Casing Type: **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Static Water Level:
Well Yield Test: **Yield Test Method:**

Unrestricted Flow Rate:

Screen Installed: **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type:
Screen Installation Type:
Slot **Length** **Set Between**

Fittings:

Wellhead Completion: Pitless adapter, 12 inches above grade

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 4/25/2017 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 95.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Formation Description	Thickness	Depth to Bottom

Geology Remarks:

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	175 ft.	Southwest

Drilling Machine Operator Name:
Employment:
Pump Installer: Dan Rowe, Tod Stevens
Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Co Inc
Business Address: 8300 Dexter Chelsea, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: WELL DRILLED 8/11/2003 (WELL ID: 81000013540)
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-002	**Permit No:** WEL2017-00081	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000022118

Elevation:

Latitude: 42.335147

Longitude: -83.675159

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
4275 GRANDEUR OAKS

Well Owner: DALE TUTTLE

Well Address:	**Owner Address:**
4275 GRANDEUR OAKS ANN ARBOR, MI 48105	8518 CEDAR HILLS ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 65.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 5/8/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 55.00 ft. depth SDR: 21.00
0.00 in. to 55.00 ft. depth SDR: 0.00

Borehole: 8.50 in. to 65.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/5/2018 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 22 GPM
Drop Pipe Length: 55.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FL-8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 39.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 50.00 ft. after 1.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Yellow Clay & Stones	11.00	19.00
Gray Clay	11.00	30.00
Gravel	3.00	33.00
Gray Clay	13.00	46.00
Clay	5.00	51.00
Sand & Gravel	14.00	65.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	55.00 ft. and 65.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 50.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	135 ft.	North

Geology Remarks:

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A01-31-210-009	**Permit No:** WE1201500045	**County:** Washtenaw		**Township:** Salem
Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000022131

Elevation:

Latitude: 42.353394

Longitude: -83.657954

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
0.25 MI E OF DIXBORO RD, DIXBORO FARMS DR S SIDE

Well Owner: PHILIP CONLIN

Well Address:	**Owner Address:**
5262 DIXBORO FARMS DR ANN ARBOR, MI 48105	7171E MICHIGAN AVE SALINE, MI 48176

Drilling Method: Cable Tool
Well Depth: 89.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 3/18/2015

Casing Type: Steel - black **Height:** 2.00 ft. above grade
Casing Joint: Welded
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 79.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 52.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Bailer
Pumping level 60.00 ft. after 1.00 hrs. at 20 GPM

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
10.00	4.00 ft.	85.00 ft. and 89.00 ft.
12.00	4.00 ft.	81.00 ft. and 85.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Gray Clay	14.00	22.00
Gray Clay & Gravel	15.00	37.00
Gravel & Sand W/Clay	2.00	39.00
Sand W/Gravel	6.00	45.00
Sand & Gravel	23.00	68.00
Gray Sand	21.00	89.00

Well Grouted: Yes **Grouting Method:** Driven/dry grout

Grouting Material	Bags	Additives	Depth
Bentonite dry granular	3.00	None	0.00 ft. to 79.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	50 ft.	West

Geology Remarks:

Drilling Machine Operator Name: ALLEN MORRIS
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-1154
Business Name: ERNEST MORRIS WD
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: NEW CONST
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-300-006	**Permit No:** WEL2017-00253	**County:** Washtenaw	**Township:** Salem

Well ID: 81000022327

Elevation:

Latitude: 42.349136

Longitude: -83.661935

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 07E	31	Active		

Distance and Direction from Road Intersection:
5162 DIXBORO RD.

Well Owner: CHRIS ARCURE/JESSICA CAINCROSS

Well Address:	**Owner Address:**
5162 DIXBORO RD. ANN ARBOR, MI 48105	3438 E. ELLSWORTH RD. ANN ARBOR, MI 48108

Drilling Method: Rotary
Well Depth: 380.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/26/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 190.00 ft. depth SDR: 21.00
5.68 in. to 190.00 ft. depth SDR: 17.00

Borehole: 8.70 in. to 380.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 3/25/2019 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 125.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 91.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 91.00 ft. after 1.00 hrs. at 12 GPM
Pumping level 175.00 ft. after 1.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	17.00	17.00
Gray Clay	48.00	65.00
Clay Gravely	47.00	112.00
Gray Clay	169.00	281.00
Clay Gravely	26.00	307.00
Clay Silty	19.00	326.00
Gray Clay	36.00	362.00
Gravel	18.00	380.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	370.00 ft. and 380.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	34.00	None	0.00 ft. to 365.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Drilling Machine Operator Name: Troy Revill
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-033	**Permit No:** WEL2017-00345	**County:** Washtenaw		**Township:** Northfield

Well ID: 81000022339

Elevation:

Latitude: 42.34986

Longitude: -83.68889

Method of Collection: Address Matching-House Number

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 06E	35	Active		

Distance and Direction from Road Intersection:
5310 PONTIAC TRAIL

Well Owner: ANDREW GENTHE

Well Address:	**Owner Address:**
5310 PONTIAC TRAIL ANN ARBOR, MI 48105	1125 WOLVERHAMPTON LANE ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 101.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/27/2017

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 89.00 ft. depth SDR: 21.00
0.00 in. to 89.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 101.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 5/21/2018 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 22 GPM
Drop Pipe Length: 95.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT-8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 62.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 80.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 101.00 ft. after 2.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Gray Clay	24.00	34.00
Sand	6.00	40.00
Gray Clay	46.00	86.00
Sand	13.00	99.00
Clay	2.00	101.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	89.00 ft. and 99.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	7.00	None	0.00 ft. to 85.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 600# SAND PACK AND A 2 FT. TAIL PIPE. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-300-003	**Permit No:** WEL2017-00285	**County:** Washtenaw		**Township:** Salem

Well ID: 81000022380

Elevation:
Latitude: 42.34661
Longitude: -83.66167
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 07E	31	Plugged		

Distance and Direction from Road Intersection:
CORNER OF JOY ROAD AND DIXBORO ROAD

Well Owner: F.Z. FARMS, LLC

Well Address:	**Owner Address:**
5177 JOY ROAD ANN ARBOR, MI 48105	4900 WALNUT WOODS DRIVE ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 370.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 10/18/2017
Casing Type: None **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole: 8.75 in. to 370.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Brown Clay	14.00	14.00
Gray Clay	201.00	215.00
Gray Sand & Gravel Dry	15.00	230.00
Gray Clay	140.00	370.00

Well Grouted: No

Geology Remarks:

Wellhead Completion:

Nearest Source of Possible Contamination:
Type **Distance** **Direction**

Drilling Machine Operator Name: J. STEPP
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Abandoned Well Plugged: No

Reason Not Plugged: Other

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: DRY HOLE. NO CASING SET. PLUGGED WITH BENTONITE SLURRY FROM 0-370'
Other Remarks: Not Plugged Reason:NO OTHER WELL TO PLUG

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-300-003	**Permit No:** WEL2017-00285	**County:** Washtenaw	**Township:** Salem

Well ID: 81000022499

Elevation:

Latitude: 42.34649

Longitude: -83.66155

Method of Collection: Address Matching-House Number

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 07E	31	Active		

Distance and Direction from Road Intersection:
CORNER OF DIXBORO AND JOY ROADS

Well Owner: F.Z. FARMS, LLC

Well Address:
5177 JOY ROAD
ANN ARBOR, MI 48105

Owner Address:
4900 WALNUT WOODS DR.
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 370.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 11/28/2017

Casing Type: PVC plastic **Height:** 2.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 182.00 ft. depth SDR: 21.00
5.00 in. to 362.00 ft. depth SDR: 17.00

Borehole: 8.75 in. to 370.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/28/2017 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15-P4 **Pump Capacity:** 20 GPM
Drop Pipe Length: 120.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL-28 **Tank Capacity:** 82.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 370.00 ft. after 4.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Gray Clay	35.00	47.00
Brown Clay	28.00	75.00
Gray Clay W/Gravel	287.00	362.00
Gravel & Sand	8.00	370.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
15.00	4.00 ft.	362.00 ft. and 366.00 ft.
20.00	4.00 ft.	366.00 ft. and 370.00 ft.

Fittings: Neoprene packer, Bottom plug

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	28.00	Other	0.00 ft. to 360.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: J. STEPP
Employment: Employee
Pump Installer: E. WHEELER/K. BURKE

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: WELL TO BE USED FOR BARN. POSSIBLE FUTURE HOME USE.

Other Remarks: Grouting Additive 1:EASY MUD

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-003	**Permit No:** WEL2018-00014	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000022524

Elevation:

Latitude: 42.336201

Longitude: -83.67492

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
EAST OF EARHART RD., WEST OF N. DIXBORO RD. - LOT 3

Well Owner: DAVID S. GONZALEZ & EMIKO MORI

Well Address:	Owner Address:
4429 GRANDEUR OAKS ANN ARBOR, MI 48105	8420 CEDAR HILLS DR. DEXTER, MI 48130

Drilling Method: Rotary
Well Depth: 56.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/2/2018

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 51.00 ft. depth SDR: 21.00
0.00 in. to 51.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 56.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/15/2018 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR260 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 20.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 30.00 ft. after 1.00 hrs. at 40 GPM
Pumping level 50.00 ft. after 1.00 hrs. at 80 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Yellow Clay	12.00	20.00
Clay & Gravel	16.00	36.00
Sand	14.00	50.00
Gravel Coarse	6.00	56.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	5.00 ft.	51.00 ft. and 56.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 48.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	Southwest

Geology Remarks:

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Tod Stevens, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-005	**Permit No:** WEL2018-00400	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000022853

Elevation:

Latitude: 42.33818

Longitude: -83.67333

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND NORTH OFF WARREN RD.

Well Owner: TIFFANY AND BRIAN ROONEY

Well Address:	Owner Address:
4687 N. GRANDEUR OAKS LAN ANN ARBOR, MI 48105	8000 WALSH RD. DEXTER, MI 48130

Drilling Method: Rotary
Well Depth: 76.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/3/2018

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 66.00 ft. depth SDR: 21.00
0.00 in. to 66.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 76.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 40.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 76.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	9.00	9.00
Gray Clay	32.00	41.00
Gravel & Stones	35.00	76.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	66.00 ft. and 76.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 66.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. WELL FIRST.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-11-200-001	**Permit No:** WEL2018-00309	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000022966

Elevation:

Latitude: 42.329556

Longitude: -83.697346

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Distance and Direction from Road Intersection:
EAST OF NIXON RD. AND WEST OF EARHART RD.

Well Owner: CYNTHIA STILES & ERIC KALDHAN

Well Address:	Owner Address:
3180 WARREN RD. ANN ARBOR, MI 48105	1912 AUSTIN AVE. ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 135.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 8/20/2018

Casing Type: PVC plastic **Height:** 2.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.68 in. to 125.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 135.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** Yes
Pump Installation Date: 10/29/2018 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Other
Model Number: 15SDSP **Pump Capacity:** 10 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 100
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FL7 **Tank Capacity:** 20.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 120.00 ft. after 2.00 hrs. at 40 GPM
Pumping level 135.00 ft. after 2.00 hrs. at 60 GPM

Formation Description	Thickness	Depth to Bottom
Sand	7.00	7.00
Yellow Clay	6.00	13.00
Gray Clay	92.00	105.00
Gravel	6.00	111.00
Sand Fine	6.00	117.00
Sand & Gravel	18.00	135.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	125.00 ft. and 135.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 120.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Jack Wynn, Ken Burke

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Co Inc
Business Address: 8300 Dexter Chelsea, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. FRANKLIN SOLAR PACK PUMPING SYSTEM INSTALLED - .75 HP, 100V.

Other Remarks: Pump Type:SOLAR PACK/PUMP, MOTOR, DRIVE

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-200-004	**Permit No:** WEL2018-00383	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000022989

Elevation:

Latitude: 42.35299

Longitude: -83.68226

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
SOUTH OF PONTIAC TRAIL AND NORTH OF JOY RD.

Well Owner: JOEL AND KRISTINE DREFFS

Well Address:	Owner Address:
5380 EARHART RD. ANN ARBOR, MI 48105	6859 EARHART RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 263.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 12/10/2018

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 193.00 ft. depth SDR: 21.00
5.68 in. to 253.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 263.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 12/11/2018 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FB07P4S2 **Pump Capacity:** 10 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 65.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 70.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 263.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Clay Sandy	10.00	10.00
Gray Clay	45.00	55.00
Gravel	6.00	61.00
Gray Clay	175.00	236.00
Sand Silty	11.00	247.00
Gray Clay	6.00	253.00
Gravel	5.00	258.00
Yellow Sand	5.00	263.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	253.00 ft. and 263.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	18.00	None	0.00 ft. to 253.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	North

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Dan Rowe, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.352965 **Longitude:** -83.681923
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 7.00 **Well Depth:** 56 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-101-003	**Permit No:** WEL2019-00124	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000023187

Elevation:

Latitude: 42.34016

Longitude: -83.66711

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
2,018 FT. SOUTH OF JOY RD. AND 1,428 FT. WEST OF N. DIXBORO RD.

Well Owner: EUGENE & GRACE KIM

Well Address:	Owner Address:
4823 RIDGE CREEK LANE ANN ARBOR, MI 48105	2845 HARDWICK ROAD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 78.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/1/2019

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 68.00 ft. depth SDR: 21.00
0.00 in. to 68.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 78.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/12/2020 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 20 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT-8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 15.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 60.00 ft. after 1.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	30.00	30.00
Gray Clay	29.00	59.00
Sand	19.00	78.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	68.00 ft. and 78.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 62.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	West

Geology Remarks:

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Tod Stevens, Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 09-12-200-013	**Permit No:** WEL2019-00152	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000023201

Elevation:

Latitude: 42.331924

Longitude: -83.674773

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
230' WEST AND 680' SOUTH OF WARREN AND GRANDEUR OAKS LANE

Well Owner: LUKE & CHRISTINA CARMICHAEL

Well Address:	Owner Address:
4430 WARREN RD ANN ARBOR, MI 48105	5092 WARREN RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 205.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/10/2019

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 165.00 ft. depth SDR: 21.00
5.00 in. to 197.00 ft. depth SDR: 17.00

Borehole: 8.50 in. to 205.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/15/2019 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 15FV15P4 **Pump Capacity:** 15 GPM
Drop Pipe Length: 120.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL22 **Tank Capacity:** 65.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 65.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 205.00 ft. after 2.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Topsoil	3.00	3.00
Brown Clay	15.00	18.00
Gray Clay	177.00	195.00
Gray Sand & Gravel	10.00	205.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	8.00 ft.	197.00 ft. and 205.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	20.00	None	0.00 ft. to 192.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	160 ft.	Northwest

Geology Remarks:

Drilling Machine Operator Name: RICH MINER
Employment: Employee
Pump Installer: ANDY WESTPHAL

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1861
Business Name: Adams Well Drilling, Inc.
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-11-200-001	**Permit No:** WEL2018-00310	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000023380

Elevation:

Latitude: 42.329516

Longitude: -83.697389

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Distance and Direction from Road Intersection:
BETWEEN NIXON & EARHART RDS.

Well Owner: CYNTHIA STILES & ERIC KALDJIAN

Well Address:	Owner Address:
3180 WARREN ROAD ANN ARBOR, MI 48105	1912 AUSTIN AVE. ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 107.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/25/2019

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 97.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 107.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/7/2020 **HP:** 1.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2ST-152-20 **Pump Capacity:** 20 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL-28 **Tank Capacity:** 82.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 45.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 107.00 ft. after 4.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	13.00	13.00
Brown Clay	10.00	23.00
Brown Clay Sandy W/Gravel	8.00	31.00
Brown Gravel	4.00	35.00
Gray Clay	60.00	95.00
Gray Sand Water Bearing	12.00	107.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	97.00 ft. and 107.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 95.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Drainfield/Dry well	200 ft.	Northeast

Geology Remarks:

Drilling Machine Operator Name: J. STEPP
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: DRILLED 10/25/2019. PUMP/TANK INSTALLATION TO OCCUR LATER. 1/7/2020 PUMP & TANK INSTALL COMPLETED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-02-100-016	**Permit No:** WEL2019-00058	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000023462

Elevation:

Latitude: 42.339049

Longitude: -83.685072

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
SOUTH OF JOY RD. AND NORTH OF WARREN RD.

Well Owner: SCOTT AND JILL HOTZ

Well Address:	Owner Address:
4525 EARHART RD. ANN ARBOR, MI 48105	10892 TREELINE DR. PINCKNEY, MI 48169

Drilling Method: Rotary
Well Depth: 123.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/18/2019

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 113.00 ft. depth SDR: 21.00
0.00 in. to 113.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 123.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/18/2019 **HP:** 1.50
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE 15 2 **Pump Capacity:** 22 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 58.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 80.00 ft. after 2.00 hrs. at 20 GPM
Pumping level 100.00 ft. after 2.00 hrs. at 60 GPM
Pumping level 123.00 ft. after 2.00 hrs. at 80 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gravel	8.00	23.00
Gravel & Clay	52.00	75.00
Gray Clay	15.00	90.00
Gravel	16.00	106.00
Gray Clay	2.00	108.00
Gravel	15.00	123.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	113.00 ft. and 123.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 107.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Tod Stevens, Karl Swarthout

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK. CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-200-007	**Permit No:** WEL2019-00414	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000023510

Elevation:

Latitude: 42.358668

Longitude: -83.676427

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND WEST OF DIXBORO RD.

Well Owner: GERMAN PARK RECREATION CLUB

Well Address:	Owner Address:
5549 PONTIAC TR. ANN ARBOR, MI 48105	10156 ARNOLD DEXTER, MI 48130

Drilling Method: Rotary
Well Depth: 292.00 ft. **Well Use:** Type III public
Well Type: Replacement **Date Completed:** 1/14/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 282.00 ft. depth SDR: 21.00
0.00 in. to 282.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 292.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 9/22/2020 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 20 GPM
Drop Pipe Length: 120.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 282.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 105.00 ft. after 2.00 hrs. at 24 GPM
Pumping level 292.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Sand	4.00	4.00
Yellow Clay	8.00	12.00
Gray Clay	265.00	277.00
Gravel	15.00	292.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	282.00 ft. and 292.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	25.00	None	0.00 ft. to 282.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	460 ft.	Northwest

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Harley Shelhart, Ken Burke

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: No
Reason Not Plugged: Will return to plug well at a later date

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK. PRESSURE TANK AND FITTINGS INSTALLED BY OWNER/OTHER THAN CRIBLEY DRILLING CO., INC. OLD WELL NOT YET ABANDONED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-11-100-001	**Permit No:** WEL2020-00086	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000023553

Elevation:

Latitude: 42.331304

Longitude: -83.684252

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Distance and Direction from Road Intersection:
SOUTH OF WARREN RD. AND NORTH OF M-14

Well Owner: THOMAS A. BARTOSKESKY

Well Address:	Owner Address:
3909 EARHART RD. ANN ARBOR, MI 48105	3909 EARHART RD. ANN ARBO, MI 48105

Drilling Method: Rotary
Well Depth: 65.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/13/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 55.00 ft. depth SDR: 21.00
0.00 in. to 55.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 65.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/15/2020 **HP:** 0.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FB05P4S2 **Pump Capacity:** 10 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 120 **Tank Capacity:** 33.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 15.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 15.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 65.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Gray Clay	34.00	44.00
Sand & Gravel	21.00	65.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	55.00 ft. and 65.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 55.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	West

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Jack Wynn, Kevin H.

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.331223 **Longitude:** -83.684244
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 4.00 **Well Depth:** 45 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 800# SAND PACK. PRESSURE TANK INSTALLED BY CRIBLEY DRILLING ON 9/11/2017. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-12-100-020	**Permit No:** WEL2020-00083	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000023573

Elevation:

Latitude: 42.32813

Longitude: -83.662424

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
WEST OF N. DIXBORO RD. AND SOUTH OF WARREN RD.

Well Owner: KALYAN HANDIQUE

Well Address:	Owner Address:
4964 WALNUT WOODS DR. ANN ARBOR, MI 48105	4964 WALNUT WOODS ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 88.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/1/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 78.00 ft. depth SDR: 21.00
0.00 in. to 78.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 88.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/3/2020 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 64.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 75.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	31.00	31.00
Sand	12.00	43.00
Gray Clay	21.00	64.00
Gravel	24.00	88.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	78.00 ft. and 88.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 73.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	125 ft.	Northwest

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Jack Wynn, Ken Burke

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.328124 **Longitude:** -83.66252
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 10.00 **Well Depth:** 80 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 800# SAND PACK. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: A-01-31-210-003	**Permit No:** WEL2019-00441	**County:** Washtenaw	**Township:** Salem

Well ID: 81000023651

Elevation:

Latitude: 42.355774

Longitude: -83.661718

Method of Collection: Interpolation-Map

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 07E	31	Active		

Distance and Direction from Road Intersection:
NORTH OF JOY RD. AND SOUTH OF PONTIAC TRAIL

Well Owner: JERRY L. HELMER

Well Address:	**Owner Address:**
5500 DIXBORO RD. ANN ARBOR, MI 48105	7400 MOON RD. SALINE, MI 48176

Drilling Method: Rotary
Well Depth: 337.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 8/20/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 199.00 ft. depth SDR: 21.00
5.68 in. to 329.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 337.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 77.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 100.00 ft. after 1.00 hrs. at 15 GPM
Pumping level 200.00 ft. after 1.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	38.00	38.00
Gray Clay	51.00	89.00
Gravel & Clay	9.00	98.00
Clay	156.00	254.00
Sand & Gravel	3.00	257.00
Clay	66.00	323.00
Gravel	14.00	337.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
25.00	8.00 ft.	329.00 ft. and 337.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	28.00	None	0.00 ft. to 317.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-36-400-009	**Permit No:** WEL2020-00182	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000023678

Elevation:

Latitude: 42.348293

Longitude: -83.66263

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Distance and Direction from Road Intersection:
NORTH OF E. JOY RD. AND SOUTH OF PONTIAC TRAIL

Well Owner: RAY AND LAUREN STEELE

Well Address:	Owner Address:
5115 DIXBORO RD. ANN ARBOR, MI 48105	5115 N. DIXBORO RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 396.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/21/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 196.00 ft. depth SDR: 21.00
5.68 in. to 386.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 396.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/27/2020 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 165.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 120.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 190.00 ft. after 2.00 hrs. at 70 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Gray Clay	16.00	26.00
Sand	8.00	34.00
Gray Clay	87.00	121.00
Gravel	13.00	134.00
Gray Clay	62.00	196.00
Gravel	4.00	200.00
Gray Clay	172.00	372.00
Gravel	24.00	396.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	10.00 ft.	386.00 ft. and 396.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	30.00	None	0.00 ft. to 386.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	West

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Tod Stevens, Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.348377 **Longitude:** -83.662515
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 3.00 **Well Depth:** 128 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,200# SAND PACK. PUMPING EQUPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

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Import ID:

Tax No: J-10-06-400-013	**Permit No:** WEL2020-00161	**County:** Washtenaw		**Township:** Superior
Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000023692

Elevation:

Latitude: 42.336571

Longitude: -83.6538

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
.25 mile north of warren and vorhees

Well Owner: Christine Pipitone

Well Address:	**Owner Address:**
5430 Meadowcrest Dr Ann Arbor, MI 48105	31461 Marquette St Garden City, MI 48135

Drilling Method: Rotary
Well Depth: 63.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/22/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 53.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 63.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 63.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	18.00	18.00
Gray Clay	32.00	50.00
Gray Sand Fine	13.00	63.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	53.00 ft. and 63.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	Retarder	0.00 ft. to 50.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	North

Drilling Machine Operator Name: Brian Keller
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name: Keller Well Drilling Inc
Business Address: 5615 Chilson, Howell, MI, 48843

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 10 ft screen 16 bags of sand
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-200-002	**Permit No:** WEL2020-00258	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000023713

Elevation:

Latitude: 42.343885

Longitude: -83.676339

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND WEST OF DIXBORO RD.

Well Owner: WASHTENAW SAND GRAVEL CO.

Well Address:	Owner Address:
4984 E. JOY RD. ANN ARBOR, MI 48105	4984 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 210.00 ft. **Well Use:** Type II public
Well Type: New **Date Completed:** 10/2/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 200.00 ft. depth SDR: 21.00
0.00 in. to 200.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 210.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 11/13/2020 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FB07P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 125.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR120 **Tank Capacity:** 33.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 100.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 105.00 ft. after 2.00 hrs. at 12 GPM
Pumping level 210.00 ft. after 2.00 hrs. at 60 GPM

Formation Description	Thickness	Depth to Bottom
Clay	10.00	10.00
Sand	12.00	22.00
Gray Clay	71.00	93.00
Sand & Gravel	8.00	101.00
Gray Clay	97.00	198.00
Sand	12.00	210.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	200.00 ft. and 210.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 200.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Northeast

Drilling Machine Operator Name: Ken Pearce
Employment: Employee
Pump Installer: Tod Stevens, Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 800# SAND PACK. WELL FIRST.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-101-004	**Permit No:** WEL2021-00052	**County:** Washtenaw		**Township:** Ann Arbor
Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000024062

Elevation:

Latitude: 42.34034

Longitude: -83.672211

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
WEST OF DIXBORO RD. AND NORTH OF WARREN RD.

Well Owner: JOHN DARISH

Well Address:	**Owner Address:**
4715 RIDGE CREEK LANE ANN ARBOR, MI 48105	4653 RAMBLING DR. TROY, MI 48098

Drilling Method: Rotary
Well Depth: 60.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/14/2021

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 56.00 ft. depth SDR: 21.00
0.00 in. to 56.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 60.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 2/24/2022 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV1P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: WR260 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 18.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 40.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	15.00	15.00
Gravel & Stones	31.00	46.00
Gravel	14.00	60.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
20.00	4.00 ft.	56.00 ft. and 60.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 51.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	130 ft.	Southwest

Geology Remarks:

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Tod Stevens, Justin Banks

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST.
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-400-015	**Permit No:** WELL2021-0356	**County:** Washtenaw	**Township:** Northfield

Well ID: 81000024222

Elevation:

Latitude: 42.351202

Longitude: -83.685366

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
Southeast of Pontiac Trail

Well Owner: Karen Piehutkoski

Well Address:	Owner Address:
5305 Earhart Ann Arbor, MI 48105	1296 Newport Rd Ann Arbor, MI 48103

Drilling Method: Rotary
Well Depth: 83.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 9/29/2021

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 79.00 ft. depth SDR: 21.00

Borehole: 8.50 in. to 83.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/12/2021 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 22 GPM
Drop Pipe Length: 60.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: Yes

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: PJR6 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 38.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 83.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand & Gravel	16.00	16.00
Gray Clay	34.00	50.00
Gray Sand	8.00	58.00
Gray Clay	10.00	68.00
Gray Sand Fine	8.00	76.00
Clay	1.00	77.00
Sand	10.00	87.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
10.00	5.00 ft.	79.00 ft. and 83.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	10.00	None	0.00 ft. to 70.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: Mark Scappaticci
Employment: Employee
Pump Installer: Andy Westphal

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2428
Business Name: Adams Well Drilling, Inc.
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B-02-35-400-015	**Permit No:** WELL2021-0356	**County:** Washtenaw		**Township:** Northfield

Well ID: 81000024223

Elevation:

Latitude: 42.351202

Longitude: -83.685366

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Inactive		

Distance and Direction from Road Intersection:
Southeast of Pontiac Trail

Well Owner: Karen Piehutkoski

Well Address:
5305 Earhart
Ann Arbor , MI 48105

Owner Address:
1296 Newport Rd
Ann Arbor, MI 48103

Drilling Method: Rotary
Well Depth: 160.00 ft. **Well Use:** Irrigation
Well Type: Dry Hole **Date Completed:** 9/29/2021

Casing Type: None **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole: 8.50 in. to 160.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:** Unscreened Sand/Gravel

Formation Description	Thickness	Depth to Bottom
Brown Sand & Gravel	16.00	16.00
Clay	104.00	120.00
Sand	6.00	126.00
Clay	34.00	160.00

Well Grouted: No

Geology Remarks:

Wellhead Completion:

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Mark Scappaticci
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2428
Business Name: Adams Well Drilling, Inc.
Business Address: 5893 Sterling Drive, Howell, MI, 48843

Abandoned Well Plugged: Yes

Casing Diameter: 8.5 in. **Casing Removed:** Yes
Plugging Material: Bentonite slurry
No. of Bags: 16.00 **Well Depth:** 160 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: HAA1787WR	County: Washtenaw	Township: Ann Arbor

Well ID: 81000024689

Elevation:
Latitude: 42.34515
Longitude: -83.68341
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
ON SOUTH EAST CORNERS OF JOY AND EARHART RD

Well Owner: JOSEPH HAWKINS

Well Address:	Owner Address:
4004 EARHART ANN ARBOR, MI 48105	4004 E. JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 140.00 ft. **Well Use:** Household
Well Type: Unknown **Date Completed:** 8/11/1987
Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 46.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Clay	40.00	40.00
Sand	5.00	45.00
Clay	88.00	133.00
Sand & Gravel	10.00	143.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		132.00 ft. and 140.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 58-0551
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9504472	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000024903

Elevation:

Latitude: 42.33324

Longitude: -83.68017

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
NORTH SIDE OF WARREN RD

Well Owner: RIEMCO HOMES

Well Address:	**Owner Address:**
4141 WARREN ANN ARBOR, MI 48105	MI

Drilling Method: Rotary
Well Depth: 87.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/11/1995

Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		83.00 ft. and 87.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	20.00	20.00
Gray Clay	25.00	45.00
Sand & Gravel	42.00	87.00

Well Grouted:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000025064

Elevation:
Latitude: 42.3334
Longitude: -83.6856
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
IN CONRER N. OF WARREN RD AND E. OF EARHART RD

Well Owner: HERMAN ZERWECK

Well Address:	Owner Address:
3975 WARREN RD ANN ARBOR, MI 48105	3975 WARREN RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 98.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 10/11/1996

Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		78.00 ft. and 98.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Gray Clay	20.00	30.00
Clay Fine	20.00	50.00
Sand Coarse	25.00	75.00
Sand Fine	23.00	98.00

Well Grouted:

Geology Remarks:
THIS WELL IS FILLING TWO SMALL PONDS

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: MB 04/07/2022
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Well ID: 81000025605

Elevation:

Latitude: 42.344969

Longitude: -83.693008

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
LESS THAN 1/2 MILE S. OF E JOY RD, 1/2 MILE WEST OF EARHART. RD

Well Owner: DOMINOS FARM CORP.

Well Address:
3570 E JOY RD
ANN ARBOR, MI 48105

Owner Address:
MI 48106

Drilling Method: Rotary
Well Depth: 92.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/28/1998

Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 38.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		82.00 ft. and 92.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Sand & Gravel	48.00	58.00
Gray Clay	12.00	70.00
Sand Fine	22.00	92.00

Well Grouted:

Geology Remarks:
ABANDON OLD WELL 4" X 65' WITH 2 BAGS PUMPED BENSEAL

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 91-01933	County: Washtenaw	Township: Ann Arbor

Well ID: 81000025606

Elevation:
Latitude: 42.333435
Longitude: -83.685573
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
N. OF WARREN RD, W. OF EARHART RD

Well Owner: HERMAN & SUSAN ZERWECK

Well Address:	Owner Address:
3975 WARREN RD ANN ARBOR, MI 48905	4125 EARHART RD ANN ARBOR, MI 48015

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 1/2/1992
Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		94.00 ft. and 103.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	8.00	8.00
Gravel	7.00	15.00
Gray Clay	20.00	35.00
Sand Coarse	40.00	75.00
Sand Fine	29.00	104.00
Gray Clay	1.00	105.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000025607

Elevation:
Latitude: 42.344672
Longitude: -83.694097
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
1/2 MILE E. OF PONTIAC TRAIL

Well Owner: ZEEB, DON/MARGARET

Well Address:	Owner Address:
3534 E. JOY RD ANN ARBOR, MI 48105	3300 W. JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 66.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/24/1990
Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 45.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Unrestricted Flow Rate:

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		62.00 ft. and 66.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	6.00	6.00
Sand & Gravel	13.00	19.00
Brown Clay	13.00	32.00
Sand	13.00	45.00
Gray Clay	4.00	49.00
Sand Water Bearing	17.00	66.00

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000025608

Elevation:
Latitude: 42.33462
Longitude: -83.701734
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
AT NORTH END OF HICKORY RIDGE RD

Well Owner: AL BLOOM

Well Address:	Owner Address:
4155 HICKORY RIDGE RD ANN ARBOR, MI 48105	2328 HAISLEY ANN ARBOR, MI 48103

Drilling Method: Rotary
Well Depth: 108.00 ft. **Well Use:** Household
Well Type: Unknown **Date Completed:** 8/18/1987
Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 46.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		100.00 ft. and 108.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Sand	2.00	14.00
Gray Clay	35.00	49.00
Gravel Medium	3.00	52.00
Gray Clay	34.00	86.00
Sand	22.00	108.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9502636	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 2	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000025609

Elevation:

Latitude: 42.3444

Longitude: -83.68823

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1/2 MILE S OF JOY RD, 1/2 MILE E OF MOTHER TERESA DR

Well Owner: H.S. LANDAU, INC/THOMAS HUNT

Well Address:	**Owner Address:**
3770 E JOY RD ANN ARBOR, MI 48105	5340 PLYMOUTH ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 274.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/16/1995

Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:

Diameter:

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 51.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		270.00 ft. and 274.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	8.00	8.00
Sand	57.00	65.00
Gray Clay	125.00	190.00
Green Sand	5.00	195.00
Gray Clay	69.00	264.00
Gravel	10.00	274.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000025665

Elevation:
Latitude: 42.34468
Longitude: -83.700718
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
LESS THAN 1/2 MILE E. OF PONTIAC TRAIL, S. E JOY RD

Well Owner: KAPP, ANNA

Well Address:
3180 E. JOY RD
ANN ARBOR, MI 48105

Owner Address:
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 77.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/22/1997

Casing Type: Unknown **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 60.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Brown Clay	9.00	9.00
Gray Clay	13.00	22.00
Gravel	3.00	25.00
Gray Clay	18.00	43.00
Brown Clay	2.00	45.00
Gravel & Clay	5.00	50.00
Brown Sand & Gravel	11.00	61.00
Sand Water Bearing	16.00	77.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		69.00 ft. and 77.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/11/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 95-00-090	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 12	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000028063

Elevation:

Latitude: 42.3318

Longitude: -83.68296

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
S. OF WARREN RD, E. OF EARHART RD

Well Owner: KOCH, KENNETH

Well Address:	**Owner Address:**
4020 WAREN RD ANN ARBOR, MI 48105	3900 EARHART ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 57.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 1/25/1995

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to

Borehole: 8.50 in. to

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 12BC **Pump Capacity:** 18 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 10.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Clay	8.00	8.00
Sand & Gravel	3.00	11.00
Clay & Gravel	12.00	23.00
Clay	16.00	39.00
Sand Water Bearing	18.00	57.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
40.00	4.00 ft.	53.00 ft. and 57.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/25/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 96-07-963	County: Washtenaw	Township: Ann Arbor

Well ID: 81000028065

Elevation:
Latitude: 42.33115
Longitude: -83.6634
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
S. OF WARREN RD, E. OF THORNWOOD CT

Well Owner: H.S. LANDAU, INC./BAIRD

Well Address:	Owner Address:
3990 THORNWOOD CT ANN ARBOR, MI 48105	5340 PLYMOUTH ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 188.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/18/1997

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting:

Diameter: 5.00 in. to 184.00 ft. depth

Borehole: 9.00 in. to 184.00 ft. depth

Static Water Level: 54.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:** 1.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
20.00	4.00 ft.	184.00 ft. and 188.00 ft.

Fittings: Neoprene packer

Well Grouted:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 100SESWI-8SCC **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	31.00	46.00
Gravel	5.00	51.00
Gray Clay	125.00	176.00
Yellow Gravel	12.00	188.00

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/25/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 92-06-036	County: Washtenaw	Township: Ann Arbor

Well ID: 81000028213

Elevation:

Latitude: 42.33039

Longitude: -83.66391

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
S. OF THORNWOOD CT, W. OF N DIXBORO RD PARCEL C, S. OF WARREN RD

Well Owner: H.S. LANDAU

Well Address:	Owner Address:
3974 THORNWOOD CT ANN ARBOR, MI 48105	5340 PLYMOUTH, SUITE 100 ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 188.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 12/28/1992

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 180.00 ft. depth

Borehole: 9.00 in. to 30.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 100SEWI-8C **Pump Capacity:** 18 GPM
Drop Pipe Length: 82.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
25.00	8.00 ft.	180.00 ft. and 188.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Gray Clay	20.00	32.00
Yellow Clay Sandy	8.00	40.00
Sand	8.00	48.00
Sand & Gravel	7.00	55.00
Gray Clay	69.00	124.00
Gray Clay Hard	54.00	178.00
Gravel	10.00	188.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/26/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 98-06-997	County: Washtenaw	Township: Ann Arbor

Well ID: 81000028218

Elevation:
Latitude: 42.33067
Longitude: -83.66347
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
S. OF WARREN RD, E. OF THORNWOOD CT, W. OF N DIXBORO RD LOT 2

Well Owner: H.S. LANDAU INC

Well Address:
3982 THORNWOOD CT
ANN ARBOR, MI 48105

Owner Address:
5340 PLYMOUTH RD, SUITE 100
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 188.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/24/1999

Casing Type: PVC plastic **Height:** 2.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 178.00 ft. depth

Borehole: 9.00 in. to 170.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 100SESWI-8SCC **Pump Capacity:** 18 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 59.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	10.00 ft.	178.00 ft. and 188.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Gray Clay	28.00	40.00
Sand	7.00	47.00
Gray Clay	128.00	175.00
Sand	8.00	183.00
Gravel	5.00	188.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/26/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: AA-13-85WN	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Well ID: 81000028222

Elevation:

Latitude: 42.32721

Longitude: -83.66294

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
D. OF DIXBORO LN, E. OF N DIXBORO RD, S. OF ARBOR VALLEY DR

Well Owner: H. DURBIN BROTHERS INC.

Well Address:
3823 DIXBORO RD
ANN ARBOR, MI 48105

Owner Address:
4800 HICKORY HILL
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: Unknown **Date Completed:** 2/26/1986

Casing Type: Steel - black **Height:**
Casing Joint: Threaded & coupled
Casing Fitting:

Diameter: 4.00 in. to 96.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: SD20 **Pump Capacity:** 20 GPM
Drop Pipe Length: 84.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 70.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Sand	17.00	17.00
Blue Clay Hard	28.00	45.00
Blue Clay & Gravel Hard	25.00	70.00
Gravel Coarse	7.00	77.00
Blue Clay Hard	16.00	93.00
Sand & Gravel Coarse	12.00	105.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
15.00	8.00 ft.	96.00 ft. and 105.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1276
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/26/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Well ID: 81000028224

Elevation:

Latitude: 42.32925

Longitude: -83.66553

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
S. OF WARREN RD, E. OF DIXBORO RD

Well Owner: WILLIAM KOEPPEL

Well Address:	Owner Address:
4808 WARREN RD ANN ARBOR, MI 48105	4808 WARREN RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 197.00 ft. **Well Use:** Household
Well Type: Unknown **Date Completed:** 5/19/1987

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 189.00 ft. depth

Borehole: 8.00 in. to 78.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: CN12BC **Pump Capacity:** 12 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 61.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
30.00	8.00 ft.	189.00 ft. and 197.00 ft.

Fittings: Neoprene packer

Formation Description	Thickness	Depth to Bottom
Brown Clay	11.00	11.00
Gray Clay	10.00	21.00
Brown Clay	39.00	60.00
Gravel	5.00	65.00
Gray Clay	13.00	78.00
Gravel	2.00	80.00
Gray Clay	51.00	131.00
Brown Clay	9.00	140.00
Gray Clay	43.00	183.00
Gravel	14.00	197.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: No

Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/26/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000028227

Elevation:
Latitude: 42.33161
Longitude: -83.67068
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
S. OF WARREN RD, E. OF N DIXBORO RD

Well Owner: NIAMAH S. SULAKA

Well Address:	Owner Address:
4630 WARREN RD ANN ARBOR, MI 48105	27745 ABERDEEN SOUTHFIELD, MI 48076

Drilling Method: Rotary
Well Depth: 149.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/25/1990

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 145.00 ft. depth
4.00 in. to 149.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 9BC **Pump Capacity:** 25 GPM
Drop Pipe Length: 100.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 52.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Topsoil	2.00	2.00
Gravel	3.00	5.00
Brown Clay	7.00	12.00
Gray Clay Strips Sandy	27.00	39.00
Brown Clay	6.00	45.00
Gray Clay	95.00	140.00
Sand Water Bearing	9.00	149.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
18.00	4.00 ft.	145.00 ft. and 149.00 ft.

Fittings: Neoprene packer

Well Grouted:

Geology Remarks:

Wellhead Completion: Pitless adapter

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: 04/26/2022 MB
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Superior

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 07E	6	Active		

Well ID: 81000028677

Elevation:

Latitude: 42.33283

Longitude: -83.65635

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1/2 mile west of vorheis on north side of warren

Well Owner: Roger Foss

Well Address:	Owner Address:
5305 Warren Ann Arbor, MI 48105	339 E Liberty So Lyon, MI

Drilling Method: Rotary
Well Depth: 109.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/26/1990

Casing Type: Steel - unknown **Height:** 1.00 ft. above grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 105.00 ft. depth

Borehole: 8.00 in. to 105.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: **Pump Capacity:** 10 GPM
Drop Pipe Length: 100.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 40.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	7.00	7.00
Yellow Gravel	2.00	9.00
Yellow Clay & Gravel	36.00	45.00
Hardpan	58.00	103.00
Sand Water Bearing	6.00	109.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		105.00 ft. and 109.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-0687
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Superior

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 07E	6	Active		

Well ID: 81000028692

Elevation:

Latitude: 42.34052

Longitude: -83.65713

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
0.6 miles north of warren 0.4 miles south of joy on east side of dixboro north of bend in road

Well Owner: Richard Goodman

Well Address:	Owner Address:
4910 Dixboro Ann Arbor, MI 48105	4910 Dixboro Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 267.00 ft. **Well Use:** Household
Well Type: Unknown **Date Completed:** 9/28/1997

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 267.00 ft. depth SDR: 21.00

Borehole: 8.00 in. to 250.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: cn9bc **Pump Capacity:** 12 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 63.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: No **Intake:** Bedrock Well

Formation Description	Thickness	Depth to Bottom
Brown Clay	21.00	21.00
Gray Clay	20.00	41.00
Gravel	24.00	65.00
Gray Clay	181.00	246.00
Unidentified Consolidated Fm	21.00	267.00

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9701463	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000029478

Elevation:

Latitude: 42.34567

Longitude: -83.65707

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
1/4 mile east of dixboro on south side of joy

Well Owner: Banbury Cross Farms

Well Address:	**Owner Address:**
5310 Joy Ann Arbor, MI 48105	5310 Joy Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 123.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/14/1997

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 98.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 98.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Unknown **Pump Type:** Submersible
Model Number: **Pump Capacity:** 10 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	22.00	22.00
Gray Clay	18.00	40.00
Gravel	3.00	43.00
Gray Clay	31.00	74.00
Sand	49.00	123.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		98.00 ft. and 123.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** Unknown
Plugging Material: Bentonite slurry
No. of Bags: 4.00 **Well Depth:** 170 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	**Permit No:** 99-09337	**County:** Washtenaw			**Township:** Superior
		Town/Range: 02S 07E	**Section:** 6	**Well Status:** Active	**WSSN:**

Source ID/Well No:

Well ID: 81000029482

Elevation:

Latitude: 42.33253

Longitude: -83.66096

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
corner of warren and dixboro NE corner

Well Owner: phillip P

Well Address:	**Owner Address:**
5031 Warren Ann Arbor, MI 48105	5075 Warren Ann Arbor, MI

Drilling Method: Rotary
Well Depth: 55.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/19/1999

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: Unknown

Diameter: 5.00 in. to 47.00 ft. depth SDR: 21.00

Borehole: 7.90 in. to 55.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: T1250 **Pump Capacity:** 12 GPM
Drop Pipe Length: 36.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 25.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Formation Description	Thickness	Depth to Bottom
Yellow Clay	7.00	7.00
Yellow Sand	2.00	9.00
Yellow Clay	4.00	13.00
Blue Clay	3.00	16.00
Blue Clay & Gravel	9.00	25.00
Gray Sand Fine	4.00	29.00
Blue Clay	3.00	32.00
Gravel Coarse	3.00	35.00
Blue Clay & Gravel	10.00	45.00
Gray Sand Fine	10.00	55.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		47.00 ft. and 55.00 ft.

Fittings: Unknown

Well Grouted:

Geology Remarks:

Wellhead Completion: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2197
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9803975	**County:** Washtenaw		**Township:** Superior
		Town/Range: 02S 07E	**Section:** 7	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000029500

Elevation:

Latitude: 42.33198

Longitude: -83.65587

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
lot 1 fleming ridge SW corner of warren and fleming

Well Owner: Advantage New Home Services

Well Address:	**Owner Address:**
3991 Fleming Ridge Ann Arbor, MI 48105	7215 Jackson Ann Arbor, MI

Drilling Method: Rotary
Well Depth: 205.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/1/1998

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 195.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 190.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 75eswi-12bcsbc **Pump Capacity:** 10 GPM
Drop Pipe Length: 185.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 78.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		195.00 ft. and 205.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Clay Sandy	18.00	18.00
Yellow Clay	4.00	22.00
Gray Clay	93.00	115.00
Yellow Clay Sandy	4.00	119.00
Gray Clay	77.00	196.00
Shale W/Gravel	9.00	205.00

Well Grouted:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0624
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9805731	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030184

Elevation:

Latitude: 42.351563

Longitude: -83.688011

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
S OF PONTIAC W OF EARHART

Well Owner: DOMAN, FRAN

Well Address:
5330 PONTIAC TRL
ANN ARBOR, MI 48105

Owner Address:
5330 PONTIAC TRL
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 120.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/1/1998

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 116.00 ft. depth

Borehole: 8.50 in. to 120.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 12BC **Pump Capacity:** 12 GPM
Drop Pipe Length: 106.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 80.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Sand	2.00	2.00
Brown Clay	19.00	21.00
Gray Clay	14.00	35.00
Gravel	9.00	44.00
Gray Clay	22.00	66.00
Sand	12.00	78.00
Gray Clay	36.00	114.00
Sand Water Bearing	6.00	120.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		116.00 ft. and 120.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** Unknown
Plugging Material: Other
No. of Bags: 10.00 **Well Depth:** 108 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:HOLE PLUG

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 9903823	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030185

Elevation:

Latitude: 42.345361

Longitude: -83.69886

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
N OF E JOY RD E OF PONTIAC TRL W OF EARHART

Well Owner: EUGENE SZENDENTIS

Well Address:	Owner Address:
3211 E JOY ANN ARBOR, MI 48105	3211 E JOY ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 254.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/24/1999

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 250.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 245.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:** 12 GPM
Drop Pipe Length: 85.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 54.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Yellow Clay	14.00	24.00
Gray Clay	66.00	90.00
Gray Clay Gravely	156.00	246.00
Gravel	8.00	254.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		250.00 ft. and 254.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** Unknown
Plugging Material: Other
No. of Bags: 8.00 **Well Depth:** 100 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:BESEAL, Pump Manufacturer:OWNERS

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9807211	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030186

Elevation:

Latitude: 42.34642

Longitude: -83.684353

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
N OF JOY W OF EARHART

Well Owner: SCHAPPATICCI CHRISTINA

Well Address:	**Owner Address:**
3965 E JOY RD ANN ARBOR, MI 48105	3965 E JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 65.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/1/1998

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 61.00 ft. depth

Borehole: 8.50 in. to 65.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Other **Pump Type:** Submersible
Model Number: **Pump Capacity:**
Drop Pipe Length: 20.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 4.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Brown Clay	5.00	5.00
Sand & Clay	3.00	8.00
Brown Clay	6.00	14.00
Gray Clay	47.00	61.00
Sand Water Bearing	4.00	65.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		61.00 ft. and 65.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 5 in. **Casing Removed:** Unknown
Plugging Material: Other
No. of Bags: 15.00 **Well Depth:** 80 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:HOLE PLUG/ CEMENT, Pump Manufacturer:OWNERS

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 97-04361	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030187

Elevation:

Latitude: 42.345669

Longitude: -83.70038

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
1/4 MI E OF PONTIAC TRL AND JOY RD N SIDE OF JOY

Well Owner: SCHOCK TERRI

Well Address:	**Owner Address:**
3191 E JOY RD ANN ARBOR, MI 48105	2250 PONTIAC TRL ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 93.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/24/1997

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting: Unknown

Diameter: 5.00 in. to 85.00 ft. depth

Borehole: 8.00 in. to 93.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 9BC **Pump Capacity:** 10 GPM
Drop Pipe Length: 70.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 55.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		85.00 ft. and 93.00 ft.

Fittings: Unknown

Wellhead Completion: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	17.00	17.00
Brown Sand	3.00	20.00
Gray Clay	25.00	45.00
Brown Sand Fine	23.00	68.00
Brown Clay	2.00	70.00
Brown Sand Fine	9.00	79.00
Gray Sand Fine	14.00	93.00

Geology Remarks:

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1924
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030188

Elevation:

Latitude: 42.347138

Longitude: -83.696963

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
S OF PONTIAC TRL E OF SUTTON W OF EARHART

Well Owner: ELMWOOD PETERSON

Well Address:
5166 PONTIAC TRL
ANN ARBOR, MI 48105

Owner Address:
5166 PONTIAC TRL
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 58.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/19/1996

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Threaded & coupled
Casing Fitting: Unknown

Diameter: 5.00 in. to 54.00 ft. depth

Borehole: 8.50 in. to 58.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 50CNSW1-9B **Pump Capacity:** 10 GPM
Drop Pipe Length: 45.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 39.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Brown Clay	5.00	5.00
Brown Clay Sandy	10.00	15.00
Sand & Gravel	25.00	40.00
Granite	10.00	50.00
See Comments	8.00	58.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		54.00 ft. and 58.00 ft.

Fittings: Unknown

Geology Remarks:
COARSE GRAVEL ROCKS 58'

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-1580
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 2 in. **Casing Removed:** No
Plugging Material: Other
No. of Bags: 1.50

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:HOLE PLUG

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 9503149	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030189

Elevation:

Latitude: 42.345552

Longitude: -83.689683

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
N OF E JOY W OF EARHARRT E OF SUTTON

Well Owner: CARL PAULINA

Well Address:	Owner Address:
3725 E JOY RD ANN ARBOR, MI 48105	3725 E JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 271.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/22/1995

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 266.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 266.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 75SEWI-12BC **Pump Capacity:** 12 GPM
Drop Pipe Length: 115.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 88.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Sand	15.00	30.00
Gray Clay	26.00	56.00
Sand	14.00	70.00
Gray Clay	196.00	266.00
Gravel	3.00	269.00
Unidentified Consolidated Fm	2.00	271.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		266.00 ft. and 271.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: 9304743	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030190

Elevation:

Latitude: 42.353795

Longitude: -83.697989

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
E OF SUTTON S OF NORTHFIELD

Well Owner: MAUREN, EDWARD

Well Address:	Owner Address:
5472 SUTTON ANN ARBOR, MI 48105	10020 HARRISON LIVONIA, MI 48150

Drilling Method: Rotary
Well Depth: 64.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 3/1/1994

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 56.00 ft. depth
4.00 in. to 64.00 ft. depth

Borehole: 8.00 in. to

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 6CC **Pump Capacity:** 50 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 25.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Brown Clay	10.00	10.00
Gray Clay	5.00	15.00
Sand	7.00	22.00
Gray Clay	26.00	48.00
Sand Water Bearing	16.00	64.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		56.00 ft. and 64.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: N05789NW	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030211

Elevation:
Latitude: 42.34882
Longitude: -83.683002
Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:

Well Owner: D.P. DEVELOPMENT

Well Address:
5225 EARHART
ANN ARBOR, MI 48105

Owner Address:
411 HURONVIEW BLVD
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 74.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/16/1990

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 66.00 ft. depth SDR: 21.00

Borehole: 8.00 in. to 64.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 100UWI-7GC **Pump Capacity:** 22 GPM
Drop Pipe Length: 55.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 36.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay Sandy	15.00	15.00
Gray Clay	49.00	64.00
Sand	10.00	74.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		66.00 ft. and 74.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Northfield

Well ID: 81000030213

Elevation:
Latitude: 42.3456
Longitude: -83.692747
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Distance and Direction from Road Intersection:
3/4 MI E OF PONTIAC TRL N SIDE OF JOY

Well Owner: DALE KAPP

Well Address:	Owner Address:
3595 E JOY RD ANN ARBOR, MI 48105	3595 E JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 70.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/10/1990

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 5.00 in. to 66.00 ft. depth
4.00 in. to 70.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 9BC **Pump Capacity:** 20 GPM
Drop Pipe Length: 20.00 ft. **Pump Voltage:** 115
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 45.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Sand	4.00	4.00
Brown Clay	9.00	13.00
Sand	9.00	22.00
Gravel & Stones	28.00	50.00
Gray Clay	2.00	52.00
Sand Water Bearing	18.00	70.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		66.00 ft. and 70.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Removed: Unknown

Plugging Material: Other

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:CEMENTED AND HOLE PLUG

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 02-35-200-011	**Permit No:** 93-01997	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 35	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030217

Elevation:

Latitude: 42.354455

Longitude: -83.694967

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
1/2 MI S OF N TERR ON E SIDE OF SUTTON

Well Owner: PAUL MAURER

Well Address:	**Owner Address:**
5470 SUTTON ANN ARBOR, MI 48105	5470 SUTTON ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 62.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 7/1/1993

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 54.00 ft. depth

Borehole: 7.87 in. to 54.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 20.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		54.00 ft. and 62.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay	12.00	12.00
Brown Clay & Gravel	3.00	15.00
Blue Clay	10.00	25.00
Blue Clay & Gravel	22.00	47.00
Gray Sand & Gravel Water Bearing	17.00	64.00

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 63-1749
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: 9708818	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	35	Active		

Well ID: 81000030218

Elevation:

Latitude: 42.346178

Longitude: -83.688998

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
N OF JOY W OF EARHART

Well Owner: STEPHEN SHEFFREY

Well Address:	Owner Address:
3747 E JOY ANN ARBOR, MI 48105	3747 E JOY ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 120.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/2/1998

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 110.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 105.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.75
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 75SESWI-12SBC **Pump Capacity:** 12 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 47.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Brown Clay	4.00	4.00
Brown Clay Sandy	3.00	7.00
Brown Sand	5.00	12.00
Gray Clay	27.00	39.00
Sand	40.00	79.00
Gray Clay	7.00	86.00
Sand	5.00	91.00
Gray Clay	2.00	93.00
Sand	4.00	97.00
Gray Clay	12.00	109.00
Sand	11.00	120.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		110.00 ft. and 120.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No: 9504174	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000030220

Elevation:

Latitude: 42.347221

Longitude: -83.672604

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
LOT 2 N OF JOY RD W OF DIXBORO

Well Owner: DAVID UPGREN/KOGEL SCHEATZ

Well Address:	Owner Address:
5105 TURTLE POINTE DR ANN ARBOR, MI 48105	PO BOX 494 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 101.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 2/10/1996

Casing Type: PVC plastic **Height:** 3.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 91.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 80.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 100SEWI-8CC **Pump Capacity:** 18 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 37.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Clay	42.00	42.00
Gravel	48.00	90.00
Sand	11.00	101.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		91.00 ft. and 101.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9603474	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030222

Elevation:

Latitude: 42.348217

Longitude: -83.672719

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
N OF JOY E OF EARHART W OF DIXBORO

Well Owner: UPGREN & ASSOC/ KOGELSCHEATZ

Well Address:	**Owner Address:**
5140 TURTLE POINTE DR ANN ARBOR, MI 48105	5140 TURTLE POINTE DR ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 117.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/13/1996

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 8.00 in. to 97.00 ft. depth SDR: 21.00

Borehole: 13.50 in. to 97.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 7.50
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 756F1-6MB **Pump Capacity:** 100 GPM
Drop Pipe Length: 90.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 52.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	45.00	45.00
Gravel	72.00	117.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		97.00 ft. and 117.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 9607569	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000030223

Elevation:

Latitude: 42.348974

Longitude: -83.673176

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
LOT 4 N OF JOY RD ON TURTLE POINTE S SIDE W OF DIXBORO

Well Owner: JOHNSON BROTHERS CONST

Well Address:	Owner Address:
5210 TURTLE POINTE DR ANN ARBOR, MI 48105	209 FOURTH SUTIE C-1 ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 253.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 4/7/1997

Casing Type: PVC plastic **Height:** 2.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 238.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 220.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 1.00
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 100SESWI-8SCC **Pump Capacity:** 18 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 46.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Clay Sandy	28.00	38.00
Gray Clay	52.00	90.00
Gray Clay Soft	138.00	228.00
Sand Fine	9.00	237.00
Gravel Fine	16.00	253.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		238.00 ft. and 253.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 9803529	County: Washtenaw	Township: Northfield

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	36	Active		

Well ID: 81000030225

Elevation:

Latitude: 42.346105

Longitude: -83.674201

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
N OF JOY RD W OF DIXBORO E OF EARHART

Well Owner: DOMINOS PROPERTIES C/O SEAN

Well Address:	Owner Address:
4451 E JOY RD ANN ARBOR, MI 48105	PO BOX 445 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 64.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/26/1998

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 54.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 46.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 50SESWI-9SBC **Pump Capacity:** 12 GPM
Drop Pipe Length: 55.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 28.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	23.00	23.00
Gray Clay	8.00	31.00
Gravel	6.00	37.00
Gray Clay	16.00	53.00
Sand	11.00	64.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
		54.00 ft. and 64.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** Unknown
Plugging Material: Other
No. of Bags: 14.00 **Well Depth:** 185 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Plugging Material:CEMENT AND BENSEAL

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9506383	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000030360

Elevation:

Latitude: 42.348169

Longitude: -83.672733

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
n of joy rd on turtle point w side w of dixboro

Well Owner: UPGREN & ASSOCIATES/HONAGHAN

Well Address:	**Owner Address:**
5140 TURTLE POINTE DR ANN ARBOR, MI 48105	PO BOX 494 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 113.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 6/10/1996

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 105.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 105.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 5.00
Manufacturer: Red Jacket **Pump Type:** Unknown
Model Number: 500CNI-10EC **Pump Capacity:** 80 GPM
Drop Pipe Length: 89.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 53.00 ft.
Well Yield Test: **Yield Test Method:** Unknown

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	10.00	10.00
Clay Sandy	30.00	40.00
Yellow Clay	32.00	72.00
Gravel	41.00	113.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
		105.00 ft. and 113.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 9607500	**County:** Washtenaw		**Township:** Salem
		Town/Range: 01S 07E	**Section:** 31	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000033934

Elevation:

Latitude: 42.35505

Longitude: -83.662

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
S OF PONTIAC TRL, ON E SIDE OF DIXBORO RD

Well Owner: PHILIP CONLIN

Well Address:
5436 N DIXBORO RD
MI

Owner Address:
2455 S INDUSTRIAL
ANN ARBOR, MI 48104

Drilling Method: Rotary
Well Depth: 90.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/11/1996

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Unknown

Diameter: 5.00 in. to 87.00 ft. depth

Borehole: 8.50 in. to

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: 9BC **Pump Capacity:** 10 GPM
Drop Pipe Length: 79.00 ft. **Pump Voltage:** 220
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: Unknown

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Well-X-Trol
Model Number: 203 **Tank Capacity:**
Pressure Relief Valve Installed:

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 75.00 ft. after 2.00 hrs. at 20 GPM
Pumping level 75.00 ft. after 2.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	11.00	11.00
Gray Clay	38.00	49.00
Sand Wet/Moist	34.00	83.00
Gray Clay	2.00	85.00
Sand Water Bearing	5.00	90.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
35.00	4.00 ft.	86.00 ft. and 90.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Unknown	9.00	Unknown	0.00 ft. to 75.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	200 ft.	East

Abandoned Well Plugged: Yes

Casing Removed: Unknown

Plugging Material: Unknown

Geology Remarks:

Drilling Machine Operator Name: STEVE WHEELER
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1290
Business Name: ANN ARBOR WELL DRILLING
Business Address: P O BOX 163

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: REPLACE WELL/OLD WELL ABANDONED/GROUTED W/HOLE PLUG CEMENT

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-34-400-008	**Permit No:** WELL2022-0382	**County:** Washtenaw		**Township:** Northfield

Well ID: 81000034551

Elevation:

Latitude: 42.34506

Longitude: -83.702671

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01S 06E	34	Active		

Distance and Direction from Road Intersection:
OFF PONTIAC TRAIL

Well Owner: MARTIN NYRKKANEN

Well Address:	Owner Address:
3025 E. JOY RD ANN ARBOR, MI 48105	3025 E. JOY RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 115.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 10/27/2022

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: Shale packer/trap

Diameter: 5.00 in. to 105.00 ft. depth SDR: 21.00

Borehole: 8.00 in. to 105.00 ft. depth
4.80 in. to 115.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/27/2022 **HP:** 0.50
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: OWNERS **Pump Capacity:** 10 GPM
Drop Pipe Length: 104.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL7 **Tank Capacity:** 22.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 76.00 ft. after 1.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Sand & Gravel	10.00	10.00
Gray Clay & Gravel	60.00	70.00
Sand	20.00	90.00
Sand & Gravel	25.00	115.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	105.00 ft. and 115.00 ft.

Fittings: Bottom plug

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 105.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	60 ft.	North

Drilling Machine Operator Name: JASON SAGER
Employment: Employee
Pump Installer: SCOTT WILDER

Abandoned Well Plugged: Yes

Latitude: 42.345091 **Longitude:** -83.702745
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 4.00 **Well Depth:** 85 ft.

Contractor Type: Water Well Drilling Contractor **Reg No:** 58-2011
Business Name: Shidler & Wilder Wells & Pump
Business Address: 17333 Ida Center, Petersburg, MI, 49270

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: ABANDONMENT OF 2ND WELL / 42.345070 -083.702683 / 5-IN. / 75-FT. / 6-BAGS OF BENTONITE SLURRY

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No: B 02 34 400 008	**Permit No:** 22-0382	**County:** Washtenaw		**Township:** Northfield
		Town/Range: 01S 06E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000034559

Elevation:

Latitude: 42.34506

Longitude: -83.702671

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
Between Pontiac Trail and Sutton Rd

Well Owner: Martin Nyrkkanen

Well Address:	**Owner Address:**
3025 E Joy Rd Ann Arbor, MI 48105	3025 E Joy Rd Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 115.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 10/27/2022

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: Shale packer/trap

Diameter: 5.00 in. to 105.00 ft. depth SDR: 21.00

Borehole: 8.00 in. to 105.00 ft. depth
4.80 in. to 115.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 10/27/2022 **HP:** 0.50
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 10SQ05-160 **Pump Capacity:** 10 GPM
Drop Pipe Length: 104.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL7 **Tank Capacity:** 22.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 50.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 76.00 ft. after 1.00 hrs. at 15 GPM

Screen Installed: No **Intake:** Bedrock Well

Formation Description	Thickness	Depth to Bottom
Sand & Gravel	10.00	10.00
Gray Clay & Gravel	60.00	70.00
Sand	20.00	90.00
Sand & Gravel	25.00	115.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 105.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	95 ft.	North

Drilling Machine Operator Name: Scott Wilder
Employment: Employee
Pump Installer: Jason Wilder

Contractor Type: Water Well Drilling Contractor **Reg No:** 58-2011
Business Name: Shidler & Wilder Wells & Pump
Business Address: 17333 Ida Center, Petersburg, MI, 49270

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-12-200-004	**Permit No:** WELL2023-0018	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000034666

Elevation:

Latitude: 42.3319

Longitude: -83.6817

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	12	Active		

Distance and Direction from Road Intersection:
300 FT E OF EARHART AND 100 FT S OF WARREN RD

Well Owner: Kenneth and Shirley Koch

Well Address:	Owner Address:
4040 Warren Rd Ann Arbor, MI 48105	4040 Warren Rd Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 78.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 1/23/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 68.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 80.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/26/2023 **HP:** 0.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2NFL52-12 **Pump Capacity:** 12 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 38.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 78.00 ft. after 4.00 hrs. at 35 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	18.00	18.00
Brown Sand	12.00	30.00
Yellow Sand	20.00	50.00
Gray Clay & Gravel	10.00	60.00
Gray Sand Water Bearing	20.00	80.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 0.00 ft.
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	68.00 ft. and 78.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	5.00	None	0.00 ft. to 65.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	120 ft.	South-Southeast

Drilling Machine Operator Name: John Stepp
Employment: Employee
Pump Installer: Ed Wheeler

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 6.00 **Well Depth:** 47 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: Pump and 35' drop pipe removed from old well.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-300-016	**Permit No:** WELL2023-0151	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000034784

Elevation:

Latitude: 42.33461

Longitude: -83.6786

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND WEST OF N. DIXBORO RD.

Well Owner: LYDIA WANG

Well Address:	Owner Address:
4165 WARREN RD. ANN ARBOR, MI 48105	4165 WARREN RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 234.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 4/26/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 200.00 ft. depth SDR: 21.00
5.68 in. to 224.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 234.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 4/27/2023 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FB07P4S2 **Pump Capacity:** 10 GPM
Drop Pipe Length: 125.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 100.00 ft. after 1.00 hrs. at 12 GPM
Pumping level 160.00 ft. after 1.00 hrs. at 30 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	18.00	18.00
Clay Sandy	31.00	49.00
Sand & Gravel	37.00	86.00
Clay Gravely	15.00	101.00
Gray Clay	60.00	161.00
Sand	4.00	165.00
Gray Clay	59.00	224.00
Sand Medium	10.00	234.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	224.00 ft. and 234.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	17.00	None	0.00 ft. to 218.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	125 ft.	Southeast

Drilling Machine Operator Name: Travis Ostrowski
Employment: Subcontractor
Pump Installer: Kevin Huver

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.334592 **Longitude:** -83.678626
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 8.00 **Well Depth:** 65 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK AND 2 CENTRALIZERS. RE-USED OWNER'S PRESSURE TANK (44 GALLON SIZE). PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-300-021	**Permit No:** WELL2023-0141	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000034869

Elevation:

Latitude: 42.335134

Longitude: -83.682116

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
NORTH OF WARREN RD. AND SOUTH OF JOY RD.

Well Owner: JARED RUNDELL

Well Address:	Owner Address:
4210 EARHART RD. ANN ARBOR, MI 48105	4210 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 209.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/4/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 199.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 209.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 120.00 ft. after 1.00 hrs. at 20 GPM
Pumping level 180.00 ft. after 1.00 hrs. at 50 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	199.00 ft. and 209.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	35.00	50.00
Sand	21.00	71.00
Gray Clay	25.00	96.00
Sand	6.00	102.00
Gray Clay	97.00	199.00
Sand Medium	10.00	209.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	18.00	None	0.00 ft. to 194.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	210 ft.	Northeast

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: NOT YET INSTALLED

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: No
Reason Not Plugged: Will return to plug well at a later date

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK, 2 CENTRALIZERS. NO PUMPING EQUIPMENT INSTALLED TO DATE. OLD WELL NOT YET ABANDONED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: B-02-35-300-038	**Permit No:** WELL2023-0185	**County:** Washtenaw	**Township:** Northfield

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
01S 06E	35	Active		

Well ID: 81000034906

Elevation:

Latitude: 42.347937

Longitude: -83.69311

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EAST OF SUTTON RD. AND NORTH OF JOY RD.

Well Owner: DAVID PAWLOWSKI

Well Address:
5220 PONTIAC TRAIL
ANN ARBOR, MI 48105

Owner Address:
5220 PONTIAC TRAIL
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 152.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 5/17/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 143.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 152.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 5/18/2023 **HP:** 1.00
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FV1P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 125.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 120 **Tank Capacity:** 33.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 60.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 140.00 ft. after 1.00 hrs. at 20 GPM
Pumping level 152.00 ft. after 1.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Sand & Gravel	12.00	12.00
Brown Clay	10.00	22.00
Sand	32.00	54.00
Clay	38.00	92.00
Clay & Sand	41.00	133.00
Clay	9.00	142.00
Gravel	6.00	148.00
Clay Gravely	4.00	152.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 4.00 ft. Below
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	5.00 ft.	143.00 ft. and 148.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 138.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	110 ft.	Northeast

Drilling Machine Operator Name: Jerry Whaley
Employment: Employee
Pump Installer: Kevin Huver, Neil Adams

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000002234

Latitude: 42.347897 **Longitude:** -83.693103
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 16.00 **Well Depth:** 293 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 500# SAND PACK AND A 4 FT. TAIL PIPE. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: J-10-06-400-013	**Permit No:** WEL2020-00161	**County:** Washtenaw		**Township:** Superior

Well ID: 81000035063

Elevation:

Latitude: 42.336571

Longitude: -83.6538

Method of Collection: Interpolation-Map

Town/Range:	**Section:**	**Well Status:**	**WSSN:**	**Source ID/Well No:**
02S 07E	6	Active		

Distance and Direction from Road Intersection:
.25 MILE NORTH OF WARREN AND VORHEES ROADS

Well Owner: CHRISTOPHER/CHRISTINE PIPITONE

Well Address:	**Owner Address:**
5430 MEADOWCREST DR. ANN ARBOR, MI 48105	5430 MEADOWCREST DR. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 63.00 ft. **Well Use:** Household
Well Type: New **Date Completed:** 9/22/2020

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.00 in. to 53.00 ft. depth SDR: 21.00

Borehole: 9.00 in. to 63.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/6/2023 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 20 GPM
Drop Pipe Length: 50.00 ft. **Pump Voltage:** 240
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 30.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 63.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	18.00	18.00
Gray Clay	32.00	50.00
Gray Sand Fine	13.00	63.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	53.00 ft. and 63.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	Retarder	0.00 ft. to 50.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	Southeast

Geology Remarks:

Drilling Machine Operator Name: BRIAN KELLER/KELLER WELL
Employment: Employee
Pump Installer: JUSTIN BANKS, DOMINIC HOFFMAN

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Co Inc
Business Address: 8300 Dexter Chelsea, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: WELL FIRST - DRILLED 9/22/2020 - BY OTHER THAN CRIBLEY DRILLING CO., INC. PUMPING EQUIPMENT INSTALLED BY CRIBLEY DRILLING CO., INC. - CONSTANT PRESSURE PUMPING SYSTEM INSTALLED.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		OB-1

Well ID: 81000035064

Elevation:

Latitude: 42.33907

Longitude: -83.67005

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
Domino's Farm Settlement Observation well #1

Well Owner: Domino's Farms Development

Well Address:
MI

Owner Address:
24 Frank Lloyd Wright Drive
Ann Arbor, MI 48106

Drilling Method: Rotary
Well Depth: 102.50 ft. **Well Use:** Other
Well Type: New **Date Completed:** 6/29/1989

Casing Type: Steel - unknown **Height:** 1.95 ft. above grade
Casing Joint: Welded
Casing Fitting:

Diameter: 4.00 in. to 100.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 34.51 ft. Below Grade
Well Yield Test: **Yield Test Method:** Other

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 3.00 in. **Blank:** 3.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	4.00 ft.	98.00 ft. and 102.00 ft.

Fittings: Other

Formation Description	Thickness	Depth to Bottom
Brown Clay W/Sand	10.00	10.00
Brown Gravel & Clay	5.00	15.00
Gray Clay	20.00	35.00
Gray Gravel W/Clay	5.00	40.00
Brown Sand	5.00	45.00
Gray Sand W/Clay	10.00	55.00
Gravel & Sand	47.00	102.00
Sandstone	0.50	102.50

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other		Unknown	0.00 ft. to 35.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Dick Herron
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:**
Business Name: Brown Drilling Company
Business Address: Howell, MI

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:Observation, Grouting Material 1:Bentonite, Screen Fittings:K-packer, Yield Test Method:n/a

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Wellogic

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		OB-2

Well ID: 81000035065

Elevation:

Latitude: 42.3391

Longitude: -83.6696

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
Domino's Farm Settlement

Well Owner: Domino's Farms Development

Well Address:
MI

Owner Address:
24 Frank Lloyd Wright Drive
Ann Arbor, MI 48106

Drilling Method: Rotary
Well Depth: 96.50 ft. **Well Use:** Other
Well Type: New **Date Completed:** 6/30/2023

Casing Type: Steel - unknown **Height:** 2.67 ft. above grade
Casing Joint: Welded
Casing Fitting:

Diameter: 4.00 in. to 92.50 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 39.36 ft. Below Grade
Well Yield Test: **Yield Test Method:** Other

Formation Description	Thickness	Depth to Bottom
Brown Clay Sandy	10.00	10.00
Gray Clay	25.00	35.00
Clay Sandy	25.00	60.00
Sand	42.00	102.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: in. **Blank:** 3.00 ft. Above
Screen Material Type: Stainless steel-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	4.00 ft.	92.50 ft. and 96.50 ft.

Fittings: Other

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Other		Unknown	0.00 ft. to 35.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Dick Herron
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:**
Business Name: Brown Drilling Company
Business Address: Howell, MI

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:Observation, Grouting Material 1:bentonite, Screen Fittings:K-packer, Yield Test Method:n/a

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000035066

Elevation:
Latitude: 42.33893
Longitude: -83.66999
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Other		TP-1

Distance and Direction from Road Intersection:
Domino's Farm Settlement

Well Owner: Domino's Farms Development

Well Address:
MI

Owner Address:
24 Frank Lloyd Wright Drive
Ann Arbor, MI 48106

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Test well
Well Type: New **Date Completed:** 6/12/2023

Casing Type: Steel - unknown **Height:** 1.00 ft. above grade
Casing Joint: Welded
Casing Fitting:

Diameter: 6.00 in. to 93.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 36.86 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 66.85 ft. after 25.00 hrs. at 302 GPM

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 6.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
30.00	10.00 ft.	95.00 ft. and 105.00 ft.

Fittings: Other

Formation Description	Thickness	Depth to Bottom
Brown Clay & Gravel	12.50	12.50
Sand & Gravel	17.50	30.00
Gray Clay & Gravel	15.00	45.00
Sand Gravel Clay W/Shale Broken	15.00	60.00
Sand & Gravel	10.00	70.00
Gravel W/Gypsum W/Shale	5.00	75.00
Gravel	5.00	80.00
Gravel W/Boulders	5.00	85.00
Gravel	20.00	105.00

Well Grouted:

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Stan Brown & Brent Herron
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:**
Business Name: Brown Drilling Company
Business Address: Howell, MI

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:
Other Remarks: Well Status:welded cap, Screen Fittings:K-packer

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Other		

Well ID: 81000035067

Elevation:

Latitude: 42.33919

Longitude: -83.67018

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
Domino's Farms - Settlement

Well Owner:

Well Address:
MI

Owner Address:

Drilling Method: Rotary
Well Depth: 96.00 ft. **Well Use:** Irrigation
Well Type: New **Date Completed:** 4/30/2001

Casing Type: Steel - black **Height:** 1.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: Drive shoe

Diameter: 6.00 in. to 85.00 ft. depth

Borehole: 12.50 in. to 85.00 ft. depth
7.38 in. to 100.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 28.39 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 40.57 ft. after 72.00 hrs. at 600 GPM

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 7.50 in. **Blank:** 3.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
146.00	10.00 ft.	85.00 ft. and 95.00 ft.

Fittings: Unknown

Formation Description	Thickness	Depth to Bottom
Brown Clay Sandy	6.00	6.00
Brown Clay Hard Silty	10.00	16.00
Gray Clay Silty	5.00	21.00
Sand	4.00	25.00
Gravel & Sand	11.00	36.00
Sand	7.00	43.00
Gray Clay Silty	5.00	48.00
Gravel & Sand Coarse	47.00	95.00
Gray Clay Silty	5.00	100.00

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	40.00	None	0.00 ft. to 85.00 ft.

Geology Remarks:

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Chris Powell
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 47-2072
Business Name: Brown Drilling Company
Business Address: 7215 Highland Rd., Howell, MI, 48843

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Status:welded cap

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-003	**Permit No:** WELL2023-0255	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035072

Elevation:

Latitude: 42.336195

Longitude: -83.674699

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
LOT #3 - NORTH OF WARREN RD. AND EAST OF EARHART RD.

Well Owner: DAVID S. GONZALEZ & EMIKO MORI

Well Address:	Owner Address:
4429 GRANDEUR OAKS ANN ARBOR, MI 48105	4429 GRANDEUR OAKS ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/21/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 75.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 105.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 6/22/2023 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 260 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 45.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 105.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	15.00	15.00
Gravel	33.00	48.00
Boulders	2.00	50.00
Gravel	41.00	91.00
Clay	14.00	105.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 20.00 ft. Below
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	10.00 ft.	75.00 ft. and 85.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 70.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	70 ft.	West

Drilling Machine Operator Name: Jerry Whaley
Employment: Employee
Pump Installer: Justin Banks, Dominic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000022524

Latitude: 42.336233 **Longitude:** -83.674712
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 4.00 **Well Depth:** 56 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,200# SAND PACK, 2 CENTRALIZERS AND A 20 FT. TAIL PIPE. RE-USED OWNERS PUMP AND PRESSURE TANK.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-300-021	**Permit No:** WELL2023-0215	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035073

Elevation:

Latitude: 42.335199

Longitude: -83.682093

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
NORTH OF WARREN RD. AND SOUTH OF JOY RD.

Well Owner: JARED & DEANE RUNDELL

Well Address:	Owner Address:
4210 EARHART RD. ANN ARBOR, MI 48105	4210 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 104.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/7/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 96.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 104.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/26/2023 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 98.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 95.00 ft. after 1.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	35.00	50.00
Sand	23.00	73.00
Gray Clay	23.00	96.00
Gray Sand	8.00	104.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	8.00 ft.	96.00 ft. and 104.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 91.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	225 ft.	Northeast

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Justin Banks, DomInic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000020559

Latitude: 42.335176 **Longitude:** -83.682099
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 6.00 **Well Depth:** 89 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK AND 2 CENTRALIZERS. RE-USED OWNERS PRESSURE TANK - 62 GALLON SIZE. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-02-400-011	**Permit No:** WELL2023-0327	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035077

Elevation:

Latitude: 42.33431

Longitude: -83.68396

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
70 FT OFF OF EARHART RD, AND 500 FT N OF WARREN

Well Owner: KAY YOURIST & SUSAN MINARD

Well Address:	Owner Address:
4125 EARHART RD ANN ARBOR, MI 48105	4125 EARHART RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 95.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/3/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 85.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 97.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/4/2023 **HP:** 0.75
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2NFL 7212 **Pump Capacity:** 12 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 69.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 95.00 ft. after 4.00 hrs. at 14 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	22.00	22.00
Gray Clay	15.00	37.00
Rust Sand & Gravel	41.00	78.00
Gray Sand Water Bearing	17.00	95.00
Gray Clay	2.00	97.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 0.00 ft.
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	85.00 ft. and 95.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 84.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southwest

Abandoned Well Plugged: No
Reason Not Plugged: Other

Geology Remarks:

Drilling Machine Operator Name: John Stepp
Employment: Employee
Pump Installer: Ed Wheeler

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Not Plugged Reason:Left well for when the gravel pit stops running.

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-002	**Permit No:** WELL2023-0337	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035110

Elevation:

Latitude: 42.335268

Longitude: -83.67543

Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Plugged		

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND NORTH OF WARREN RD.

Well Owner: DALE AND MARGAUX MORI TUTTLE

Well Address:	Owner Address:
4275 GRANDEUR OAKS LANE ANN ARBOR, MI 48105	4275 GRANDEUR OAKS LANE ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 243.00 ft. **Well Use:** Household
Well Type: Dry Hole **Date Completed:** 8/9/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting:

Diameter: 5.68 in. to 200.00 ft. depth SDR: 21.00
5.68 in. to 243.00 ft. depth SDR: 17.00

Borehole: 9.00 in. to 243.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed:

Static Water Level: 0.00 ft. Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:**
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Telescoped

Slot	Length	Set Between
18.00	4.00 ft.	231.00 ft. and 243.00 ft.

Fittings: None

Formation Description	Thickness	Depth to Bottom
Sand	12.00	12.00
Sand & Gravel	24.00	36.00
Sand	13.00	49.00
Gray Clay	26.00	75.00
Sand & Gravel	14.00	89.00
Gray Clay	90.00	179.00
Sand	10.00	189.00
Gray Clay	47.00	236.00
Gravel	7.00	243.00

Well Grouted: Yes **Grouting Method:** Other

Grouting Material	Bags	Additives	Depth
Bentonite slurry	25.00	None	0.00 ft. to 243.00 ft.

Geology Remarks:

Wellhead Completion:

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Co Inc
Business Address: 8300 Dexter Chelsea, Dexter, MI, 48130

Abandoned Well Plugged: Yes

Latitude: 42.335268 **Longitude:** -83.67543
Casing Diameter: 5 in. **Casing Removed:** Yes
Plugging Material: Bentonite slurry
No. of Bags: 25.00 **Well Depth:** 243 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: ATTEMPTED TO MAKE A WELL AT 89 FT., 189 FT. AND 243 FT. CASING AND SCREEN WERE NOT ABLE TO BE REMOVED. WELL ABANDONED WITH 25 BAGS OF BENSEAL.

Other Remarks: Grouting Method:BORE HOLE GROUTED CLOSED.

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: i-09-01-301-002	**Permit No:** well2023-0337	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000035111

Elevation:

Latitude: 42.33531

Longitude: -83.67578

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND NORTH OF WARREN RD.

Well Owner: DALE AND MARGAUX MORI TUTTLE

Well Address:
4275 GRANDEUR OAKS LANE
ANN ARBOR, MI 48105

Owner Address:
4275 GRANDEUR OAKS LANE
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 97.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/10/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 67.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 97.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/21/2023 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 20 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT-8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 65.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	10.00	10.00
Clay Sandy	13.00	23.00
Sand & Gravel	74.00	97.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	20.00 ft.	77.00 ft. and 97.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 72.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	275 ft.	Southeast

Abandoned Well Plugged: No
Reason Not Plugged: Other

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Justin Banks, Dominic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK. RE-USED OWNER'S SUBMERSIBLE PUMP AND PRESSURE TANK FROM OLD WELL. OLD WELL NOT YET ABANDONED - OWNER WANTS TO KEEP IT IN RESERVE FOR NOW.

Other Remarks: Not Plugged Reason:SEE GENERAL REMARKS.

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-300-017	**Permit No:** WELL2023=0342	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035168

Elevation:

Latitude: 42.3327

Longitude: -83.68345

Method of Collection: GPS Std Positioning Svc SA On

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
NE CORNER OF EARHART AND WARREN

Well Owner: JOAQUIN WHELAN

Well Address:	Owner Address:
4014 EARHART RD ANN ARBOR, MI 48105	4014 EARHART RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 94.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/16/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 84.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 100.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/17/2023 **HP:** 0.50
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 10FE05-P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 72.00 ft. **Pump Voltage:** 115
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Flex-Lite-Flexcon
Model Number: FL12 **Tank Capacity:** 35.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 52.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 94.00 ft. after 4.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay & Sand	4.00	4.00
Brown Clay Gummy	12.00	16.00
Gray Clay	3.00	19.00
Brown Clay & Sand	17.00	36.00
Gray Clay	10.00	46.00
Gray Sand Fine	14.00	60.00
Gray Sand Water Bearing	34.00	94.00
Gray Clay	6.00	100.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	84.00 ft. and 94.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 82.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	80 ft.	Southeast

Drilling Machine Operator Name: JOHN STEPP
Employment: Employee
Pump Installer: E.WHEELER

Abandoned Well Plugged: Yes

Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 6.00 **Well Depth:** 60 ft.

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: OLD WELLCUT OFF 2' BELOW GRADE LOCATED 20' EAST OF NEW WELL

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-11-100-006	**Permit No:** WELL2023-0532	**County:** Washtenaw	**Township:** Ann Arbor

Well ID: 81000035335

Elevation:

Latitude: 42.329756

Longitude: -83.686057

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Distance and Direction from Road Intersection:
NORTH OF M-14 AND SOUTH OF WARREN RD.

Well Owner: DF LAND DEVELOPMENT, LLC

Well Address:	Owner Address:
3867 EARHART RD. ANN ARBOR, MI 48105	24 FRANK LLOYD WRIGHT DR. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 125.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 12/22/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 107.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 125.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 1/8/2024 **HP:** 0.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FS05P4S2 **Pump Capacity:** 10 GPM
Drop Pipe Length: 65.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 35.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 60.00 ft. after 1.00 hrs. at 100 GPM
Pumping level 70.00 ft. after 2.00 hrs. at 100 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	15.00	15.00
Sand	8.00	23.00
Gray Clay	44.00	67.00
Gravel	6.00	73.00
Gray Clay	7.00	80.00
Sand Fine	35.00	115.00
Sand & Gravel	2.00	117.00
Gray Clay	8.00	125.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 8.00 ft. Below
Screen Material Type: PVC-saw cut
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	10.00 ft.	107.00 ft. and 117.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	13.00	None	0.00 ft. to 102.00 ft.

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	85 ft.	Northeast

Abandoned Well Plugged: Yes

Latitude: 42.329743 **Longitude:** -83.685961
Casing Diameter: 4 in. **Casing Removed:** No
Plugging Material: Bentonite chips/pellets
No. of Bags: 7.00 **Well Depth:** 55 ft.

Geology Remarks:

Drilling Machine Operator Name: Garrett Blaszkowski
Employment: Employee
Pump Installer: Kevin Huver, Joseph Cordell

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 900# SAND PACK AND AN 8 FT. TAIL PIPE. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

APPENDIX F
Haley & Aldrich Boring Logs and Well Installation Reports

TEST BORING REPORT

Boring No. MW-1

Project	MMM Vella Pit, Ann Arbor, MI
Client	Mid Michigan Materials
Contractor	Cascade Drilling

File No. 0207666-006
Sheet No. 1 of 4
Start October 06, 2023
Finish October 09, 2023
Driller Nolan Wilson
H&A Rep. N. Schaffer
Elevation 946.4
Datum NAVD 1988
Location See Plan
N 307581.760042
E 13309320.230062

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	Sonic	O	--	Rig Make & Model: Sonic
Inside Diameter (in.)	6	5.25	--	Bit Type:
Hammer Weight (lb)	--	Sonic	-	Drill Mud:
Hammer Fall (in.)	--	--	-	Casing: Driven
				Hoist/Hammer:
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
0		S1 75	0.0 10.0		CL		Stiff, brown, **LEAN CLAY** with gravel, MPS 0.15 inch, no structure, no odor, dry.		10			5	85
						938.4 8.0	Similar as above.						
10		S2 120	10.0 20.0										
						931.4 15.0	Similar as above.						
20		S3 120	20.0 30.0		CL	926.4 20.0	Stiff, brown, **LEAN CLAY**, MPS 0.5 inch, no odor, no structure, dry.		5			5	90
25													

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 120
Rock Cored (ft)
Samples
Boring No. MW-1

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
25						919.4							
					SC	27.0	Stiff, brown, **CLAYEY SAND**, MPS 0.5 inch, no odor, no structure, dry.		5			80	15
30		S4 120	30.0 40.0			914.4 32.0	Similar as above.						
					CL	912.4 34.0	Stiff, brown, sandy **LEAN CLAY**, MPS 0.25 inch, no odor, no structure, dry.					30	70
35						908.4 38.0	Similar as above. Gray-brown at 38 feet.						
40		S5 120	40.0 50.0		SP	906.4 40.0	Loose, brown, **POORLY GRADED SAND** with clay, MPS 0.25 inch, no odor, no structure, dry.				10	80	10
					CL	904.4 42.0	Stiff, brown, sandy **LEAN CLAY**, MPS 0.25 inch, no odor, no structure, moist.					30	70
45					SW	900.4 46.0	Loose, brown-gray, **WELL GRADED SAND** with silt and gravel, no odor, no structure, moist.	10	10	20	30	20	10
50		S6 120	50.0 60.0			896.4 50.0	Similar as above.						
					SP	893.4 53.0	Loose, brown, **POORLY GRADED SAND** with silt, MPS 0.2 inch, no odor, no structure, moist.				20	70	10
55					SW-SM	890.4 56.0	Loose, gray-brown, **WELL GRADED SAND** with silt, MPS 0.5 inch, no odor, no structure, moist.			20	30	40	10
60		S7 120	60.0 70.0		SW-SM	886.4 60.0	Loose, gray, **WELL GRADED SAND** with silt, no structure, no odor, moist.		5	15	30	40	10

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-1
File No. 0207666-006
Sheet No. 3 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
65													
70		S8 102	70.0 80.0		SW-SM	875.4 71.0	Similar as above, now gray-brown.			20	30	40	10
75													
80		S9 112	80.0 90.0		SM	866.4 80.0	Loose, gray, **SILTY SAND**, no structure, no odor, moist.			20	30	30	20
85													
90		S10 110	90.0 100.0		SP-SM	856.4 90.0	Loose, gray, **POORLY GRADED SAND** with silt, no structure, no odor, moist.			5	50	35	10
95													

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-1

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-1
File No. 0207666-006
Sheet No. 4 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
100						846.4							
		S11 69	100.0 110.0		SP	100.0	Loose, gray, **POORLY GRADED SAND** with gravel, no structure, no odor, moist.		20	20	30	25	5
					SP		Similar as above	5	30	45	15	5	
105													
110		S12 120	110.0 120.0		CL	836.4 110.0	Very stiff, gray, **LEAN CLAY**, homogenous, no odor, moist.					10	90
115													
120						826.4 120.0	**END OF BORING**						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-1

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

TEST BORING REPORT

Boring No. MW-2

Project	MMM Vella Pit, Ann Arbor, MI
Client	Mid Michigan Materials
Contractor	Cascade Drilling

File No. 0207666-006
Sheet No. 1 of 5
Start October 02, 2023
Finish October 04, 2023
Driller Trevor Ramun
H&A Rep. N. Schaffer
Elevation 965.3
Datum NAVD 1988
Location See Plan
N 306707.945844
E 13308700.540028

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	Sonic	O	--	Rig Make & Model: Sonic
Inside Diameter (in.)	6	5.25	--	Bit Type:
Hammer Weight (lb)	--	Sonic	-	Drill Mud:
Hammer Fall (in.)	--	--	-	Casing: Driven
				Hoist/Hammer:
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
0		S1 96	0.0 8.0		CL		Medium stiff, brown, **SANDY CLAY**, MPS 1.0 inch, no structure, no odor, wet-moist, trace fine gravel.				10	20	70
					CL	962.3 3.0	Hard, brown, **CLAY** with sand, MPS 0.5 inch, no structure, no odor, moist.				5	5	90
5													
		S2 120	8.0 18.0										
10						955.3 10.0	Similar as above, brown-gray.						
15													
						949.3 16.0	Similar as above, now very stiff.						
		S3 120	18.0 28.0										
20													

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 138
Rock Cored (ft)
Samples

Boring No. MW-2

Field Tests:
Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
20						943.3							
						22.0	Similar as above, gray, MPS 0.25 inch, fat.						
25													
		S4 120	28.0 38.0										
30						934.3							
						31.0	Similar as above, wet.						
						932.3							
						33.0	Similar as above, trace fine gravel.						
35						930.3							
					CH	35.0	Medium stiff, gray, **FAT CLAY** with gravel, MPS 0.25 inch, no structure, no odor, moist.		10		5	5	80
						927.3							
		S5 60	38.0 43.0		ML	38.0	Medium stiff, brown, **SILT** with sand, no structure, no odor, moist.				5	5	90
40													
					ML		Similar as above					10	90
		S6 60	43.0 48.0										
45						917.3							
		S7 60	48.0 58.0		SP	48.0	Soft, brown, **POORLY GRADED SAND**, no oversized particulate, no structure, no odor, moist.			5	90	5	

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
50													
55													
		S8 68	58.0 68.0										
60					SP-SM	904.3 61.0	Loose, brown, **POORLY GRADED SAND** with silt, MPS 0.5 inch, no structure, no odor, moist.			5	80	5	10
65													
		S9 39	68.0 73.0										
70					SM	894.3 71.0	Loose, brown, **SILTY SAND**, MPS 0.25 inch, no structure, no odor, moist.			5	70	5	20
		S10 60	73.0 78.0										
75					SP	889.3 76.0	Loose, gray, **POORLY GRADED SAND**, medium grained, MPS 0.25 inch, no structure, no odor, moist.			5	90		5
		S11 60	78.0 83.0										

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-2
File No. 0207666-006
Sheet No. 4 of 5

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
80						883.3							
					SW-SM	82.0	Loose, brown-gray, **WELL GRADED SAND** with silt and gravel, MPS 1.0 inch, no structure, no odor, moist.		15	10	55	10	10
		S12 60	83.0 88.0										
85						878.3 87.0	Similar as above, less gravel.			10	65	15	10
		S13 60	88.0 98.0										
90						873.3 92.0	Similar as above.						
					SM	871.3 94.0	Loose, light-gray, **SILTY SAND**, MPS 0.2 inch, no structure, no odor, moist-wet.			10	70		20
95													
		S14 120	98.0 108.0										
100													
						862.3 103.0	Similar as above.						
105													
		S15 118	108.0 118.0		SW-SM	857.3 108.0	Loose, gray, **WELL GRADED SAND** with silt, MPS 0.2 inch, no structure, no odor, moist-wet.			20	60	10	10

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-2

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-2
File No. 0207666-006
Sheet No. 5 of 5

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
110													
115					SC	850.3 115.0	Medium dense, gray, **CLAYEY SAND**, MPS 1.0 inch, no structure, no odor, moist.			10	60	10	20
		S16 108	118.0 128.0		SW	847.3 118.0	Medium dense, gray, **WELL-GRADED SAND** coarsening downward, MPS 0.2 inch, no structure, no odor, moist.				80	15	5
120													
125						839.3 126.0	Similar as above, more coarse.			15	65	15	5
		S17 120	128.0 138.0		CL	836.3 129.0	Very stiff, gray, **LEAN CLAY** with sand, MPS 0.1 inch, no structure, no odor, moist.			5	15	95	80
130													
					CL	832.3 133.0	Very stiff, gray, **LEAN CLAY**, MPS 0.05 inch, no structure, no odor, moist.				5		95
135													
						827.3 138.0	**END OF BORING**						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-2

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

TEST BORING REPORT

Boring No. MW-3

Project	MMM Vella Pit, Ann Arbor, MI
Client	Mid Michigan Materials
Contractor	Cascade Drilling

File No. 0207666-006
Sheet No. 1 of 4
Start October 11, 2023
Finish October 11, 2023
Driller Nolan Wilson
H&A Rep. N. Schaffer
Elevation 947.6
Datum NAVD 1988
Location See Plan
N 306644.873136
E 13309782.179925

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	Sonic	O	--	Rig Make & Model: Sonic
Inside Diameter (in.)	6	5.25	--	Bit Type:
Hammer Weight (lb)	--	Sonic	-	Drill Mud:
Hammer Fall (in.)	--	--	-	Casing: Driven
				Hoist/Hammer:
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
0		S1 86	0.0 10.0		CL		Very stiff, red-gray, **LEAN CLAY** with sand, MPS 0.1 inch, no structure, no odor, dry-moist.					15	85
10		S2 98	10.0 20.0		CL	937.6 10.0	Stiff, brown, **LEAN CLAY** with sand, MPS 0.1 inch, no structure, no odor, moist.					20	80
20		S3 120	20.0 30.0				Similar as above.						
25					CL	924.6 23.0	Stiff, gray, **LEAN CLAY**, MPS 0.3 inch, no structure, no odor, moist.					5	95

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 110
Rock Cored (ft)
Samples

Boring No. MW-3

Field Tests:
Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
25						920.6							
					SP	27.0	Loose, brown, **POORLY GRADED SAND**, MPS 0.3 inch, no structure, no odor, moist.				55	40	5
30		S4 120	30.0 40.0			915.6 32.0	Similar as above.						
					SP-SM	914.6 33.0	Loose, tan, **POORLY GRADED SAND** with silt, MPS 0.2 inch, no structure, no odor, moist.				20	70	10
35													
40		S5 120	40.0 50.0										
					CL	905.6 42.0	Stiff, brown, **LEAN CLAY**, MPS 0.5 inch, no structure, no odor, moist.				5	5	90
					CL	903.6 44.0	Gravel lense, medium stiff, brown, **SANDY LEAN CLAY**, MPS 0.5 inch, no structure.						
45					SP-SM	901.6 46.0	Loose, brown, **POORLY GRADED SAND** with silt and gravel, MPS 0.5 inch, no structure, no odor, moist.		5	10	50	25	10
50		S6 120	50.0 60.0		SP-SM	897.6 50.0	Loose, brown, **POORLY GRADED SAND** with silt, MPS 0.3 inch, no structure, no odor, moist.				60	30	10
55					SP-SM	892.6 55.0	Loose, brown, **POORLY GRADED SAND** with silt and gravel, no structure, no odor, moist.	5	25		40	20	10
60		S7 120	60.0 70.0		SP-SM	887.6 60.0	Loose, brown, **POORLY GRADED SAND** with silt and gravel, MPS 3.0 inch.	5	10		40	35	10

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-3
File No. 0207666-006
Sheet No. 3 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
65							Similar as above, gray.						
					SP-SM	880.6 67.0	Loose, gray, **POORLY GRADED SAND** with silt, MPS 0.5 inch, no structure, no odor, dry.		5		25	60	10
70		S8 120	70.0 80.0			876.6 71.0	Similar as above.						
75						869.6 78.0	Similar as above.						
80		S9 120	80.0 90.0		SP-SM	867.6 80.0	Loose, gray, **POORLY GRADED SAND** with silt and gravel, MPS 4.0 inch, no structure, no odor, dry.	10	15		40	25	10
85													
					SC	858.6 89.0	Loose, gray, **CLAYEY SAND** with gravel, MPS 3.0 inch, no odor, no structure, moist.	10	15	20	25	10	20
90		S10 120	90.0 100.0		SP-SM	857.6 90.0	Loose, gray, **POORLY GRADED SAND** with silt, MPS 0.5 inch, no odor, no structure, moist.		5	5	45	35	10
					SC	853.6 94.0	Loose, gray, **CLAYEY SAND** with gravel, MPS 5.0 inch, no odor, no structure, moist.	10	20	15	20	15	20
95					CL	850.6 97.0	Stiff, gray, **LEAN CLAY** with sand, MPS 0.5 inch, no structure, no odor, moist.					15	85

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-3

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-3
File No. 0207666-006
Sheet No. 4 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
100		S11 120	100.0 110.0				Similar as above.						
105													
110						837.6 110.0	**END OF BORING**						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-3

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

TEST BORING REPORT

Boring No. MW-4

Project	MMM Vella Pit, Ann Arbor, MI
Client	Mid Michigan Materials
Contractor	Cascade Drilling

File No. 0207666-006
Sheet No. 1 of 4
Start October 05, 2023
Finish October 05, 2023
Driller Nolan Wilson
H&A Rep. N. Schaffer
Elevation 929.8
Datum NAVD 1988
Location See Plan
N 306581.47989
E 13310605.500129

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	Sonic	O	--	Rig Make & Model: Sonic
Inside Diameter (in.)	6	5.25	--	Bit Type:
Hammer Weight (lb)	--	Sonic	-	Drill Mud:
Hammer Fall (in.)	--	--	-	Casing: Driven
				Hoist/Hammer:
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
0		S1 120	0.0 10.0		CL		Stiff, gray-brown, **LEAN CLAY** with gravel, MPS 0.5 inch, no structure, no odor, moist.		15		5		80
10		S2 120	10.0 20.0			915.8 14.0	Similar as above.						
20													

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
- O - Open End Rod
- T - Thin Wall Tube
- U - Undisturbed Sample
- S - Split Spoon Sample

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary
- Overburden (ft) 95
- Rock Cored (ft)
- Samples

Boring No. MW-4

Field Tests:

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

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TEST BORING REPORT

Boring No. MW-4
File No. 0207666-006
Sheet No. 2 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
20		S3 120	20.0 30.0			907.8 22.0	Similar as above.						
					GM	905.8 24.0	Loose, brown, **WELL GRADED GRAVEL** with silt and sand, MPS 4.0 inch, no structure, no odor, dry.	50	20			20	10
25													
30		S4 120	30.0 40.0			897.8 32.0	Similar as above.						
					SP-SM	895.8 34.0	Loose, brown, **POORLY GRADED SAND** with silt, MPS 0.2 inch, no structure, no odor, moist.				10	80	10
35													
40		S5 42	40.0 45.0		GM	889.8 40.0	Loose, brown, **WELL GRADED GRAVEL** with silt and sand, MPS 3.0 inch, no structure, no odor, moist.	40	30			20	10
45		S6 60	45.0 50.0		SP-SM	884.8 45.0	Loose, brown, **POORLY GRADED SAND** with silt and gravel, MPS 2.0 inch, no structure, no odor, dry.	15	15		10	50	10

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-4

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
50		S7 120	50.0 60.0				Similar as above.						
55													
60		S8 120	60.0 70.0		SP	869.8 60.0	Loose, gray, **POORLY GRADED SAND** MPS 0.2 inch, no structure, no odor, dry.	5	5		60	25	5
65													
						862.8 67.0	Similar as above, moist-wet.						
70		S9 105	70.0 80.0		SP-SM	859.8 70.0	Loose, brown-gray, **POORLY GRADED SAND** with silt and gravel, MPS 4.0 inch, no structure, no odor, moist.	10	15		65		10
75													

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-4
File No. 0207666-006
Sheet No. 4 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
80						849.8							
		S10 60	80.0 85.0		GC	80.0	Loose, gray, **CLAYEY GRAVEL**, MPS 4.0 inch, no odor, no structure, moist-wet.	50	30				20
85						844.8							
		S11 120	85.0 95.0		CL	85.0	Stiff, gray, **LEAN CLAY** with sand, MPS 0.1 inch, no odor, no structure, moist.			10	10		80
90													
95						834.8 95.0	**END OF BORING**						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-4

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

TEST BORING REPORT

Boring No. MW-5

Project	MMM Vella Pit, Ann Arbor, MI
Client	Mid Michigan Materials
Contractor	Cascade Drilling

File No. 0207666-006
Sheet No. 1 of 3
Start October 10, 2023
Finish October 10, 2023
Driller Nolan Wilson
H&A Rep. N. Schaffer
Elevation 902.7
Datum NAVD 1988
Location See Plan
N 308438.296058312
E 13309959.349847

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	Sonic	O	--	Rig Make & Model: Sonic
Inside Diameter (in.)	6	5.25	--	Bit Type:
Hammer Weight (lb)	--	Sonic	-	Drill Mud:
Hammer Fall (in.)	--	--	-	Casing: Driven
				Hoist/Hammer:
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
0		S1 48	0.0 10.0		GW-GM		Medium stiffness, dark brown, **WELL GRADED GRAVEL** with silt and sand, MPS 3.0 inch, no structure, no odor, moist.	30	30	20	10		10
					CL	899.7 3.0	Soft, gray-brown, **LEAN CLAY** with gravel, MPS 0.5 inch, no structure, no odor, moist.	5	10		10		75
5													
10		S2 70	10.0 20.0			891.7 11.0	Similar as above.						
						888.7 14.0	Lense of filler material, **CONCRETE AND METAL**.						
15					CL	887.7 15.0	Soft, red-brown, **SANDY LEAN CLAY**, MPS 0.25 inch, no structure, no odor, moist-wet.		10	10	10	10	60
						884.7 18.0	Similar as above, light brown color.						
20													

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 70
Rock Cored (ft)
Samples

Boring No. MW-5

Field Tests:
Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-2 REV-WPID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

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TEST BORING REPORT

Boring No. MW-5
File No. 0207666-006
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
20		S3 120	20.0 30.0				Similar as above.						
					CL		Stiff, gray-brown, **LEAN CLAY** with sand, MPS 0.4 inch, no structure, no odor, moist.		5			10	85
25													
30		S4 104	30.0 40.0			872.7 30.0	Similar as above.						
					CL	870.7 32.0	Very soft, gray-brown, **SANDY LEAN CLAY**, MPS 0.2 inch, no structure, no odor, moist-wet.			10	10	10	70
35													
					SC	866.7 36.0	Loose, gray-brown, **CLAYEY SAND**, MPS 0.2 inch, no structure, no odor, wet.			20	35	20	25
					CL	863.7 39.0	Very stiff, gray, **LEAN CLAY**, MPS 0.2 inch, no structure, no odor, wet.					10	90
40		S5 108	40.0 50.0		CL	862.7 40.0	Medium stiff, gray, **SANDY LEAN CLAY**, MPS 0.1 inch, no structure, no odor, wet.			10	15	10	65
45													

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-5

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

HALEY ALDRICH

TEST BORING REPORT

Boring No. MW-5
File No. 0207666-006
Sheet No. 3 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	PID Readings (ppm)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines
50		S6 120	50.0 60.0		CL	852.7 50.0	Medium stiff, gray, **LEAN CLAY**, MPS 0.1 inch, no structure, no odor, moist-wet.					10	90
55													
60		S7 120	60.0 70.0		CL		Similar as above					10	90
65													
70						832.7 70.0	**END OF BORING**						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. MW-5

H&A-TEST BORING-07-2 REV-W/PID COL-NO FT HA-LIB09.GLB HA-TB+CORE+WELL-07-2 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0207666\DELIVERABLES\VELLA PIT\HYDRO_ANALYSIS\GINT\VELLA_NEW_WELLS.GPJ Nov 10, 23

OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. MW-1

Boring No.

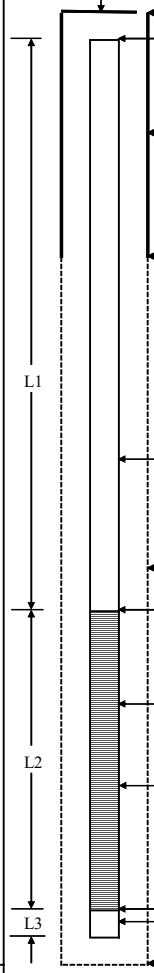
PROJECT	MMM VELLA PIT HYDROGEOLOGICAL EVALUATION	**H&A FILE NO.**	207666
LOCATION	ANN ARBOR CHARTER TOWNSHIP, MI	**PROJECT MGR.**	LESLIE NELSON
CLIENT	MID MICHIGAN MATERIALS	**FIELD REP.**	RAJ GAUTAM
CONTRACTOR	CASCADE DRILLING LP	**DATE INSTALLED**	10/9/2023
DRILLER	NOLAN WILSON	**WATER LEVEL**	

Ground El. 946.4 ft
El. Datum NAVD 1988

Location

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
See log	See right



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no: ---

Height/Depth of top of guard pipe/roadway box above/below ground surface: ~3.5 ft

Height/Depth of top of riser pipe above/below ground surface: 3.27 ft

Type of protective casing: METAL STICK UP
Length: ~5.0 ft
Inside Diameter: 4.0 in

Depth of bottom of guard pipe/roadway box: ~1.5 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Grout	0.0	103.0
Bentonite Seal	103.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: BENTONITE GROUT

Diameter of borehole: 6.0 in

Depth to top of well screen: 105.0 ft

Type of screen: SCHEDULE 40, 10 SLOT
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: WELL GRAVEL

Depth of bottom of well screen: 110.0 ft

Backfilled Borehole (Collapsed/Bentonite Chip): 10.0 ft

Depth of bottom of borehole: 120.0 ft

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)

(Not to Scale)

108.27 ft	+	5 ft	+	0 ft	=	113.27 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. MW-2

Boring No.

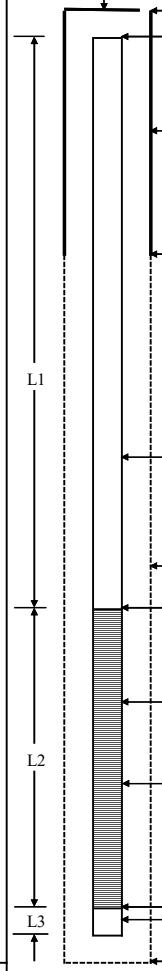
PROJECT	MMM VELLA PIT HYDROGEOLOGICAL EVALUATION	**H&A FILE NO.**	207666
LOCATION	ANN ARBOR CHARTER TOWNSHIP, MI	**PROJECT MGR.**	LESLIE NELSON
CLIENT	MID MICHIGAN MATERIALS	**FIELD REP.**	RAJ GAUTAM / NICK SCHAFFER
CONTRACTOR	CASCADE DRILLING LP	**DATE INSTALLED**	10/4/2023
DRILLER	TREVOR RAMUN	**WATER LEVEL**	

Ground El. 965.34 ft
El. Datum NAV 1988

Location

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
See log	See right



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no._____

Height/Depth of top of guard pipe/roadway box above/below ground surface	~3.5	ft
Height/Depth of top of riser pipe above/below ground surface	2.97	ft
Type of protective casing:	METAL STICK UP	
Length	5.0	ft
Inside Diameter	4.000	in
Depth of bottom of guard pipe/roadway box	~1.5	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Grout	0.0	123.0
Bentonite Seal	123.0	2.0

Type of riser pipe:	PVC	
Inside diameter of riser pipe	2.0	in
Type of backfill around riser	BENTONITE GROUT	
Diameter of borehole	6.0	in
Depth to top of well screen	125.0	ft
Type of screen	SCHEDULE 40, 10 SLOT	
Screen gauge or size of openings	0.1	in
Diameter of screen	2.0	in
Type of backfill around screen	WELL GRAVEL	
Depth of bottom of well screen	130.0	ft
Backfilled Borehole (Collapsed/Bentonite Chip)	-	ft
Depth of bottom of borehole	138.0	ft

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)

(Not to Scale)

Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length
127.97 ft	+	5 ft	+	0 ft	=	132.97 ft

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. MW-3

Boring No.

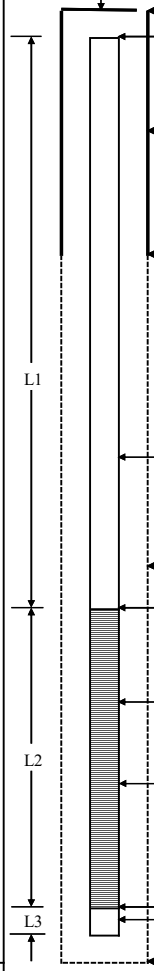
PROJECT	MMM VELLA PIT HYDROGEOLOGICAL EVALUATION	**H&A FILE NO.**	207666
LOCATION	ANN ARBOR CHARTER TOWNSHIP, MI	**PROJECT MGR.**	LESLIE NELSON
CLIENT	MID MICHIGAN MATERIALS	**FIELD REP.**	RAJ GAUTAM
CONTRACTOR	CASCADE DRILLING LP	**DATE INSTALLED**	10/11/2023
DRILLER	NOLAN WILSON	**WATER LEVEL**	

Ground El. 947.6 ft
El. Datum NAVD 1988

Location

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
See log	See right



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no: ---

Height/Depth of top of guard pipe/roadway box above/below ground surface: ~3.5 ft

Height/Depth of top of riser pipe above/below ground surface: 3.07 ft

Type of protective casing: 4" Diameter Metal Stick Up
Length: 5.0 ft
Inside Diameter: 4.0 in

Depth of bottom of guard pipe/roadway box: ~1.5 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Grout	0.0	83.0
Bentonite Seal	83.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: BENTONITE GROUT

Diameter of borehole: 6.0 in

Depth to top of well screen: 85.0 ft

Type of screen: SCHEDULE 40, 10 SLOT
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: WELL GRAVEL

Depth of bottom of well screen: 90.0 ft

Backfilled Borehole (Collapsed/Bentonite Chip): 20.0 ft

Depth of bottom of borehole: 110.0 ft

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)

(Not to Scale)

88.07 ft	+	5 ft	+	0 ft	=	93.07 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. MW-4

Boring No.

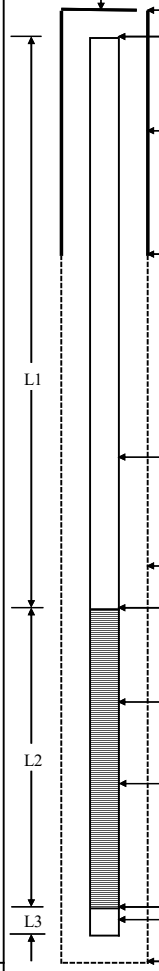
PROJECT	MMM VELLA PIT HYDROGEOLOGICAL EVALUATION	**H&A FILE NO.**	207666
LOCATION	ANN ARBOR CHARTER TOWNSHIP, MI	**PROJECT MGR.**	LESLIE NELSON
CLIENT	MID MICHIGAN MATERIALS	**FIELD REP.**	RAJ GAUTAM / NICK SCHAFFER
CONTRACTOR	CASCADE DRILLING LP	**DATE INSTALLED**	10/5/2023
DRILLER	NOLAN WILSON	**WATER LEVEL**	

Ground El. 929.8 ft
El. Datum NAV 1988

Location

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
See log	See right



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no._____

Height/Depth of top of guard pipe/roadway box above/below ground surface	~3.5	ft
Height/Depth of top of riser pipe above/below ground surface	~3.43	ft
Type of protective casing:	METAL STICK UP	
Length	5.0	ft
Inside Diameter	4.000	in
Depth of bottom of guard pipe/roadway box	~1.5	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Grout	0.0	83.0
Bentonite Seal	83.0	2.0

Type of riser pipe:	PVC	
Inside diameter of riser pipe	2.0	in
Type of backfill around riser	BENTONITE GROUT	
Diameter of borehole	6.0	in
Depth to top of well screen	85.0	ft
Type of screen	SCHEDULE 40, 10 SLOT	
Screen gauge or size of openings	0.1	in
Diameter of screen	2.0	in
Type of backfill around screen	WELL GRAVEL	
Depth of bottom of well screen	90.0	ft
Backfilled Borehole (Collapsed/Bentonite Chip)	-	ft
Depth of bottom of borehole	95.0	ft

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)

(Not to Scale)

Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length
88.43 ft	+	5 ft	+	0 ft	=	93.43 ft

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. MW-5

Boring No.

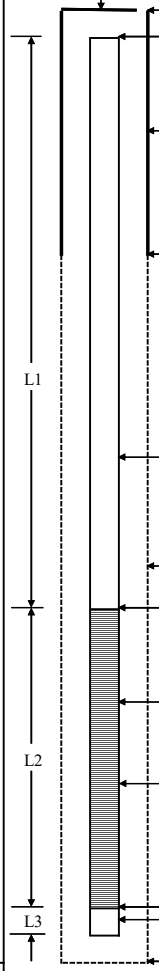
PROJECT	MMM VELLA PIT HYDROGEOLOGICAL EVALUATION	**H&A FILE NO.**	207666
LOCATION	ANN ARBOR CHARTER TOWNSHIP, MI	**PROJECT MGR.**	LESLIE NELSON
CLIENT	MID MICHIGAN MATERIALS	**FIELD REP.**	RAJ GAUTAM
CONTRACTOR	CASCADE DRILLING LP	**DATE INSTALLED**	10/10/2023
DRILLER	NOLAN WILSON	**WATER LEVEL**	

Ground El. 902.8 ft
El. Datum NAV 1988

Location

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
See log	See right



Type of protective cover/lock (circle one): Pent.bolt 9/16" hex. 1/2" hex. 7/10" hex.
Padlock key no: ---

Height/Depth of top of guard pipe/roadway box above/below ground surface	~3.5	ft
Height/Depth of top of riser pipe above/below ground surface	~3.1	ft
Type of protective casing:	METAL STICK UP	
Length	5.0	ft
Inside Diameter	4.000	in
Depth of bottom of guard pipe/roadway box	~1.5	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Grout	0.0	33.0
Bentonite Seal	33.0	2.0

Type of riser pipe:	PVC	
Inside diameter of riser pipe	2.0	in
Type of backfill around riser	BENTONITE GROUT	
Diameter of borehole	6.0	in
Depth to top of well screen	35.0	ft
Type of screen	SCHEDULE 40, 10 SLOT	
Screen gauge or size of openings	0.1	in
Diameter of screen	2.0	in
Type of backfill around screen	WELL GRAVEL	
Depth of bottom of well screen	45.0	ft
Backfilled Borehole (Collapsed/Bentonite Chip)	-	ft
Depth of bottom of borehole	70.0	ft

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)

(Not to Scale)

Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length
38.1 ft	+	10 ft	+	0 ft	=	48.1 ft

COMMENTS:

APPENDIX G
Pages from 2019 GZA Reserve Estimate Report

Table 1
Soil Boring Summary
Ajax Materials Corporation
4984 Earhart Road, Ann Arbor, Michigan 48105

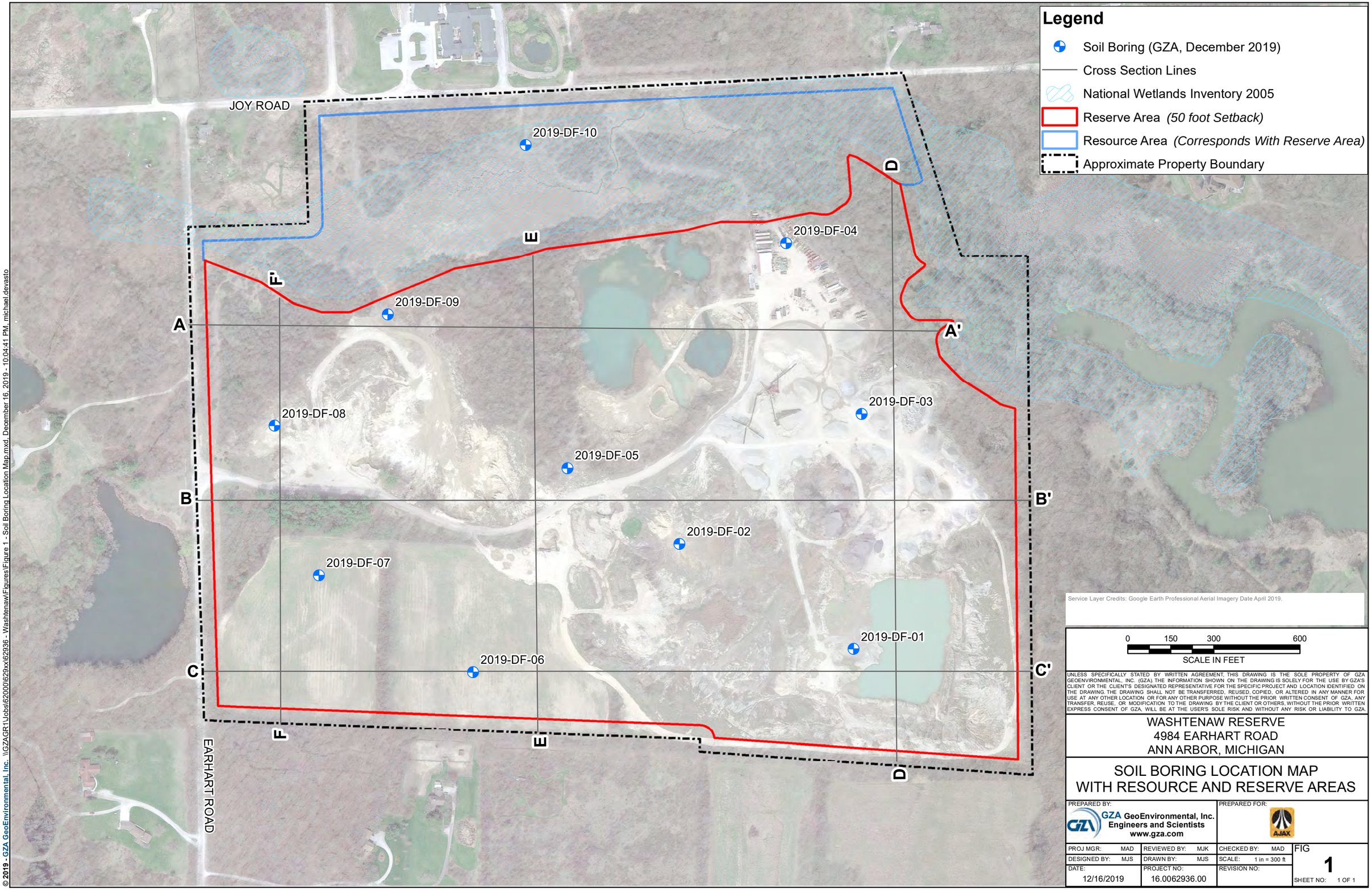
	2019-DF-01			2019-DF-02			2019-DF-03			2019-DF-04			2019-DF-05		
Collar Elevation	894			900			910			904			946		
Northing, Easting	13310267, 306953			13309660, 307319			13310294, 307319			13310032, 308367			13309270, 307584		
	Depth to Top of Formation	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**
Overbuden/Fill	-	-	-	-	-	-	-	-	-	0	904	36	-	-	-
Clayey Gravel	-	-	-	-	-	-	0	910	3	-	-	-	-	-	-
Silt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay	-	-	-	-	-	-	3	907	11	-	-	-	0	946	17
Sand with Silt	0	894	17	0	900	17	14	896	13	36	868	11	-	-	-
Sand and Gravel	17	877	30	17	883	42	27	883	27	-	-	-	-	-	-
OL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay	47	847	30	59	841	18	54	856	23	-	-	-	-	-	-
Sand with Clay	-	-	-	-	-	-	-	-	-	-	-	-	17	929	20
Clay	-	-	-	-	-	-	-	-	-	-	-	-	37	909	10
Sand with Clay	-	-	-	-	-	-	-	-	-	-	-	-	47	899	3
Sand and Gravel	-	-	-	-	-	-	-	-	-	-	-	-	50	896	7
OL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand with Silt	-	-	-	-	-	-	-	-	-	47	857	17	-	-	-
Clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand and Gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt with Clay	-	-	-	-	-	-	-	-	-	64	840	3	-	-	-
Silt	-	-	-	-	-	-	-	-	-	67	837	2	-	-	-
Clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand and Gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand and Gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand	-	-	-	-	-	-	-	-	-	69	835	48	57	889	41
Clayey Gravel	-	-	-	-	-	-	-	-	-	-	-	-	98	848	3
Clay	-	-	-	-	-	-	-	-	-	-	-	-	101	845	36
EOB	817			823			833			787			809		

1. Soil borings were drilled by Cascade Drilling using rotosonic drilling method in December 2019.
2. Soil boring coordinates and collar elevations were obtained by GZA GeoEnvironmental using a handheld GPS device in NAD 83 State Plane Michigan South US Feet. Elevations were rectifyied to Macomb County 2016 1 meter digital elevation model from the USGS.
3. Formation thicknesses are estimated from observations of the recovered soil samples.
4. The bottom formation thicknesses reported represents the depth drilled into the sand or clay encountered, not the actual thickness of that layer.
5. 'Sand and Gravel' describes soil that was characterized as 'Sand with/some/little/trace/no Gravel' and 'Gravel with/some/little/trace/no Sand'.

Table 1
Soil Boring Summary
Ajax Materials Corporation
4984 Earhart Road, Ann Arbor, Michigan 48105

	2019-DF-06			2019-DF-07			2019-DF-08			2019-DF-09			2019-DF-10		
Collar Elevation	960			950			946			968			882		
Northing, Easting	13308941, 306872			13308404, 307209			13308249, 307730			13308644, 308119			13309124, 308709		
	Depth to Top of Formation	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**	**Depth to Top of Formation**	**Elevation of Top of Formation**	**Formation Thickness**
Overbuden/Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clayey Gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt	-	-	-	-	-	-	-	-	-	-	-	-	0	882	3.5
Clay	0	960	40	0	950	35.5	-	-	-	-	-	-	3.5	879	20
Sand with Silt	40	920	77	35.5	915	41.5	-	-	-	-	-	-			
Sand and Gravel	117	843	9	77	873	55	-	-	-	0	968	5.5	23.5	859	15.5
OL	-	-	-	-	-	-	-	-	-	5.5	963	1.5			
Clay	126	834	11	132	818	5	-	-	-	-	-	-	39	843	1
Sand with Clay	-	-	-	-	-	-	0	946	17	-	-	-	-	-	-
Clay	-	-	-	-	-	-	17	929	8	-	-	-	-	-	-
Sand with Clay	-	-	-	-	-	-	25	921	7.5	-	-	-	-	-	-
Sand and Gravel	-	-	-	-	-	-	-	-	-	7	961	7	40	842	17
OL	-	-	-	-	-	-	-	-	-	14	954	3	-	-	-
Sand with Silt	-	-	-	-	-	-	35.5	911	15.5				-	-	-
Clay	-	-	-	-	-	-	51	895	2				-	-	-
Sand and Gravel	-	-	-	-	-	-	53	893	4	17	951	15	-	-	-
Silt with Clay	-	-	-	-	-	-	-	-	-				-	-	-
Silt	-	-	-	-	-	-	57	889	10	32	936	2	57	825	11
Clay	-	-	-	-	-	-	67	879	20				-	-	-
Sand and Gravel	-	-	-	-	-	-	87	859	2	34	934	16	68	814	25
Clay	-	-	-	-	-	-	-	-	-	50	918	5	93	789	0.5
Sand and Gravel	-	-	-	-	-	-	-	-	-	-	-	-	93.5	789	25.5
Silt	-	-	-	-	-	-	-	-	-	55	913	2	-	-	-
Sand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clayey Gravel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay	-	-	-	-	-	-	89	857	8	57	911	10	119	763	8
EOB	823			813			852			901			755		

1. Soil borings were drilled by Cascade Drilling using rotosonic drilling method in December 2019.
2. Soil boring coordinates and collar elevations were obtained by GZA GeoEnvironmental using a handheld GPS device in NAD 83 State Plane Michigan South US Feet.
Elevations were rectifyied to Macomb County 2016 1 meter digital elevation model from the USGS.
3. Formation thicknesses are estimated from observations of the recovered soil samples.
4. The bottom formation thicknesses reported represents the depth drilled into the sand or clay encountered, not the actual thickness of that layer.
5. 'Sand and Gravel' describes soil that was characterized as 'Sand with/some/little/trace/no Gravel' and 'Gravel with/some/little/trace/no Sand'.



© 2019 - GZA GeoEnvironmental, Inc. \\GZAGR1\Jobs\62000\629xx\62936 - Washtenaw\Figures\Figure 1 - Soil Boring Location Map.mxd, December 16, 2019 - 10:04:41 PM, michael.devasto

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WASHTENAW RESERVE
4984 EARHART ROAD
ANN ARBOR, MICHIGAN

SOIL BORING LOCATION MAP WITH RESOURCE AND RESERVE AREAS

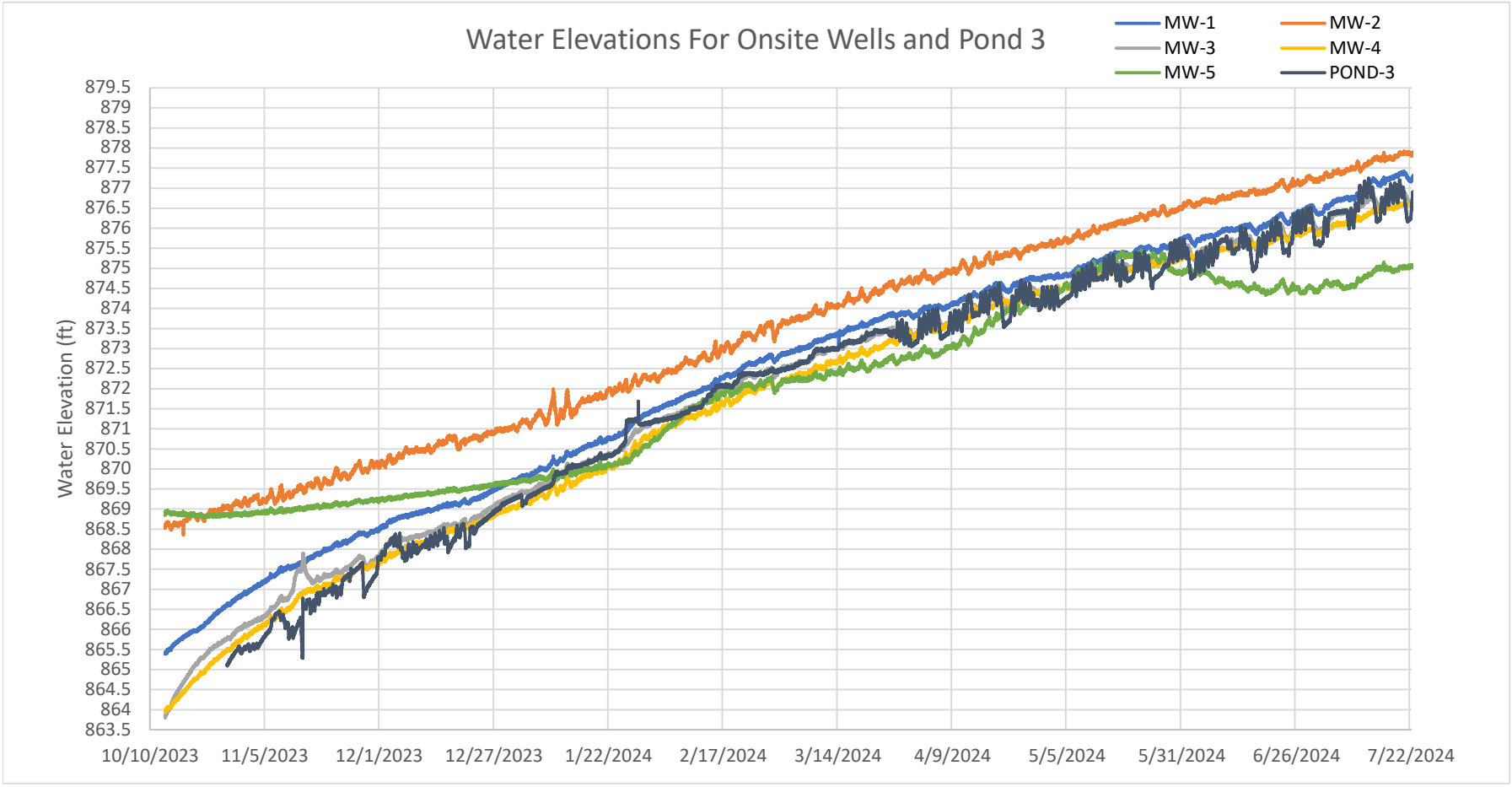
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: AJAX	
PROJ MGR: MAD	REVIEWED BY: MJK	CHECKED BY: MAD	FIG 1
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: 1 in = 300 ft	
DATE: 12/16/2019	PROJECT NO: 16.0062936.00	REVISION NO:	SHEET NO: 1 OF 1

APPENDIX H
Monitoring Well and Staff Gauge Pressure Transducer Data

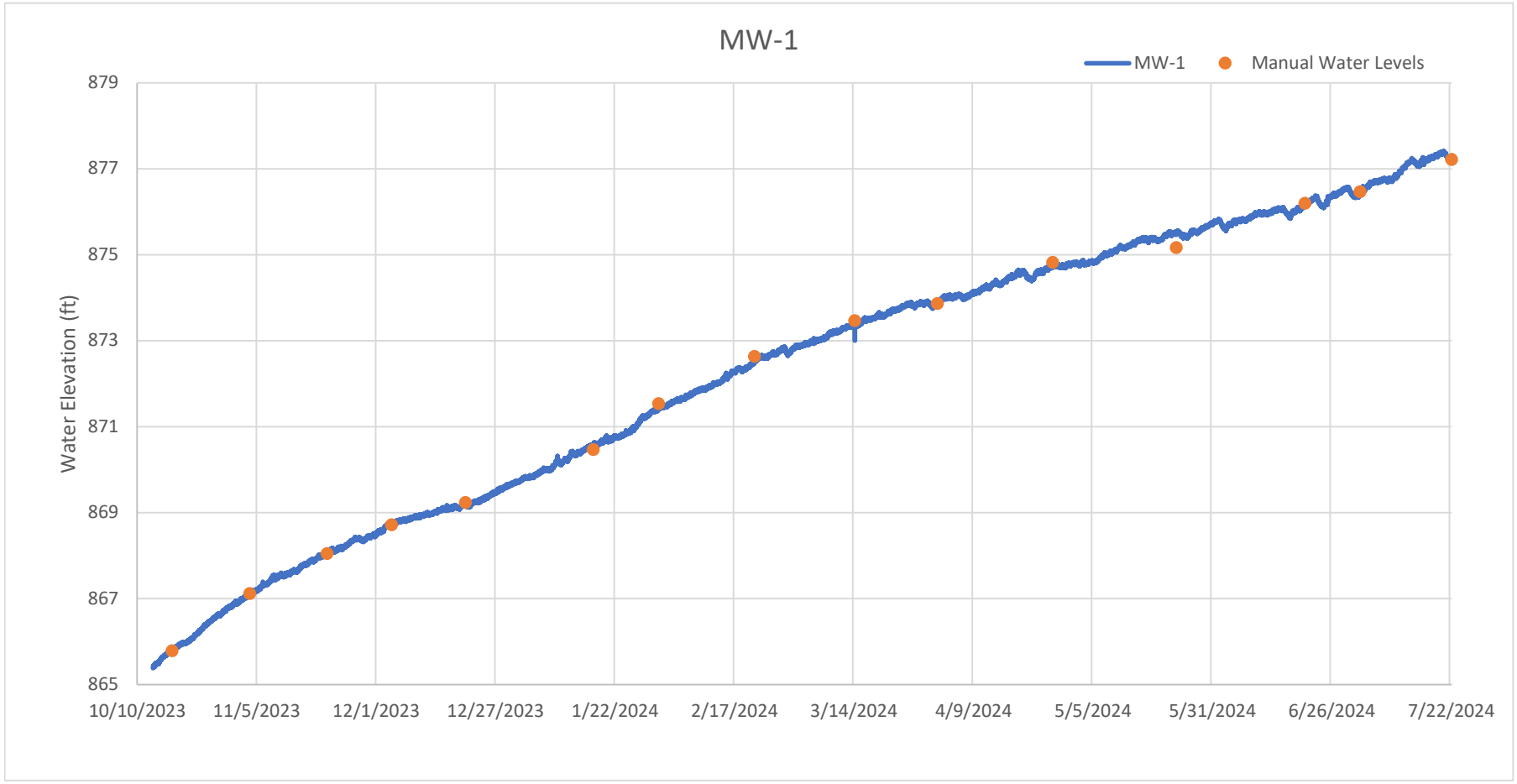
TRANSDUCER DATA PLOT - ONSITE WELLS AND POND 3

MID MICHIGAN MATERIALS - VELLA PIT

ANN ARBOR TOWNSHIP, MICHIGAN



TRANSDUCER DATA PLOT - MW-1
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



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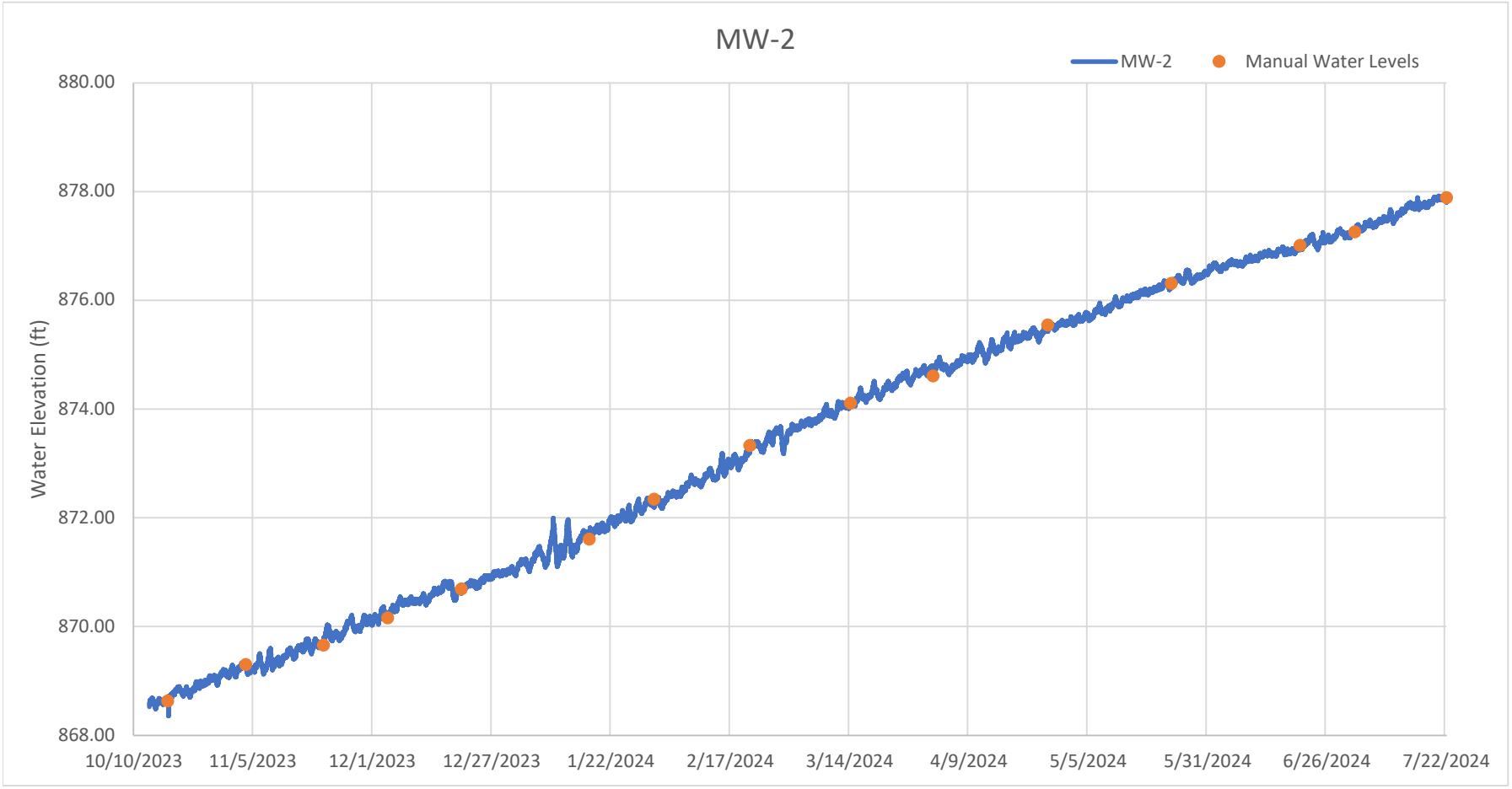
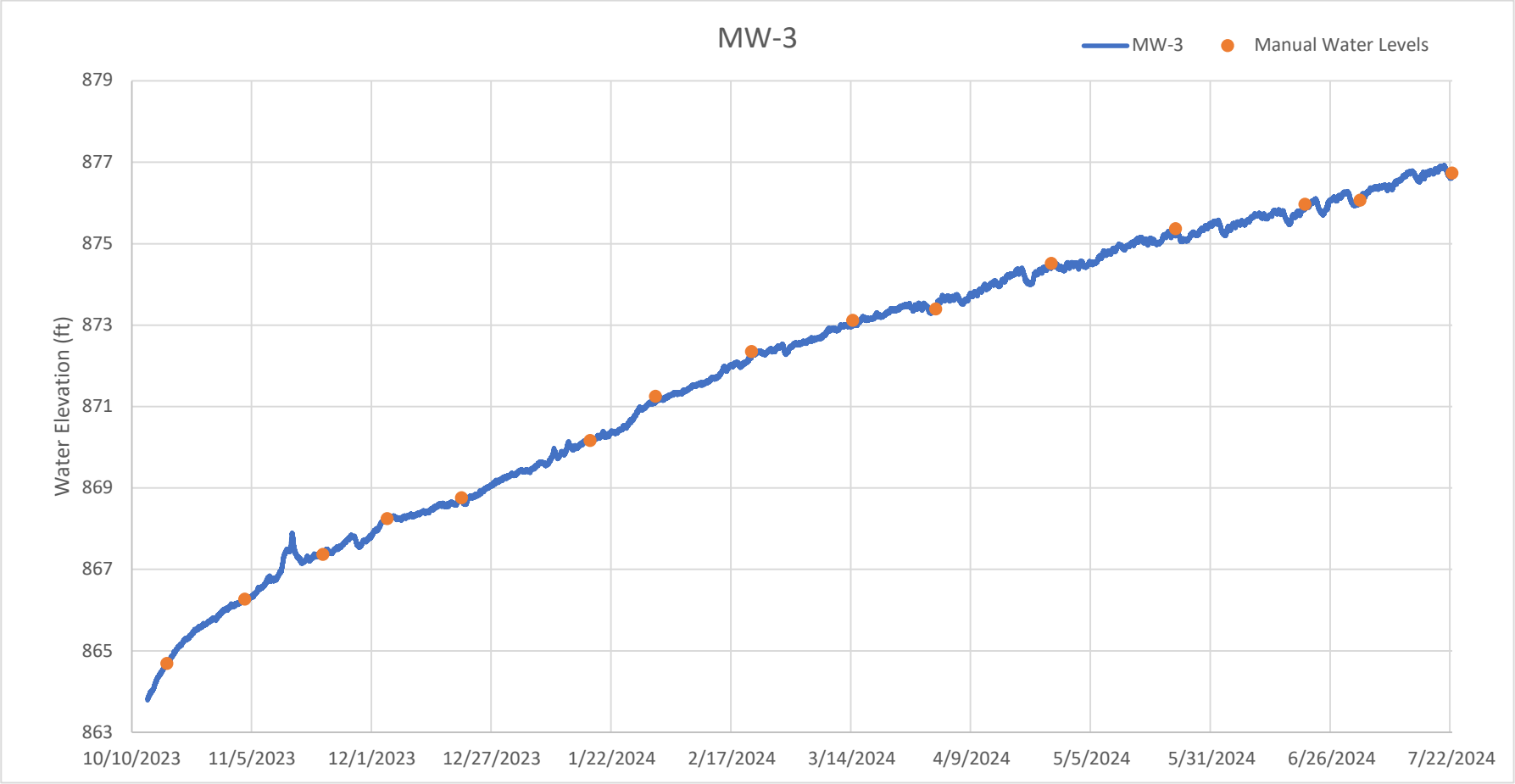
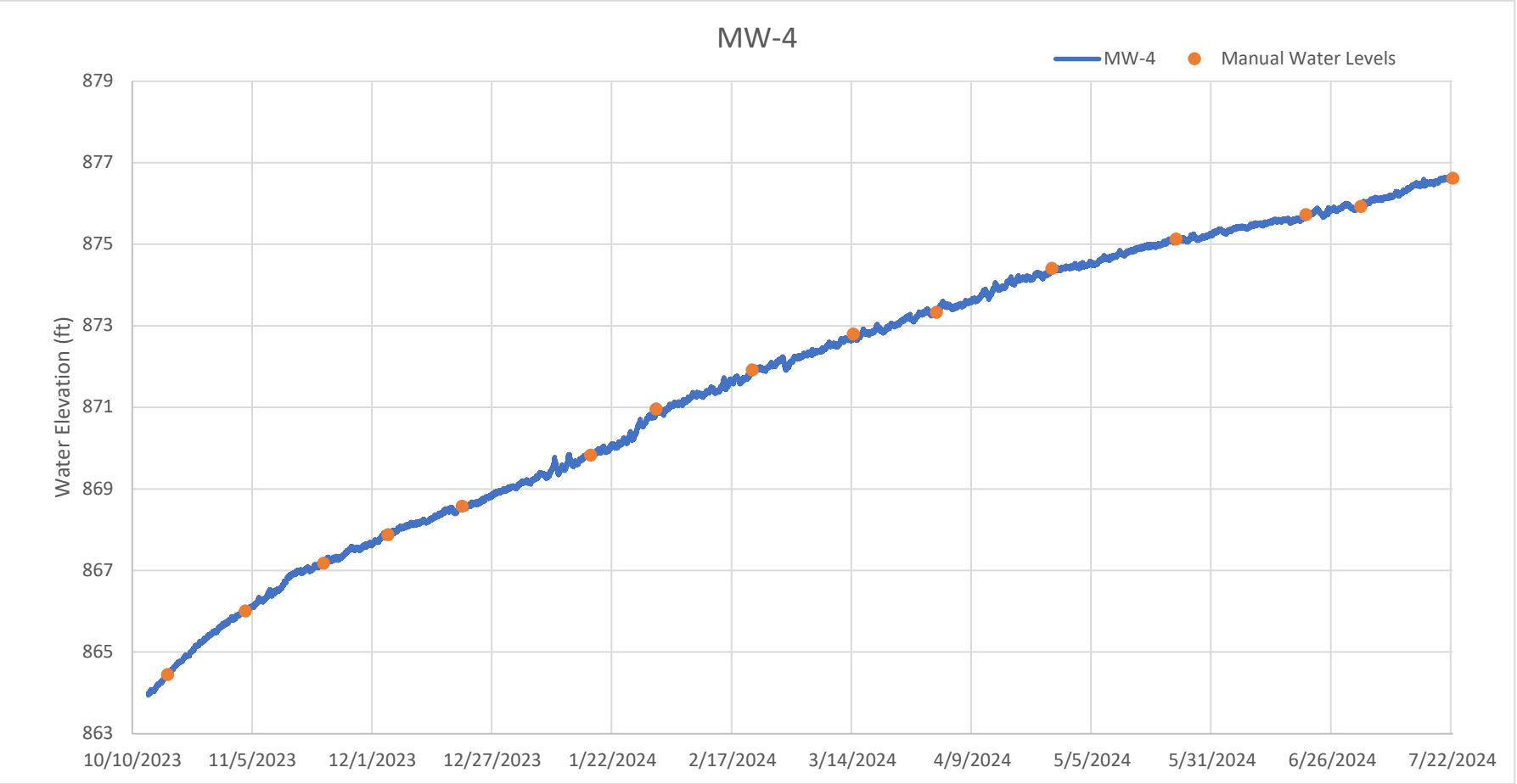
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



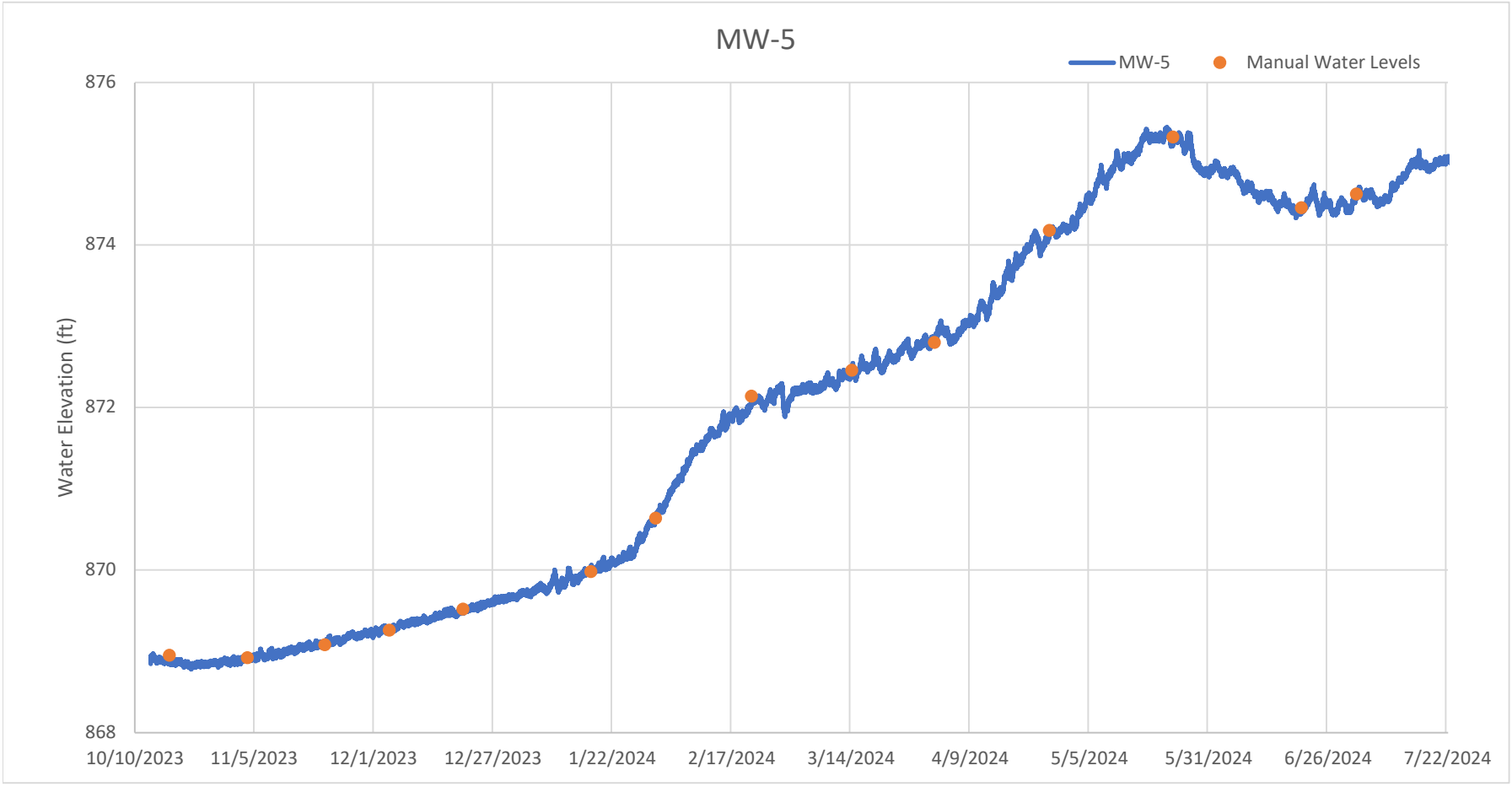
TRANSDUCER DATA PLOT - MW-3
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



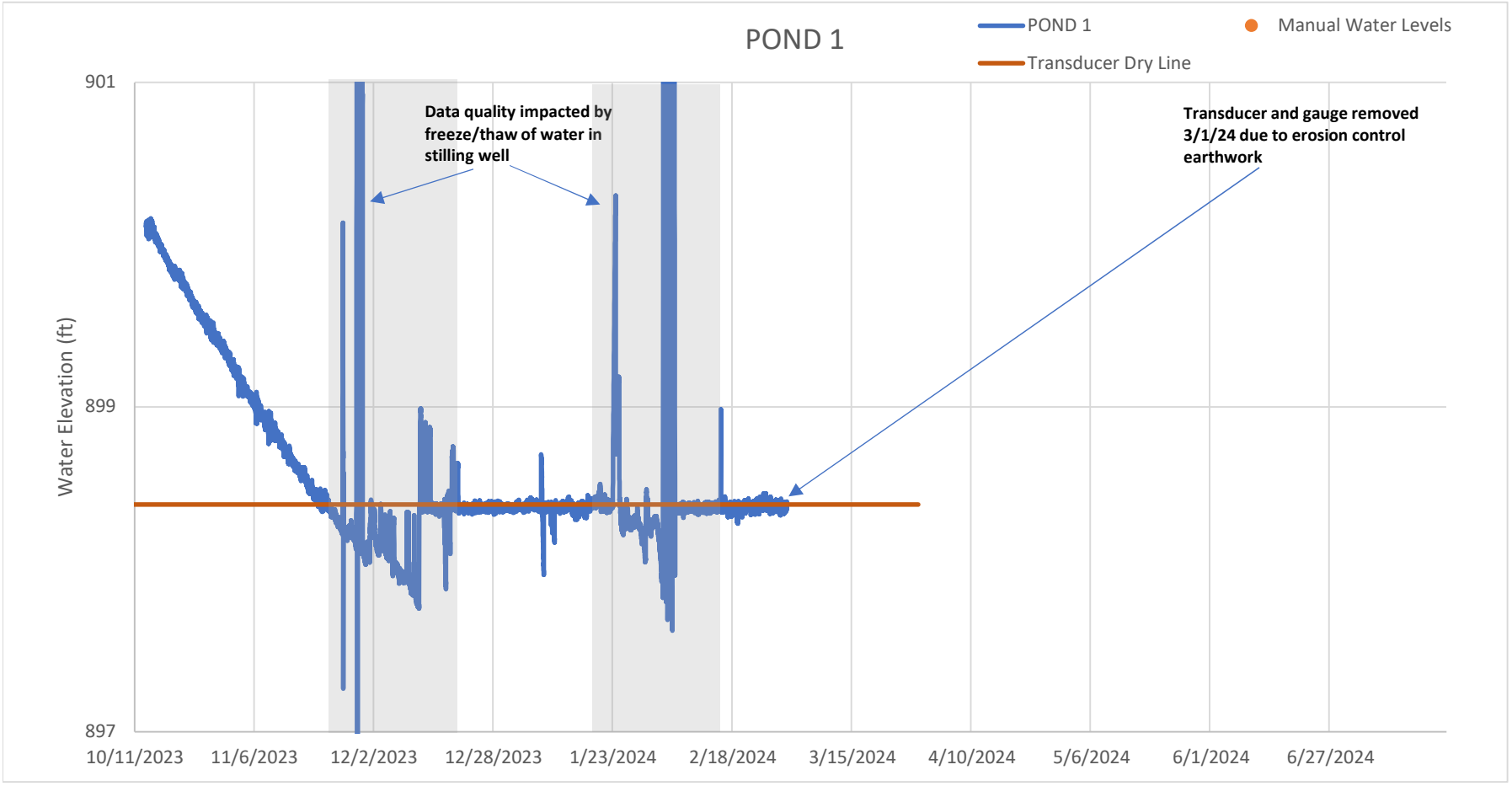
TRANSDUCER DATA PLOT - MW-4
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



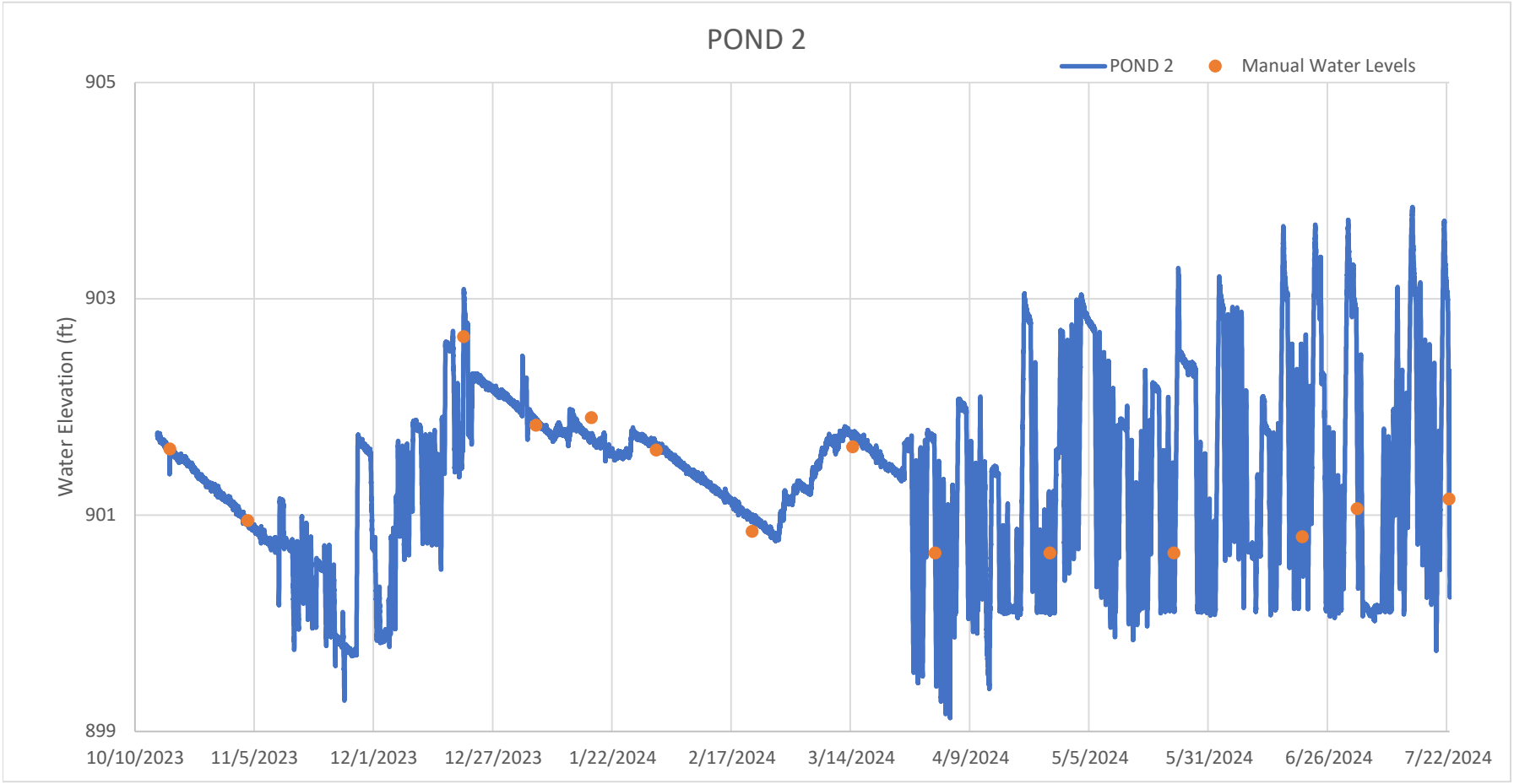
TRANSDUCER DATA PLOT - MW-5
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



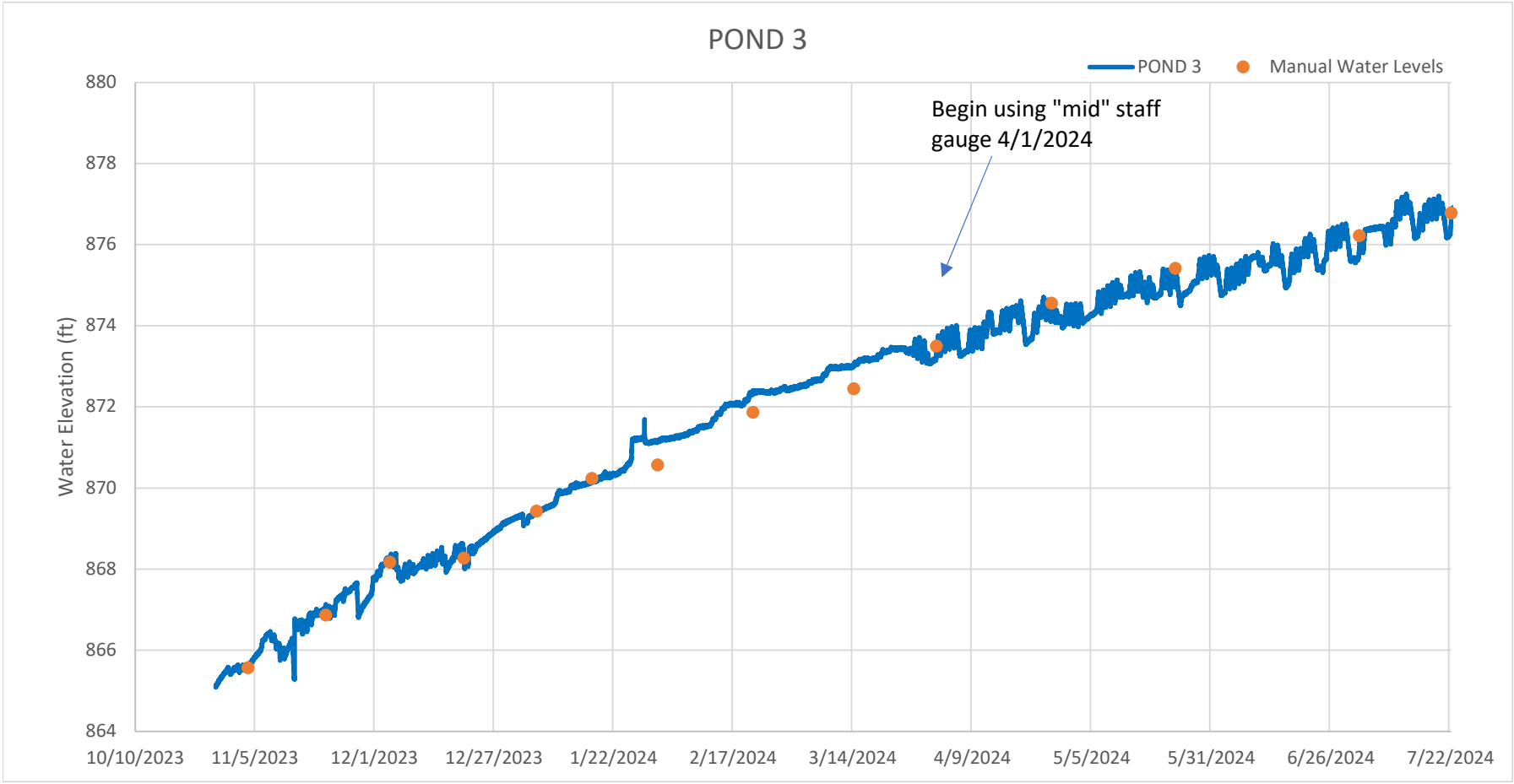
TRANSDUCER DATA PLOT - POND 1
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



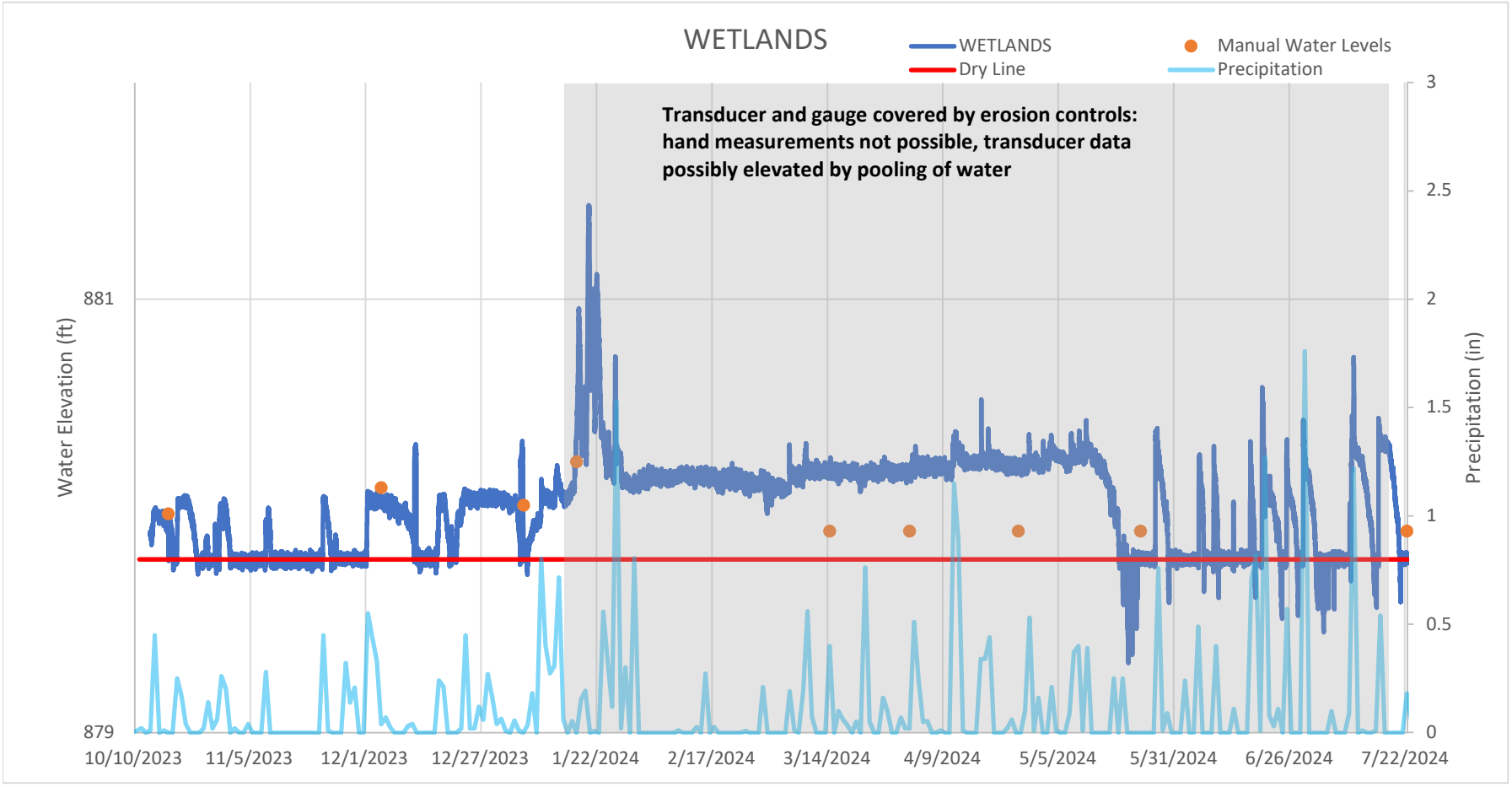
TRANSDUCER DATA PLOT - POND 2
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



TRANSDUCER DATA PLOT - POND 3
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

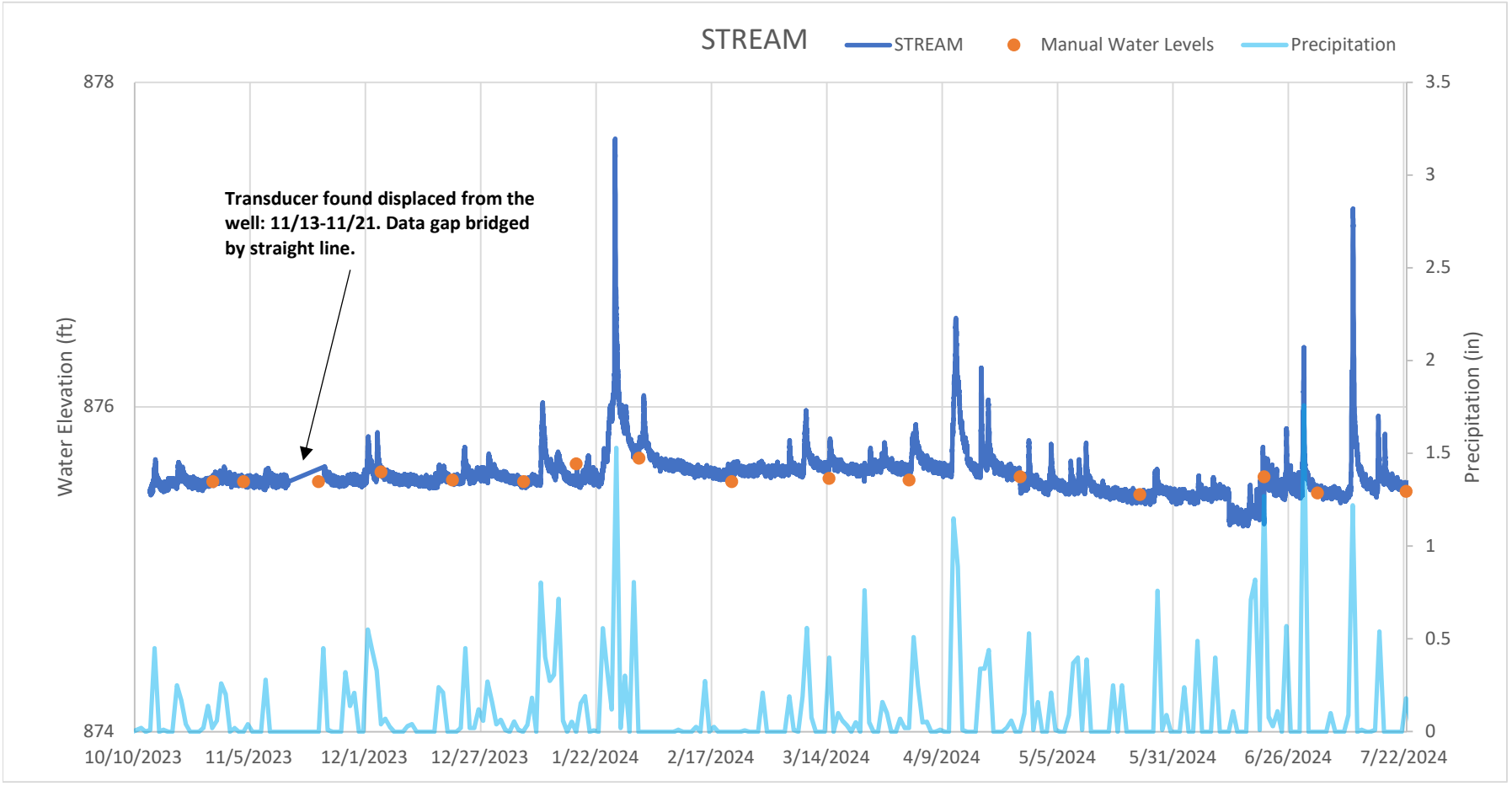


TRANSDUCER DATA PLOT - WETLANDS
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



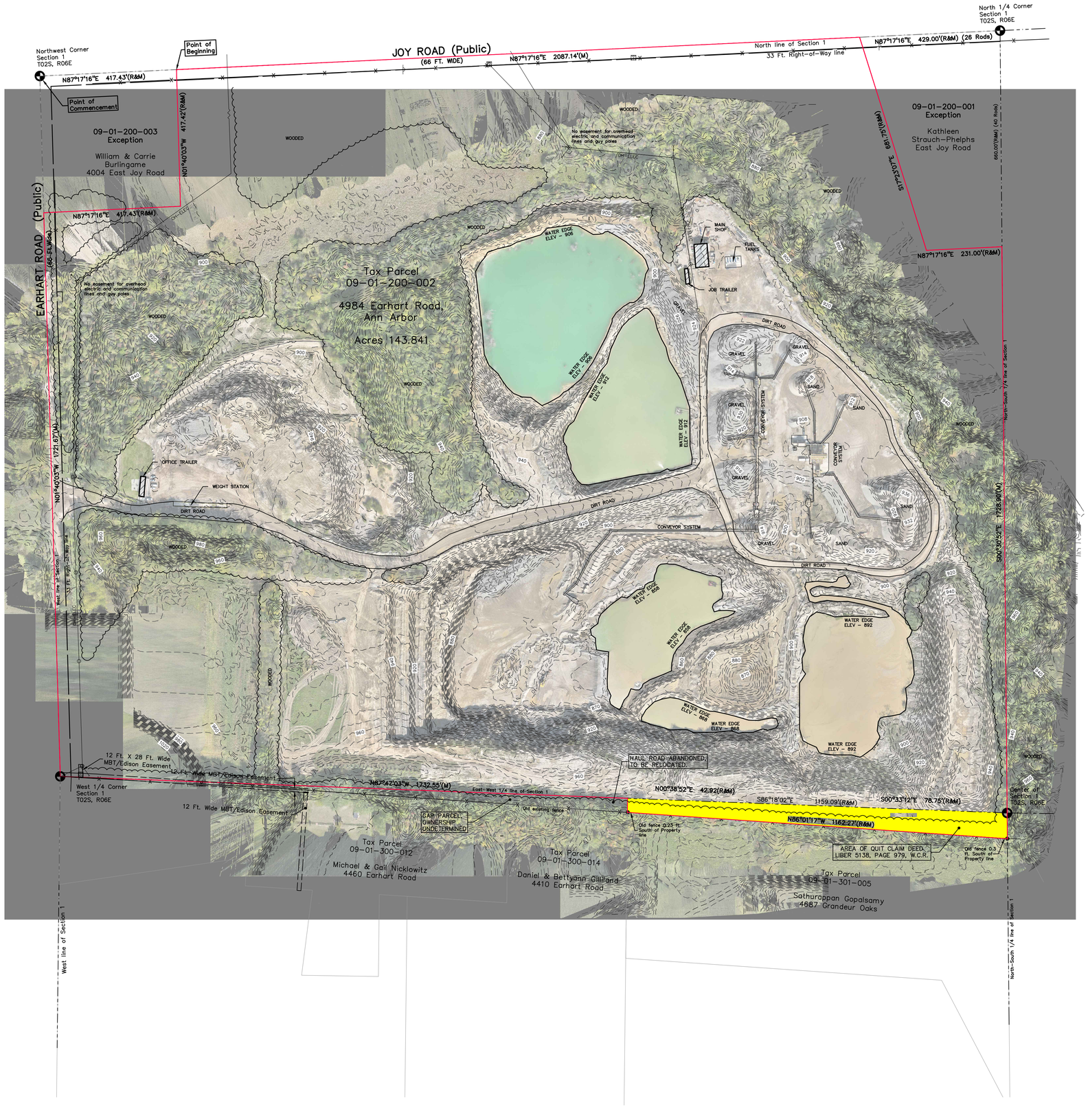
Precipitation data source: NOAA/NWS NOWData: https://www.weather.gov/wrh/climate?wfo=dtx

TRANSDUCER DATA PLOT - STREAM
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN



Precip and Temp data source: NOAA/NWS NOWData: https://www.weather.gov/wrh/climate?wfo=dtx

APPENDIX I
2 October 2023 Aerial Survey



LEGEND:

- EX. OH, ELEC, POLE & GUY WIRE
- EX. U.G. CABLE TV & PEDESTAL
- EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
- EX. U.G. ELEC.MANHOLE, METER & HANDHOLE
- EX. GAS LINE
- EX. GAS VALVE & GAS LINE MARKER
- EX. TRANSFORMER & IRRIGATION VALVE
- EX. WATER MAIN
- EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
- EX. WATER VALVE BOX & SHUTOFF
- EX. SANITARY SEWER
- EX. SANITARY CLEANOUT & MANHOLE
- EX. COMBINED SEWER MANHOLE
- EX. STORM SEWER
- EX. CLEANOUT & MANHOLE
- EX. SQUARE, ROUND, & BEEHIVE CATCH BASIN
- EX. YARD DRAIN & ROOF DRAIN
- EX. UNIDENTIFIED STRUCTURE
- EX. MAILBOX, SIGN & LIGHTPOLE
- EX. FENCE
- EX. GUARD RAIL
- EX. SPOT ELEVATION
- EX. CONTOUR
- EX. WETLAND

- IRON FOUND / SET
- NAIL FOUND / NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND / SET
- SECTION CORNER FOUND
- R M C RECORDED / MEASURED / CALCULATED

LEGAL DESCRIPTION:

(per First American Title Insurance Company, Commitment No. C000122143, Commitment Date: June 04, 2020, Revision No. 3, Dated June 15, 2020)

Tax Id Number(s): I-09-01-200-002
Land situated in the Township of Ann Arbor, in the County of Washtenaw, in the State of Michigan

The Northwest fractional 1/4 of Section 1, except beginning in the North line of section at a point which is 26 rods West of North 1/4 corner of Section 1; thence East 26 rods to North 1/4 corner of Section 1; thence South 40 rods in the North and South 1/4 line; thence West 14 rods; thence Northwesterly to the point of beginning. ALSO EXCEPT North 417.42 feet of West 417.42 feet of Northwest 1/4 of Section 1. Also commencing at South 1/4 corner of Section 1; thence North 86 degrees 49 minutes 07 seconds West 1214.13 feet; thence North 02 degrees 07 minutes 34 seconds East 2597.57 feet to point of beginning; thence continue North 02 degrees 07 minutes 34 seconds East 42.92 feet; thence South 86 degrees 18 minutes 02 seconds East 1159.09 feet; thence South 00 degrees 55 minutes 22 seconds West 78.75 feet; thence North 84 degrees 32 minutes 15 seconds West 1162.27 feet to the point of beginning. Being part of the West 1/2 of Section 1, Town 2 South, Range 6 East.

More particularly described as:

Part of the Northwest 1/4 of Section 1, Township 02 South, Range 06 East of Ann Arbor Township, Washtenaw County, Michigan.

Commencing at the Northwest corner of Section 1, Township 02 South, Range 06 East, Thence along the north line of said Section 1, N87°17'16"E, 417.43 feet to the Point-of-Beginning: Thence continuing along said north line of Section 1, N87°17'16"E, 2087.14 feet; thence along the west line of Tax Parcel 09-01-200-001, S17°23'07"E, 681.75 feet; thence along the south line of said Tax Parcel 09-01-200-001, N87°17'16"E, 231.00 feet to the north-south 1/4 line of said Section 1 as monumented; thence along said north-south line as monumented, S00°30'52"E, 1728.90 feet to the Center of said Section 1 as referenced in Quit Claim deed recorded in Liber 5130, Page 979, Washtenaw Register of Deed; thence along said north-south line of said Section 1 as monumented, S00°33'12"E 78.75 feet; thence N86°01'17"W, 1162.27 feet; thence N00°38'52"E, 42.92 feet to the east-west 1/4 line as monumented; thence along said east-west 1/4 line as monumented, N87°47'03"W, 1732.55 feet to the west 1/4 corner of said Section 1, thence along the west line of said Section 1, N01°40'03"W, 1721.67 feet; thence along the south line of Tax Parcel 09-01-200-003, N87°17'16"E, 417.43 feet; thence along the east line of said Tax Parcel 09-01-200-003, N01°40'03"W, 417.42 feet to the north line of said Section 1 and the Point-of-Beginning.

Flood Zone Rating and Statement:

Said described property is located within an area having a Zone Designation "X" (Area of Minimal Flooding), on Flood Insurance Community Panel 26161C0258E, Effective Date - March 03, 2012. Per FEMA Interactive Map.

PEA GROUP
t: 844.813.2949
www.peagroup.com

NORTH

0 75 150 300
SCALE: 1" = 150'

811 Know what's below. Call before you dig.

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE LOCATIONS AND ELEVATIONS AND ARE NOT GUARANTEED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

LOCATION MAP - NOT TO SCALE

MID MICHIGAN MATERIALS
6966 FISHER ROAD
JEDDO, MICHIGAN 48032

PROJECT TITLE

ASC-WSG
4984 EARHART ROAD
ANN ARBOR, MICHIGAN 48105

REVISIONS
- -

ORIGINAL ISSUE DATE:
OCTOBER 09, 2023

DRAWING TITLE

TOPOGRAPHIC SURVEY

PEA JOB NO.	2022-1308
P.M.	DLC
DN.	JSH
DES.	XXX

DRAWING NUMBER:
1 OF 1

NOT FOR CONSTRUCTION

C:\Users\Jhosley\Desktop\[XP08A0E-22-1308.dwg PLOT DATE: 10/10/2023 BY: Jared Hosley

APPENDIX J
17 October 2023 Preliminary Groundwater Potentiometric Surface Contour Map

STREAM GAUGE
875.51

WETLAND GAUGE
880.62

MW-5
868.95

POND GAUGE 1
899.94

868

867

POND GAUGE 2
901.61

MW-1
865.79

866

865

POND GAUGE 3
(ESTIMATED,
INSTALLATION IN PROGRESS)

MW-2
868.63

MW-3
864.69

MW-4
864.45

LEGEND

- A — MONITORING WELL
- # — POND GAUGE
- # — STREAM GAUGE
- X — WETLAND GAUGE
- 868.95 — GROUNDWATER POTENTIOMETRIC SURFACE MEASUREMENT
- 868.95 — SURFACE WATER ELEVATION MEASUREMENT, NOT USED IN CONTOURING
- CREEK
- GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- INFERRED GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FEET
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POTENTIOMETRIC SURFACE MEASUREMENTS TAKEN 17 OCTOBER 2023
3. POND 3 DEWATERING CEASED ON 10 OCTOBER 2023
4. AERIAL IMAGERY SOURCE: NEARMAP, 2 OCTOBER 2023

N

0 260 520
SCALE IN FEET

HALEY ALDRICH

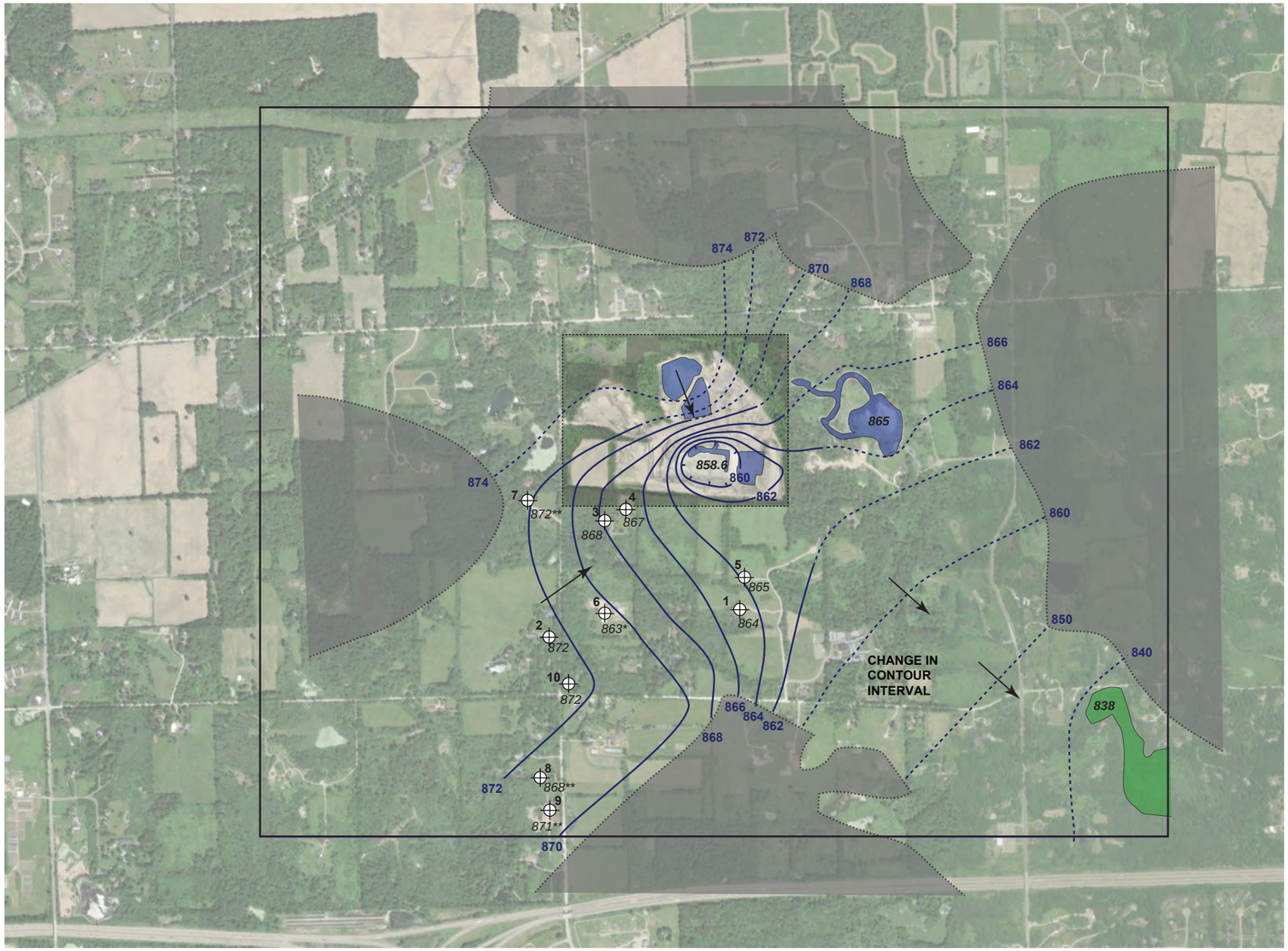
MID MICHIGAN MATERIALS VELLA PIT
4984 EARHART RD
ANN ARBOR, MICHIGAN

GROUNDWATER POTENTIOMETRIC SURFACE MAP

OCTOBER 2023

PRELIMINARY FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: mnjones - LAST SAVED: 10/27/2023 10:14 AM



LEGEND

7 / 865 — DOMESTIC WELL: SUBSCRIPT = ESTIMATED GROUNDWATER ELEVATION
SUPERSCRIPT = WELL ID: SEE DESCRIPTION IN TEXT
* = NOT USED IN CONTOURING
** = NOT SURVEYED; UNCERTAIN REFERENCE ELEVATION

866 — POTENTIOMETRIC CONTOUR: WATER LEVEL IN UPPER AQUIFER ESTIMATED FOR JULY - AUGUST, 2023. DASHED WHERE INFERRED

GROUNDWATER FLOW DIRECTION

INITIAL (CIRCA AUGUST 2023) NUMERICAL MODEL DOMAIN

AERIAL IMAGERY FOR VELLA PIT, 2023 (INSET)

SURFACE WATER BODY; NUMBER INDICATES ESTIMATED WATER SURFACE ELEVATION

WETLANDS; NUMBER INDICATES ESTIMATED TOPOGRAPHIC ELEVATION

UPPER AQUIFER NOT PRESENT IN INITIAL NUMERICAL MODEL: SUBJECT TO REVISION AFTER MODEL EXPANSION AND REFINEMENT

NOTES

1. https://services.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer ACCESSED 05 OCTOBER 2023
2. AERIAL IMAGE FOR VELLA PIT IS OVERLAYED ON AERIAL IMAGE BASEMAP: SHOWS CURRENT CONFIGURATION OF PIT LAKES

N

0 — 2,500 — 5,000

SCALE IN FEET

HALEY ALDRICH

MID MICHIGAN MATERIALS - VELLA PIT
4984 EARHART ROAD, ANN ARBOR, MI 48105

POTENTIOMETRIC SURFACE JULY-AUGUST 2023

OCTOBER 2023

FIGURE A5

Attachment 5: Potentiometric Surface Map

Explanation for Wells on Potentiometric Surface Map

Note: Domestic water wells are not designed to be used as observation wells and many details of the well construction (type of pump, how the riser pipe is attached to the pitless adapter, etc.) add uncertainty in addition to the lack of surveyed elevations when converting reported static water depths to groundwater head in the aquifer. We estimate that this uncertainty is on the order of ±2 feet.

1. Well ID: 81000035111. Installed on 10 August 2023. Drillers Log reports static water level at 55 feet below ground surface (BGS). Well location surveyed by Global Positioning System (GPS): geographic coordinates given, but no surveyed elevation. Elevation estimated as 919 feet during visit to property for well health check: corresponds to an estimated groundwater elevation of 864 feet above sea level (ASL).

2. Well ID: 81000035077. Installed on 3 August 2023. Drillers Log reports static water level at 69 feet BGS. Well location surveyed by GPS: geographic coordinates given, but no surveyed elevation. Elevation estimated as 941 feet during visit to property for well health check: corresponds to an estimated groundwater elevation of 872 feet ASL.

3. Well ID: 81000019759. Installed on 14 September 2012. Cribley Drilling Co. (Cribley) measured static water level at 100.1 feet BGS in a well health check on 31 July 2023. Well location surveyed by GPS: geographic coordinates given, but no surveyed elevation. Elevation estimated as 968 feet during visit to property for well heath check: corresponds to an estimated groundwater elevation of 868 feet ASL.

4. Well ID: 81000004744. Installed 8 September 1983. Drillers Log reports a wellhead elevation of 970 feet with map interpolated geographic coordinates. The estimate from the United States Geological Survey (USGS) digital elevation model is 974 feet ASL. The well pump was lowered on 19 July 2023. The homeowner reports that Cribley measured a depth to water of 107.4 feet at the time of this repair. Using the 974 feet ASL elevation, this corresponds to an estimated groundwater elevation of 867 feet ASL.

5. Well ID: 81000035072. Installed on 21 June 2023. Drillers Log reports static water level at 45 feet BGS. Well location surveyed by GPS: geographic coordinates given, but no surveyed elevation. Elevation estimated as 910 feet ASL based on USGS digital elevation model. This corresponds to an estimated groundwater elevation of 865 feet ASL. Note that because this groundwater elevation estimate is at least a month earlier than the other wells in this map and water levels in the upper aquifer are known to have fallen during this time, contours have not been adjusted to force a fit to this well.

6. Well ID: 81000035073. Installed on 7 June 2023. Drillers Log reports static water level at 75 feet BGS. Well location surveyed by GPS: geographic coordinates given, but no surveyed elevation. Elevation estimated as 938 feet ASL based on USGS digital elevation model, which would correspond to an estimated groundwater elevation of 863 feet ASL, a non-sequitur compared with nearby wells. However, this well was a direct replacement for a well installed into the lower aquifer in May. Both logs list a static water level of 75 feet, which is an unlikely coincidence given observations in nearby wells in the upper and lower aquifers. We believe that this may have resulted from the driller re-using their well log template. Based on this data quality concern, this well was omitted from the potentiometric surface contouring.

7. Well ID: 81000004750. Installed on 2 June 1987. Drillers Log reports an elevation of 950 feet ASL with map interpolated geographic coordinates. The estimate from the USGS digital elevation model is 951 feet ASL. On 12 July 2023, Cribley measured the static water level in this well at 78.9 feet BGS as part of a well health check performed on behalf of the property owner. These results were shared in a 31 July 2023 e-mail from a representative of the property owner. Using the latter estimate of elevation, this corresponds to an estimated groundwater elevation of 872 feet ASL. Given the age of the well and lack of surveyed coordinates, an estimated reference elevation is unavailable, and this result is treated with greater uncertainty in drawing potentiometric contours.

8. Well ID: 81000004825. Installed on 6 July 1983. Drillers Log reports an elevation of 905 feet ASL with map interpolated geographic coordinates. The estimate from the USGS digital elevation model is 905.7 feet ASL. On 12 July 2023, Cribley measured the static water level in this well at 37.7 feet BGS as part of a well health check performed on behalf of the property owner. These results were shared in a 31 July 2023 e-mail from a representative of the property owner. Using the latter estimate of elevation, this corresponds to an estimated groundwater elevation of 868 feet ASL. Given the age of the well and lack of surveyed coordinates, an estimated reference elevation is unavailable, and this result is treated with greater uncertainty in drawing potentiometric contours.

9. Well ID: 81000004829. Installed on 2 July 1987. Drillers Log reports an elevation of 929 feet ASL with map interpolated geographic coordinates. The estimate from the USGS digital elevation model is 914.77 feet ASL. On 12 July 2023, Cribley measured the static water level in this well at 44 feet BGS as part of a well health check performed on behalf of the property owner. These results were shared in a 31 July 2023 e-mail from a representative of the property owner. Using the latter estimate of elevation, this corresponds to an estimated groundwater elevation of 871 feet ASL. Given the age of the well and lack of surveyed coordinates, a precise reference elevation is unavailable, and this result is treated with greater uncertainty in drawing potentiometric contours.

10. Well ID: 81000035168. Installed on 16 August 2023. Drillers Log reports static water level at 52 feet BGS. Well location surveyed by GPS: geographic coordinates given, but no surveyed elevation. Elevation estimated as 924 feet ASL based on USGS digital elevation model, which corresponds to an estimated groundwater elevation of 872 feet ASL.

Other constraints used in potentiometric surface: the general shape of potentiometric contours was taken from the groundwater model and refined using the 10 wells described above. The minimum groundwater elevation at Vella Pit is constrained to 858.6, the set operating level of dewatering in the lowest excavation. Based on topographic maps and Google Earth, Massey Lake has a surface elevation of approximately 865 feet ASL. A wetland related to Flemming Creek in the southeast corner of the groundwater model area corresponds to a topographic depression of 838 – 830 feet ASL constraining groundwater elevations to no higher than this elevation in the upper aquifer. The assumed influence of the northern settling ponds at Vella Pit is represented in the deflection of contours: determining a relationship between the elevation of water in these ponds and water levels in the aquifer is part of the current investigation.

Attachment 5: Supporting Domestic Water Well Logs

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: i-09-01-301-002	**Permit No:** well2023-0337	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000035111

Elevation:

Latitude: 42.33531

Longitude: -83.67578

Method of Collection: GPS Std Positioning Svc SA Off

Distance and Direction from Road Intersection:
EAST OF EARHART RD. AND NORTH OF WARREN RD.

Well Owner: DALE AND MARGAUX MORI TUTTLE

Well Address:
4275 GRANDEUR OAKS LANE
ANN ARBOR, MI 48105

Owner Address:
4275 GRANDEUR OAKS LANE
ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 97.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/10/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 67.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 97.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/21/2023 **HP:** 1.00
Manufacturer: Grundfos **Pump Type:** Submersible
Model Number: 22SQE10-190 **Pump Capacity:** 20 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: FT-8 **Tank Capacity:** 2.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 55.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 65.00 ft. after 1.00 hrs. at 25 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	10.00	10.00
Clay Sandy	13.00	23.00
Sand & Gravel	74.00	97.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	20.00 ft.	77.00 ft. and 97.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 72.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	275 ft.	Southeast

Abandoned Well Plugged: No
Reason Not Plugged: Other

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Justin Banks, Dominic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,000# SAND PACK. RE-USED OWNER'S SUBMERSIBLE PUMP AND PRESSURE TANK FROM OLD WELL. OLD WELL NOT YET ABANDONED - OWNER WANTS TO KEEP IT IN RESERVE FOR NOW.

Other Remarks: Not Plugged Reason:SEE GENERAL REMARKS.

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-02-400-011	**Permit No:** WELL2023-0327	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035077

Elevation:

Latitude: 42.33431

Longitude: -83.68396

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
70 FT OFF OF EARHART RD, AND 500 FT N OF WARREN

Well Owner: KAY YOURIST & SUSAN MINARD

Well Address:	Owner Address:
4125 EARHART RD ANN ARBOR, MI 48105	4125 EARHART RD ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 95.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 8/3/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.00 in. to 85.00 ft. depth SDR: 21.00

Borehole: 8.75 in. to 97.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/4/2023 **HP:** 0.75
Manufacturer: F.E. Myers **Pump Type:** Submersible
Model Number: 2NFL 7212 **Pump Capacity:** 12 GPM
Drop Pipe Length: 80.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 69.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 95.00 ft. after 4.00 hrs. at 14 GPM

Formation Description	Thickness	Depth to Bottom
Brown Sand	22.00	22.00
Gray Clay	15.00	37.00
Rust Sand & Gravel	41.00	78.00
Gray Sand Water Bearing	17.00	95.00
Gray Clay	2.00	97.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 0.00 ft.
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
15.00	10.00 ft.	85.00 ft. and 95.00 ft.

Fittings: Coupling

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	6.00	None	0.00 ft. to 84.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	Southwest

Abandoned Well Plugged: No
Reason Not Plugged: Other

Geology Remarks:

Drilling Machine Operator Name: John Stepp
Employment: Employee
Pump Installer: Ed Wheeler

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2591
Business Name: Ann Arbor Well Drilling Inc
Business Address: PO Box 163, Dexter, MI, 48130

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Not Plugged Reason:Left well for when the gravel pit stops running.

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 2012 00525	County: Washtenaw	Township: Ann Arbor

Well ID: 81000019759

Elevation:
Latitude: 42.33835
Longitude: -83.68136
Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
4410 Earhart

Well Owner: Betty Gilliland

Well Address:	Owner Address:
4410 Earhart Rd Ann Arbor, MI 48105	4410 Earhart Rd Ann Arbor, MI 48105

Drilling Method: Rotary
Well Depth: 120.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/14/2012

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 105.00 ft. depth SDR: 21.00
0.00 in. to 105.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 115.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 8/30/2012 **HP:** 0.75
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 10FV07P4 **Pump Capacity:** 10 GPM
Drop Pipe Length: 105.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.00 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 200 **Tank Capacity:** 62.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 85.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 85.00 ft. after 2.00 hrs. at 12 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	22.00	22.00
Gray Clay	23.00	45.00
Sand	70.00	115.00
Gray Clay	5.00	120.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Telescoped

Slot	Length	Set Between
12.00	10.00 ft.	105.00 ft. and 115.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 105.00 ft.

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	150 ft.	Southwest

Abandoned Well Plugged: Yes

Latitude: 42.33835 **Longitude:** -83.68136
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 3.00 **Well Depth:** 92 ft.

Geology Remarks:

Drilling Machine Operator Name: Kurt Wing
Employment: Employee
Pump Installer: Tod Stevens

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Water Well Contractor's Certification

This well/pump was constructed under my supervision and I hereby certify that the work complies with Part 127 Act 368 PA 1978 and the well code.

Signature of Registered Contractor **Date**

General Remarks: 5 TAILPIPE 900# SAND PACK ABANDON OLD WELL 5 X 92 WITH 3-50# BAGS BENTONITE SLURRY, PUMP EQUIPMENT REMOVED, CASING CUT OFF BELOW GRADE

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810901300012	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 1	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004744

Elevation: 970 ft.
Latitude: 42.3387093214
Longitude: -83.6806529686
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2350' N OF WARREN RD., 800' E OF EARHART RD.

Well Owner: DIMCHOFF, DON

Well Address:	**Owner Address:**
4460 EARHART RD. ANN ARBOR, MI 48105	4460 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 124.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 9/8/1983

Casing Type: Unknown **Height:** 2.00 ft. above grade
Casing Joint: Unknown
Casing Fitting: None

Diameter: 5.00 in. to 124.00 ft. depth

Borehole:

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 85.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 85.00 ft. after 2.00 hrs. at 12 GPM

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Yellow Clay	12.00	12.00
Gray Clay	55.00	67.00
Sand	57.00	124.00

Screen Installed: Yes **Filter Packed:** Unknown
Screen Diameter: 4.00 in. **Blank:** 1.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
16.00	4.00 ft.	120.00 ft. and 124.00 ft.

Fittings: Unknown

Geology Remarks:

Wellhead Completion: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Unknown		

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1586
Business Name:
Business Address:

Abandoned Well Plugged: Unknown

Casing Removed:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: STILL IN SAND-BUT BOTTOMED OUT ON BOULDER. AA 8-83 S/W SCREEN MATERIAL AND CONTRACTOR TYPE MB 04/07/2022

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-301-003	**Permit No:** WELL2023-0255	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035072

Elevation:

Latitude: 42.336195

Longitude: -83.674699

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
LOT #3 - NORTH OF WARREN RD. AND EAST OF EARHART RD.

Well Owner: DAVID S. GONZALEZ & EMIKO MORI

Well Address:	Owner Address:
4429 GRANDEUR OAKS ANN ARBOR, MI 48105	4429 GRANDEUR OAKS ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 105.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/21/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 75.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 105.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 6/22/2023 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 75.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Diaphragm/bladder
Manufacturer: Well-Rite-Flexcon
Model Number: WR 260 **Tank Capacity:** 85.0 Gallons
Pressure Relief Valve Installed: Yes

Static Water Level: 45.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Test pump
Pumping level 105.00 ft. after 2.00 hrs. at 50 GPM

Formation Description	Thickness	Depth to Bottom
Brown Clay	15.00	15.00
Gravel	33.00	48.00
Boulders	2.00	50.00
Gravel	41.00	91.00
Clay	14.00	105.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:** 20.00 ft. Below
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
20.00	10.00 ft.	75.00 ft. and 85.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	8.00	None	0.00 ft. to 70.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	70 ft.	West

Drilling Machine Operator Name: Jerry Whaley
Employment: Employee
Pump Installer: Justin Banks, Dominic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000022524

Latitude: 42.336233 **Longitude:** -83.674712
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 4.00 **Well Depth:** 56 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 1,200# SAND PACK, 2 CENTRALIZERS AND A 20 FT. TAIL PIPE. RE-USED OWNERS PUMP AND PRESSURE TANK.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: I-09-01-300-021	**Permit No:** WELL2023-0215	**County:** Washtenaw		**Township:** Ann Arbor

Well ID: 81000035073

Elevation:

Latitude: 42.335199

Longitude: -83.682093

Method of Collection: GPS Std Positioning Svc SA Off

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	1	Active		

Distance and Direction from Road Intersection:
NORTH OF WARREN RD. AND SOUTH OF JOY RD.

Well Owner: JARED & DEANE RUNDELL

Well Address:	Owner Address:
4210 EARHART RD. ANN ARBOR, MI 48105	4210 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Rotary
Well Depth: 104.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/7/2023

Casing Type: PVC plastic **Height:** 1.00 ft. above grade
Casing Joint: Solvent welded/glued
Casing Fitting: None

Diameter: 5.68 in. to 96.00 ft. depth SDR: 21.00
0.00 in. to 0.00 ft. depth SDR: 0.00

Borehole: 9.00 in. to 104.00 ft. depth

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: 7/26/2023 **HP:** 1.50
Manufacturer: Franklin Electric **Pump Type:** Submersible
Model Number: 20FV15P4 **Pump Capacity:** 18 GPM
Drop Pipe Length: 98.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: 1.25 in. **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: Yes

Static Water Level: 75.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Air
Pumping level 95.00 ft. after 1.00 hrs. at 20 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	15.00	15.00
Gray Clay	35.00	50.00
Sand	23.00	73.00
Gray Clay	23.00	96.00
Gray Sand	8.00	104.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 5.00 in. **Blank:**
Screen Material Type: PVC-slotted
Screen Installation Type: Attached

Slot	Length	Set Between
12.00	8.00 ft.	96.00 ft. and 104.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	9.00	None	0.00 ft. to 91.00 ft.

Geology Remarks:

Wellhead Completion: Pitless adapter, 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	225 ft.	Northeast

Drilling Machine Operator Name: Travis Ostrowski
Employment: Employee
Pump Installer: Justin Banks, DomInic Hoffman

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-2014
Business Name: Cribley Drilling Company
Business Address: 8300 Dexter-Chelsea Rd, Dexter, MI, 48130

Abandoned Well Plugged: Yes
Drilling Record ID: 81000020559

Latitude: 42.335176 **Longitude:** -83.682099
Casing Diameter: 5 in. **Casing Removed:** No
Plugging Material: Bentonite slurry
No. of Bags: 6.00 **Well Depth:** 89 ft.

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: USED 700# SAND PACK AND 2 CENTRALIZERS. RE-USED OWNERS PRESSURE TANK - 62 GALLON SIZE. PUMPING EQUIPMENT REMOVED FROM ABANDONED WELL.

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Well ID: 81000004750

Elevation: 950 ft.
Latitude: 42.3389516441
Longitude: -83.6849880263
Method of Collection: Interpolation-Map

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	2	Active		

Distance and Direction from Road Intersection:
2450' N OF WARREN RD., 300' W OF EARHART RD.

Well Owner: MILLER, RICHARD

Well Address:
4485 EARHART RD.
ANN ARBOR, MI 48105

Owner Address:
WESTLAND, MI

Drilling Method: Cable Tool
Well Depth: 113.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 6/2/1978

Casing Type: Unknown **Height:** 0.00 ft. below grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 109.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:**
Manufacturer: Red Jacket **Pump Type:** Submersible
Model Number: **Pump Capacity:** 0 GPM
Drop Pipe Length: 84.00 ft. **Pump Voltage:**
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 66.00 ft.
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 66.00 ft. after 2.00 hrs. at 12 GPM

Unrestricted Flow Rate:

Formation Description	Thickness	Depth to Bottom
Clay	20.00	20.00
Sand & Gravel	65.00	85.00
Clay	2.00	87.00
Sand	26.00	113.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.75 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
30.00	4.00 ft.	109.00 ft. and 113.00 ft.

Fittings: Neoprene packer

Geology Remarks:

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-0524
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: BOTTOMED ON CLAY. AA1-78. SCREEN MATERIAL, CONTRACTOR TYPE, SOURCE 04/11/2022 MB

Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 810911100001	**Permit No:**	**County:** Washtenaw		**Township:** Ann Arbor
		Town/Range: 02S 06E	**Section:** 11	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 81000004825

Elevation: 905 ft.
Latitude: 42.329927
Longitude: -83.685919
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
400' S OF WARREN RD., 300' W OF EARHART RD.

Well Owner: KORZON, MARK

Well Address:	**Owner Address:**
3867 EARHART RD. ANN ARBOR, MI 48105	3867 EARHART RD. ANN ARBOR, MI 48105

Drilling Method: Cable Tool
Well Depth: 63.00 ft. **Well Use:** Household
Well Type: Replacement **Date Completed:** 7/6/1983

Casing Type: Unknown **Height:** 1.00 ft. above grade
Casing Joint: Threaded & coupled
Casing Fitting: Drive shoe

Diameter: 4.00 in. to 59.00 ft. depth
3.00 in. to 63.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 0.50
Manufacturer: A.Y. McDonald **Pump Type:** Submersible
Model Number: **Pump Capacity:** 10 GPM
Drop Pipe Length: 40.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 20.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 30.00 ft. after 1.00 hrs. at 15 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Sand	10.00	10.00
Yellow Clay	20.00	30.00
Gray Sand	5.00	35.00
Gray Clay	5.00	40.00
Gray Sand Fine	10.00	50.00
Gray Sand Medium	13.00	63.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 3.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: PVC-slotted
Screen Installation Type: Unknown

Slot	Length	Set Between
12.00	5.00 ft.	59.00 ft. and 63.00 ft.

Fittings: Neoprene packer

Well Grouted: No

Geology Remarks:

Wellhead Completion: Other, 12 inches above grade

Drilling Machine Operator Name:
Employment: Unknown

Nearest Source of Possible Contamination:

Type	Distance	Direction
Septic tank	100 ft.	East

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1692
Business Name:
Business Address:

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: WELL STATUS, SCREEN MATERIAL, HP, VOLTS, GPM, CONT. TYPE, SOURCE, 04/25/2022 MB

Other Remarks: Wellhead Completion:12 inch Above Grade

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No:	County: Washtenaw	Township: Ann Arbor

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
02S 06E	11	Active		

Well ID: 81000004829

Elevation: 929 ft.
Latitude: 42.328223
Longitude: -83.684493
Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
2200' S OF WARREN RD., 750' W EARHART RD.

Well Owner: DOMINO'S FARMS HOLDING

Well Address:	Owner Address:
3767 EARHART RD. ANN ARBOR, MI 48105	P.O. BOX 974 ANN ARBOR, MI 48106

Drilling Method: Rotary
Well Depth: 96.00 ft. **Well Use:** Unknown
Well Type: Replacement **Date Completed:** 7/2/1987

Casing Type: PVC plastic **Height:** 0.00 ft. below grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 5.00 in. to 84.00 ft. depth

Borehole:

Pump Installed: Yes **Pump Installation Only:** No
Pump Installation Date: **HP:** 5.00
Manufacturer: Aermotor **Pump Type:** Submersible
Model Number: 4ST-70-500 **Pump Capacity:** 64 GPM
Drop Pipe Length: 67.00 ft. **Pump Voltage:** 230
Drop Pipe Diameter: **Drilling Record ID:**
Draw Down Seal Used: No

Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 48.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Unknown
Pumping level 70.00 ft. after 2.00 hrs. at 80 GPM

Formation Description	Thickness	Depth to Bottom
Yellow Clay	16.00	16.00
Blue Clay Hard	51.00	67.00
Sand & Gravel Fine	29.00	96.00

Screen Installed: Yes **Filter Packed:** No
Screen Diameter: 4.00 in. **Blank:** 0.00 ft. Above
Screen Material Type: Stainless steel-wire wrapped
Screen Installation Type: Unknown

Slot	Length	Set Between
10.00	12.00 ft.	84.00 ft. and 96.00 ft.

Fittings: Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown

Grouting Material	Bags	Additives	Depth
Bentonite slurry	0.00	None	

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Abandoned Well Plugged: No
Reason Not Plugged: Unknown

Geology Remarks:

Drilling Machine Operator Name:
Employment: Unknown

Contractor Type: Water Well Drilling Contractor **Reg No:** 81-1760
Business Name:
Business Address:

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: SCREEN MATERIAL, STATUS, CONT. TYPE, MODEL #, HP, VOLTS, GPM, LONGITUDE/LATITUDE 04/25/2022 MB

Other Remarks:

APPENDIX K
Groundwater Model Development Report

HALEY ALDRICH

www.haleyaldrich.com

APPENDIX K

VELLA PIT GROUNDWATER MODEL DEVELOPMENT
4984 EARHART ROAD
ANN ARBOR TOWNSHIP, MICHIGAN

by
Haley & Aldrich of Michigan, Inc.
Ann Arbor, Michigan

for
Mid Michigan Materials, Inc.
Oxford, Michigan

File No. 0207666-004
September 2024

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1. Groundwater Flow Model Development

Haley & Aldrich of Michigan, Inc. (Haley & Aldrich) developed a groundwater flow model to evaluate estimated groundwater changes in support of the updated Hydrogeological Investigation Report for the Inland Lakes and Streams Permit at the Mid Michigan Materials, Inc. (MMM) Vella Pit in Ann Arbor Township, Michigan (herein referred to as Site, Pit or Mine). The remaining text in Section describes the model construction (Section 1.1 through Section 1.4) and calibration (Section 1.5). Section 2 describes model simulations performed consistent with the *DRAFT WRD Hydrogeologic Investigation Completeness Checklist and Guidance* dated December 2023 (December 2023 Draft Guidance) provided by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Water Resources Division (WRD), Water Resources Unit (WRU), and additional input provided by EGLE permitting and WRD staff during teleconference meetings on 10 January 2024, 24 January 2024, 14 August 2024, and 19 August 2024.

The numerical model MODFLOW-2005 (MODFLOW; Harbaugh, 2005) was selected for the modeling effort and is an industry-standard three-dimensional, finite difference groundwater flow model developed by the United States Geological Survey (USGS). MODFLOW is capable of simulating the groundwater conditions under various scenarios including pumping and changes to infiltration over time. While numerical modeling is a well-established and effective tool for evaluating hydrogeology and simulating estimated future conditions, the level of accuracy is directly dependent on the data available to construct the model. Model results should not be construed by the user as a definitive predictor of the future.

Based on the teleconference meetings with EGLE referenced above, Haley & Aldrich understands that because the Site has relatively complex geology that is not conducive to an analytical hydrogeology evaluation, numerical modeling is EGLE's preferred approach to evaluation of Site hydrogeology, including Item 9 of the December 2023 Draft Guidance:

> *Groundwater Elevation Change Predictions – Groundwater change estimates should be provided for all resources (wetland, lake, stream, or well) within 1,000 feet of the lake boundary by evaluating all three phases listed below:*
>
> > *a. Early Excavation – effects resulting from groundwater seepage/material removal into/from the pit.*
> >
> > *b. Late Excavation – effects resulting from local hydraulic gradient flattening, groundwater seepage/material removal, and increased evaporation during final year of excavation.*
> >
> > *c. Long-Term – effects resulting from the local hydraulic gradient flattening and increased evaporation resulting from creation of the newly formed lake.*

The model was calibrated using three stress periods: 1) an initial steady-state stress period simulating pre-dewatering conditions; 2) a transient stress period simulating dewatering conditions; and 3) a transient stress period simulating conditions from the dewatering pump shutoff to present. The calibrated model was then used to simulate future conditions in four phases as described in Section 2.

1.1 MODEL DOMAIN

The model domain was established to encompass the Site and surrounding properties where potential effects of past dewatering have been evaluated, and to evaluate potential future effects on resources within 1,000 feet of the Site as described in the December 2023 Draft Guidance.

MODFLOW uses a rectangular grid within the domain and allows for establishing irregular groundwater flow boundary conditions that represent actual and Site-specific features in the study area. The setup is facilitated by assigning boundary types and values to specific grid cells. Figure 1 depicts the model domain boundary.

Figure 2 depicts the model domain with the grid spacing selected for the model. The three-dimensional finite difference groundwater flow model domain covers an approximate length of 21,200 feet (ft) in the x-direction (west to east), 19,080 ft in the y-direction (north to south), and approximately 300 ft in the z-direction (vertical). The model consists of 381 rows, 423 columns, and 3 layers for a total of 483,489 cells covering an approximate area of 9,286 acres. In MODFLOW, the groundwater-flow system is subdivided laterally and vertically into rectilinear blocks called cells. The hydraulic properties of the material in each cell are assigned and assumed to be uniform within each cell. The row and column dimension of each cell is uniform across the model domain.

1.2 MODEL GEOLOGY

The process used to evaluate geology within the model domain and construct geologic units within the model is summarized below. Attachment A shows excerpts of the data visualization used to evaluate and construct these geologic units. A digital elevation model (DEM) was obtained from the USGS National Map website to establish the surface topography of the model domain.

To build the model geology and geometry of layers within the model domain, Haley & Aldrich reviewed lithologic descriptions contained in 587 publicly available EGLE Wellogic logs generated by water well drillers during installation of residential water wells, and geologic boring logs and cross sections generated during investigations at the Site. 72 well logs were removed from the data set, due to incomplete or absent geologic information, or geologic descriptions determined to be outliers relative to surrounding wells and/or grossly oversimplified based on the level of detail available in nearby wells. Figure 1 in Attachment A shows a plan view of the off-Site water wells and on-Site monitoring wells and test borings used in this evaluation.

Geologic descriptions in the remaining were catalogued and grouped based into the following approximate Unified Soil Classification System classifications: Silt & Clay, Sand, Silty/Clayey Sand, Gravel, Silty/Clayey Gravel, and Rock. Using these description groups, a pre-geology file was created for all screened wells within the model domain, which was visualized in CTECH Earth Visualization Studio (EVS) software (see Figure 2 in Attachment A). Next, a Haley & Aldrich hydrogeologist grouped these geologic descriptions into Upper Aquifer, Till 1, Till 2, and Lower Aquifer (see Figure 3 in Attachment A). This interpretation of hydrogeologic units was based on projected and expected elevations of these units in neighboring wells beginning from on-Site borings and wells confirmed to have been screened within the Upper Aquifer and moving outward, geologic interpretation of regional trends and local geologic materials, and regional geologic maps and references, such as regional geology maps (Fleck,

1980), United States Department of Agriculture soil coverage maps (Natural resources Conservation Service), and quaternary geology maps (EGLE). Aquifer interpretations were continually reviewed and adjusted to provide continuity across the model domain with conceptual site model geology. A three-dimensional visual model of the aquifer and till geologic strata geometry was created in EVS using this data (see Figure 4 in Attachment A) and was then exported to MODFLOW layer geometry.

The Site was divided into three vertical hydrogeologic units[1] to represent the overburden soils observed in the model domain. A summary of each stratigraphic unit is as follows:

- Clay, Silt, and Silty Clay (Upper Till) – The Upper Till is continuous across the model domain, except at the Site where these materials have been removed during mining and in limited areas northwest of the Site where water well logs indicate sand and gravel at the surface. Where the Upper Till is present, it ranges in thickness from approximately 20 to 40 ft in the area near the Site up to approximately 160 ft in the area north of the Site. These soils are most likely clay till based on their heterolithic characteristics, which is consistent with regional quaternary geologic mapping.
- Sand or Sand and Gravel (Upper Aquifer) – The thickness of sand or sand/gravel beneath the till ranges from approximately 50 to 100 ft in the vicinity of the Site. The Upper Aquifer thickness is more variable in the rest of the model domain, with thicknesses ranging from less than 10 ft to approximately 100 ft. The sand and gravel unit appears to be a regional lens of coarse glacial outwash. This unit is interpreted to be continuous throughout the model domain. However, lower conductivity zones identified during model calibration (see Section 1.4) indicate flow is limited in some areas, particularly northwest of the Site. These areas are consistent with moraines and other till features identified in quaternary geology mapping.
- Clay, Silt, and Silty Clay (Lower Till) – The Lower Till is continuous across the model domain and was observed at thicknesses ranging from approximately 100 ft to greater than 200 ft. These soils are most likely lacustrine clay based on their homogeneous characteristics.

To account for vertical and horizontal heterogeneities within model layers, aquifer hydraulic conductivity was allowed to vary laterally within the model domain during calibration (see Section 1.4). For example, this accommodated differences between locations where the Upper Aquifer consists of poorly-graded sand (i.e., higher hydraulic conductivity), and locations where the Upper Aquifer sand and gravel materials are interbedded with thinner discontinuous lenses of silt or clay (i.e., lower hydraulic conductivity).

Elevations used in the model were determined from surveyed measurements where available. The DEM for the area was used to determine elevations where surveyed measurements were not available. Layer thicknesses were determined through the review of the above-mentioned Site geology. Figures 5 through 7 in Attachment A show an EVS visualization of the interpolated thicknesses of the Upper Till, Upper Aquifer, and Lower Till, respectively.

[1] The Lower Aquifer was not included as a model layer because the geologic logs reviewed for the model domain indicated that the Lower Till unit is consistently present as a thick (100 to 200+ foot) aquitard separating these aquifer materials, and the mining activity is in the Upper Aquifer materials.

1.3 BOUNDARY CONDITIONS

Boundary conditions define the locations and manner in which water enters and exits the active model domain. The conceptual model for the groundwater system that forms the basis for the model boundary conditions is as follows:

1. During dewatering, the main mining pit (Pond 3) is the major groundwater discharge feature and creates radial flow onto the Site,
2. Massey Lake and nearby tributaries are gaining, and;
3. Recharge was assigned to the model domain.

The specified boundaries of the model generally defined the driving forces for groundwater flow. To recreate observed groundwater heads, four MODFLOW boundary packages were used: the River Package, Drain Package, Well Package, and Recharge Package. The locations of river boundary conditions and the mining pit in Layer 1 and Layer 2 of the model are illustrated in Figure 3A and 3B, respectively.

1.3.1 River Boundaries

River boundaries in MODFLOW are a special form of the head-dependent boundary condition. In a head-dependent boundary, the model computes the difference in head between the boundary and the model cell to calculate the amount of water flowing into or out of the model through the boundary. The river boundary condition is active in Layer 1 and Layer 2 with head in the river being 865 to 875 ft in the eastern part of the model domain, and from 917 to 936 ft in the western part of domain, where this boundary condition was added to model a reach between two ponds that are connected. This reach was added as a river boundary to improve model calibration in this area of the domain. The surface water elevations of the river boundaries as well as the riverbed conductance were varied as part of model calibration. Model calibration indicated a western river boundary hydraulic conductance of 19 square feet per day (ft^2/day) and an eastern river boundary hydraulic conductance varying from 1 to 50 ft^2/day.

1.3.2 Drain Boundaries

To simulate dewatering of the Mine, the drain package was utilized. The elevation of the drain was set to 858 ft to simulate the elevation maintained during dewatering and active mining. To simulate dewatering, a transient stress period was added with the drain instantly set to 858.6 ft, simulating a rapid lowering of the water level, beginning on 1 March 2022 and extending until the cessation of dewatering on 10 October 2023. A subsequent transient stress period simulated raising the drain elevation over time, mimicking the observed elevations in the pond measured between 10 October 2023 and 22 July 2024.

Drain boundaries were set for ponds and creeks other than those where river boundaries were used. A drain boundary was also established to simulate the wetlands in the northern portion of the Site. The elevation of these drain boundaries was set to the surface elevation as indicated by the DEM.

1.3.3 Well Boundaries

The model calibration described in subsequent sections indicated that observed water elevations at the 2797 Trailwood Lane property were not achieved in the model without pumping from additional off-Site

wells located closer to that property. Haley & Aldrich reviewed the Wellogic database for nearby wells that are likely to have a higher extraction rate than a single homeowner residential well. These were identified at a greenhouse property west of this location (3825 Nixon Road) and at a residential subdivision northwest of this location (Westbrooke Circle), where the database shows 43 separate wells clustered in the subdivision.

Model calibration indicated withdrawal rates from these wells of 30,000 and 49,000 gallons per day[2], respectively. These wells were assumed to be active during the scenarios of pit expansion.

Based on input from EGLE WRD staff during the 19 August 2024 teleconference, two wells (one withdrawal and one injection well) were added at the Site to simulate the limited pumping from Pond 3 for use in the wash plant, and recirculation of that water from the wash plant back into the aquifer. These wells are active during transient stress periods after the initial dewatering stress period. The wells are 200 ft apart and the rate of withdrawal and injection is assumed to be 2 million gallons per day (mgd). This is an upper limit of current pumping from Pond 3 and is likely a conservative (i.e., high) estimate of withdrawal for the wash plant.

1.3.4 Recharge Boundaries

The recharge term within MODFLOW accounts for precipitation and evaporation as well as other potential losses of water prior to recharging into the aquifer system. This term was then calibrated to replicate the observed water levels in water wells. An initial set of recharge zones was established based on topography, thickness of till across the domain, and the pattern of groundwater flow. These zones were then subdivided further during the calibration of the groundwater flow model described in Section 1.5 below.

- Recharge rates were calibrated for 34 zones across the model domain. The range of recharge outside of the Site was 0.05 inches per year to 23.40 inches per year. A higher recharge value of up to 200 inches per year was set at the Site where surface till had been removed and the Upper Aquifer is exposed. Figures 4A and 4B show calibrated recharge values used for steady-state and transient stress periods. Refinement of the recharge around the mine area was updated to simulate the rebound conditions observed following dewatering.

1.4 HYDRAULIC MODEL PROPERTIES

Hydraulic properties were initially assigned consistent with literature regarding soils in the area (Heath, 1983). These parameters were iteratively varied during model calibration to achieve the best fit to observed hydraulic patterns including head elevations, hydraulic gradients, and flow directions.

Hydraulic property zones were initially established based on the model geology review and were further subdivided during model calibration using Thiessen polygons generated from calibration targets. The model was calibrated using three stress periods: an initial steady-state stress period simulating pre-dewatering conditions, a transient stress period simulating dewatering conditions, and a transient stress period simulating conditions from the dewatering pump shutoff to present.

[2] The actual contribution of each of these sets of wells may vary (i.e., higher withdrawal at the greenhouse property and lower withdrawal at the subdivision, with the potential for additional influence from other wells nearby). The model calibration indicates the cumulative effect of nearby wells without identifying exact rates at each well.

1.4.1 Calibrated Horizontal and Vertical Hydraulic Conductivity

The calibrated hydraulic conductivity values used in the model varied across 75 zones and ranged from 0.007044 feet per day (ft/day) to 200 ft/day. The highest value was set at Pond 3 on the Site. Calibrated hydraulic conductivity values are shown in plan view by model layer in Figures 5A through 5C. Vertical hydraulic conductivity values were estimated at $1/10^{th}$ of the horizontal hydraulic conductivity values, ranging from 0.0007 ft/day to 20 ft/day.

1.4.2 Porosity, Storage, and Yield

Effective porosity values were set to be 0.3, consistent with published values for the type of material present at the Site (Heath, 1983). This value does not affect model calibration. For areas that are generally sandy, a specific storage of 0.0001 ft^{-1} and specific yield of 0.05 were utilized. Areas that are generally composed of silt and clay material were assigned a specific storage of 0.00001 ft^{-1} and specific yield of 0.01. These values were then varied as part of the calibration process to match observed responses to dewatering and recovery. Figures 6A and 6B show storage zones used for calibration. The calibrated specific storage, specific yield, and porosity values for each zone in Layer 1 and Layer 2 are shown in Tables 1A and 1B, respectively.

1.5 METHODS OF EVALUATING MODEL CALIBRATION QUALITY

Model calibration is the process of refining the model representation of the hydrogeologic framework, hydraulic properties, and boundary conditions to minimize the difference between the simulated heads and fluxes to the measured data. Construction of a complex model with more parameters than the data support may reduce the residuals (difference between measured and simulated values) but does not ensure a more accurate model. Therefore, calibrated model parameters also need to be checked for their validity. Throughout the calibration process, no adjustments were made that conflicted with the general understanding of the groundwater system and previously documented information.

The iterative calibration process of “trial and error” was used for model calibration. It involves making changes to the input values, running MODFLOW, and assessing the impact of the changes. Beside the trial and error approach, a model independent parameter optimization software tool – PEST was used to adjust selected input values to further improve model calibration (Doherty, 2016).

The quality of model fit can be assessed from many statistical and graphical methods. One method is based on the difference between simulated and observed heads and flows, or residuals. The overall magnitude of the residuals is considered, but the distribution of those residuals, both statistically and spatially, can be equally important. The magnitude of residuals can initially point to gross errors in the model, the data (measured quantity), or how the measured quantity is simulated (Hill, 2000). A useful graphical analysis is a simple scatter plot of simulated values as a function of observed values.

For the flow calibration, the statistics of the mean error (ME), mean absolute error (MAE), and the root mean square (RMS) error were used to assess the calibration quality. They are defined as follows:

$$ME = \frac{\sum_{i=1}^{n}(O_i - C_i)}{n}$$

$$MAE = \frac{\sum_{i=1}^{n}|O_i - C_i|}{n}$$

$$RMS = \frac{\sum_{i=1}^{n}(O_i - C_i)^2}{n}$$

Where:
Oi = Observed head at observation point i
Ci = Calculated head at observation point i
n = Number of observation points

The ME is the average of the differences between the observed and calculated heads (or residuals) and can indicate the overall comparison between computed and observed data. Negative and positive residuals can cancel each other out, resulting in a ME close to zero even when the calibration is not good. The sign of the ME is an indication of the overall comparison of the model to the data (e.g., a positive ME indicates the model is generally computing heads that are too high).

The MAE is the average of the absolute values of the residuals. The absolute value prevents positive and negative residuals from canceling each other, providing a clearer picture of the magnitude of errors across the model, without an indication of the direction (high or low) of the errors.

The RMS error is the square root of the average of the squares of the residuals. The RMS adds additional weight to points where the residual is greatest. If the residuals at all points are very similar, the RMS will be close to the MAE. Alternatively, a few points with high errors can add significantly to the RMS for an otherwise well calibrated model. For all three of these criteria the optimal value is zero.

The numerical goals for the groundwater flow model calibration are to 1) minimize the ME and MAE, and 2) achieve the ratio of the RMS error of the head residuals to the range of observed heads (i.e., normalized RMS error) to be within approximately 10 percent (%) (Anderson, M.P., Woessner, W.W., 1992). Local hydraulic heterogeneity may result in significant localized water level variations which can only be accurately modeled through more complicated assumptions of hydraulic property fields. The goal of this calibration effort is to adequately capture the observed flow field without complex assumptions for hydraulic conductivity distribution.

An initial (pre-dewatering) steady-state stress period was used for initial calibration of model hydraulic properties. Because Site-specific observations were not available from the period prior to dewatering, this calibration used static water elevations available from Wellogic water well logs in the model domain. Because the installation dates of water wells in the region span decades, a subset of static water levels was used from wells drilled in the period from 2015 to 2018. This period was selected because it is relatively recent but also occurred prior to the start of Mine dewatering. Where there were spatial gaps in the model domain in observations during this period, additional wells drilled outside of that time period were used for model calibration after confirming that observations in those wells were

consistent with observations from the surrounding area. The observed heads that were used for model calibration are shown in Table 2.

Evaluation of the calibration results indicates that the numerical calibration goals have been achieved. The ME in head was 0.70 ft. The absolute residual mean is +2.81 ft. The RMS error for the calibrated model was +3.67 ft, and the normalized RMS error was 0.034. This degree of model calibration is considered adequate for the model simulations because the observed flow field has been reproduced. Presented on the following page is the scatter plot of the observed versus simulated heads, which generally fall along the theoretical slope of 1 to 1.

Observed versus computed target values is shown in the below Figure 7.

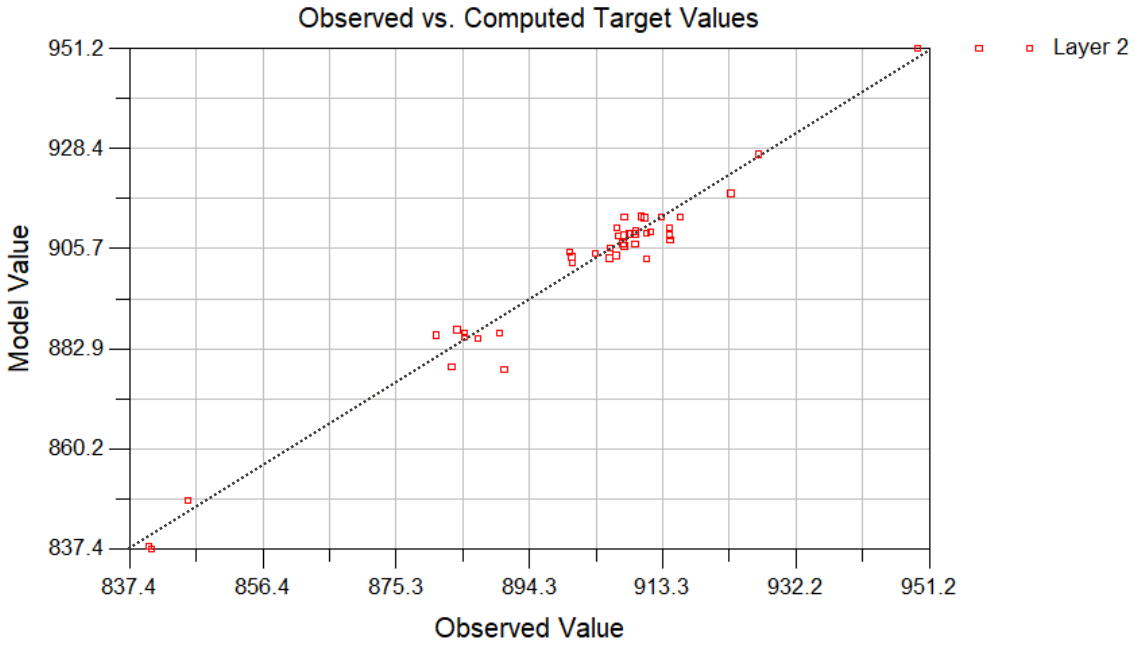

Figure 7: Calibration scatter plot. Values represent steady-state targets.

The calibration assessment has met the acceptable calibration goals, and therefore, the steady state portion of the groundwater flow model is considered to be usable for the development of the simulations described in Section 2.

To calibrate the model to transient conditions simulating the dewatering and subsequent recovery of the aquifer system, observations collected during the post-dewatering period were qualitatively compared to modeled values. This process required the variance of input parameters such as specific storage, hydraulic conductivity, and recharge to create similar elevations and recovery curve shapes as observed in Site monitoring wells and off-site residential water wells. The pond elevation was varied as described in Section 1.3.2.

Graphs showing observed and modeled data for transient stress period target calibration points are included as Attachment B.
As discussed in Section 1.3.3, model calibration indicated that pumping at the mine itself was not sufficient to explain observed water decreases at the off-Site water well at 2797 Trailwood Lane.

Sensitivity testing during model calibration indicated that varying other hydraulic properties of the model, such as storage, would not reproduce observations at this location without causing deterioration in the calibration at other observation points. The best fit to observed conditions was produced by simulating pumping from wells identified in Wellogic at a greenhouse property west of this location (3825 Nixon Road) and at a residential subdivision northwest of this location (Westbrooke Circle), where the Wellogic database shows 43 separate wells.

This finding is illustrated in the first calibration graph in Attachment B, which compares modeled groundwater elevations with and without nearby pumping to observed groundwater elevations at 2797 Trailwood Lane.

2. Model Simulations

To evaluate the groundwater elevation change predictions required by EGLE's December 2023 Draft Guidance, the model was used to simulate conditions during current and future phases of mining and conditions subsequent to final Site reclamation, using the conceptual reclamation plan of a large pond.

These periods were split into the following phases based on the mining plan indicated by MMM, each of which was simulated over a five-year period:

- Phase 1: Current mining activities and pond extent
- Phase 2: Mine expansion to the west
- Phase 3: Mine expansion to the north
- Phase 4: Final conceptual reclamation conditions and pond extent

Based on input from EGLE WRD staff during the 19 August 2024 teleconference, expansion of the excavation area was simulated by increasing the hydraulic conductivity to 1,000 ft/day and setting the specific storage to 1. These values simulate an open pond under the planned dredging activities. To simulate the extraction and return water into the pond, the wells described in Section 1.3.3 were added to the model. To show progression through each phase of the mine operation, the head values from the previous phase were used as the initial head values for the next transient stress period.

Phase 4 simulated post-mining reclamation conditions, with the final planned pond extent. The wells used to simulate pumping to and return from the wash plant were turned off for this final stress period. For the simulated final pond extent, recharge was set to the average precipitation for the area (32 inches per year as per worldclimate.com). To simulate evaporation during the final reclamation period, the evapotranspiration package was utilized at a rate of 31.5 inches per year. This value was referenced in Evaporation Atlas for the Contiguous 48 United States (National Oceanic and Atmospheric Administration, 1982).

While this approach to simulating final conditions is consistent with input from EGLE during the 19 August 2024 teleconference, it is likely to be a conservative in that it will underestimate recharge to the aquifer during the simulated final reclamation period. Precipitation and evaporation are assumed to be uniform throughout the year, whereas in reality both will vary seasonally, with high precipitation periods (e.g., early spring) often occurring separately from high evaporation periods (e.g., late summer). This approach also omits recharge that would occur from surface water runoff into the pond. It also omits the increase in recharge that would occur as a result of Upper Till layer removal over the expanded mining extent. The model calibration results discussed above indicate that this removal of the Upper Till has created high recharge conditions (approximately 200 inches per year) within the current extent of excavation. This high recharge value was conservatively not used in the expanded pond extent (Phase 2 through 4) because it could not be calibrated and compared with observations, as the high modeled recharge in the current excavation extent was.

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TABLES

TABLE 1A
LAYER 1 Ss, Sy, AND POROSITY MODEL ZONE VALUES
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

Zone	Ss (ft^{-1})	Sy	Porosity
1	0.0001	0.2	0.3
19	0.0001	0.2	0.3
20	0.0001	0.2	0.3
21	0.0001	0.2	0.3
22	0.0001	0.2	0.3
23	0.0001	0.2	0.3
24	0.0001	0.2	0.3
25	0.0001	0.001	0.3
26	0.0001	0.2	0.3
27	0.0001	0.2	0.3
28	0.0001	0.2	0.3
29	0.0001	0.0001	0.3
30	0.0001	0.030328	0.3
31	0.0001	0.2	0.3
32	0.0001	0.02	0.3
33	0.0001	0.025728	0.3

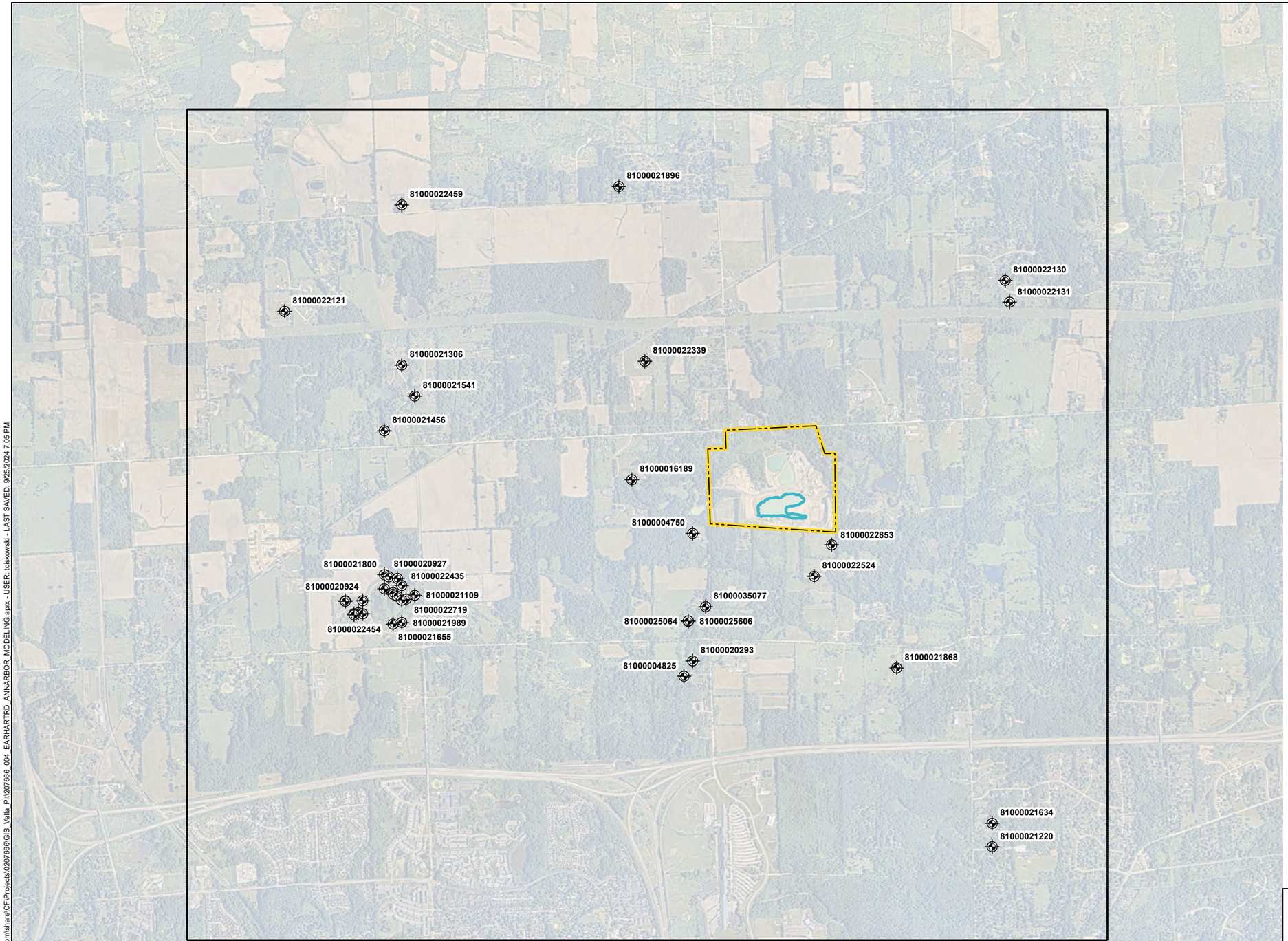
TABLE 1B
LAYER 2 Ss, Sy, AND POROSITY MODEL ZONE
MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

Zone	Ss (ft^{-1})	Sy	Porosity
4	0.00005	0.01	0.3
5	0.00005	0.01	0.3
6	0.00005	0.01	0.3
7	0.00005	0.01	0.3
8	0.00005	0.01	0.3
9	0.00005	0.01	0.3
10	0.00005	0.01	0.3
11	0.00005	0.01	0.3
12	0.00005	0.01	0.3
13	0.00005	0.01	0.3
14	0.00005	0.01	0.3
15	0.00005	0.01	0.3
16	0.00005	0.01	0.3
17	0.00005	0.01	0.3
18	0.00005	0.05	0.3
34	0.033152	0.002	0.3
35	0.000091	0.002	0.3
36	0.00005	0.002	0.3

TABLE 2
STEADY STATE MODEL GROUNDWATER HEAD VALUES MID MICHIGAN MATERIALS - VELLA PIT
ANN ARBOR TOWNSHIP, MICHIGAN

Well ID	X	Y	Head	Year
81000021896	13305900	314469	949.559	2016
81000022459	13300900	314052	910.244	2017
81000022130	13314800	312307	900.307	2015
81000022131	13314900	311804	900.369	2015
81000022121	13298200	311595	913.052	2017
81000022339	13306500	310447	926.922	2017
81000021306	13300900	310360	907.801	2015
81000021541	13301200	309647	915.732	2016
81000021456	13300500	308847	910.675	2015
81000022853	13310800	306225	883.25	2018
81000021800	13300500	305527	911.566	2016
81000022524	13310400	305501	890.734	2018
81000020927	13300600	305485	914.202	2015
81000020928	13300800	305442	914.308	2015
81000022435	13300900	305284	907.78	2017
81000020931	13300500	305207	906.965	2015
81000021526	13300700	305120	907.603	2016
81000020930	13300700	305088	909.294	2015
81000021109	13301200	305059	910.936	2015
81000020929	13300800	305038	905.782	2015
81000022719	13301000	304970	906.604	2018
81000022720	13300900	304951	903.621	2018
81000020926	13300000	304936	909.437	2015
81000020924	13299600	304933	914.207	2015
81000022396	13299600	304920	906.695	2017
81000022027	13299900	304663	908.462	2017
81000020922	13299800	304636	910.975	2015
81000022009	13300000	304635	907.825	2017
81000022454	13299800	304603	909.374	2015
81000021989	13300900	304433	905.697	2017
81000021655	13300700	304399	900.054	2016
81000021868	13312300	303389	845.712	2016
81000021634	13314500	299804	840.118	2016
81000021220	13314500	299266	840.507	2015
81000016189	13306200	307721	923	2005
81000004750	13307600	306481	884	1978
81000035077	13307900	304792	881	2023
81000025064	13307500	304457	890	1996
81000025606	13307500	304469	885	1992
81000020293	13307600	303550	887	2013
81000004825	13307400	303190	885	1983

FIGURES



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

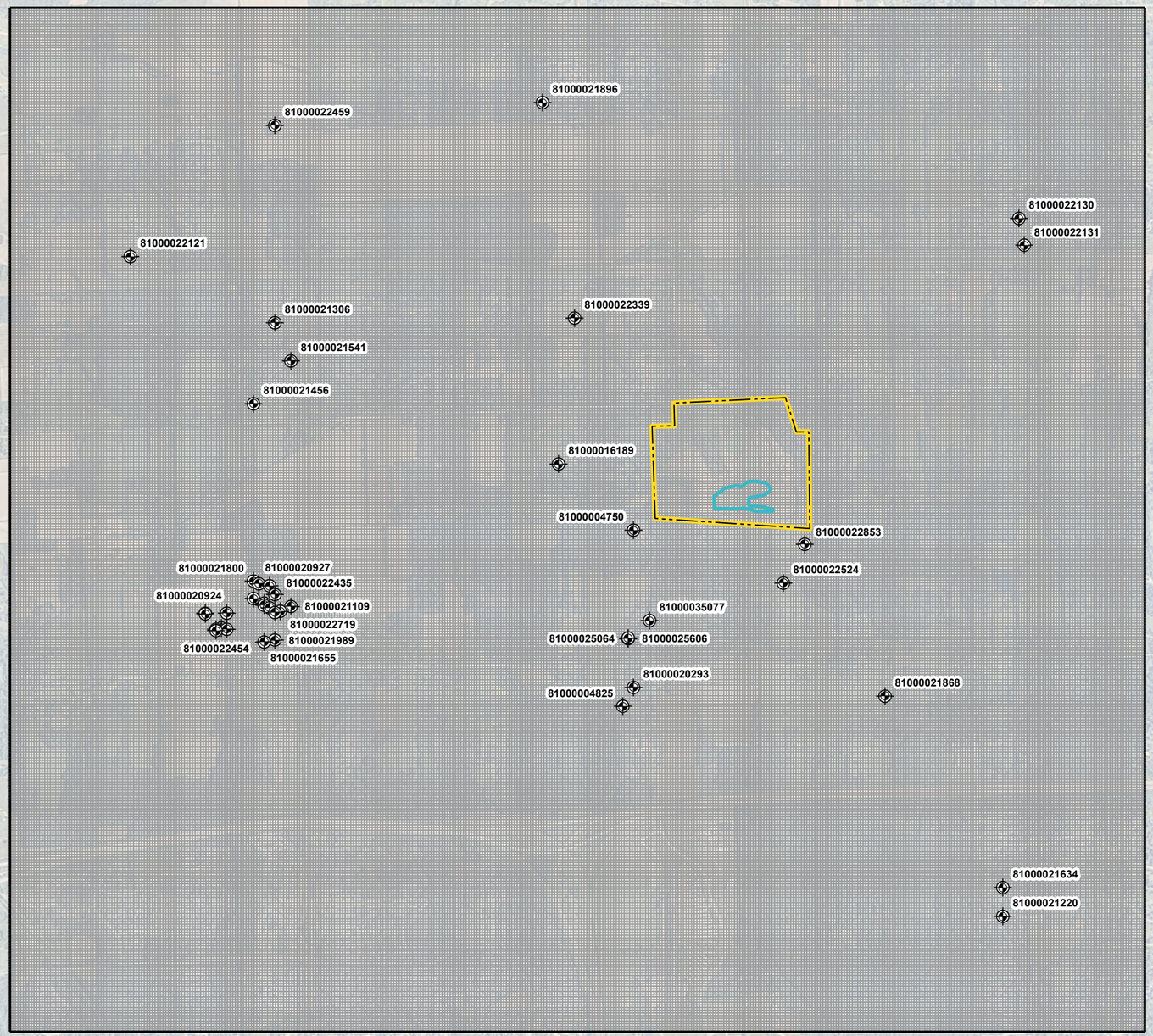
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

MODEL DOMAIN

SEPTEMBER 2024

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- MODEL GRID
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

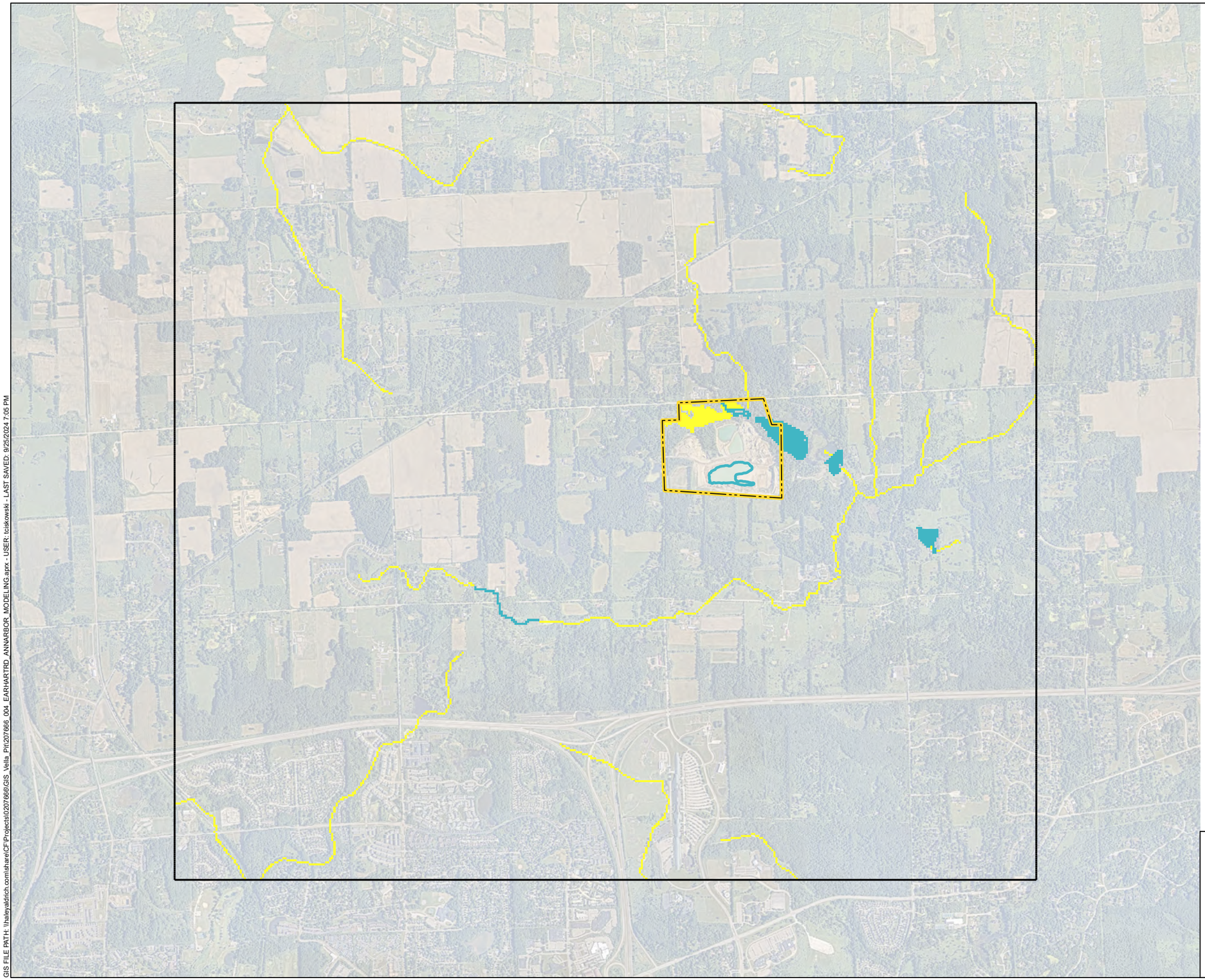
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

MODEL GRID

SEPTEMBER 2024

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- POND 3 BOUNDARY
- MODEL DOMAIN
- RIVER LOCATION
- DRAIN LOCATION
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

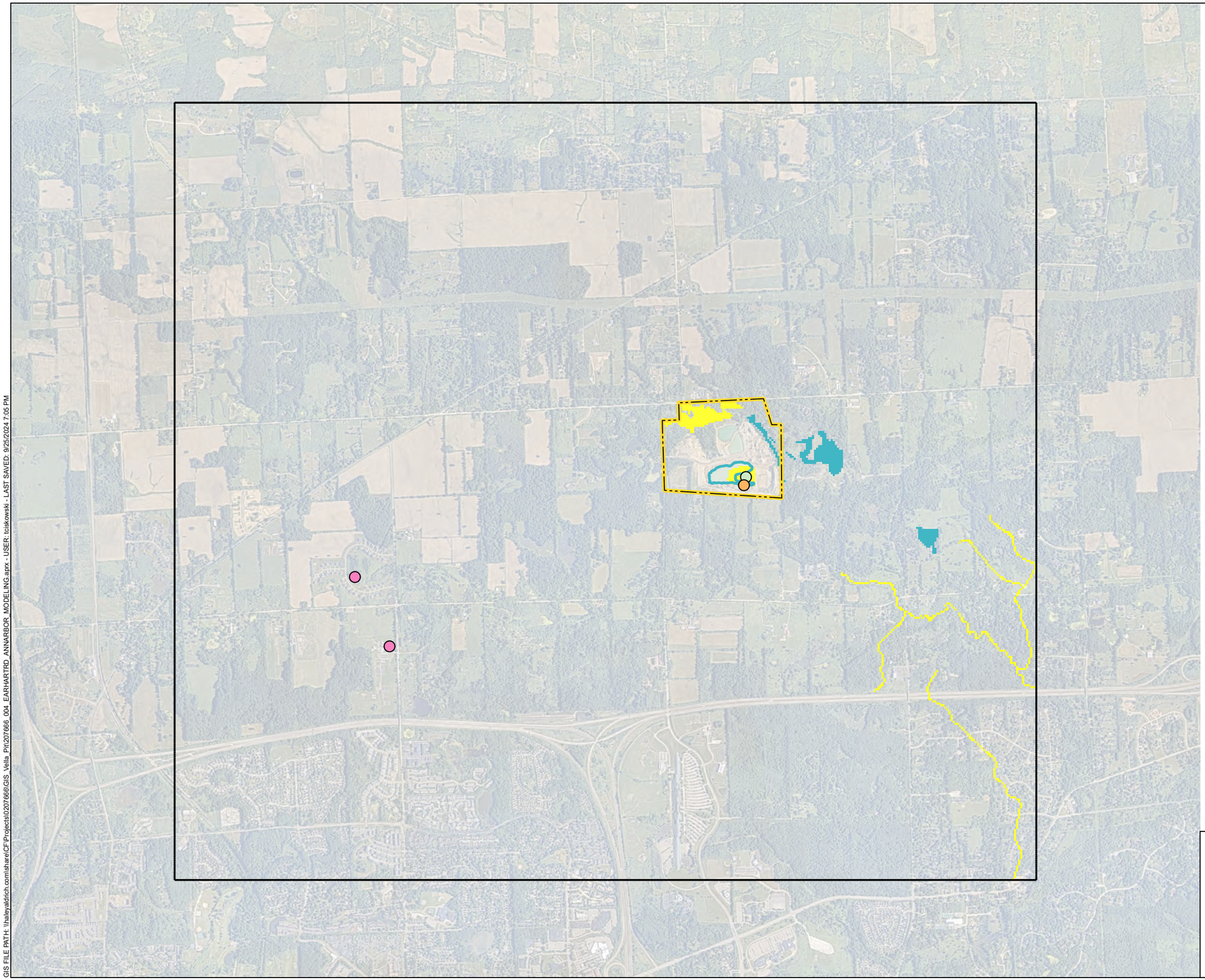
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

LAYER 1
BOUNDARY CONDITIONS

SEPTEMBER 2024

FIGURE 3A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- RETURN WATER WELL
- SCENARIO EXTRACTION WELL
- SIMULATED EXTRACTION WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- RIVER LOCATION
- DRAIN LOCATION
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

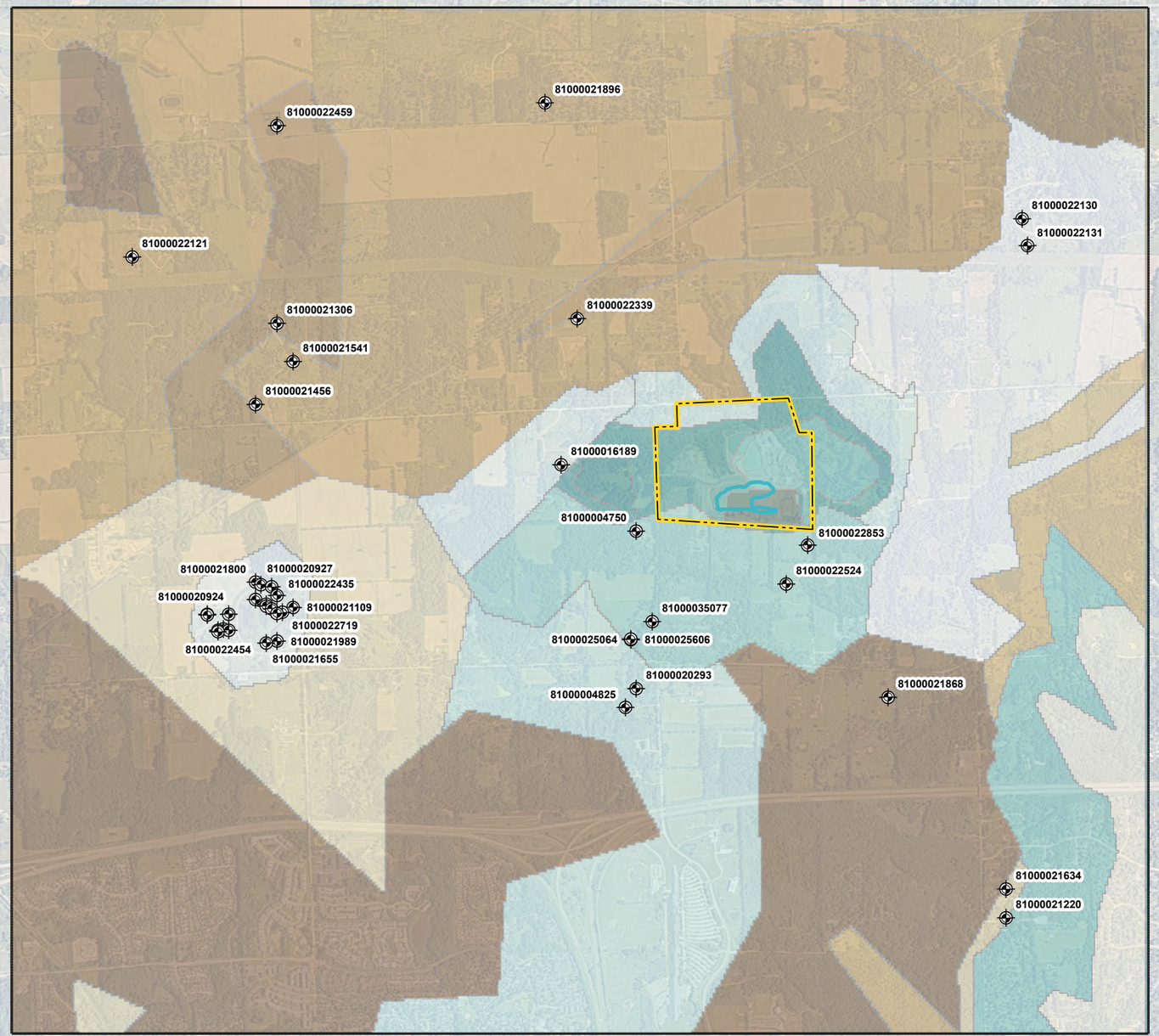
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

LAYER 2
BOUNDARY CONDITIONS

SEPTEMBER 2024

FIGURE 3B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: teiskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

RECHARGE IN FEET PER DAY

- 0.000011
- 0.000023
- 0.000025
- 0.000031
- 0.000035
- 0.000037
- 0.000039
- 0.000048
- 0.000062
- 0.000114
- 0.000246
- 0.000267
- 0.000339
- 0.0004
- 0.0008
- 0.001026
- 0.001598
- 0.001671
- 0.002759
- 0.0032
- 0.003425
- 0.045662

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

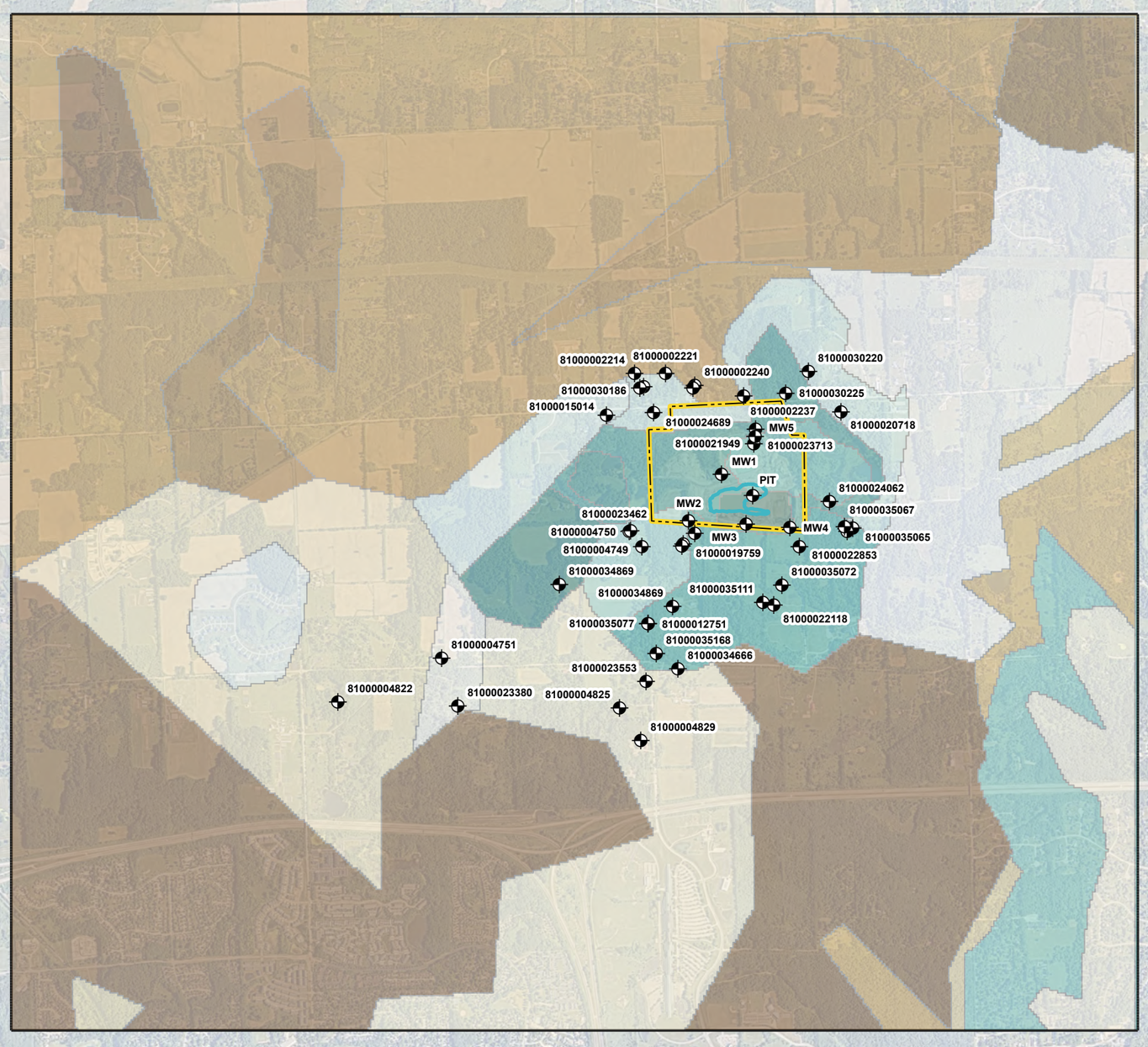
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

STEADY STATE RECHARGE

SEPTEMBER 2024

FIGURE 4A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- TRANSIENT TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

RECHARGE IN FEET PER DAY

- 0.000011
- 0.000023
- 0.000025
- 0.000031
- 0.000035
- 0.000037
- 0.000039
- 0.000048
- 0.000062
- 0.000114
- 0.000142
- 0.000226
- 0.000246
- 0.00025
- 0.000267
- 0.000339
- 0.0004
- 0.0008
- 0.00114
- 0.001671
- 0.002759
- 0.003196
- 0.0032
- 0.003425
- 0.004687
- 0.04566

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

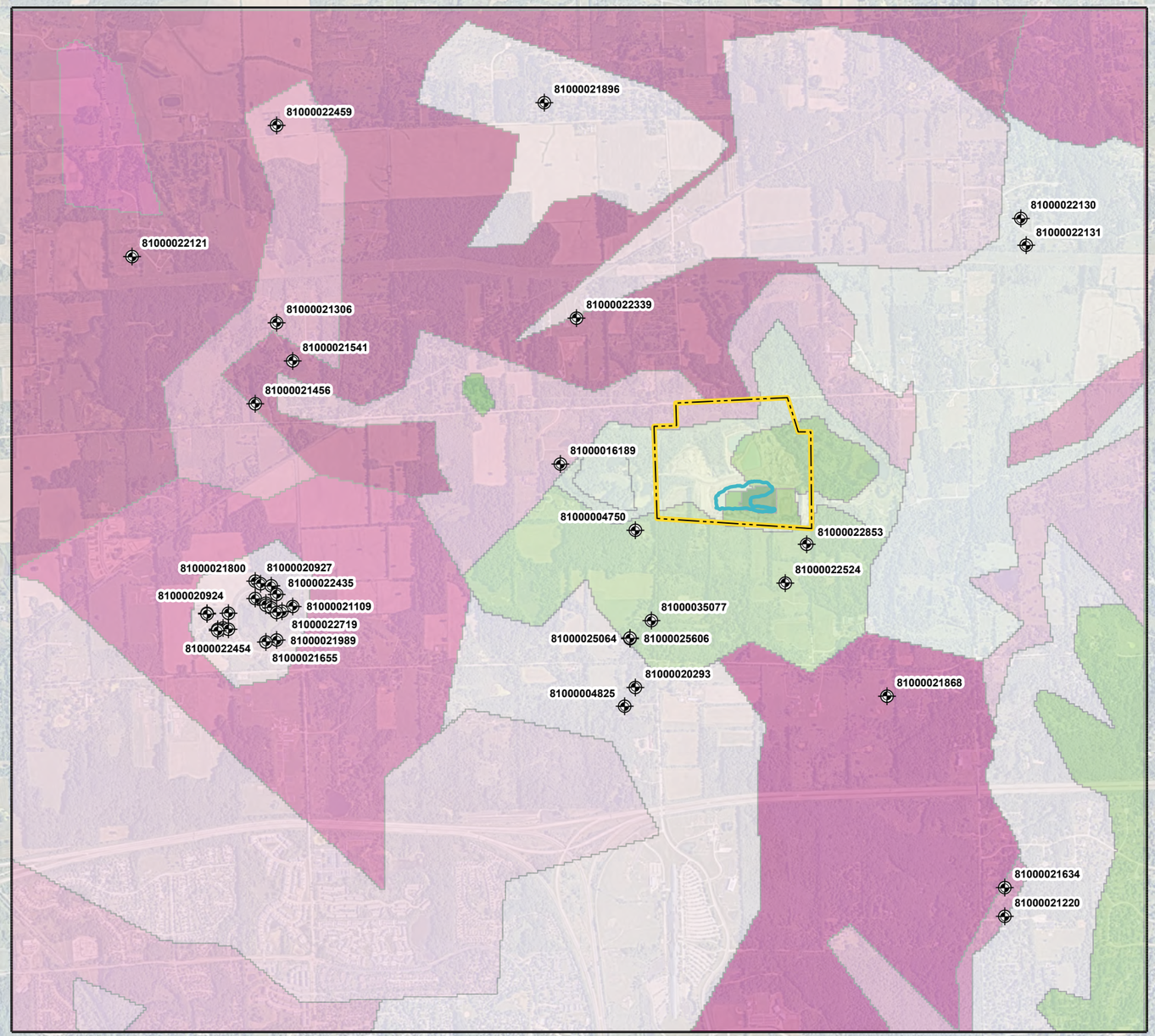
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

TRANSIENT RECHARGE

SEPTEMBER 2024

FIGURE 4B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

HYDRAULIC CONDUCTIVITY IN FEET PER DAY

- 0.007044
- 0.00739
- 0.007624
- 0.007897
- 0.007904
- 0.00805
- 0.008057
- 0.008154
- 0.009291
- 0.009431
- 0.01
- 0.010334
- 0.010484
- 0.011437
- 0.012356
- 0.017957
- 0.02
- 0.084203
- 0.107621
- 0.2
- 1
- 2
- 5
- 11.339099
- 16.650346
- 20.892392
- 22.502877
- 200

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

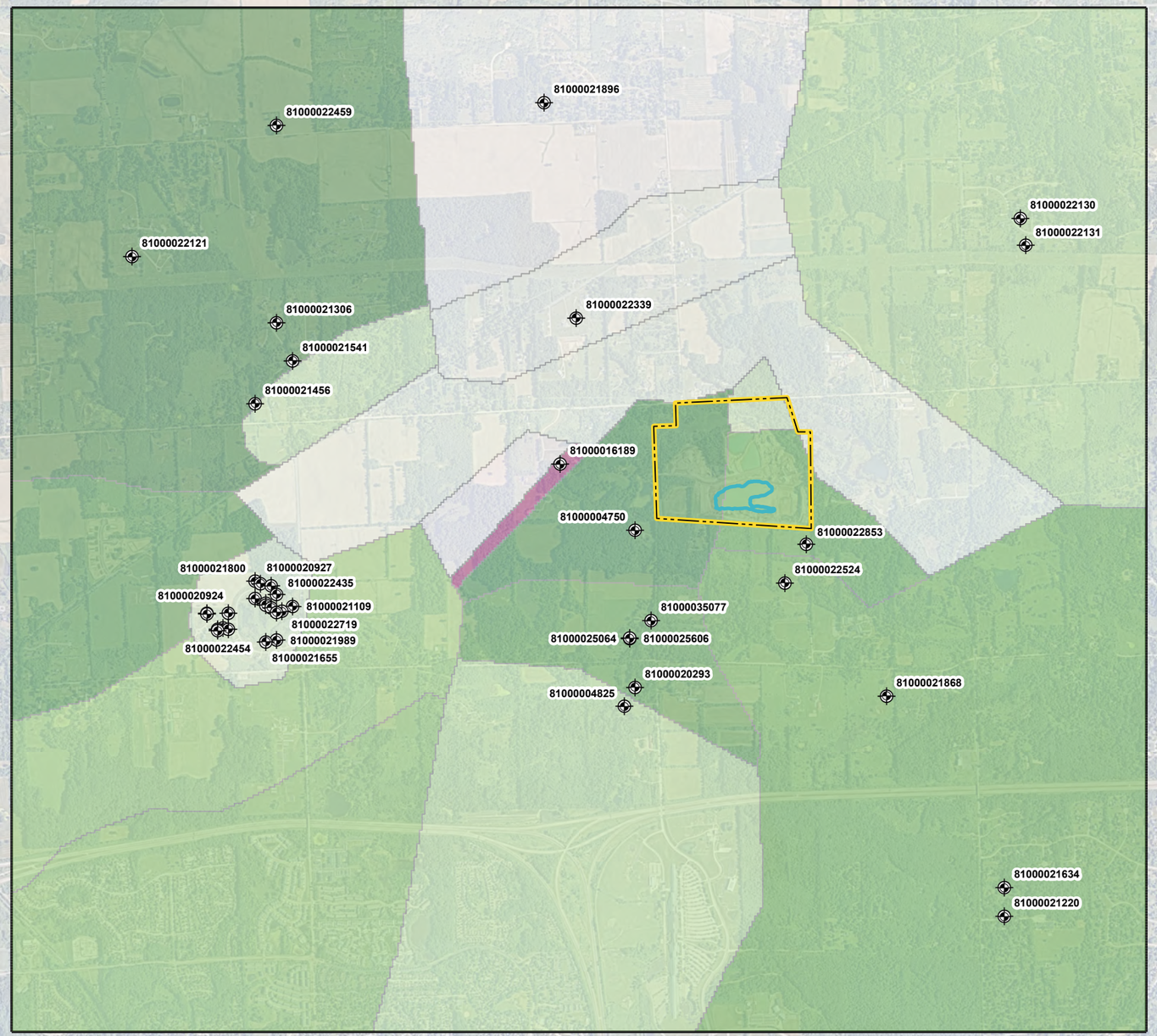
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

HYDRAULIC CONDUCTIVITIES IN LAYER 1

SEPTEMBER 2024

FIGURE 5A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

HYDRAULIC CONDUCTIVITY IN FEET PER DAY

- 0.001
- 0.175191
- 0.181922
- 0.243678
- 0.5
- 3.278174
- 4
- 4.249269
- 10
- 19
- 19.5
- 37.5
- 48.594271
- 60
- 79.132335
- 130
- 200

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

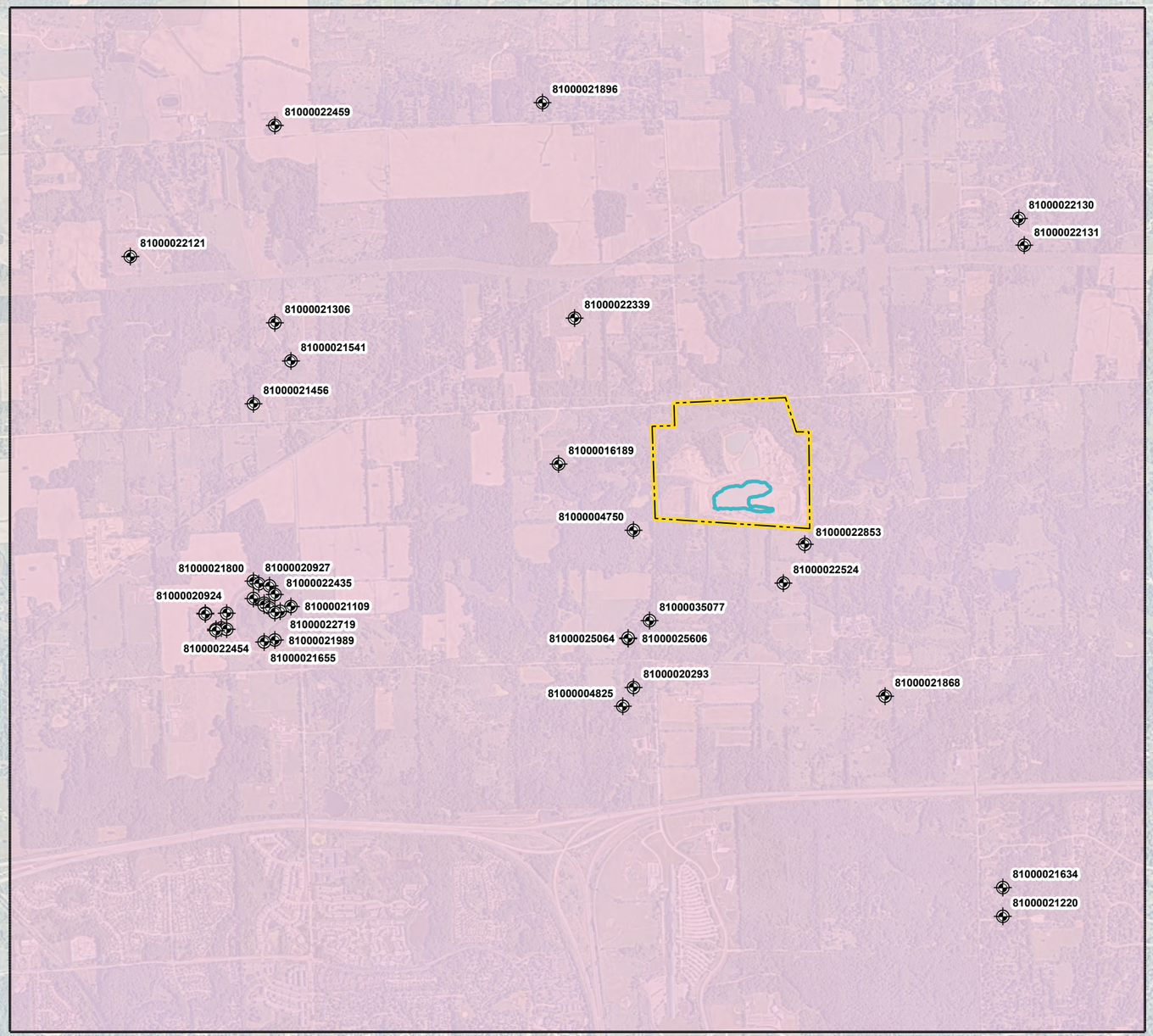
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

HYDRAULIC CONDUCTIVITIES IN LAYER 2

SEPTEMBER 2024

FIGURE 5B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/26/2024 10:49 AM



LEGEND

- STEADY STATE TARGET WELL
- POND 3 BOUNDARY
- MODEL DOMAIN
- SITE BOUNDARY

HYDRAULIC CONDUCTIVITY IN FEET PER DAY

- 0.01

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

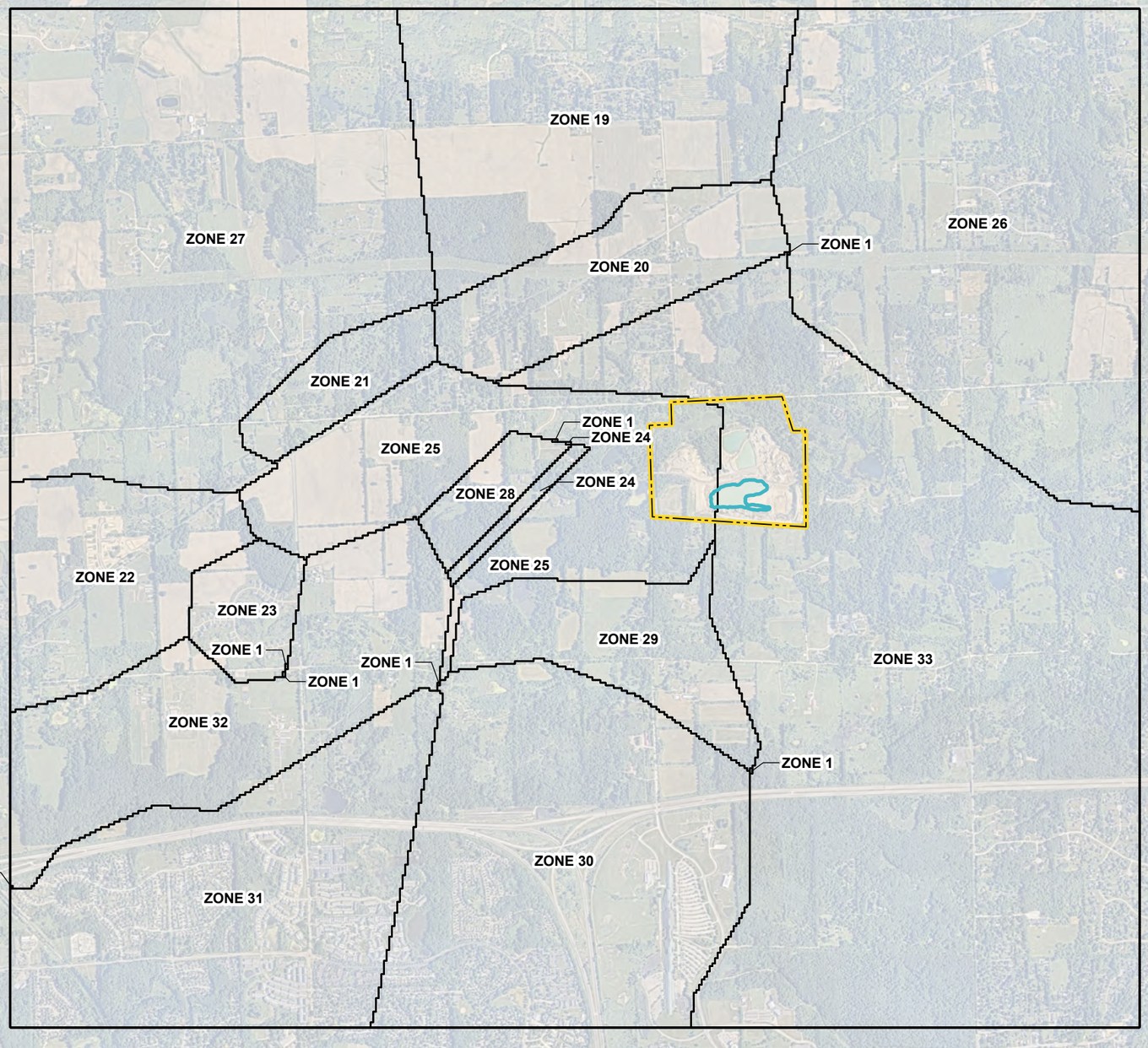
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

HYDRAULIC CONDUCTIVITIES IN LAYER 3

SEPTEMBER 2024

FIGURE 5C

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- POND 3 BOUNDARY
- MODEL DOMAIN
- STORAGE ZONE BOUNDARY
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

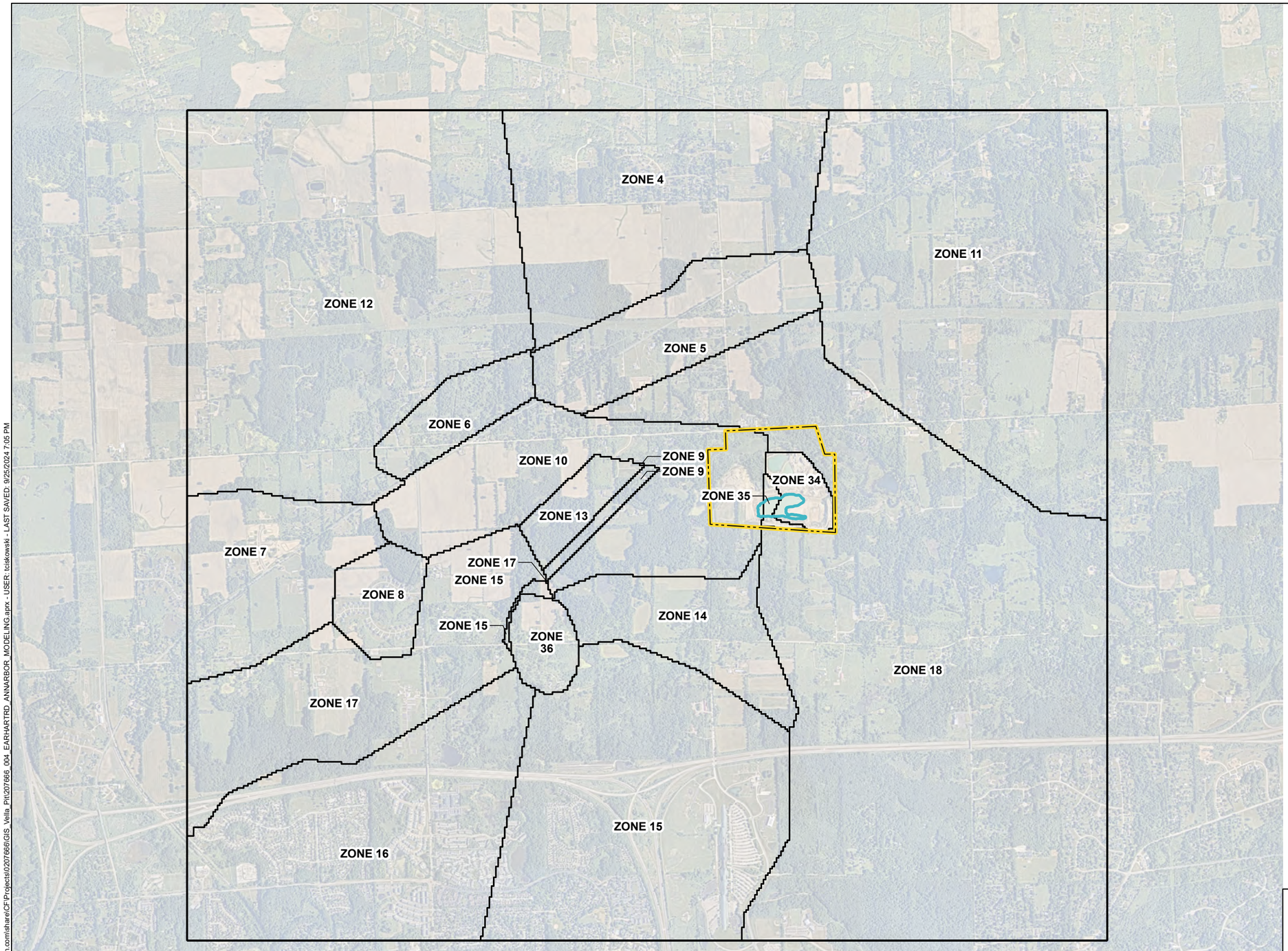
MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

LAYER 1
STORAGE ZONES

SEPTEMBER 2024

FIGURE 6A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM



LEGEND

- POND 3 BOUNDARY
- MODEL DOMAIN
- STORAGE ZONE BOUNDARY
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 2,400 4,800

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
GROUNDWATER MODEL
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

LAYER 2
STORAGE ZONES

SEPTEMBER 2024

FIGURE 6B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR_MODELING.aprx - USER: tciskowski - LAST SAVED: 9/25/2024 7:05 PM

ATTACHMENT A
EVS Geologic Model Construction and Visualization

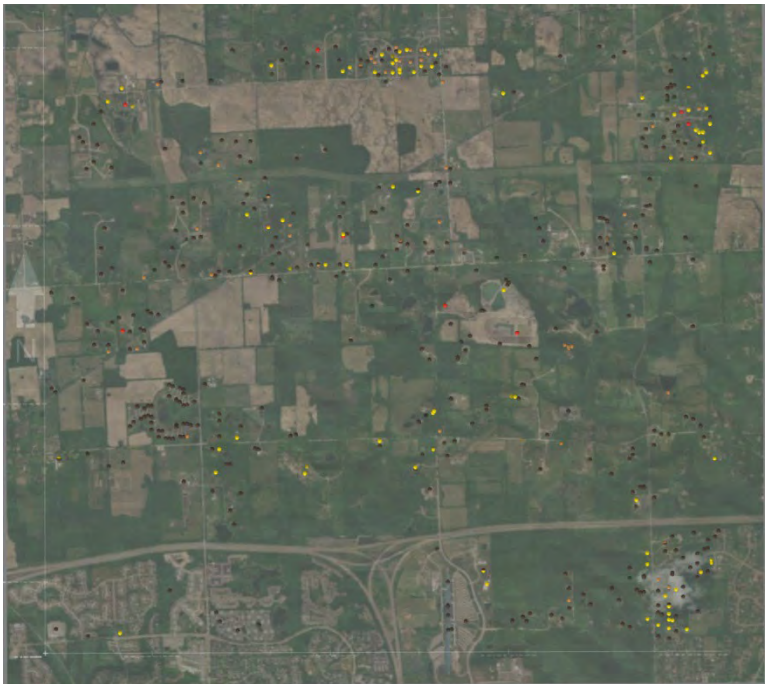


Figure 1: Wells on aerial image

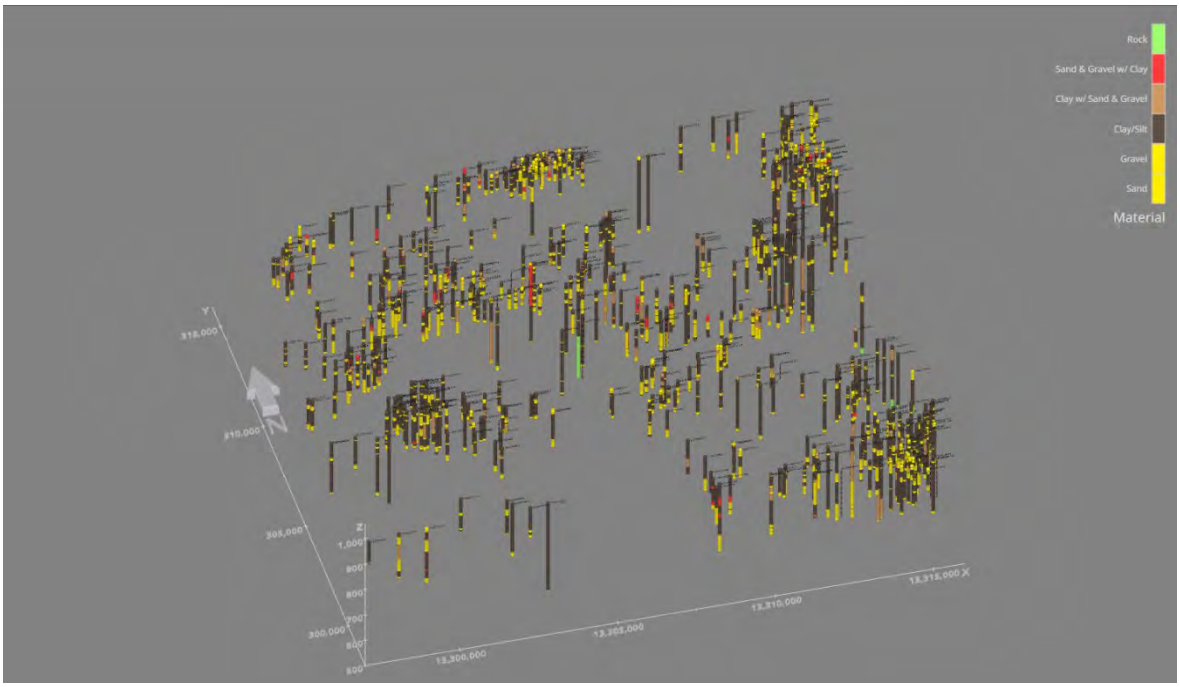


Figure 2: Geologic view of wells (EVS visualization)

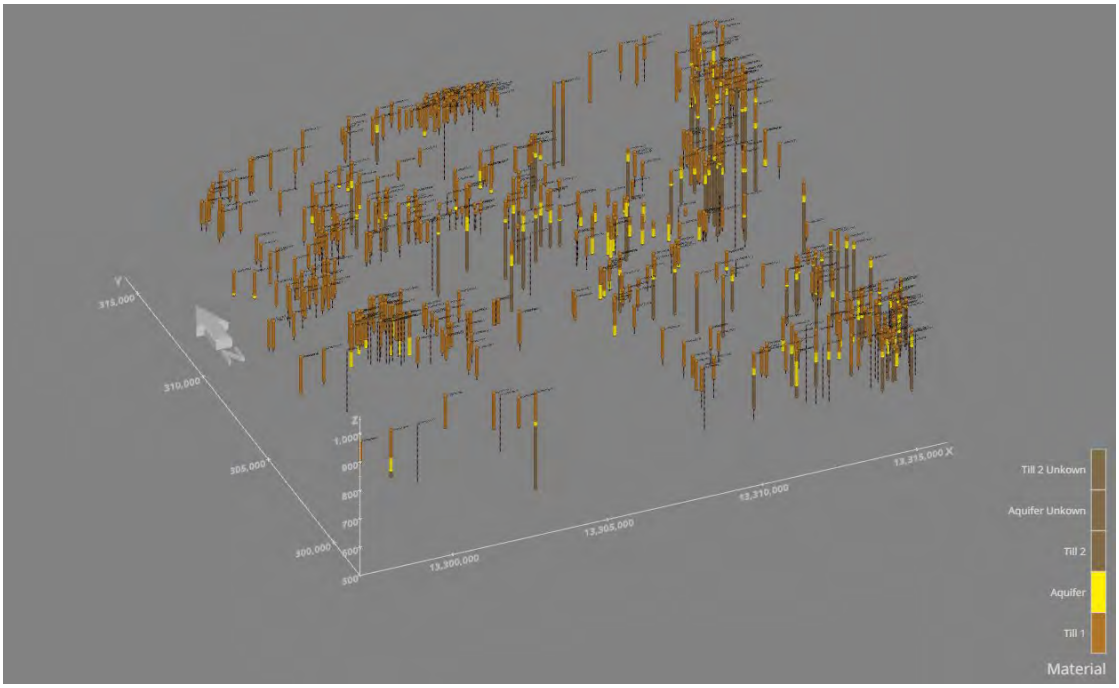


Figure 3: Aquifer and Till in Wells (aquifer modeled but not shown here where well screen does not fully penetrate aquifer)

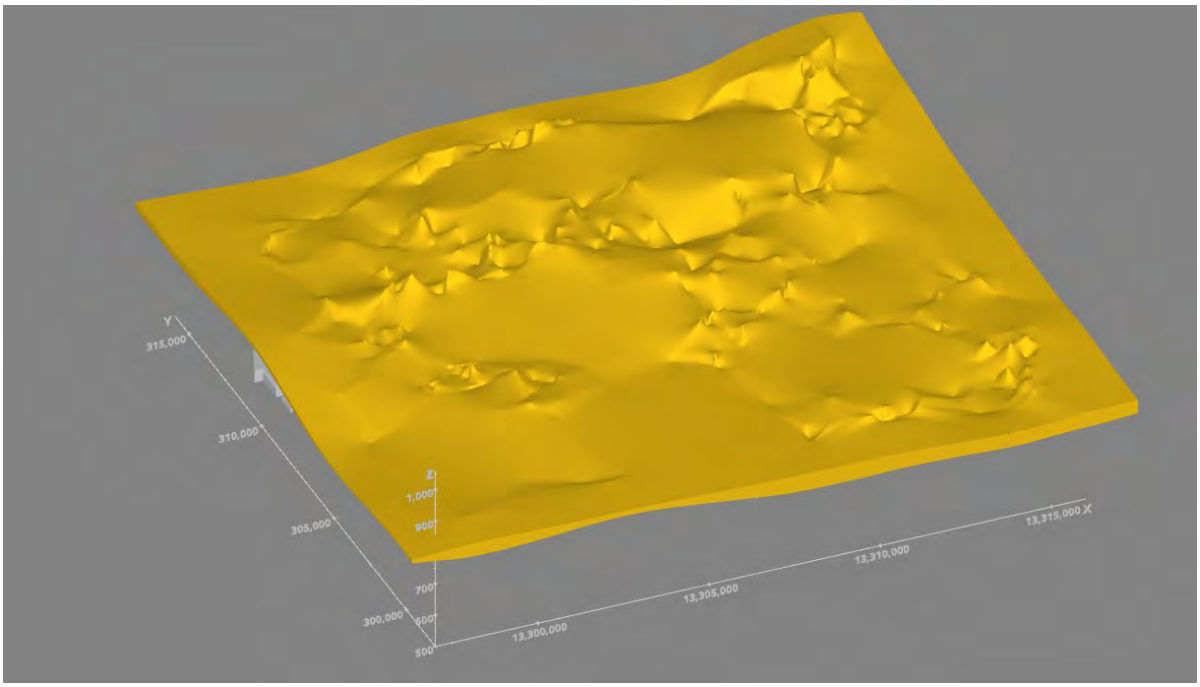


Figure 4: 3D visualization of aquifer in EVS

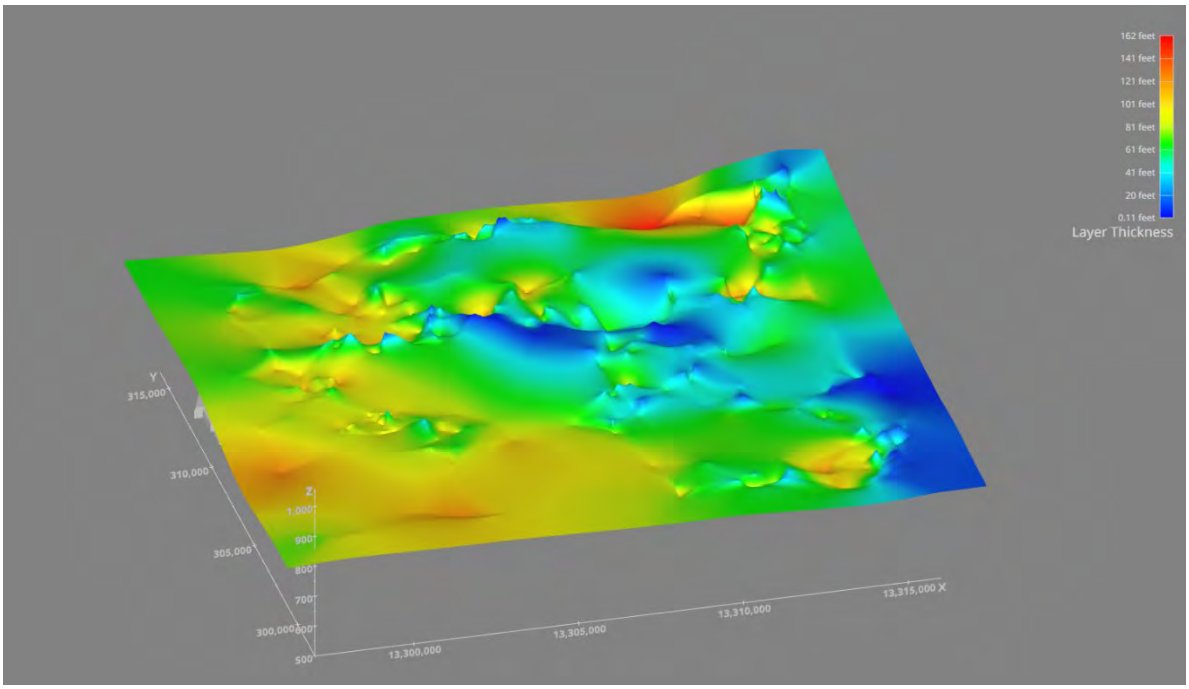


Figure 5: Upper Till thickness map

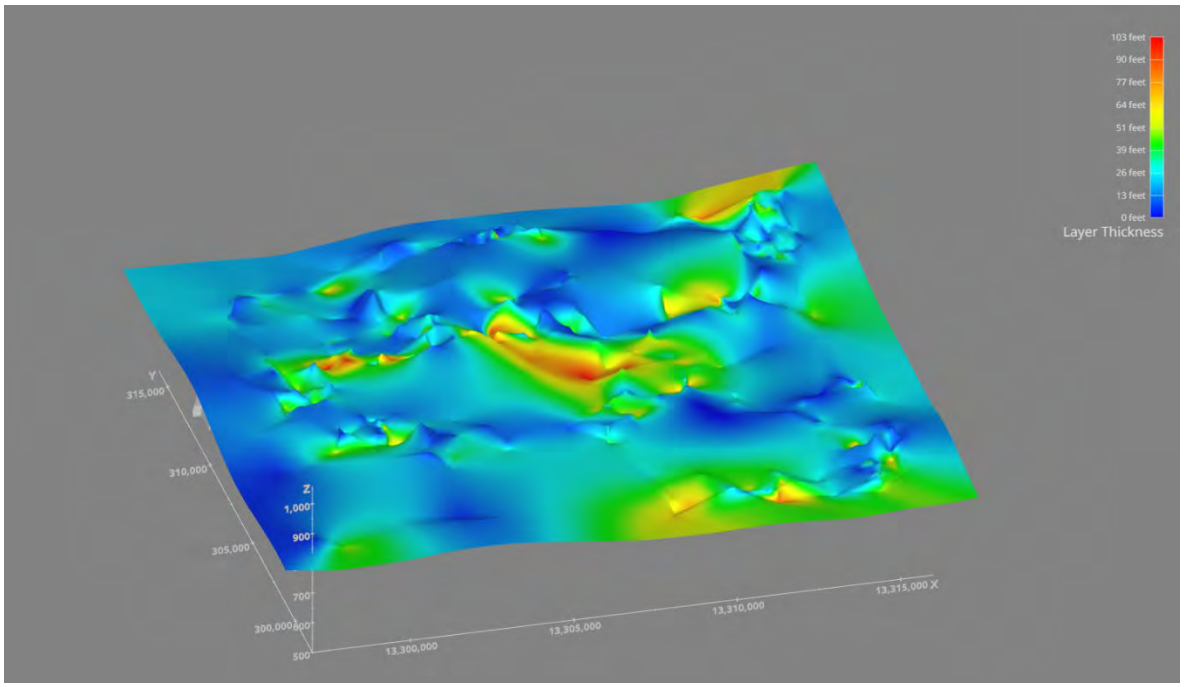


Figure 6: Upper Aquifer thickness map

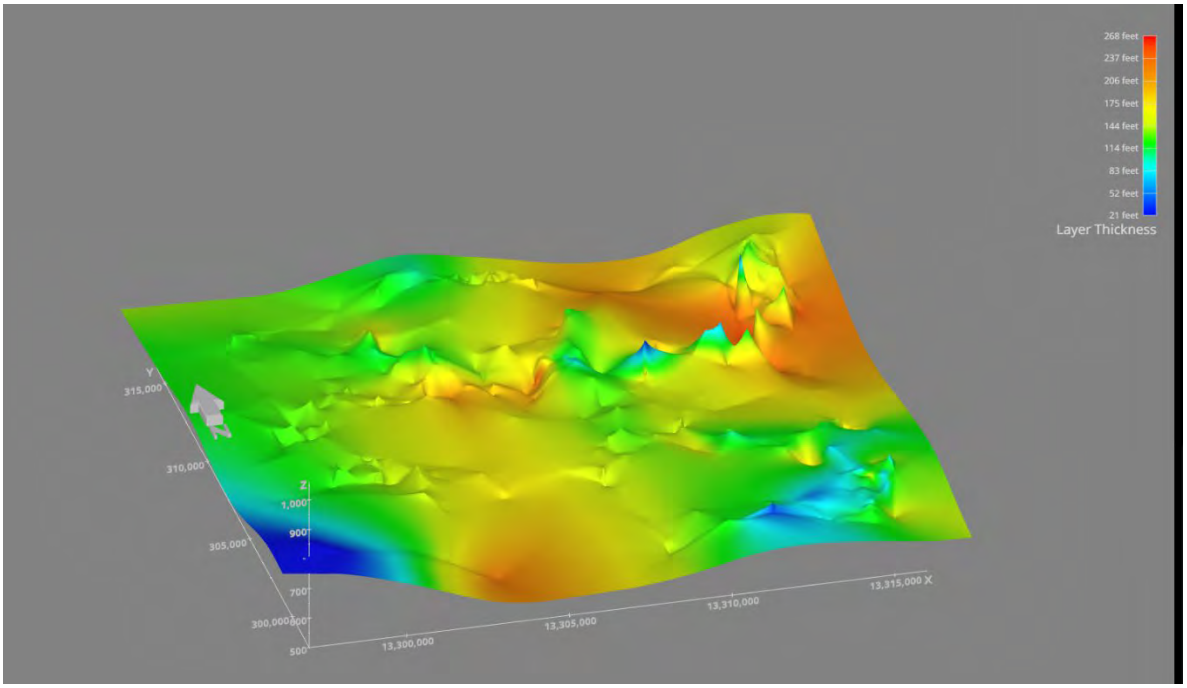
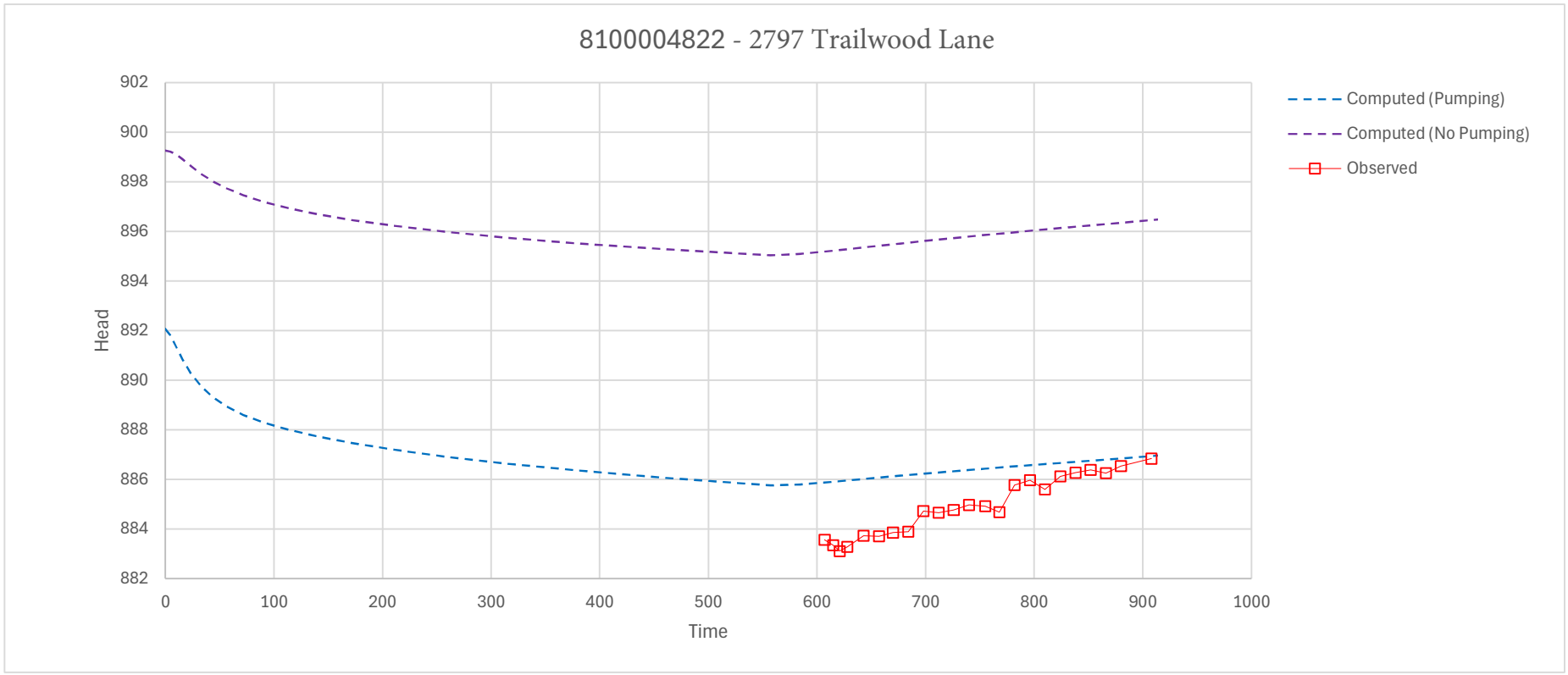
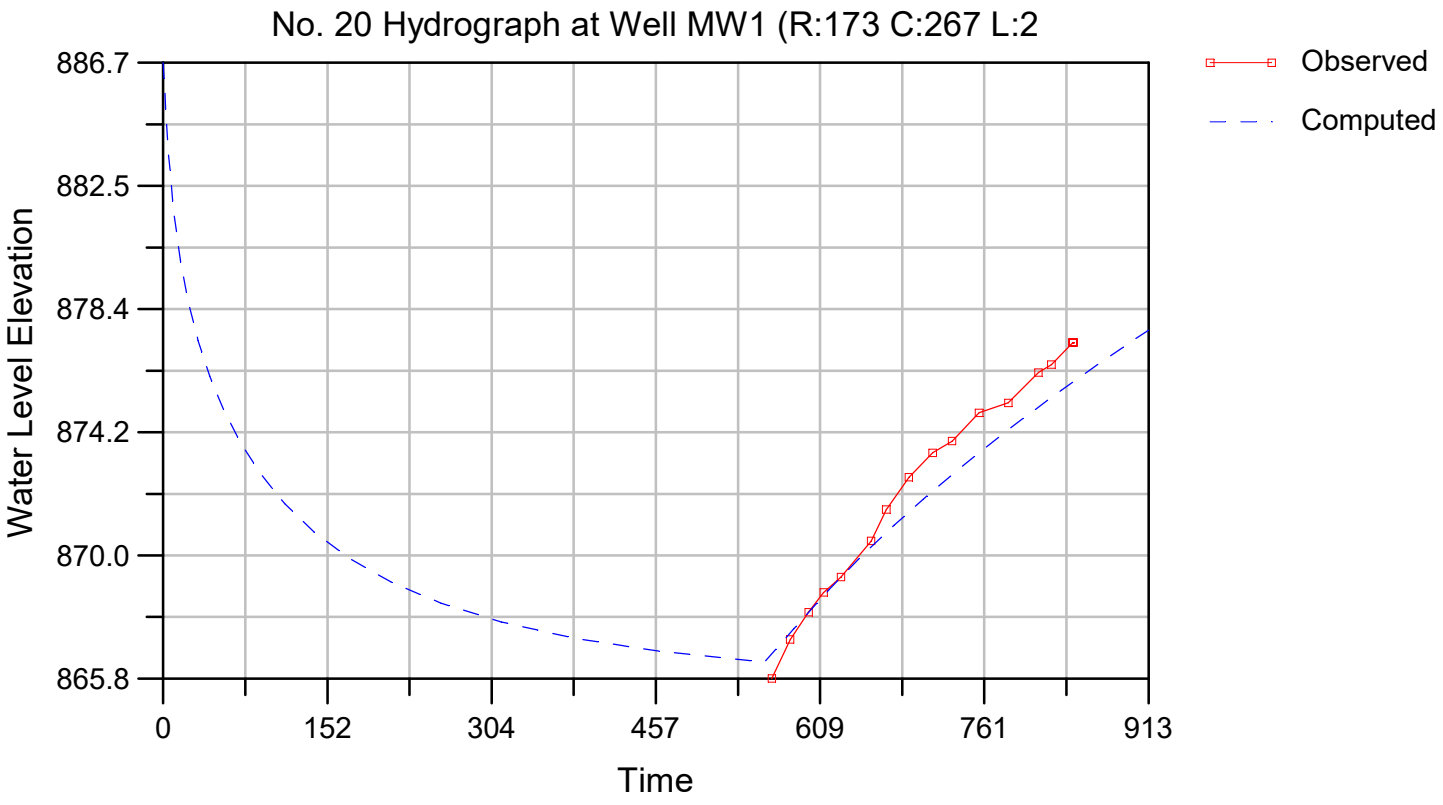
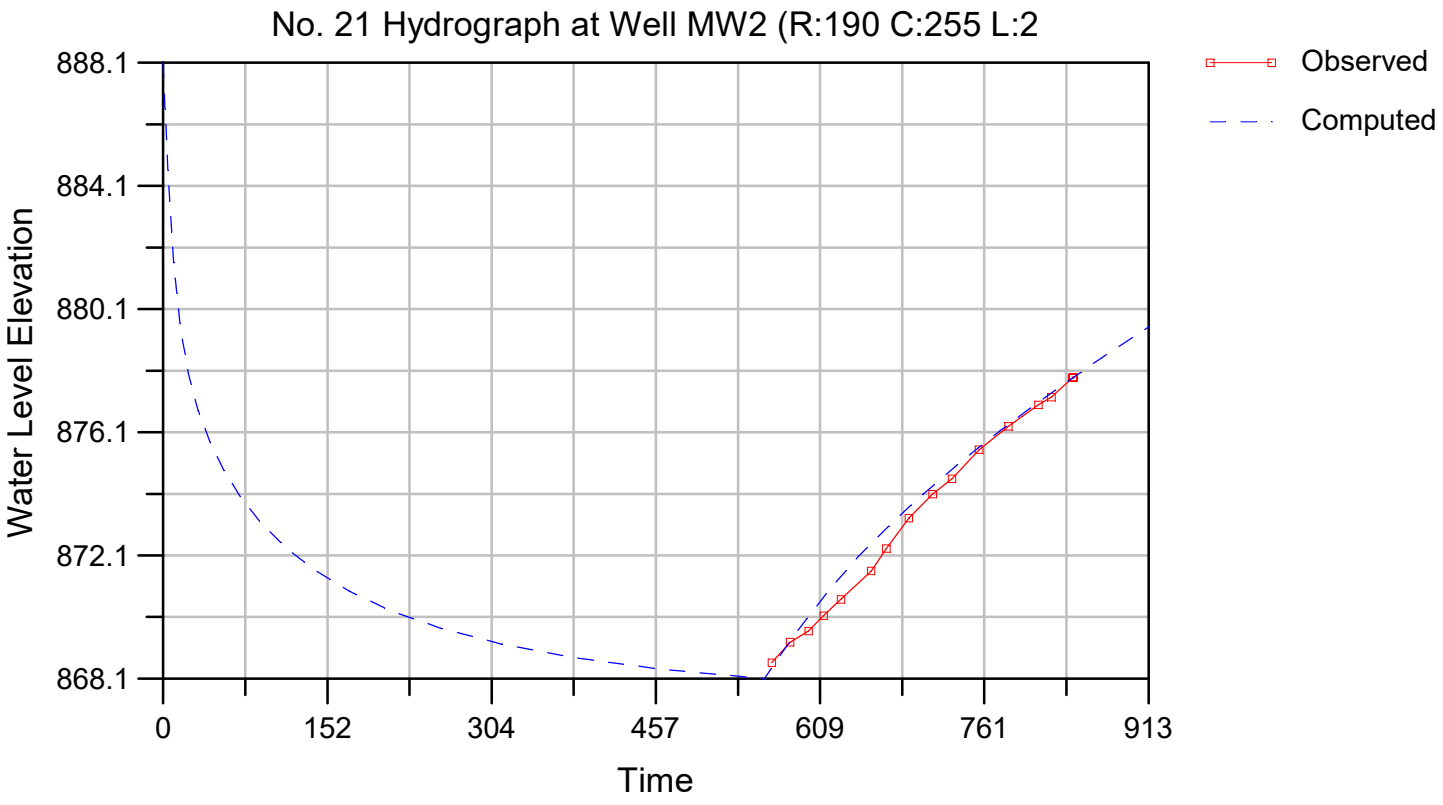


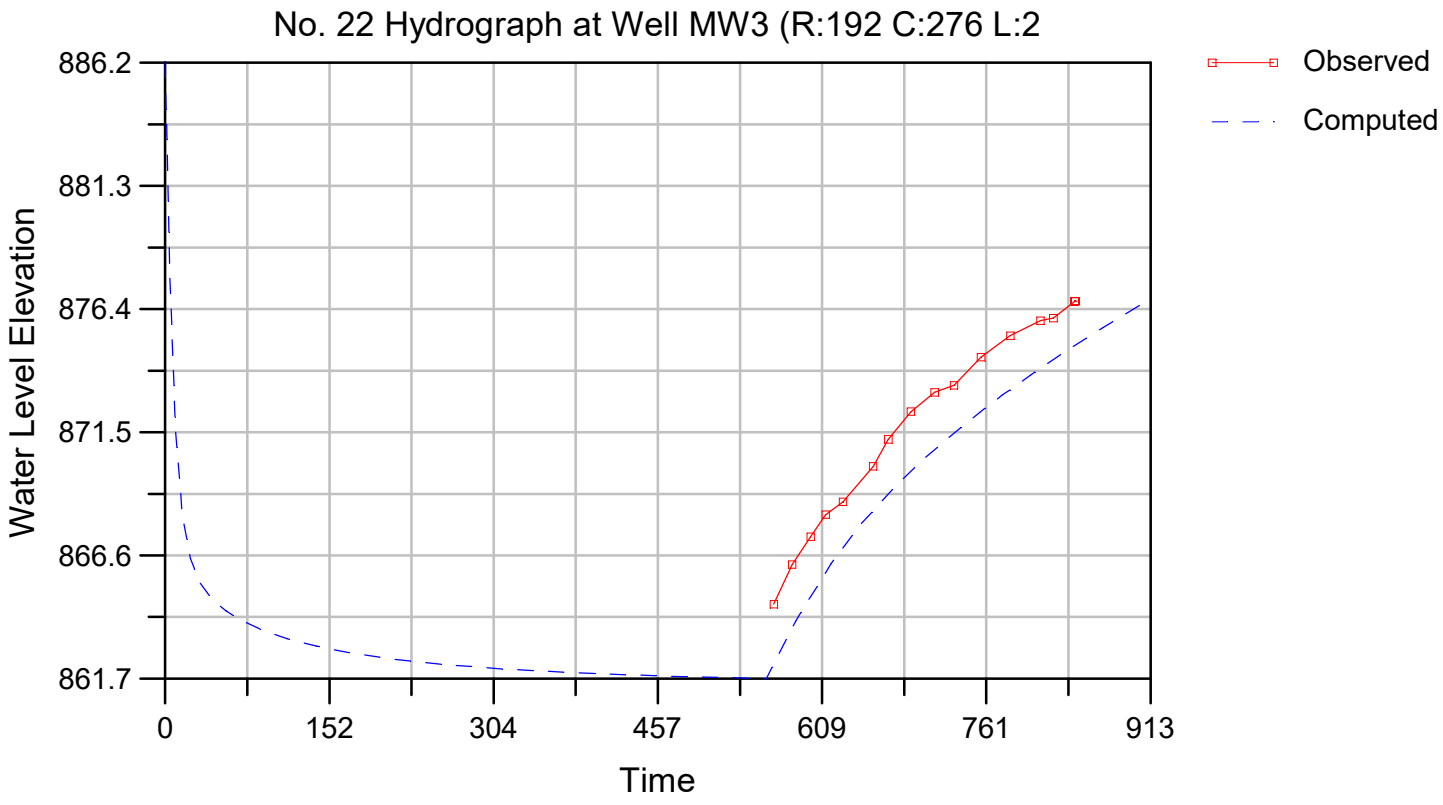
Figure 7: Lower Till thickness map

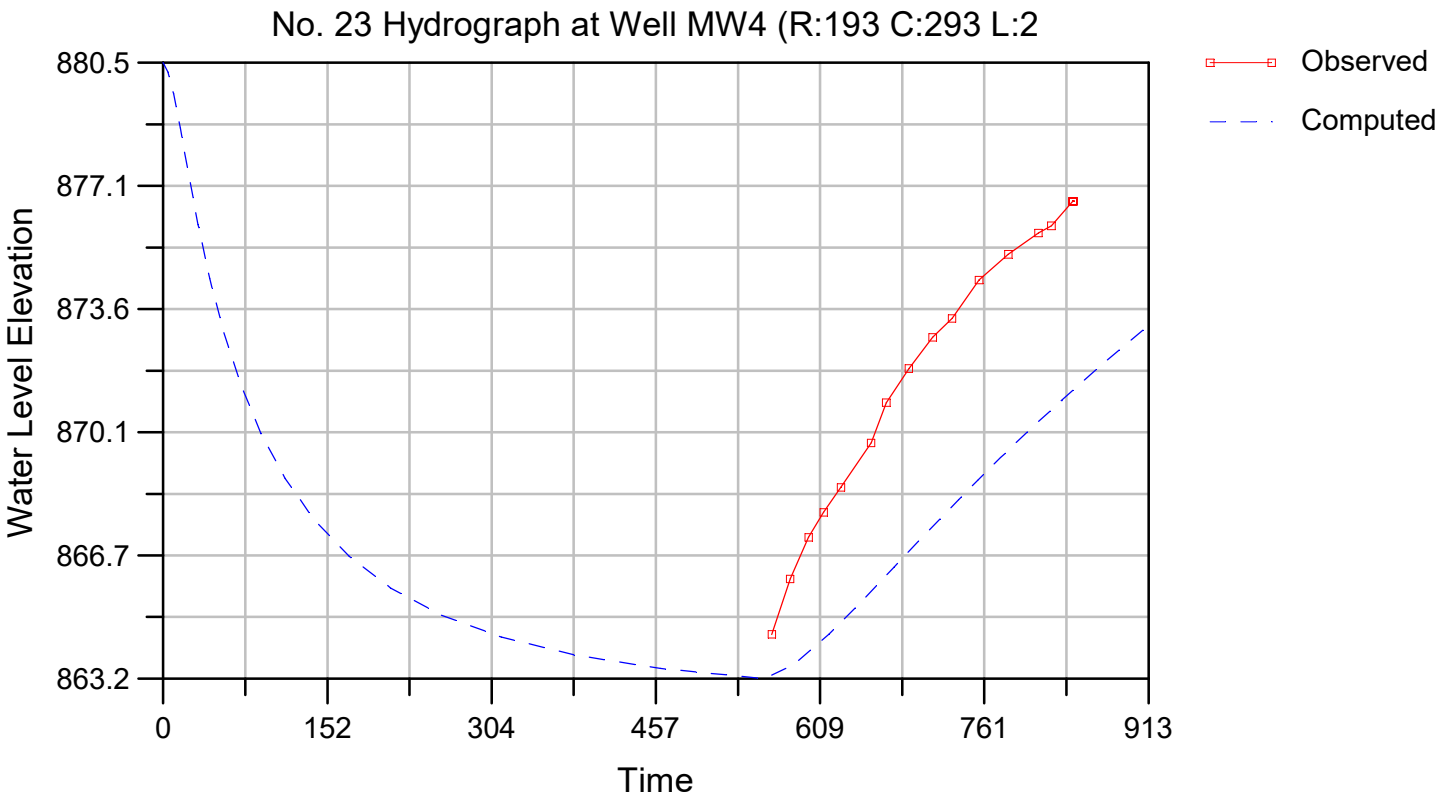
ATTACHMENT B
Calibration Graphs

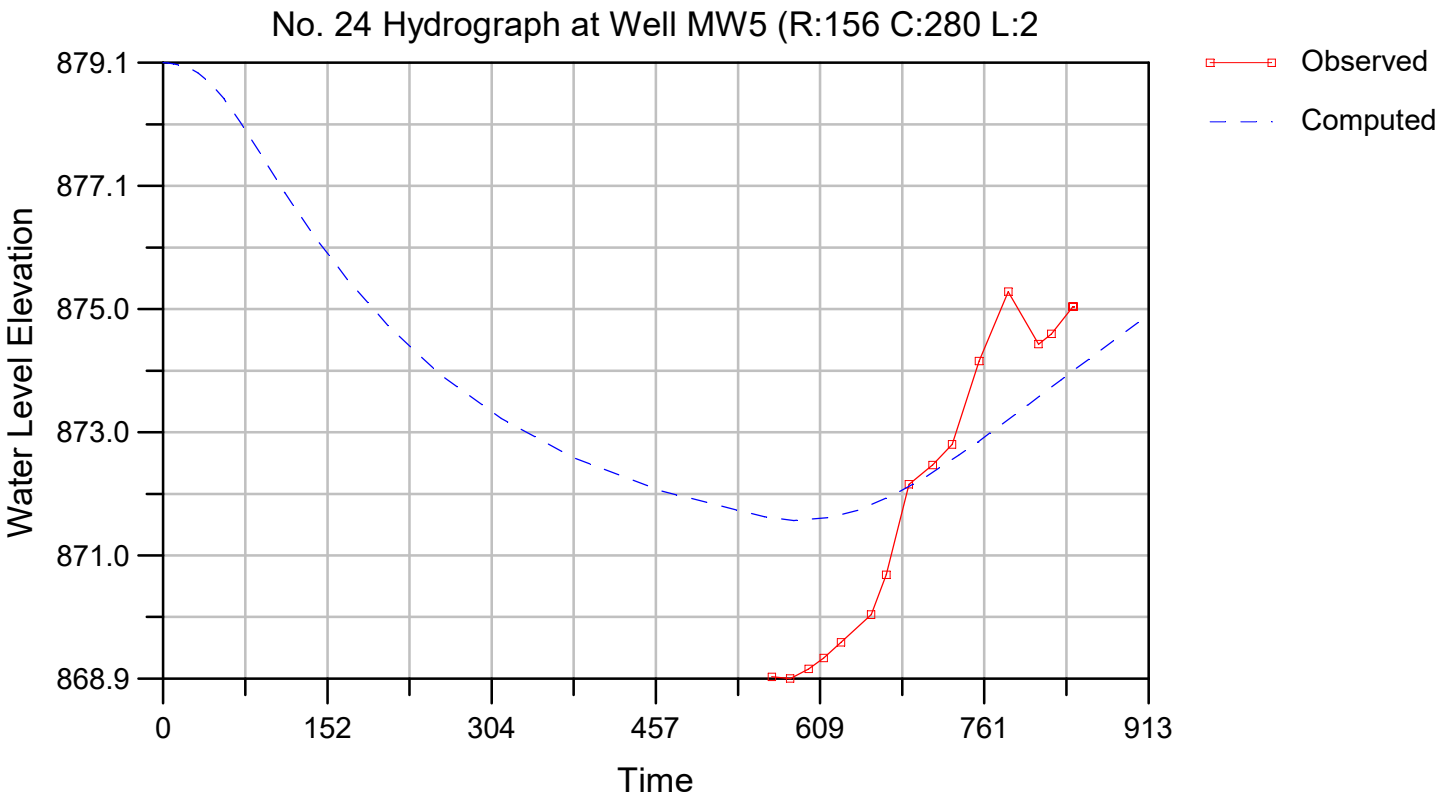

8100004822 - 2797 Trailwood Lane
902
900
898
896
894
892
890
888
886
884
882
Head
0
100
200
300
400
500
600
700
800
900
1000
Time
Computed (Pumping)
Computed (No Pumping)
Observed

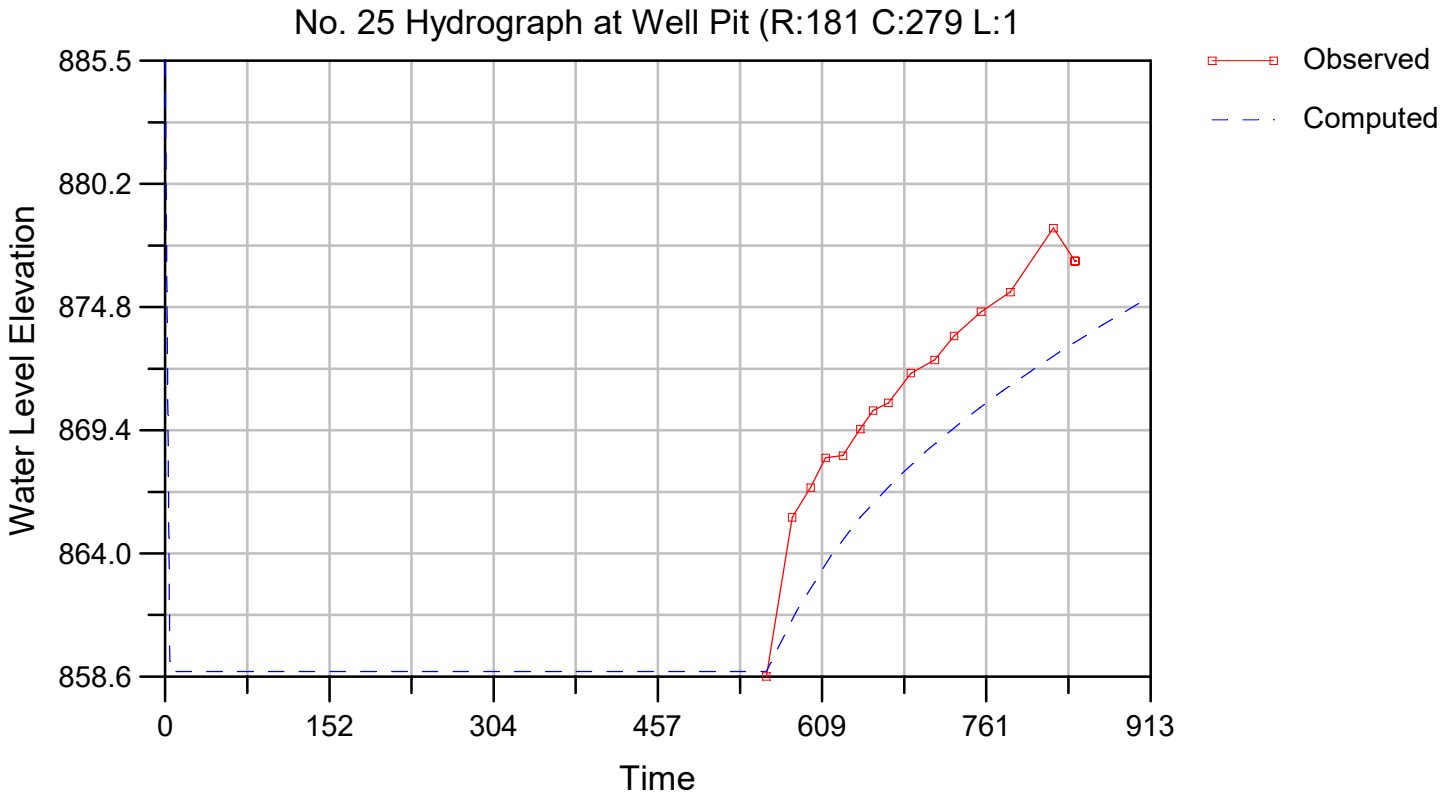

No. 20 Hydrograph at Well MW1 (R:173 C:267 L:2
886.7
882.5
878.4
874.2
870.0
865.8
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

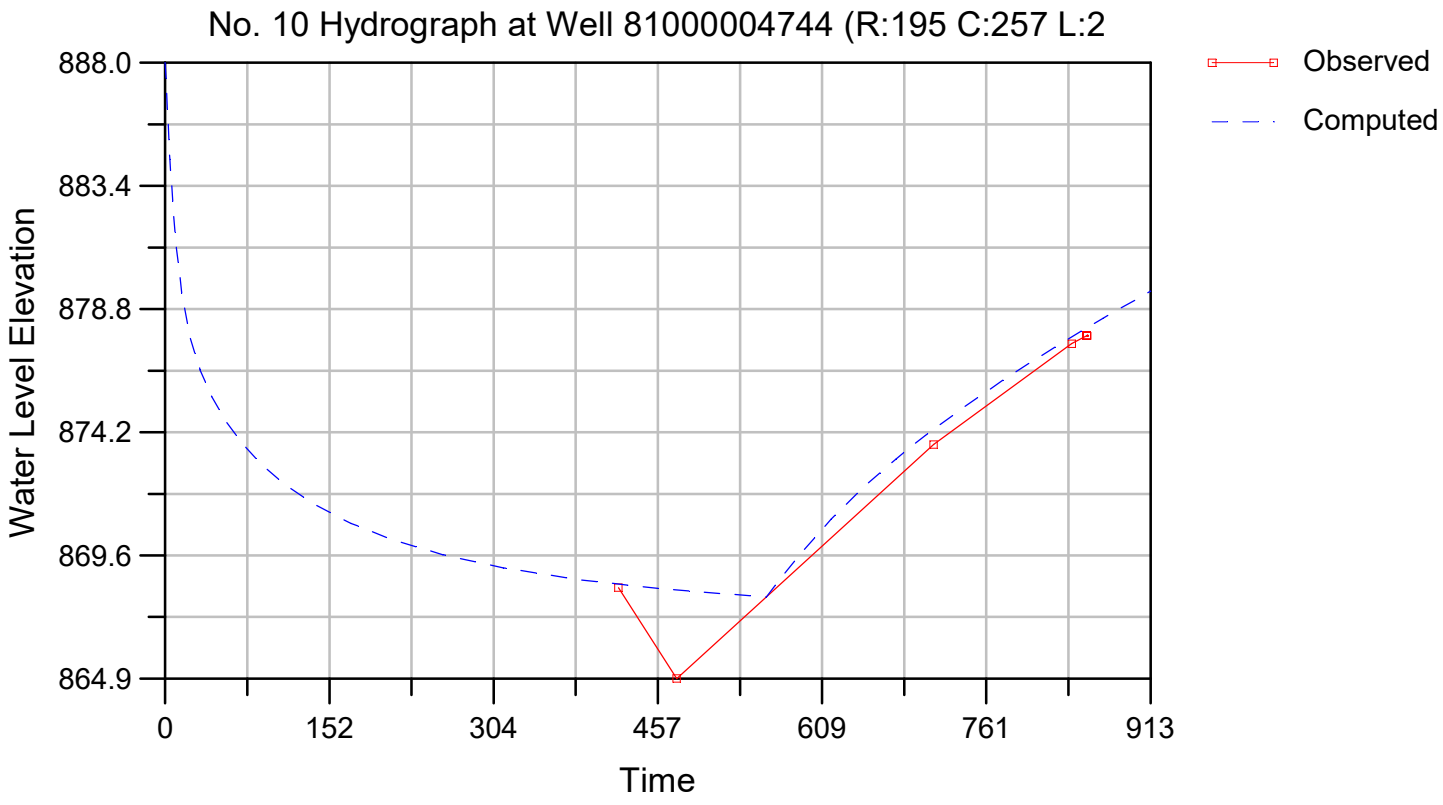

No. 21 Hydrograph at Well MW2 (R:190 C:255 L:2
888.1
884.1
880.1
876.1
872.1
868.1
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

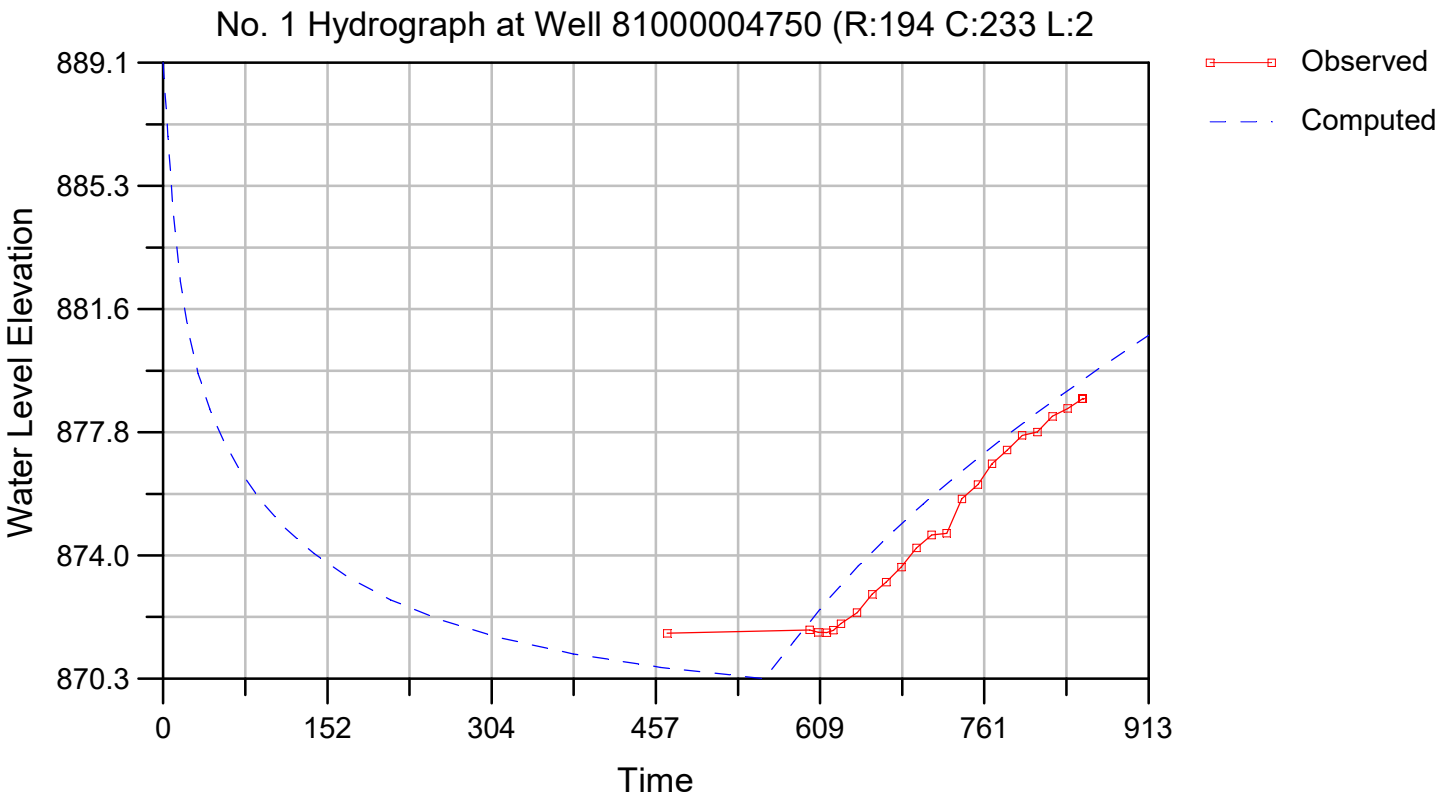

No. 22 Hydrograph at Well MW3 (R:192 C:276 L:2
886.2
881.3
876.4
871.5
866.6
861.7
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

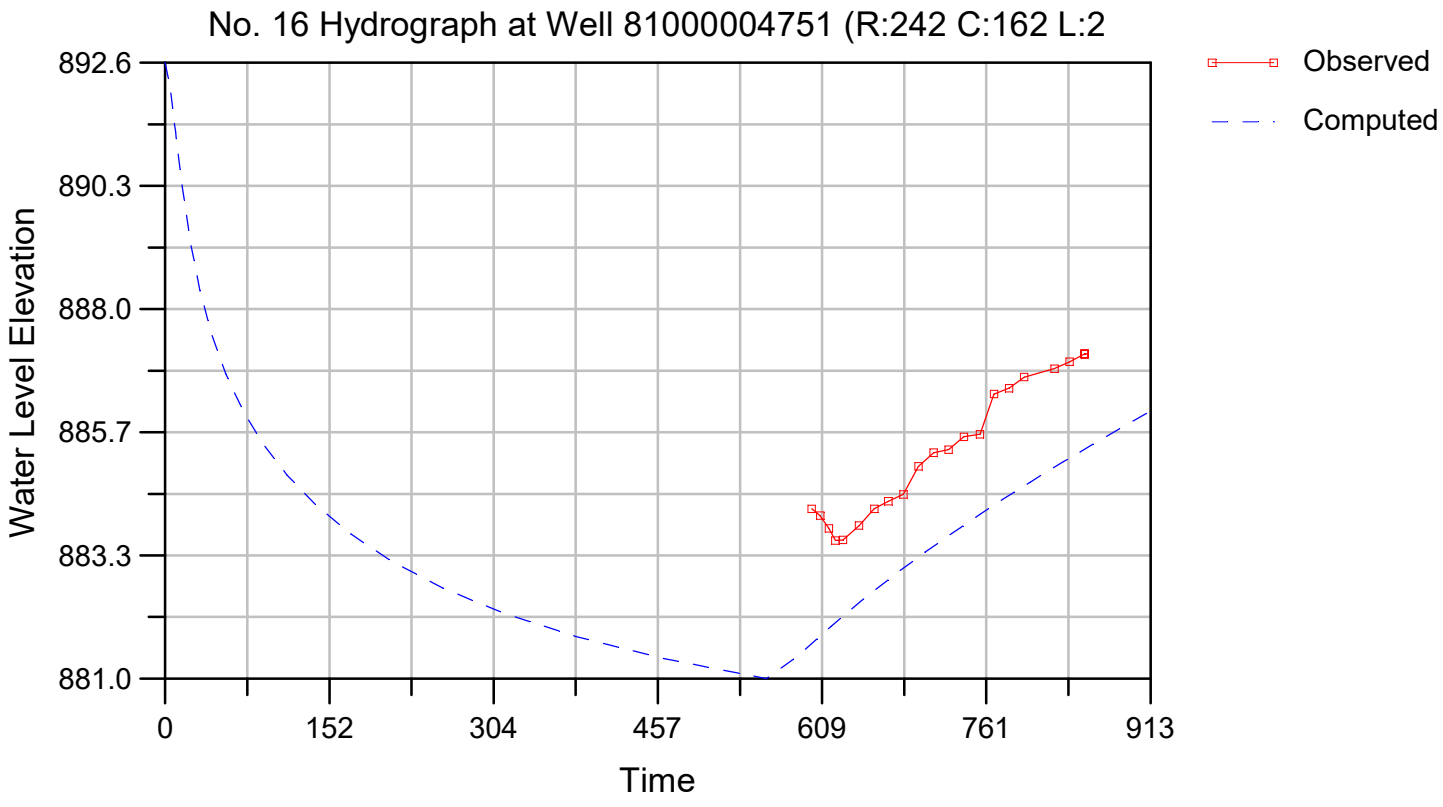

No. 23 Hydrograph at Well MW4 (R:193 C:293 L:2
Water Level Elevation
880.5
877.1
873.6
870.1
866.7
863.2
0
152
304
457
609
761
913
Time
Observed
Computed

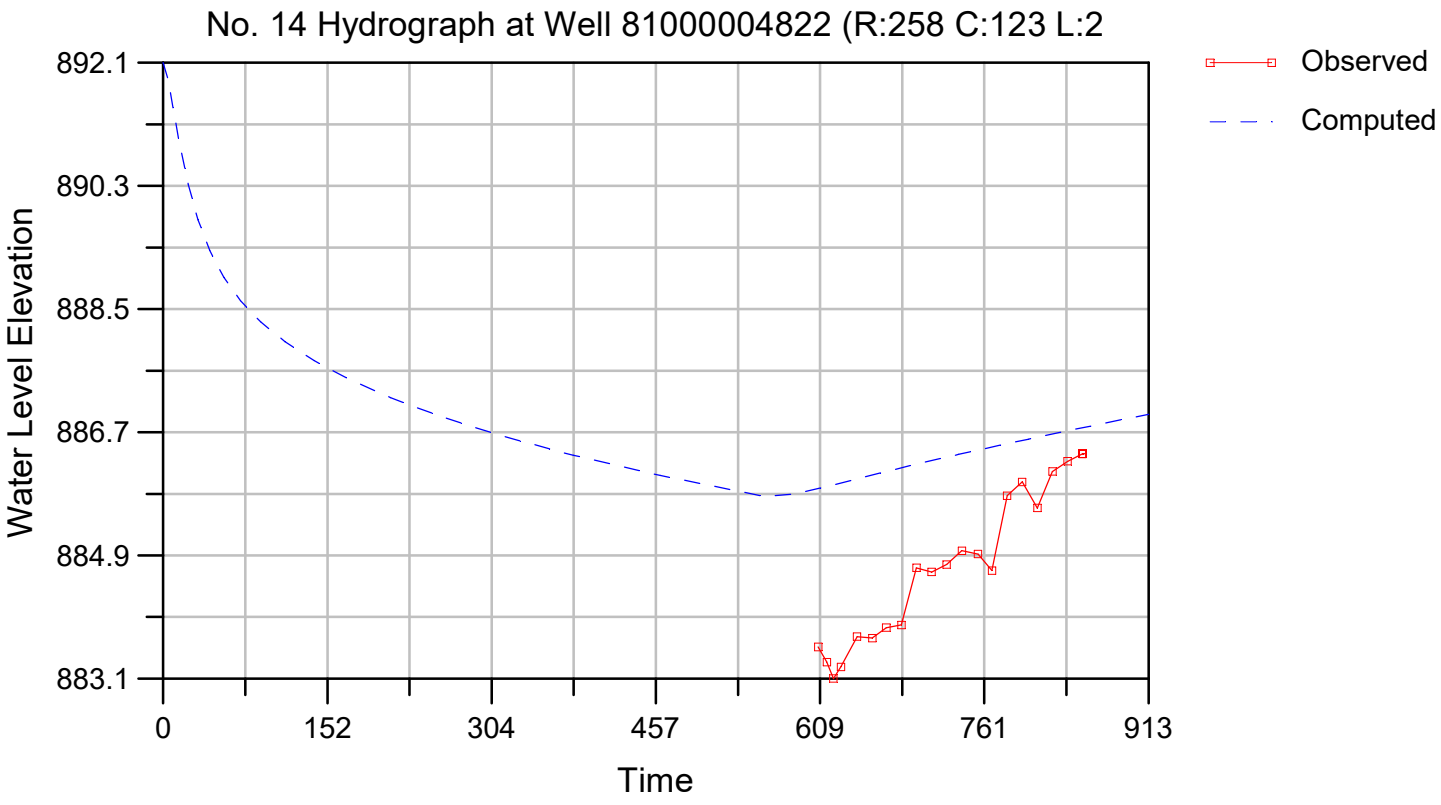

No. 24 Hydrograph at Well MW5 (R:156 C:280 L:2
879.1
877.1
875.0
873.0
871.0
868.9
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

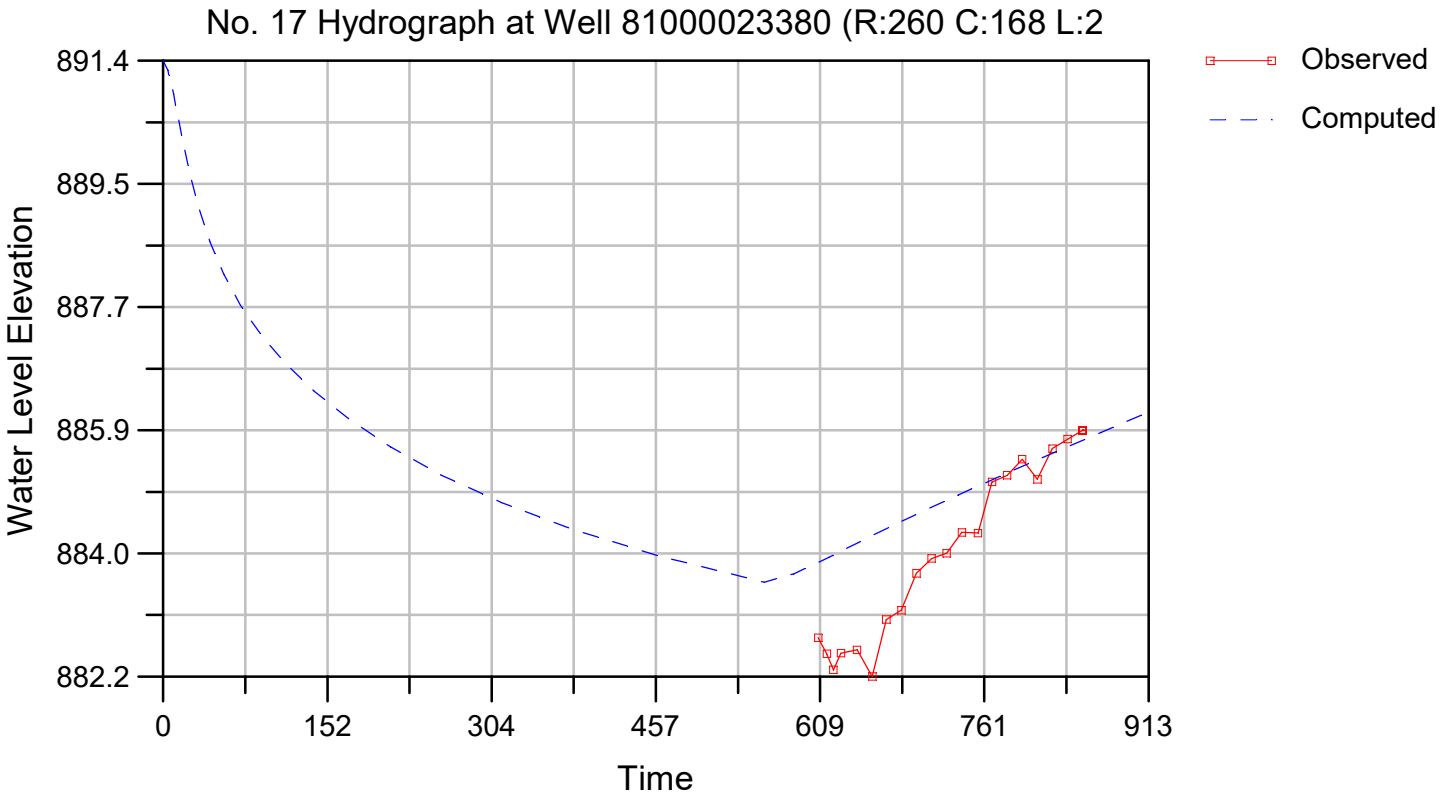

No. 25 Hydrograph at Well Pit (R:181 C:279 L:1
885.5
880.2
874.8
869.4
864.0
858.6
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

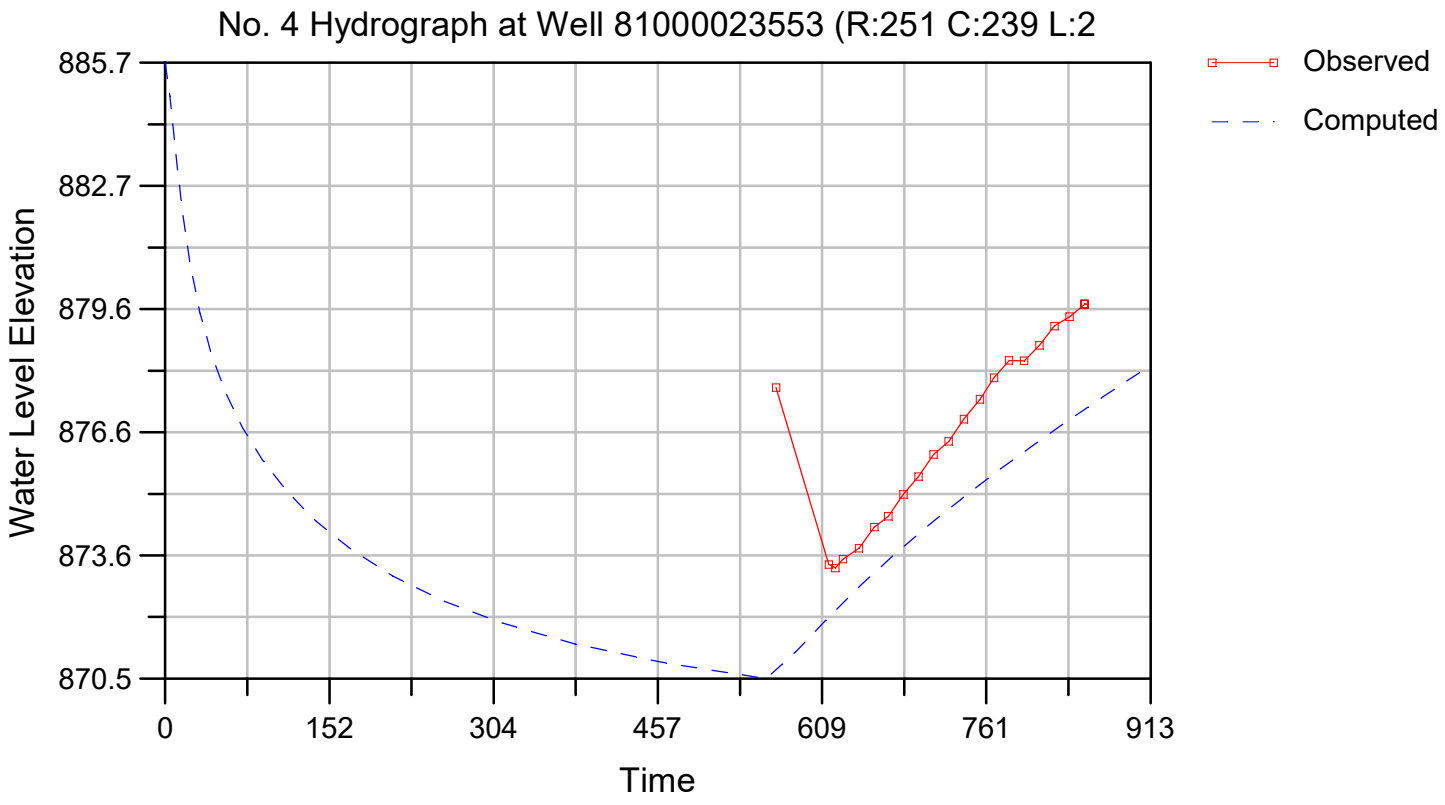

No. 10 Hydrograph at Well 81000004744 (R:195 C:257 L:2
888.0
883.4
878.8
874.2
869.6
864.9
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

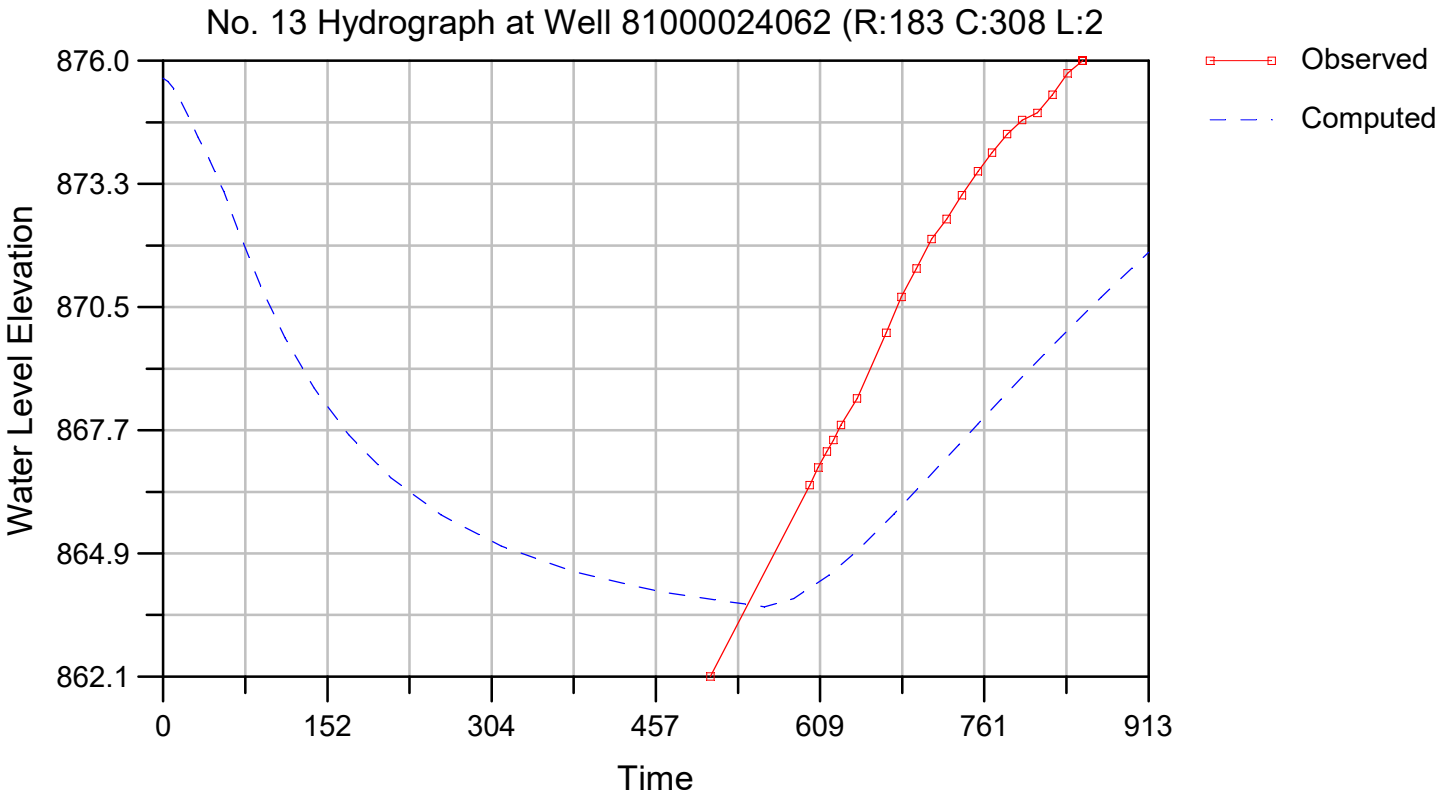

No. 1 Hydrograph at Well 81000004750 (R:194 C:233 L:2
889.1
885.3
881.6
877.8
874.0
870.3
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

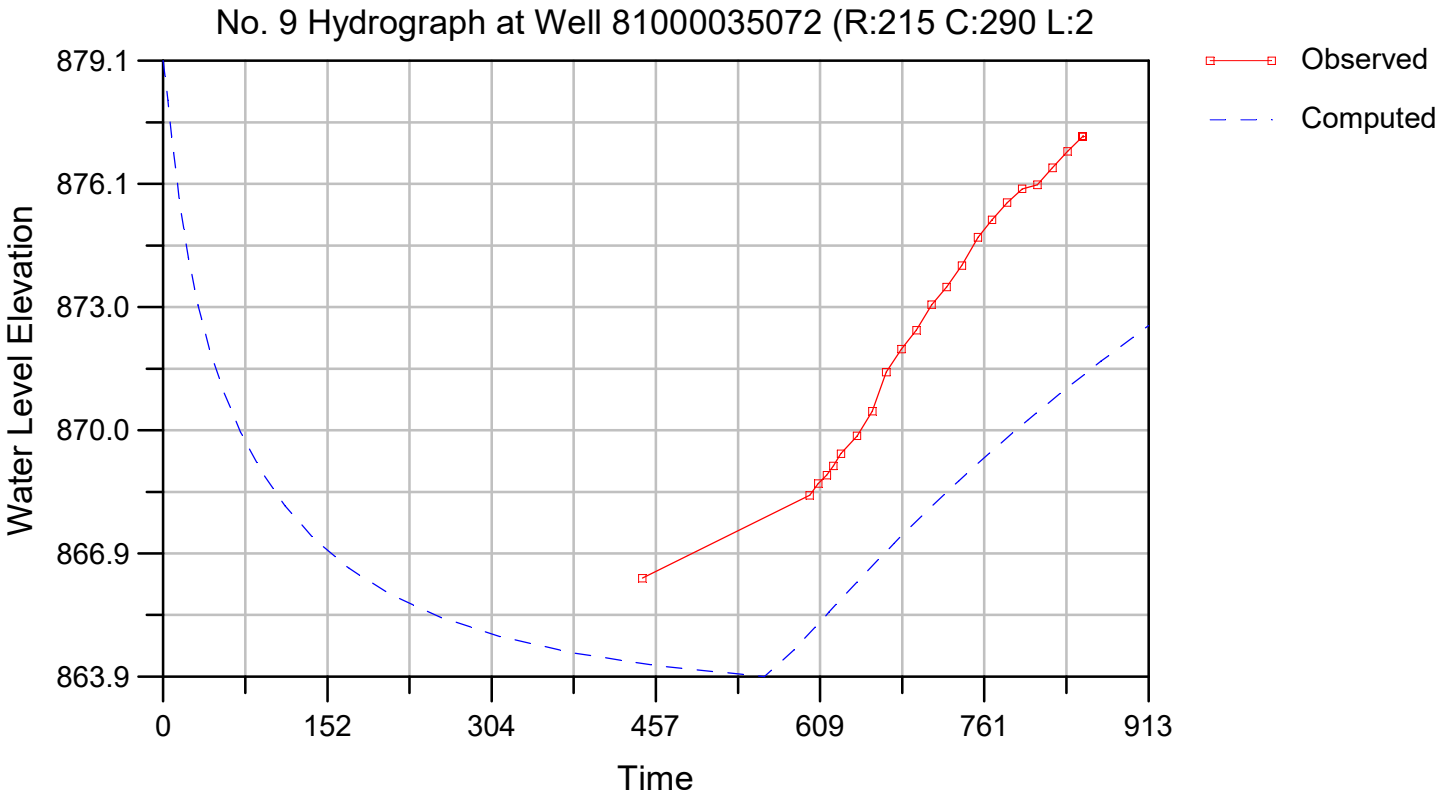

No. 16 Hydrograph at Well 81000004751 (R:242 C:162 L:2
892.6
890.3
888.0
885.7
883.3
881.0
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

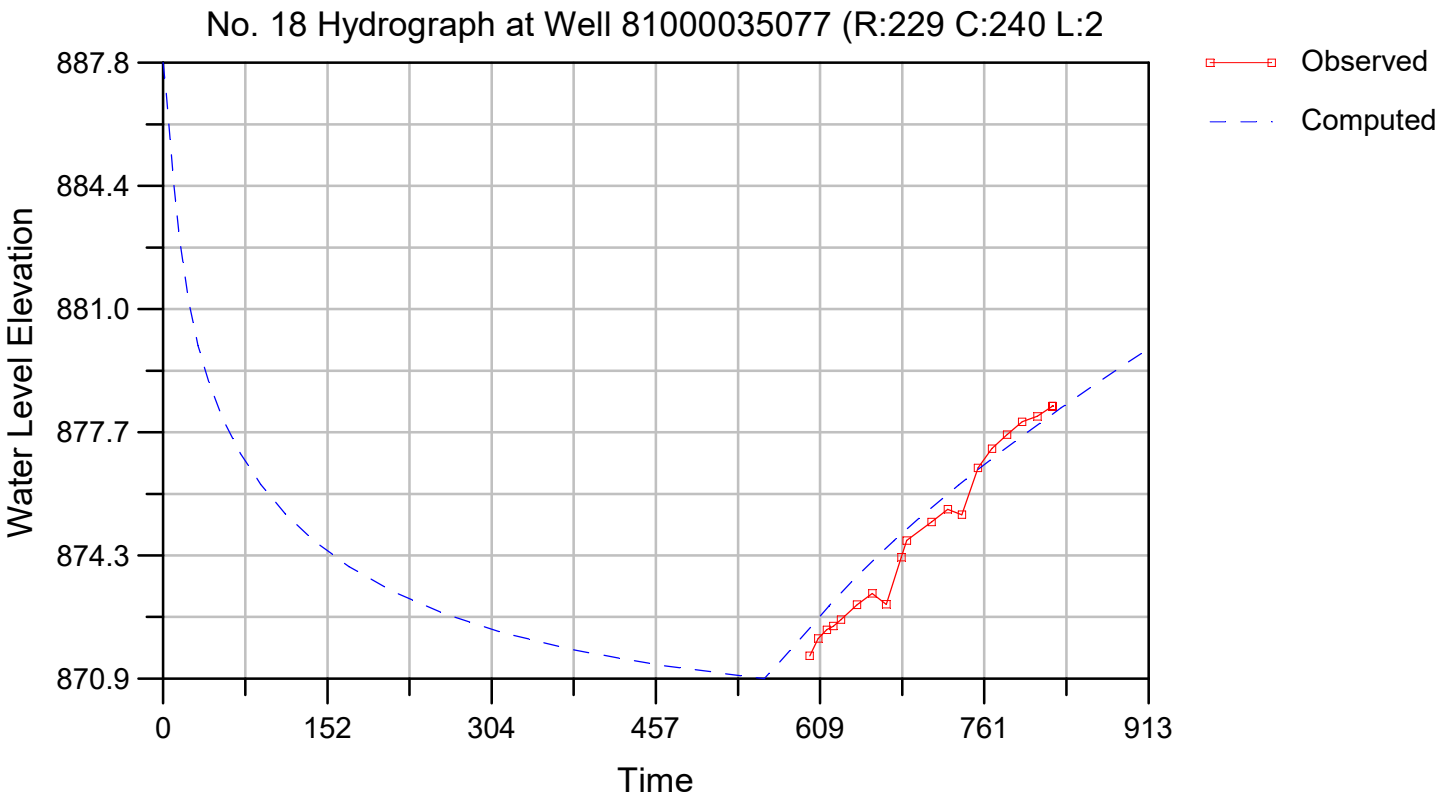

No. 14 Hydrograph at Well 81000004822 (R:258 C:123 L:2
892.1
890.3
888.5
886.7
884.9
883.1
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

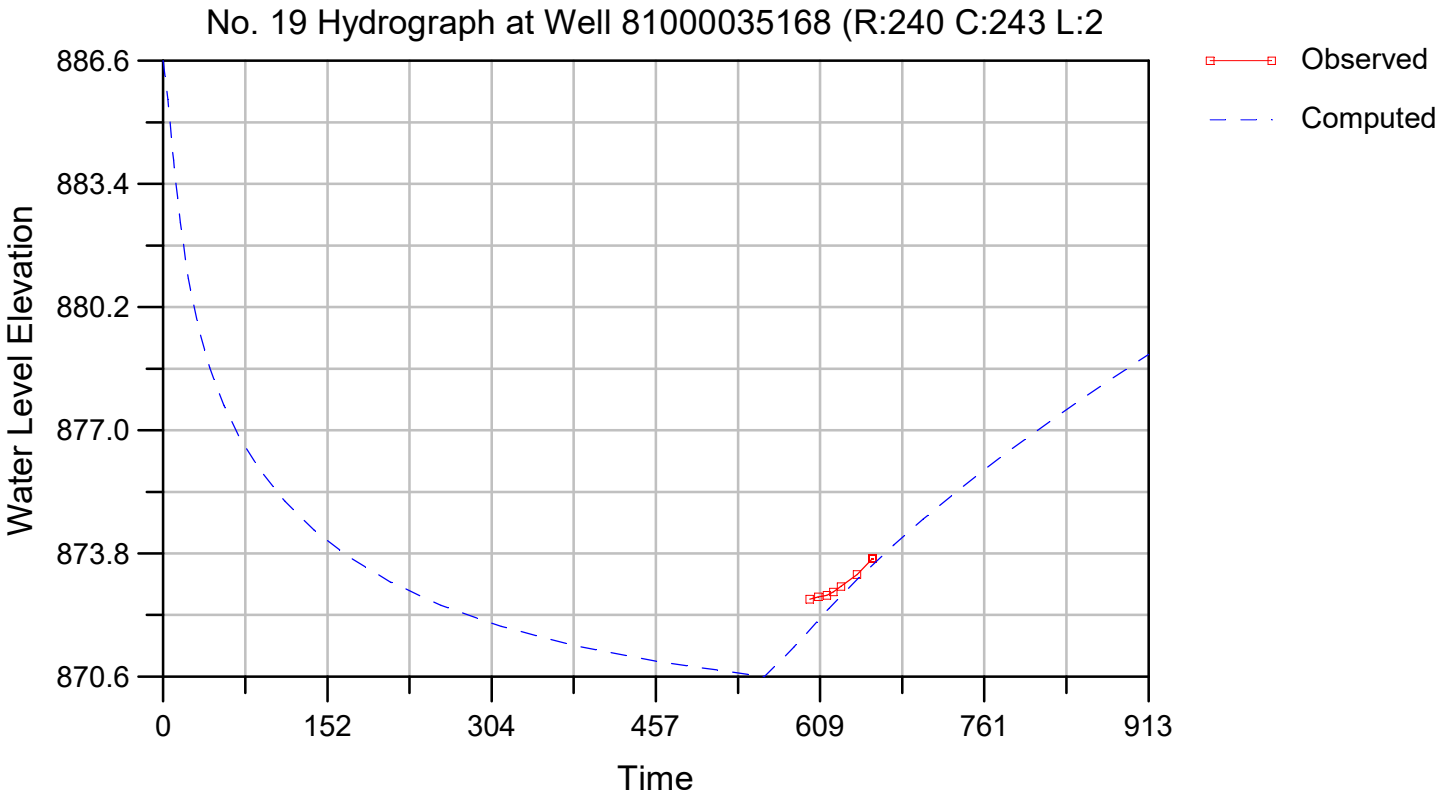

No. 17 Hydrograph at Well 81000023380 (R:260 C:168 L:2
Water Level Elevation
891.4
889.5
887.7
885.9
884.0
882.2
0
152
304
457
609
761
913
Time
Observed
Computed


No. 4 Hydrograph at Well 81000023553 (R:251 C:239 L:2
885.7
882.7
879.6
876.6
873.6
870.5
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

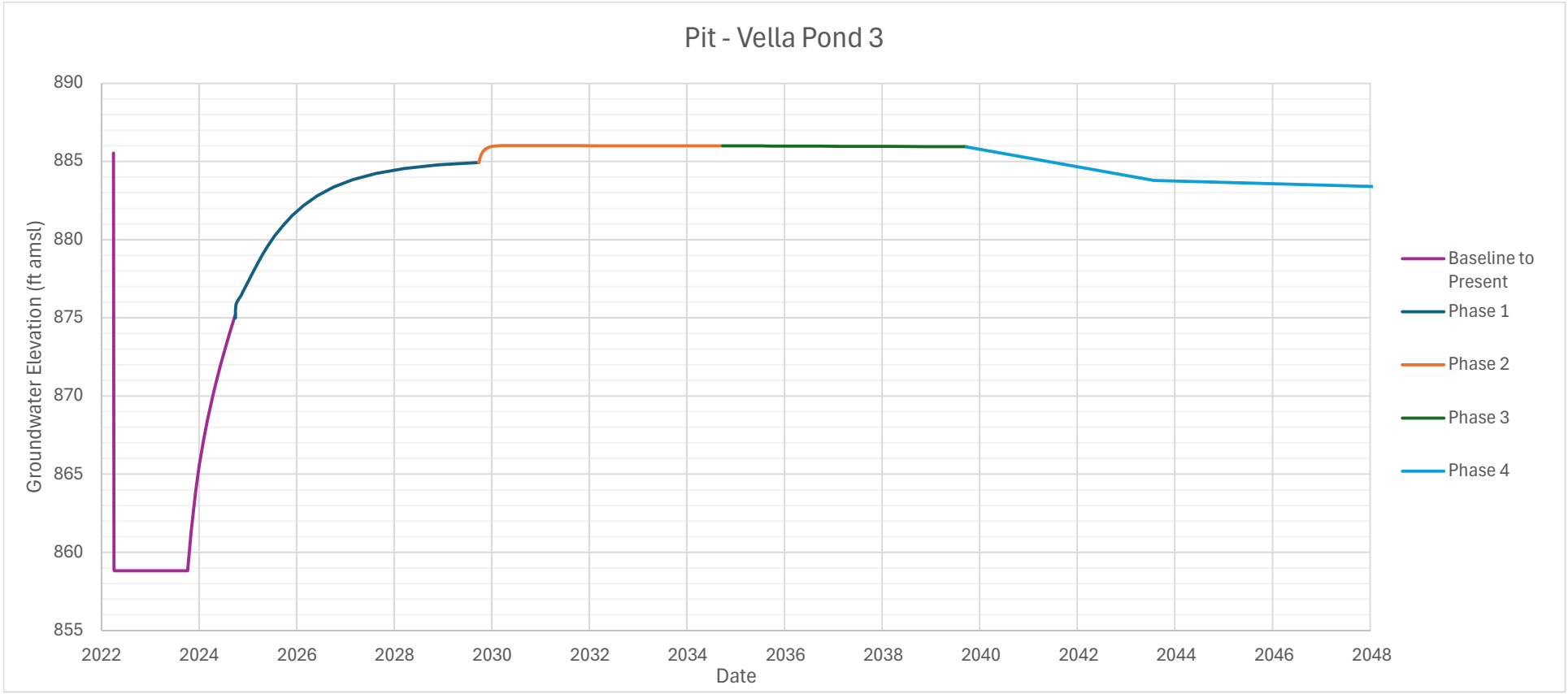

No. 13 Hydrograph at Well 81000024062 (R:183 C:308 L:2
876.0
873.3
870.5
867.7
864.9
862.1
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

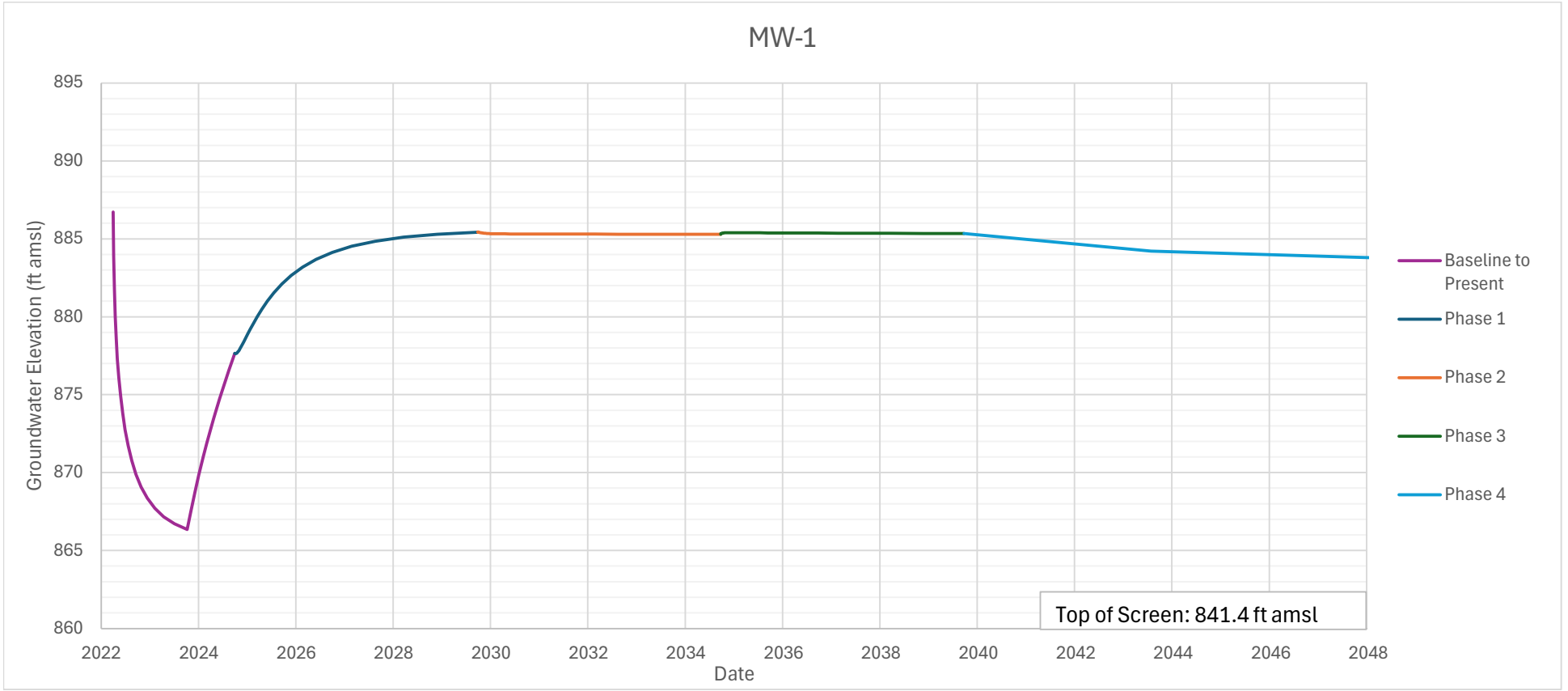

No. 9 Hydrograph at Well 81000035072 (R:215 C:290 L:2
879.1
876.1
873.0
870.0
866.9
863.9
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

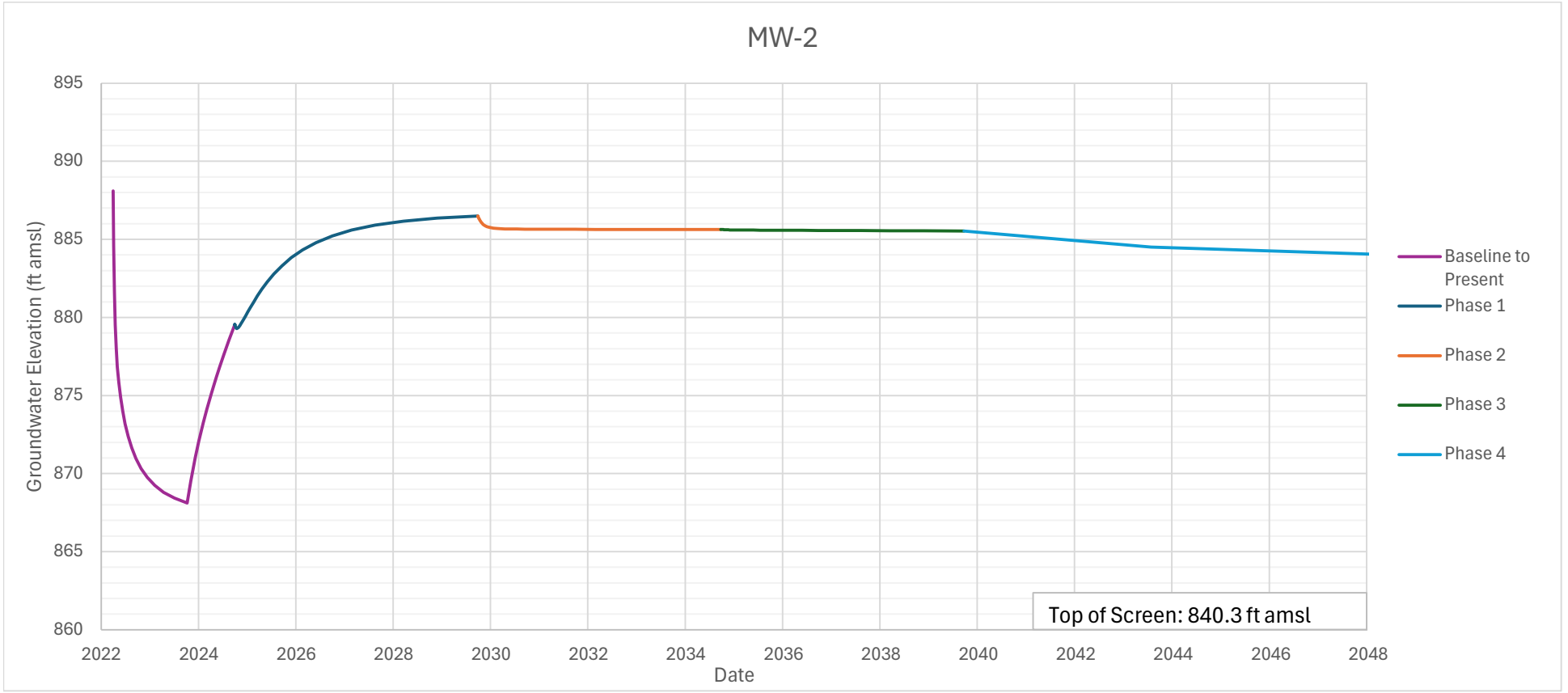

No. 18 Hydrograph at Well 81000035077 (R:229 C:240 L:2
887.8
884.4
881.0
877.7
874.3
870.9
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

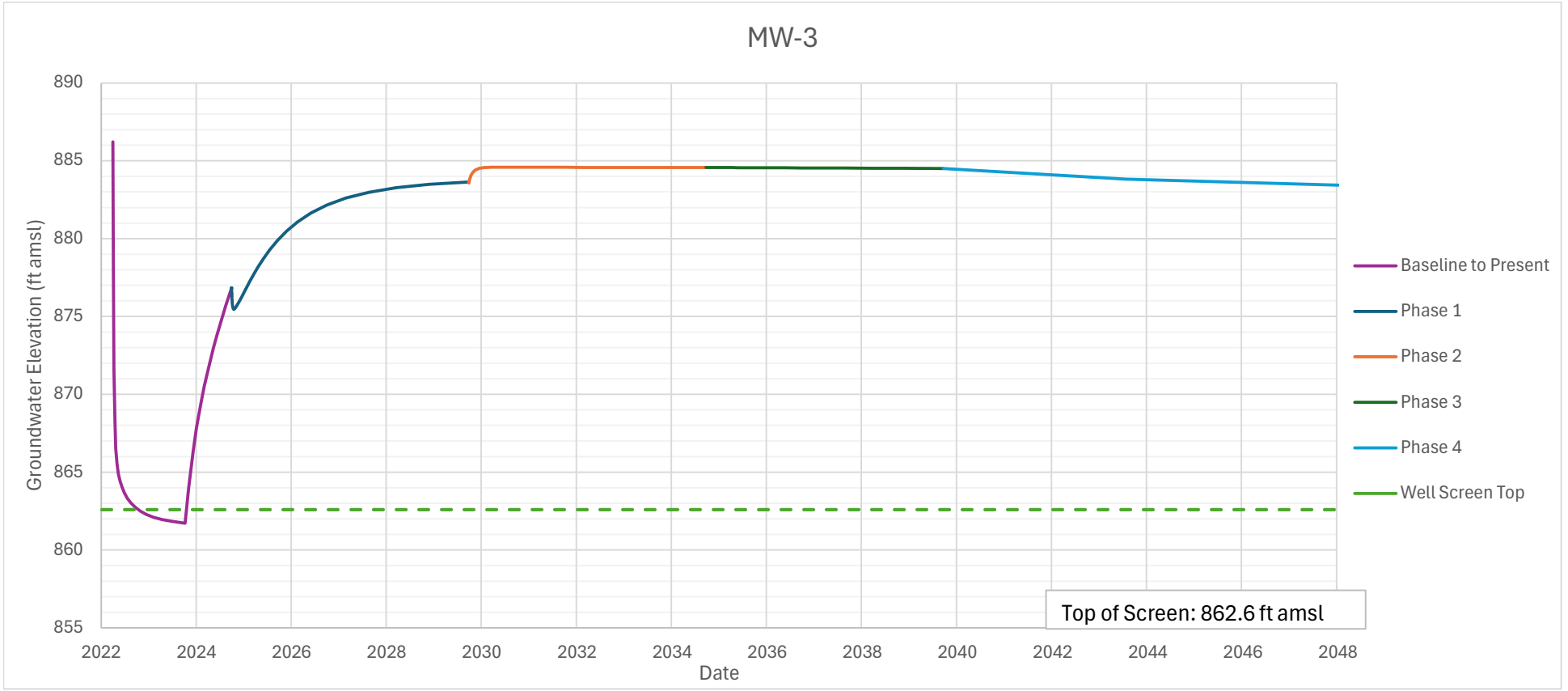

No. 19 Hydrograph at Well 81000035168 (R:240 C:243 L:2
886.6
883.4
880.2
877.0
873.8
870.6
Water Level Elevation
0
152
304
457
609
761
913
Time
Observed
Computed

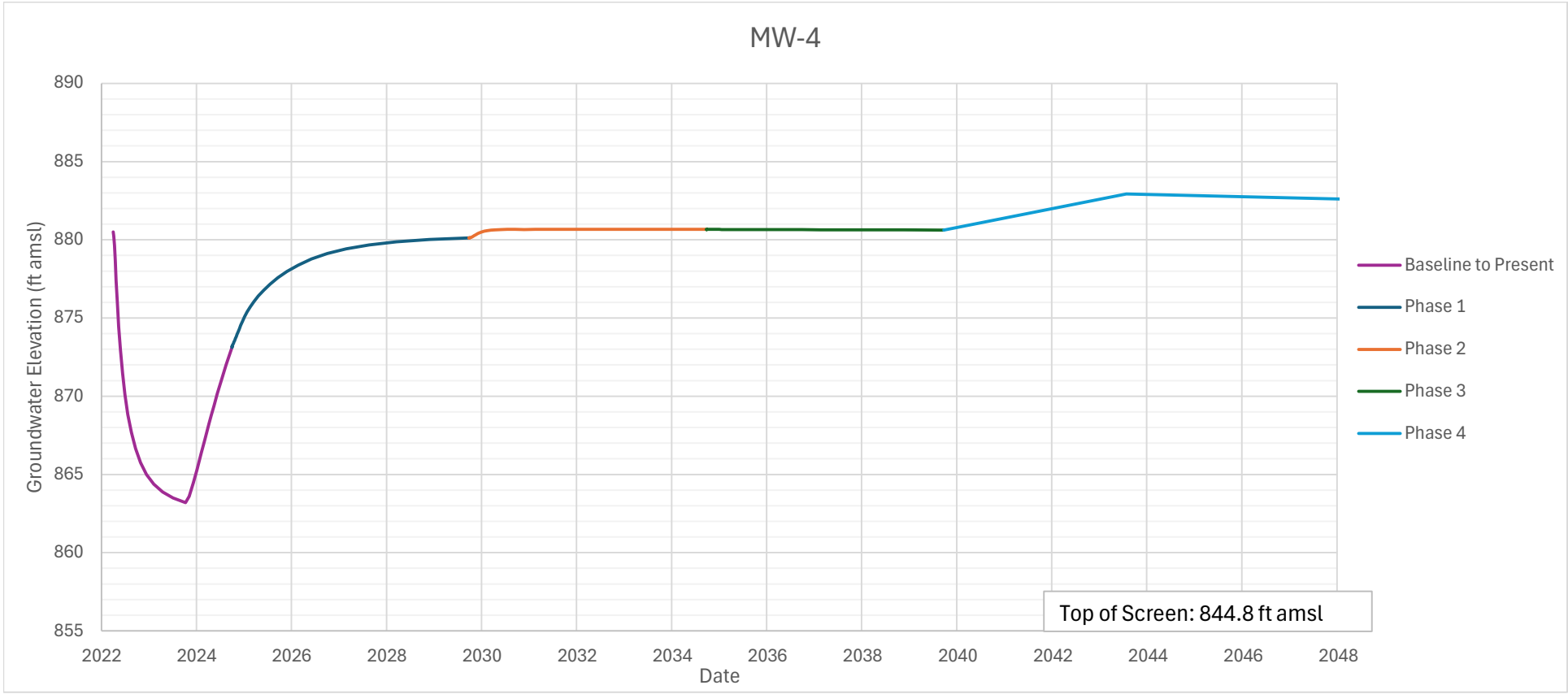
APPENDIX L
Model Output Graphs

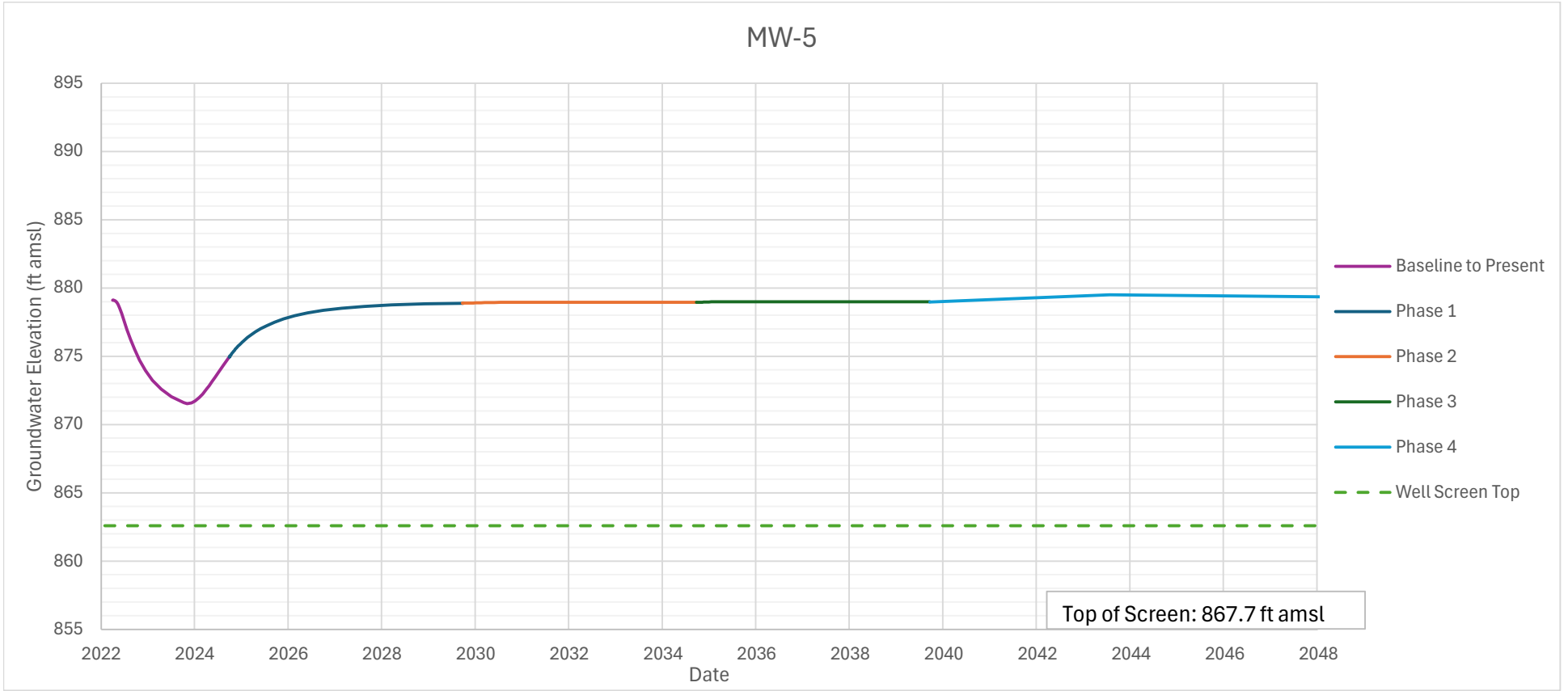

Pit - Vella Pond 3
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

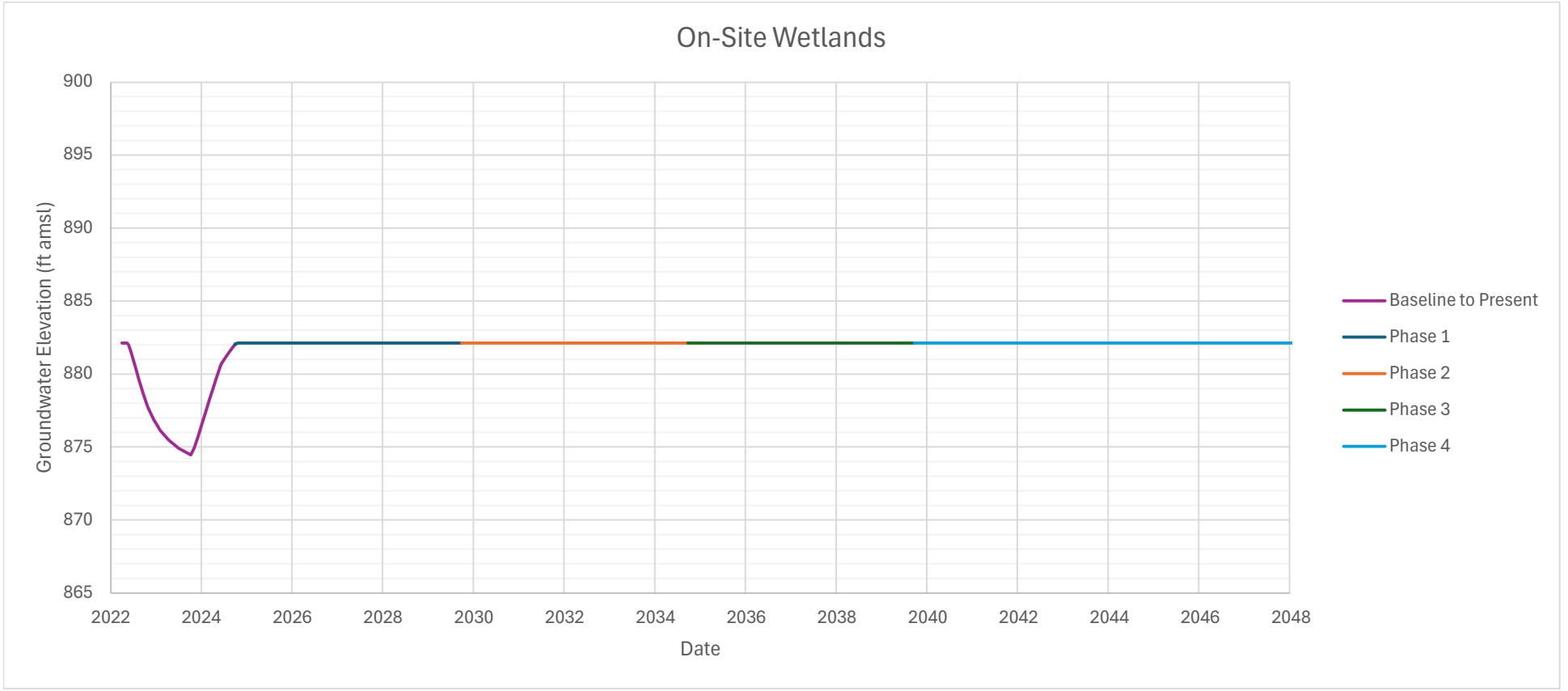

MW-1
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Top of Screen: 841.4 ft amsl

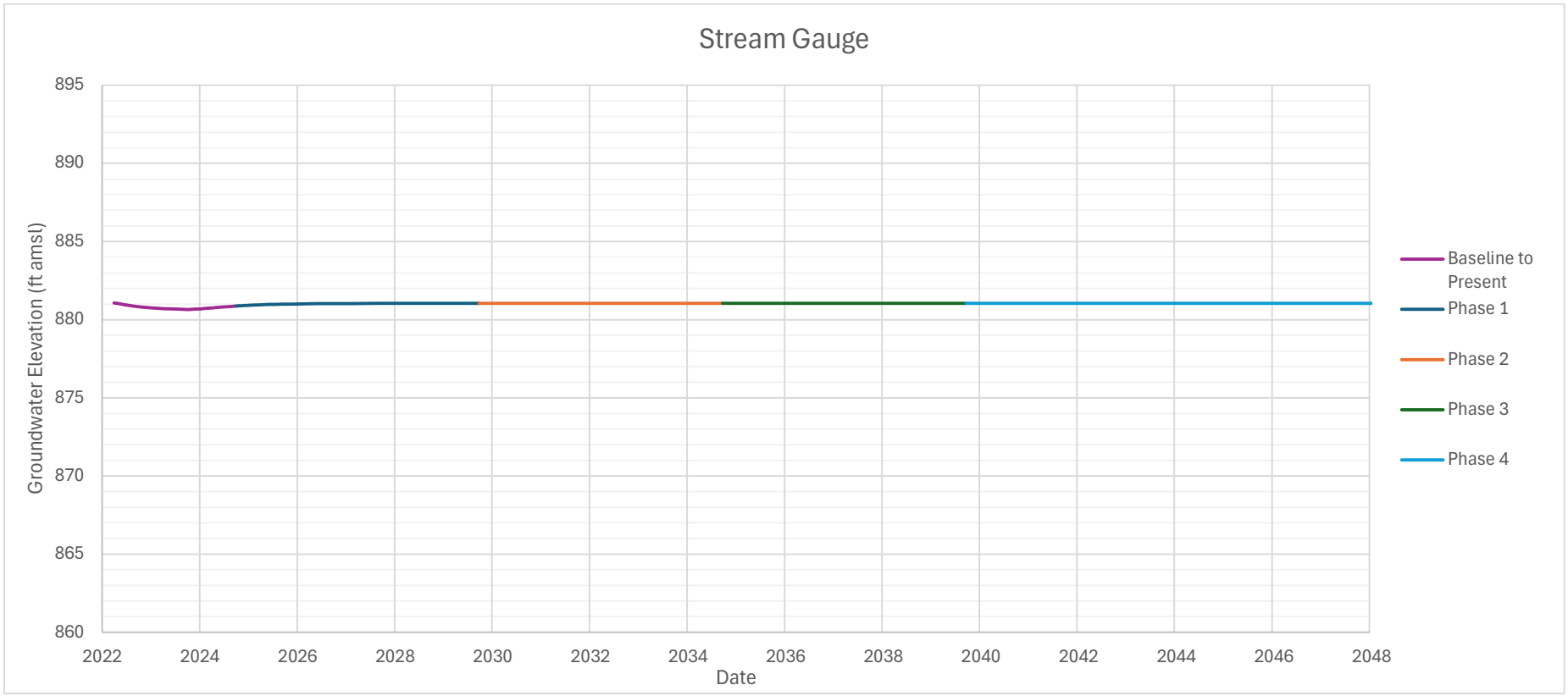

MW-2
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Top of Screen: 840.3 ft amsl

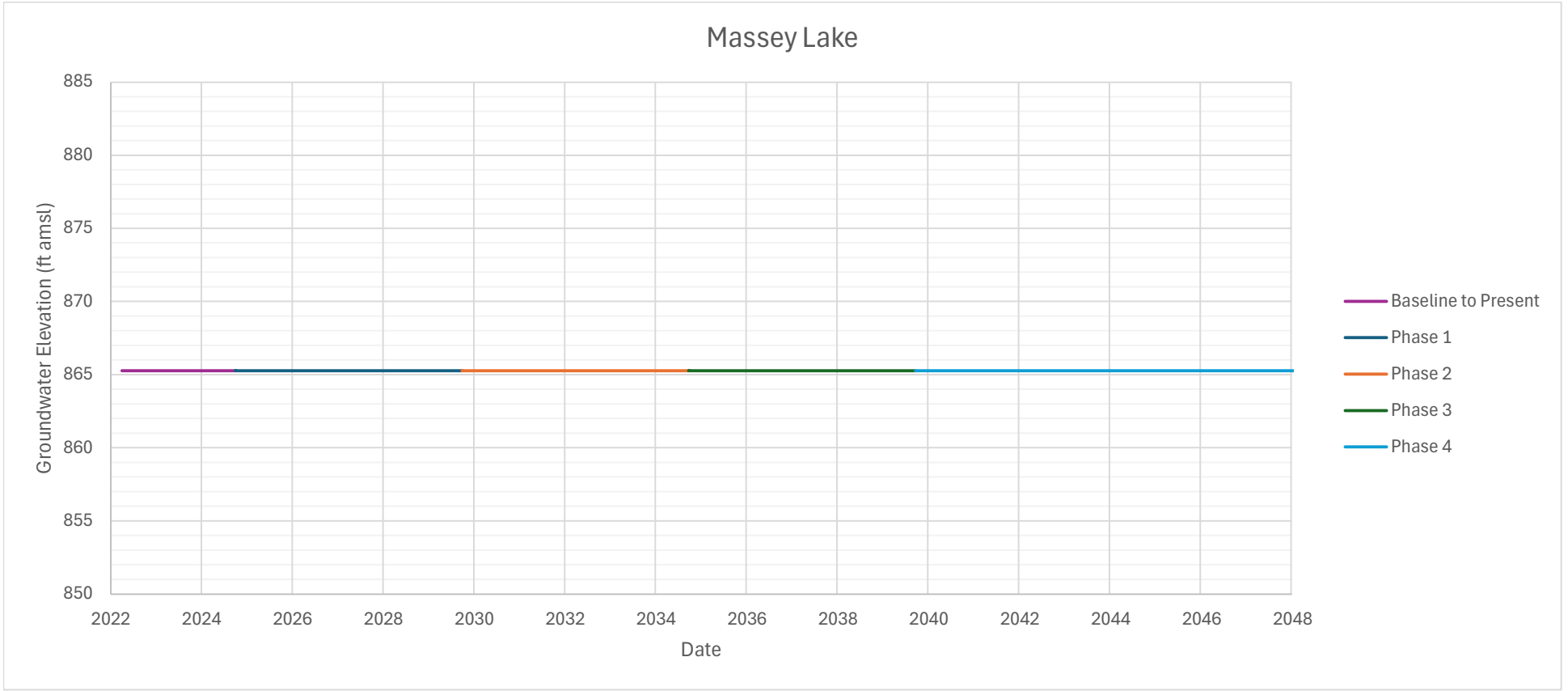

MW-3
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top
Top of Screen: 862.6 ft amsl

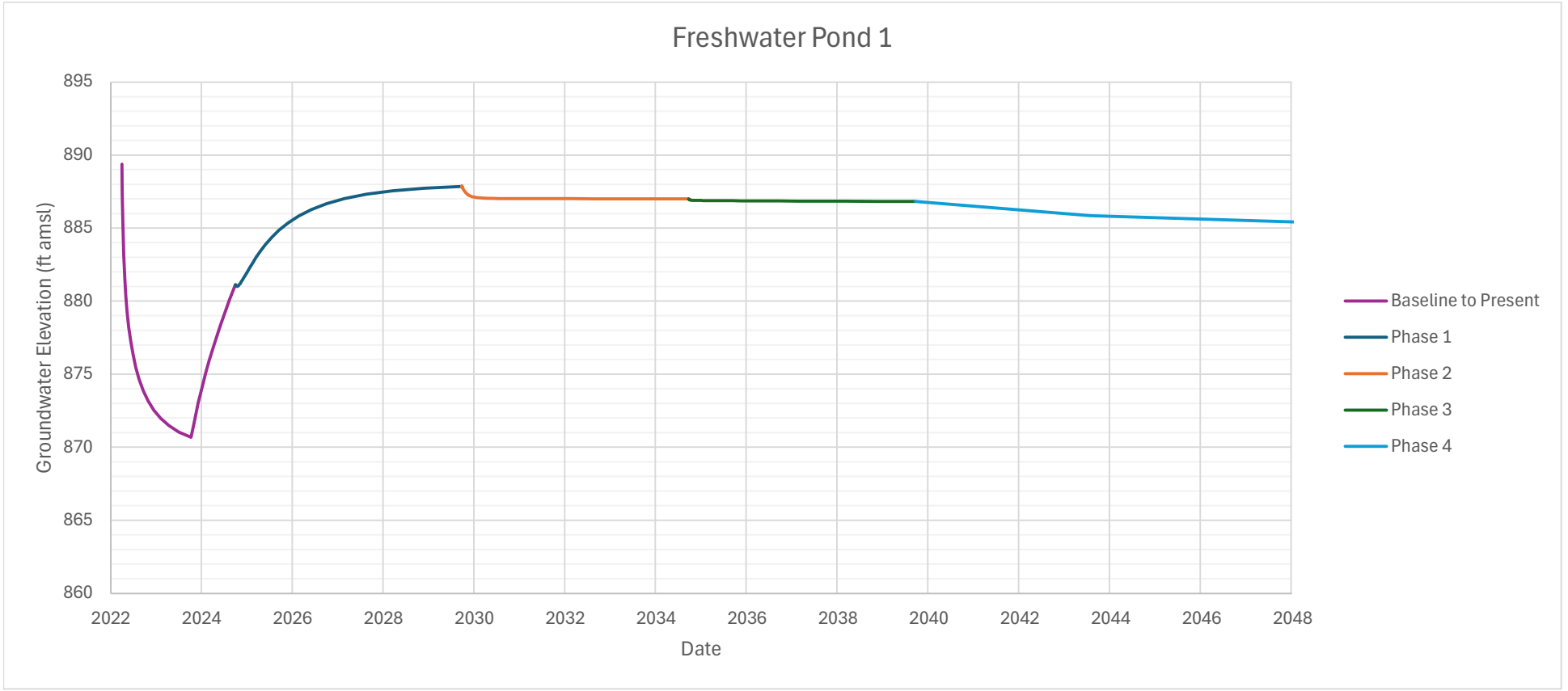

MW-4
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Top of Screen: 844.8 ft amsl

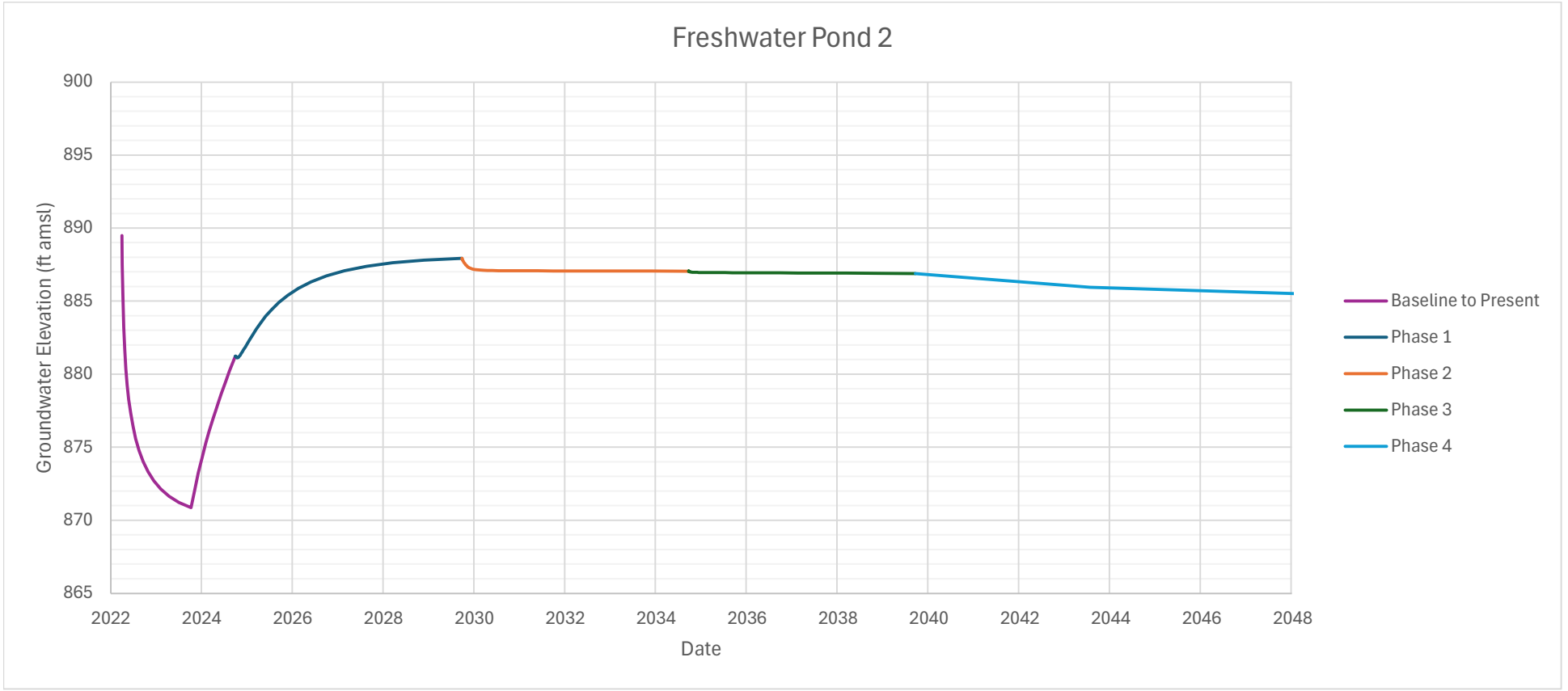

MW-5
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top
Top of Screen: 867.7 ft amsl

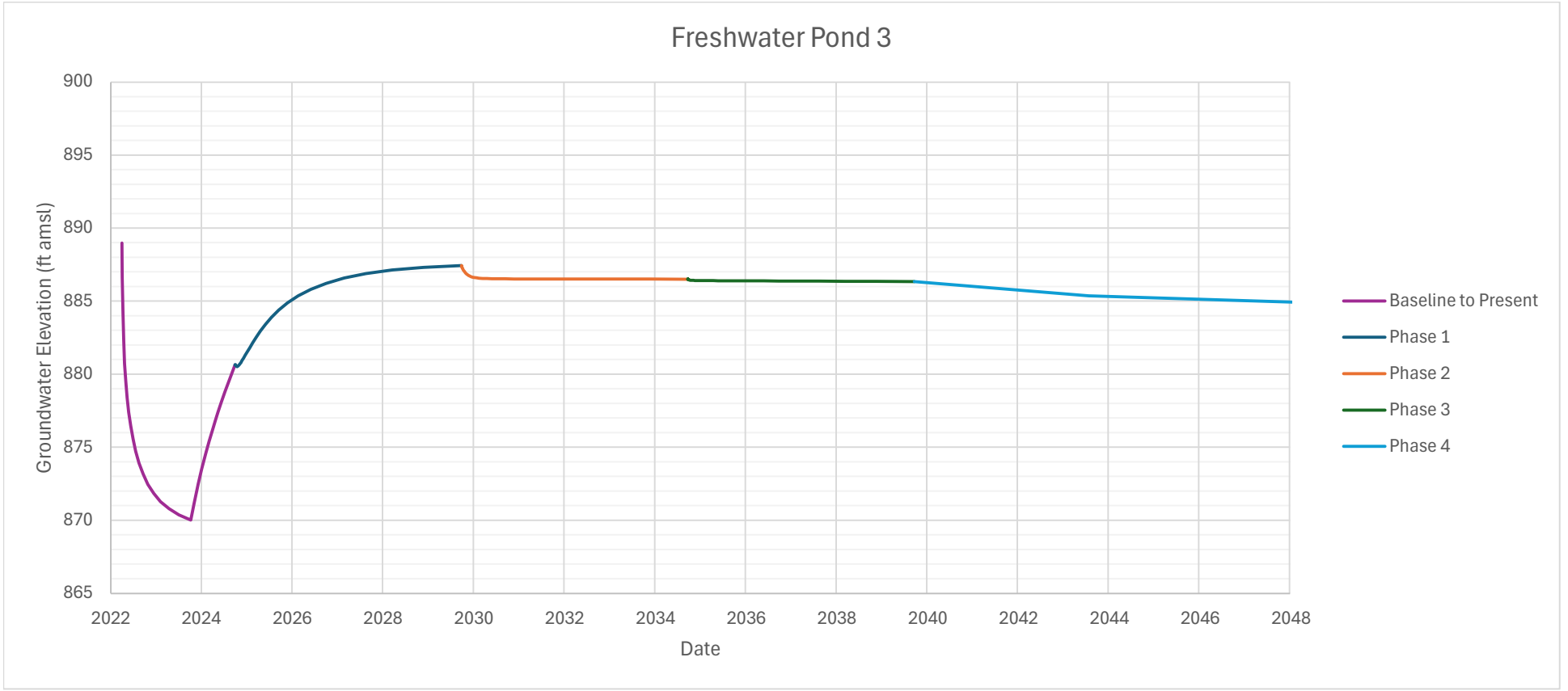

On-Site Wetlands
900
895
890
885
880
875
870
865
Groundwater Elevation (ft amsl)
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

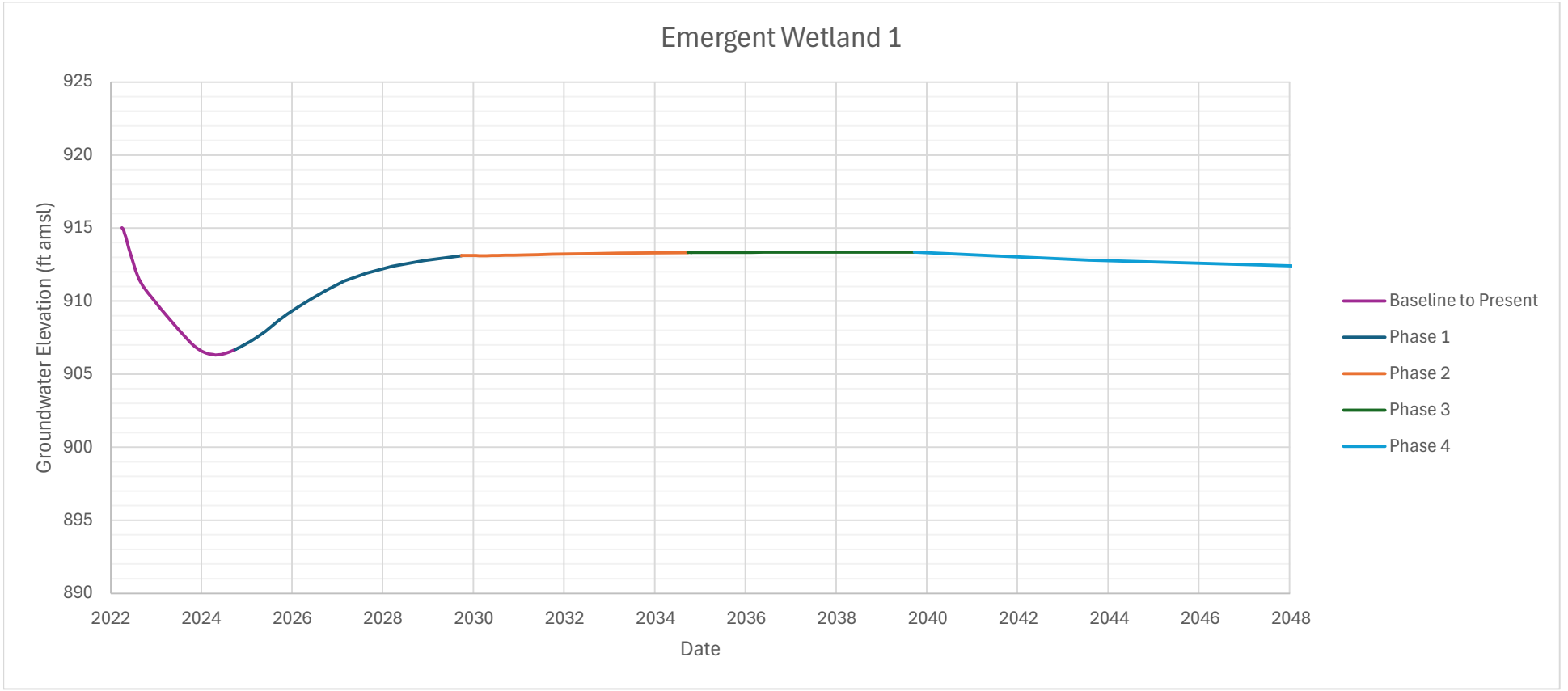

Stream Gauge
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

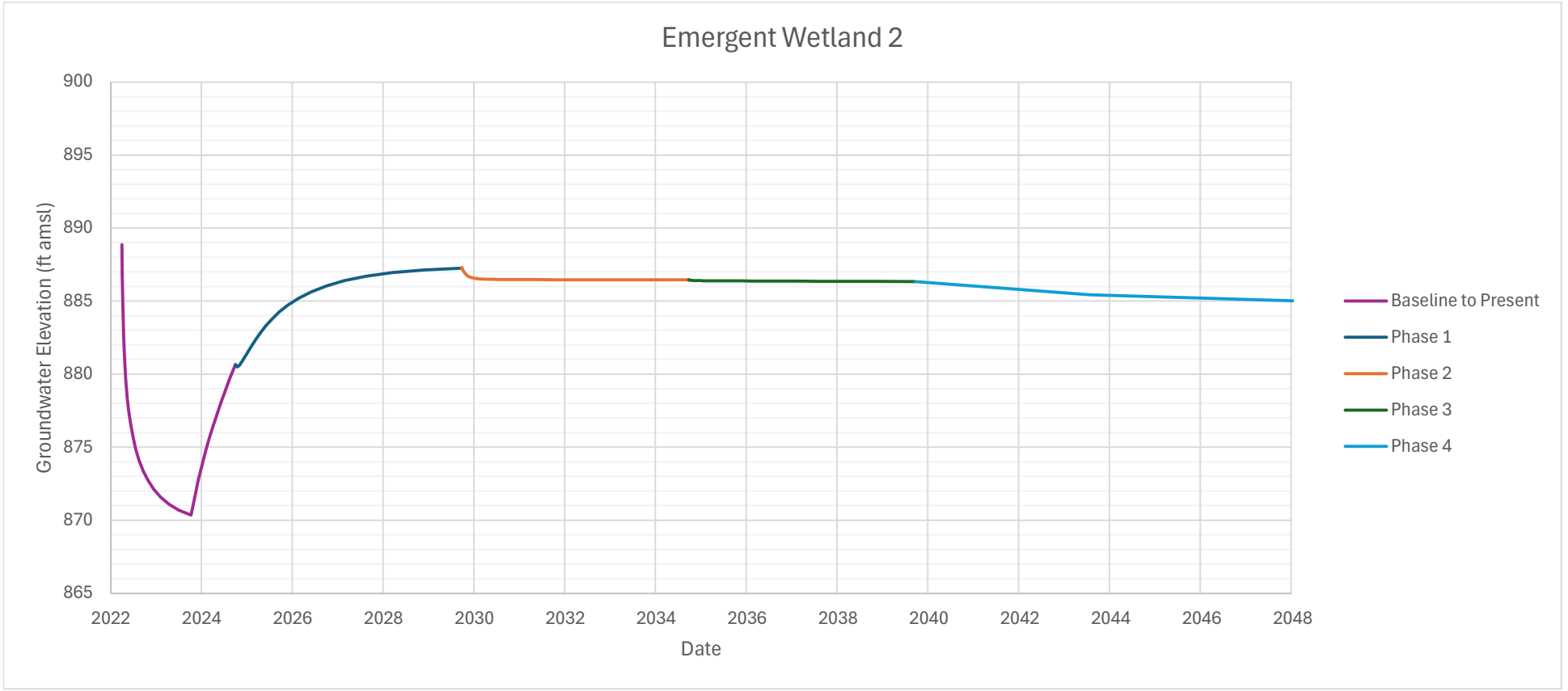

Massey Lake
Groundwater Elevation (ft amsl)
885
880
875
870
865
860
855
850
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

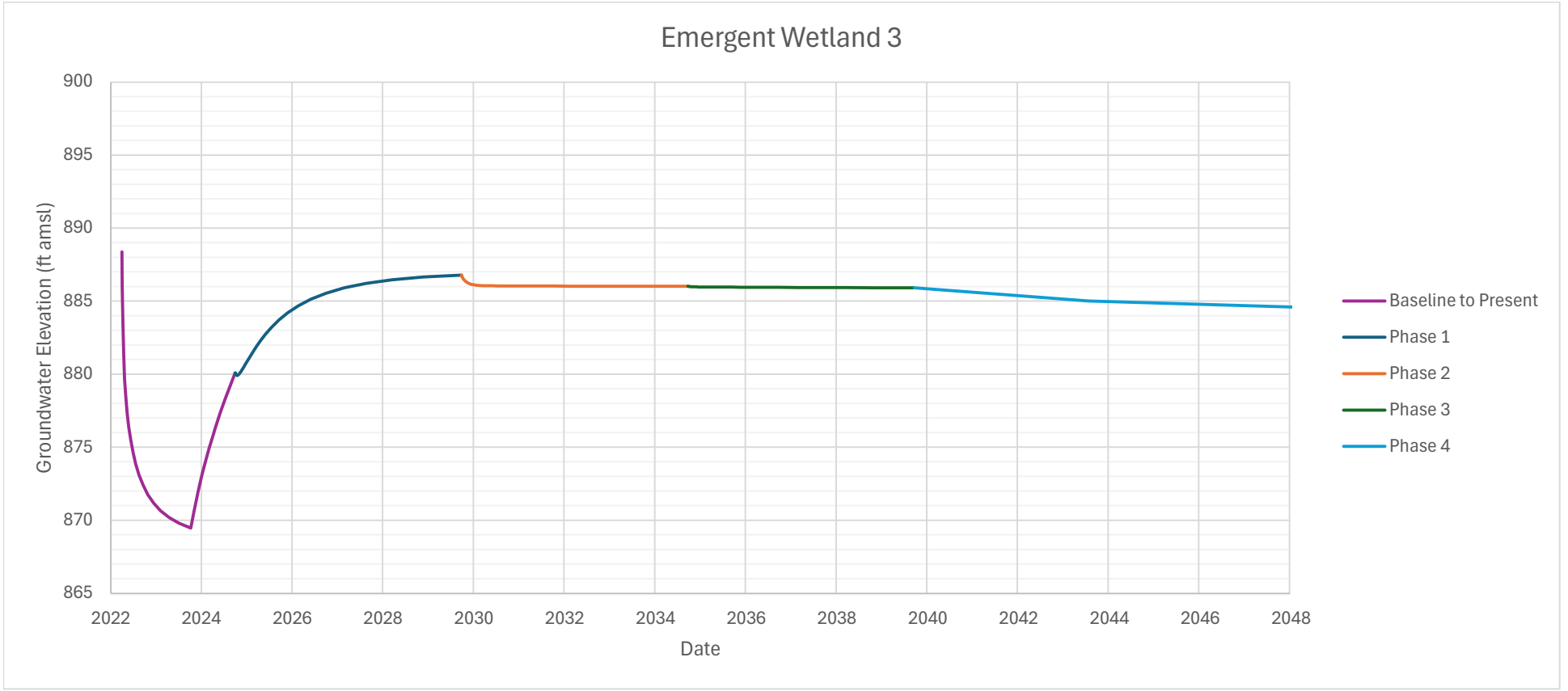

Freshwater Pond 1
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

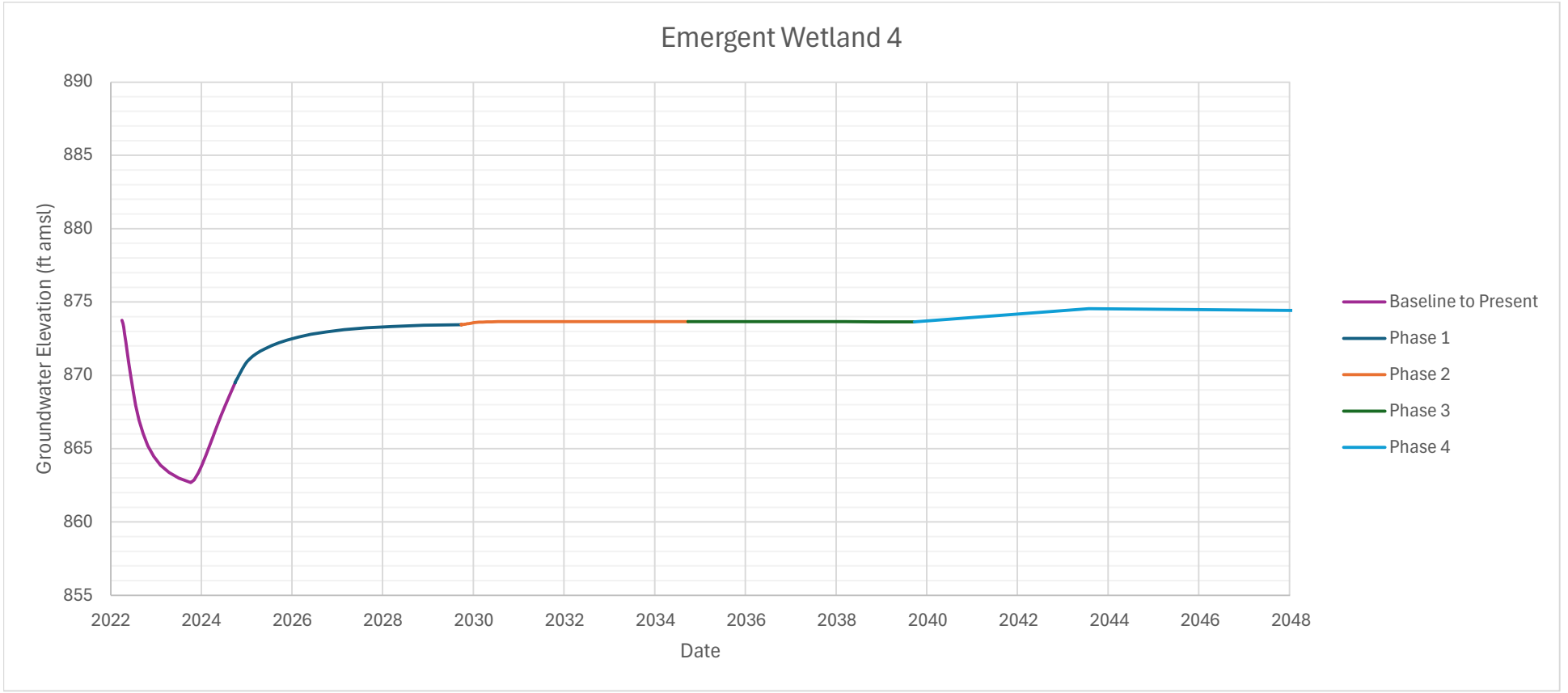

Freshwater Pond 2
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

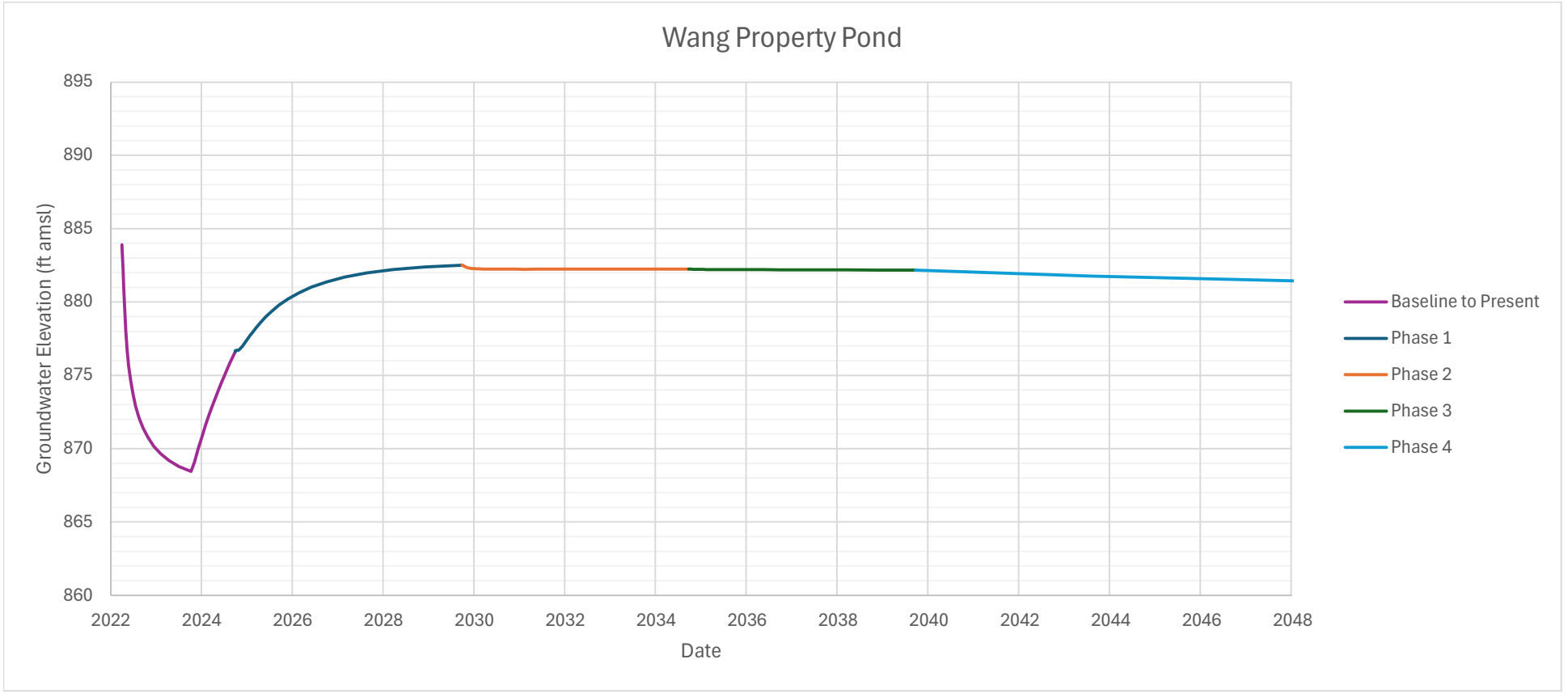

Freshwater Pond 3
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

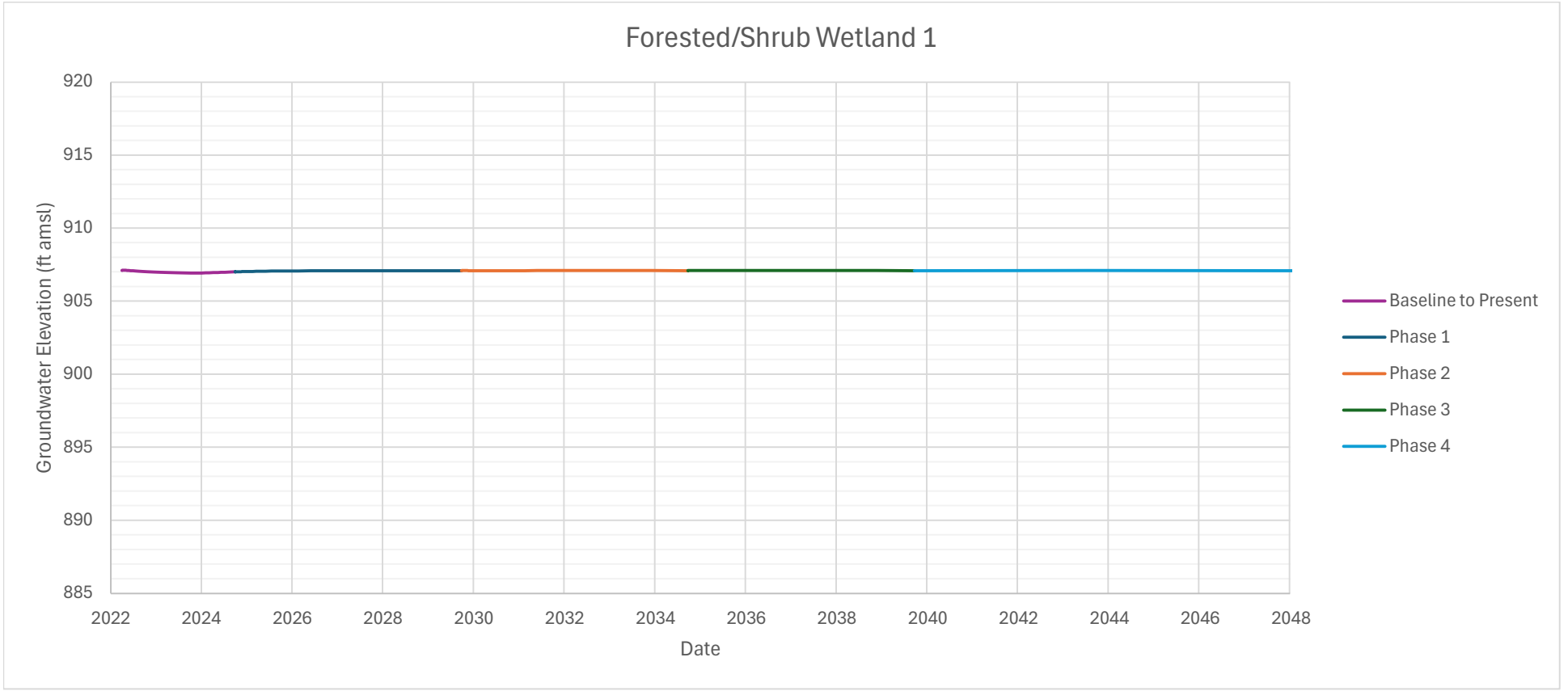

Emergent Wetland 1
Groundwater Elevation (ft amsl)
925
920
915
910
905
900
895
890
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

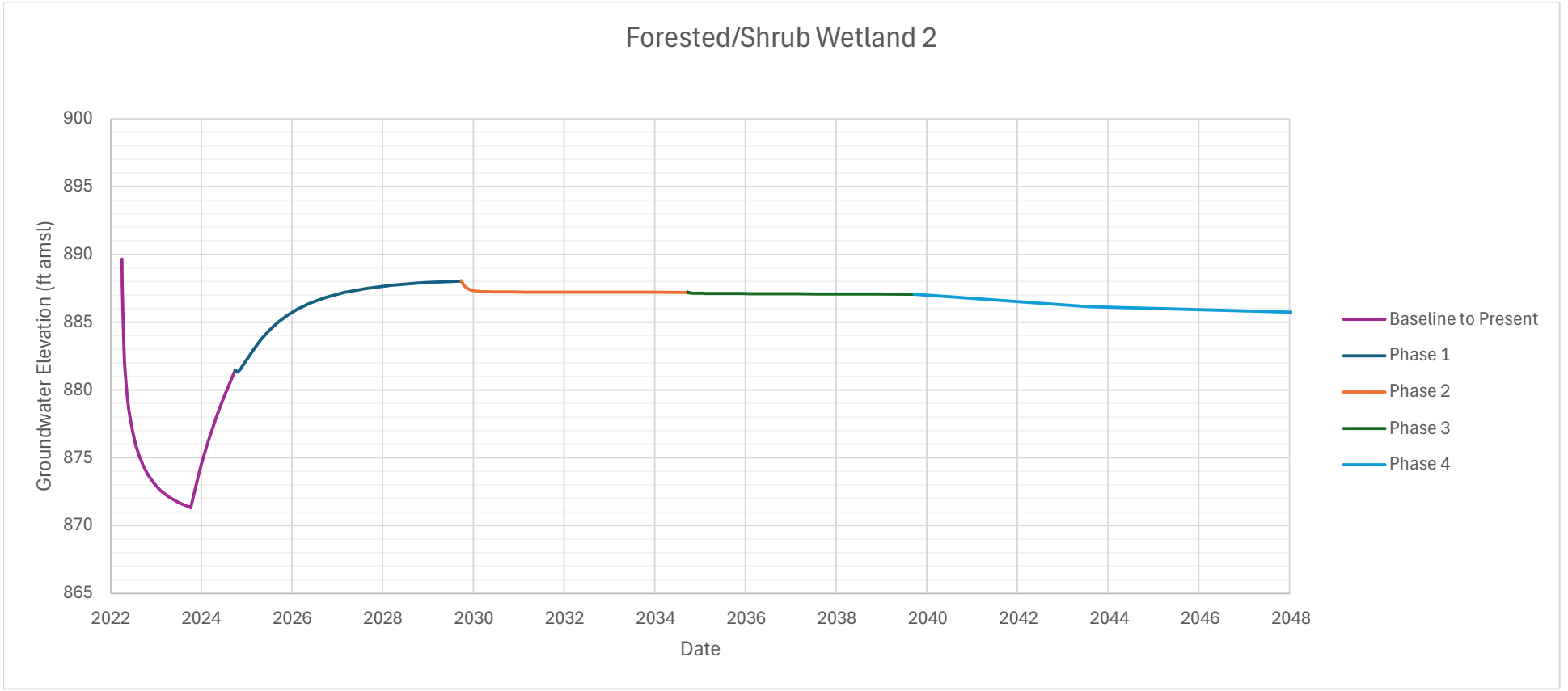

Emergent Wetland 2
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

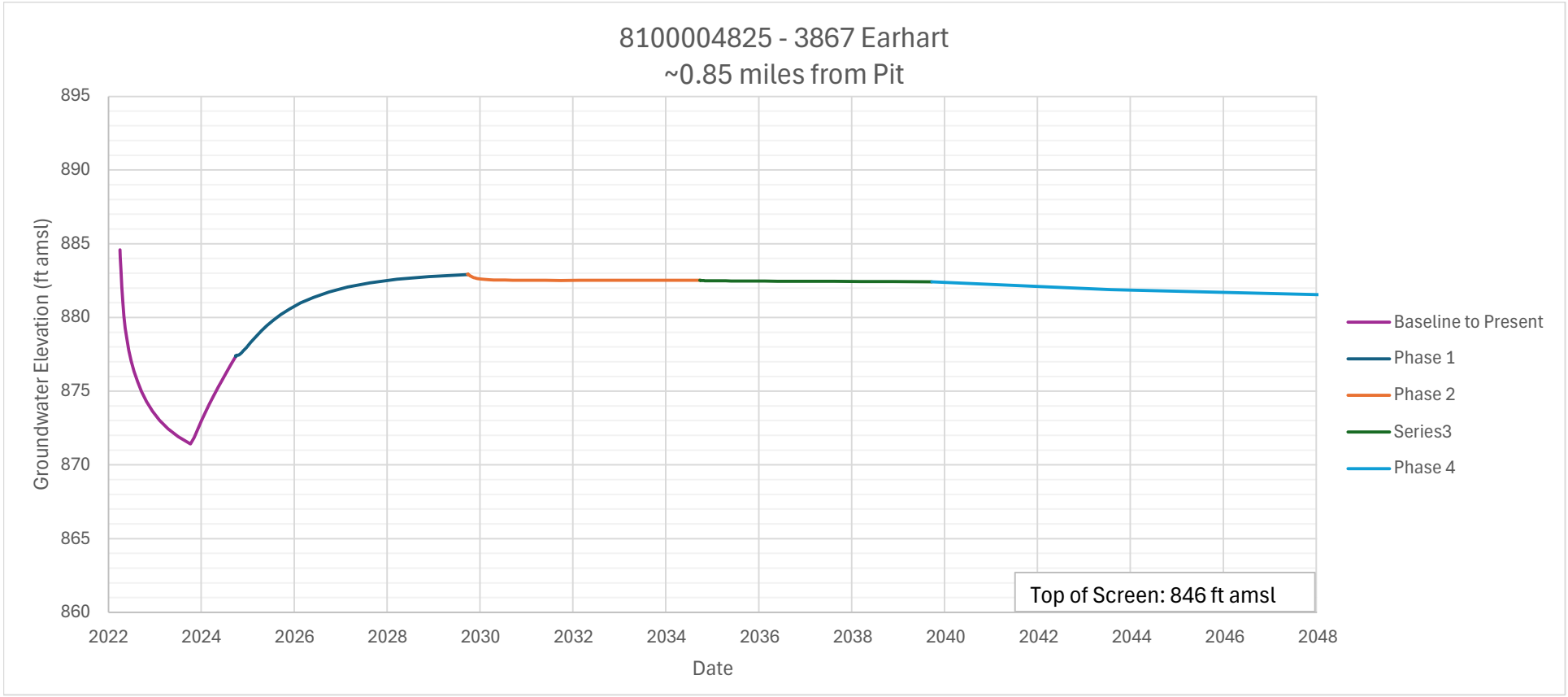

Emergent Wetland 3
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

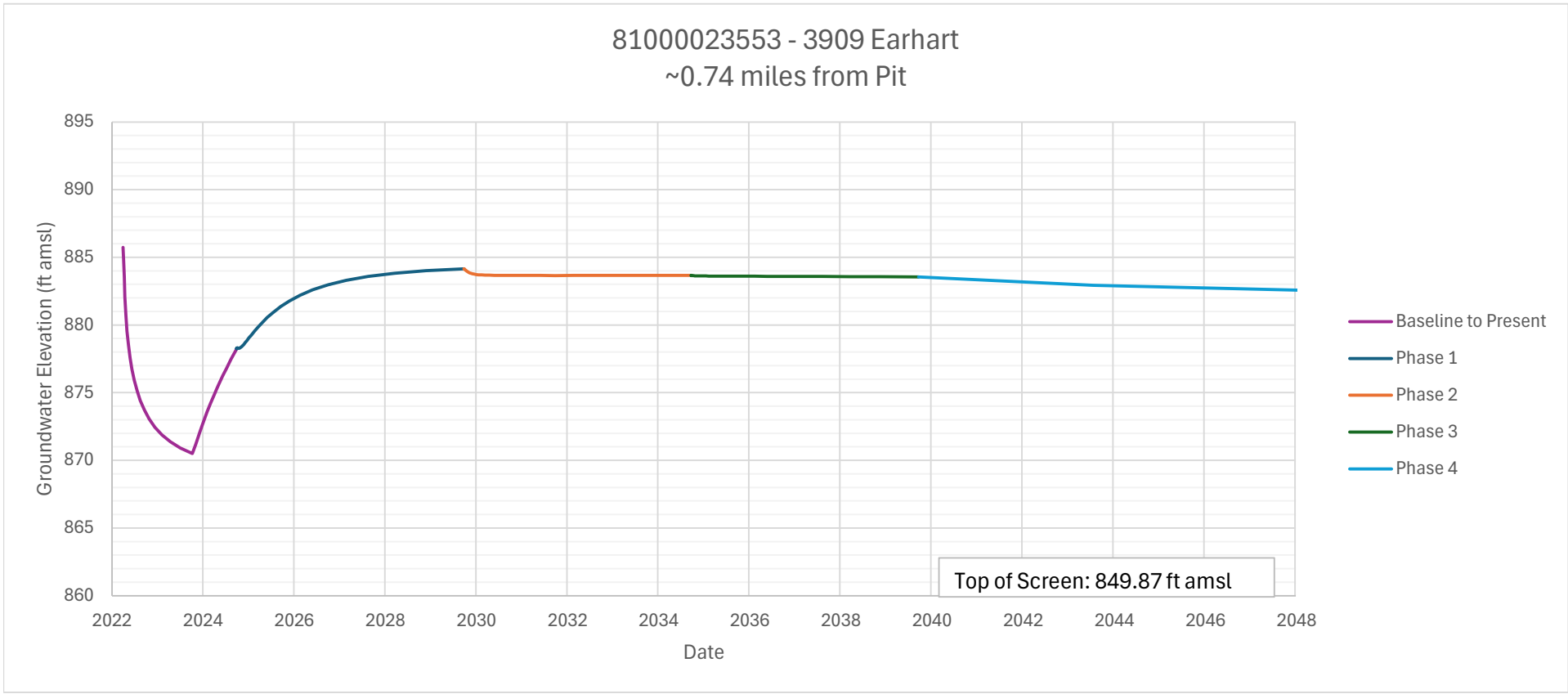

Emergent Wetland 4
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

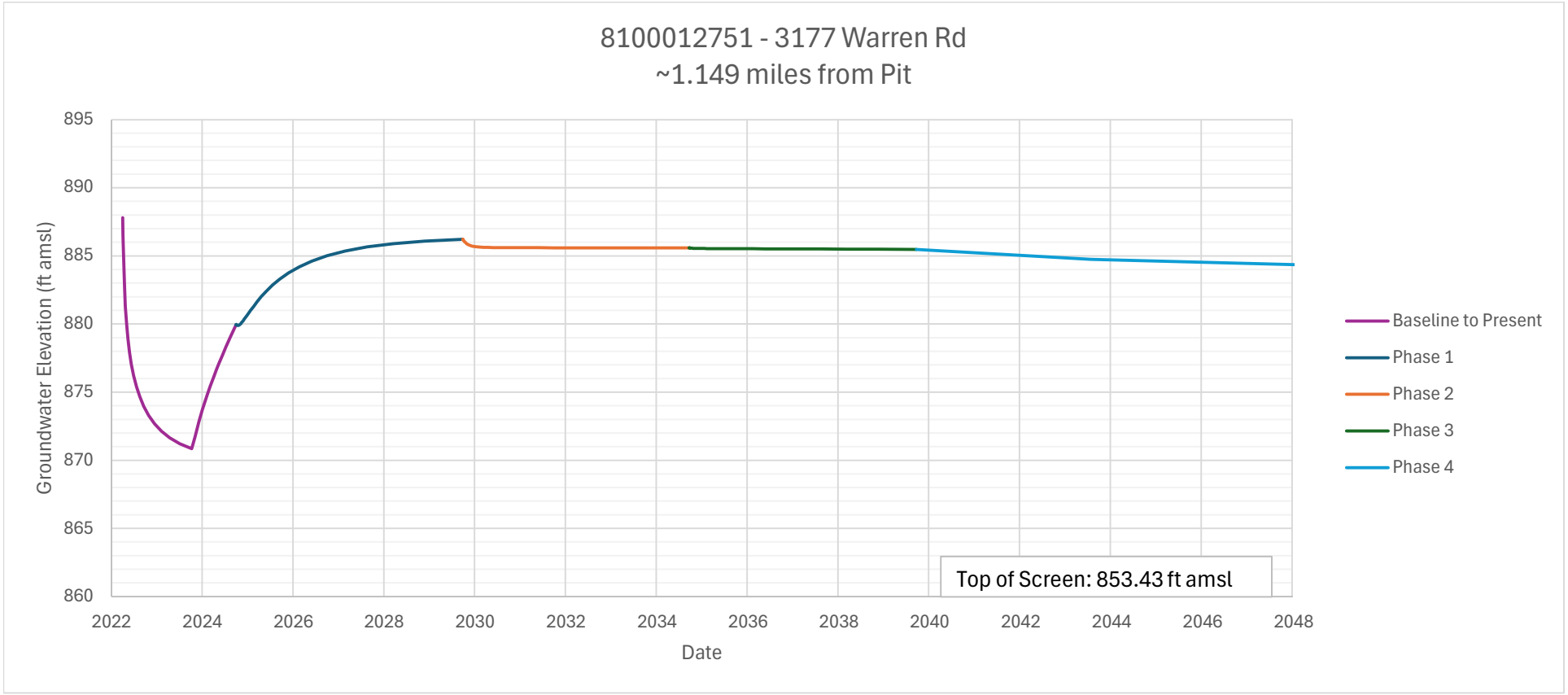

Wang Property Pond
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

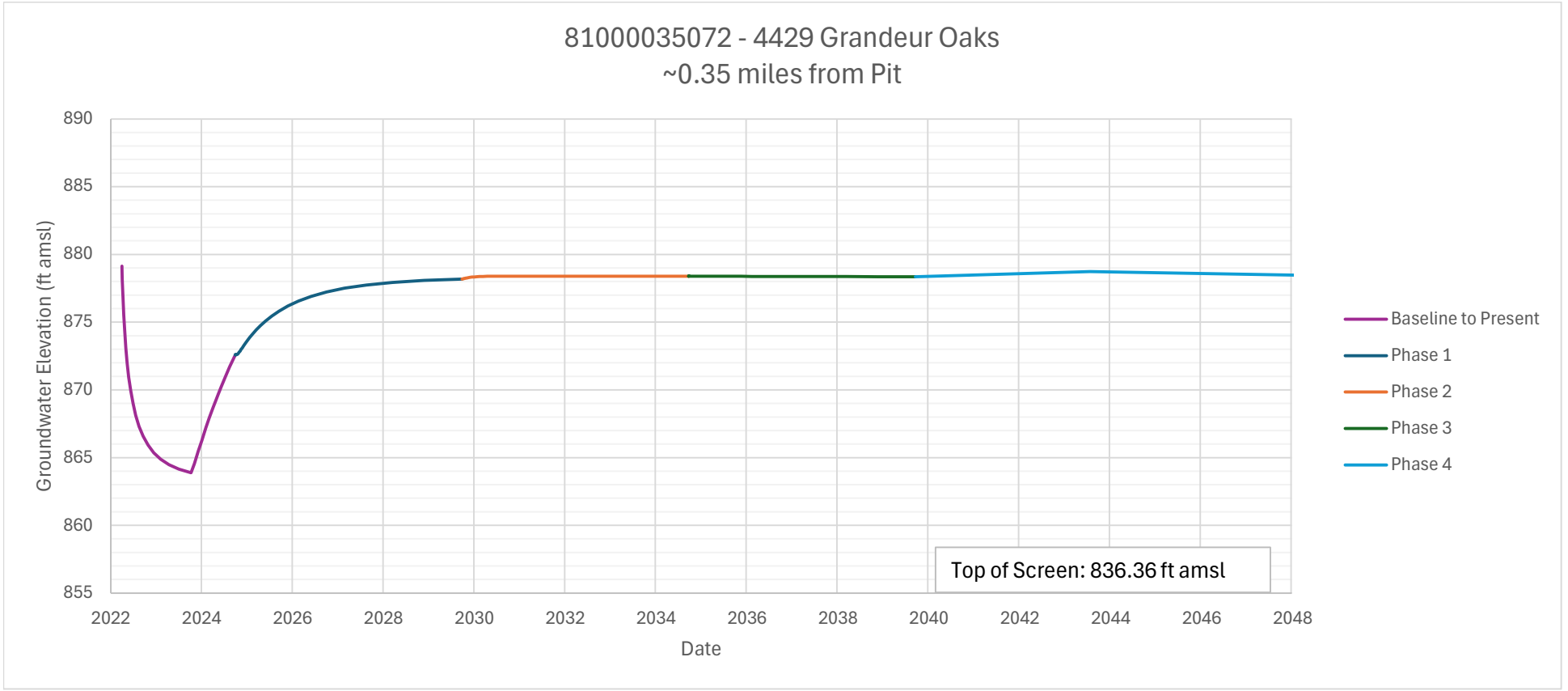

Forested/Shrub Wetland 1
Groundwater Elevation (ft amsl)
920
915
910
905
900
895
890
885
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

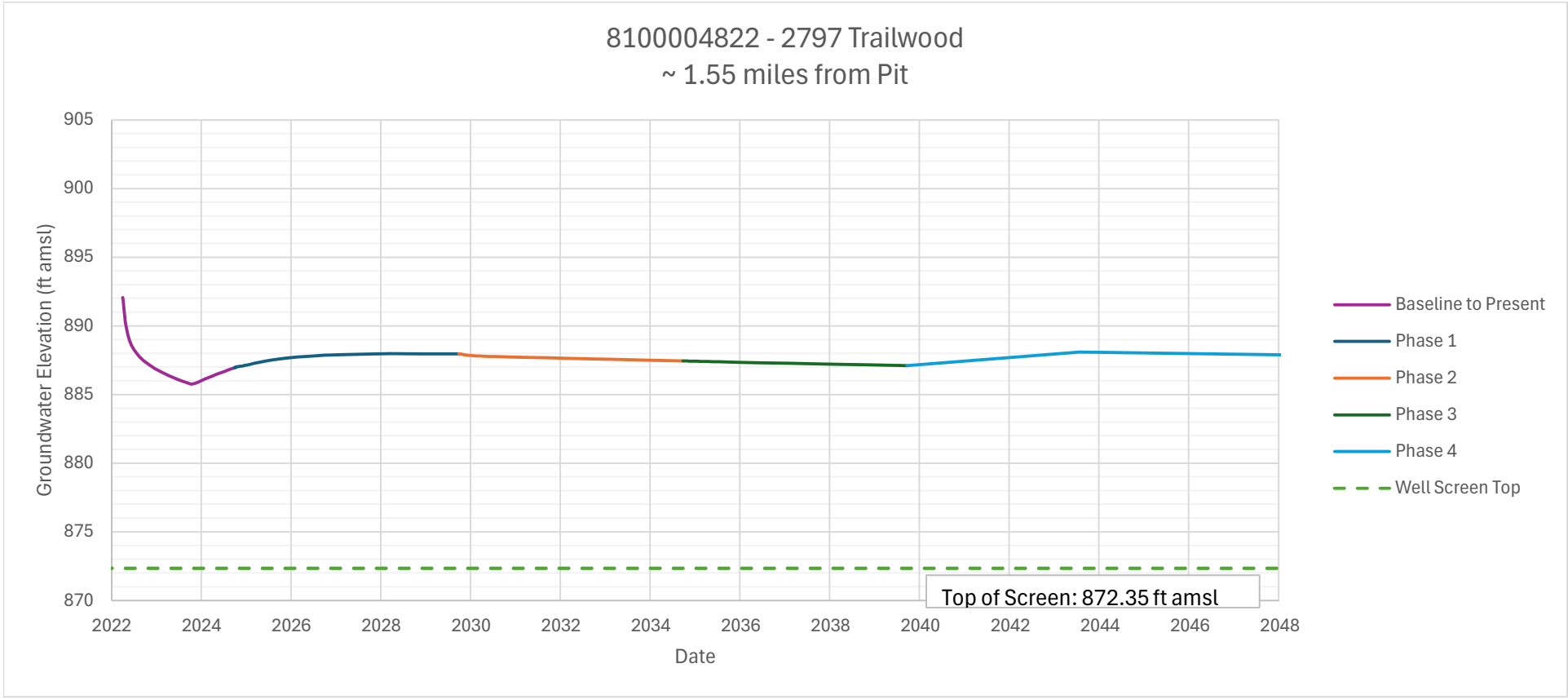

Forested/Shrub Wetland 2
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

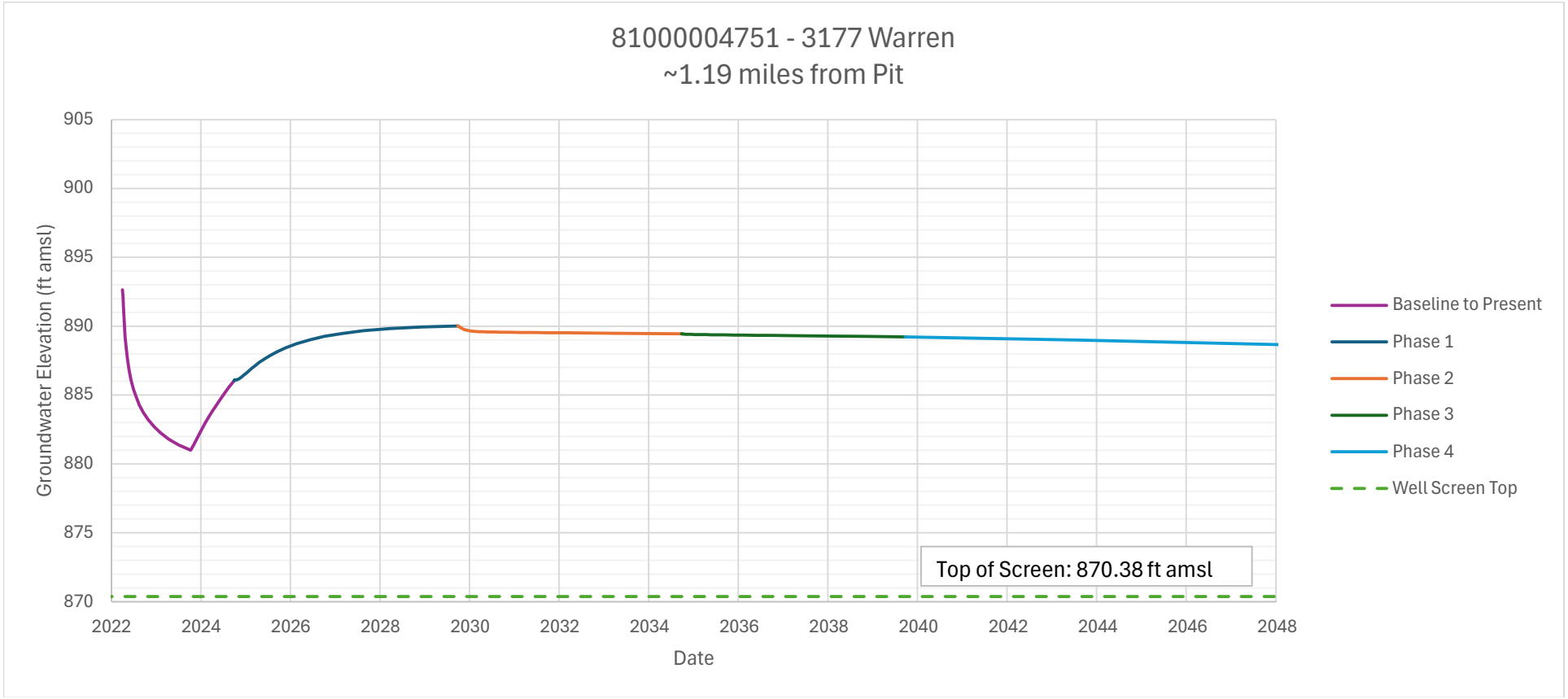

8100004825 - 3867 Earhart
~0.85 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 846 ft amsl
Baseline to Present
Phase 1
Phase 2
Series3
Phase 4

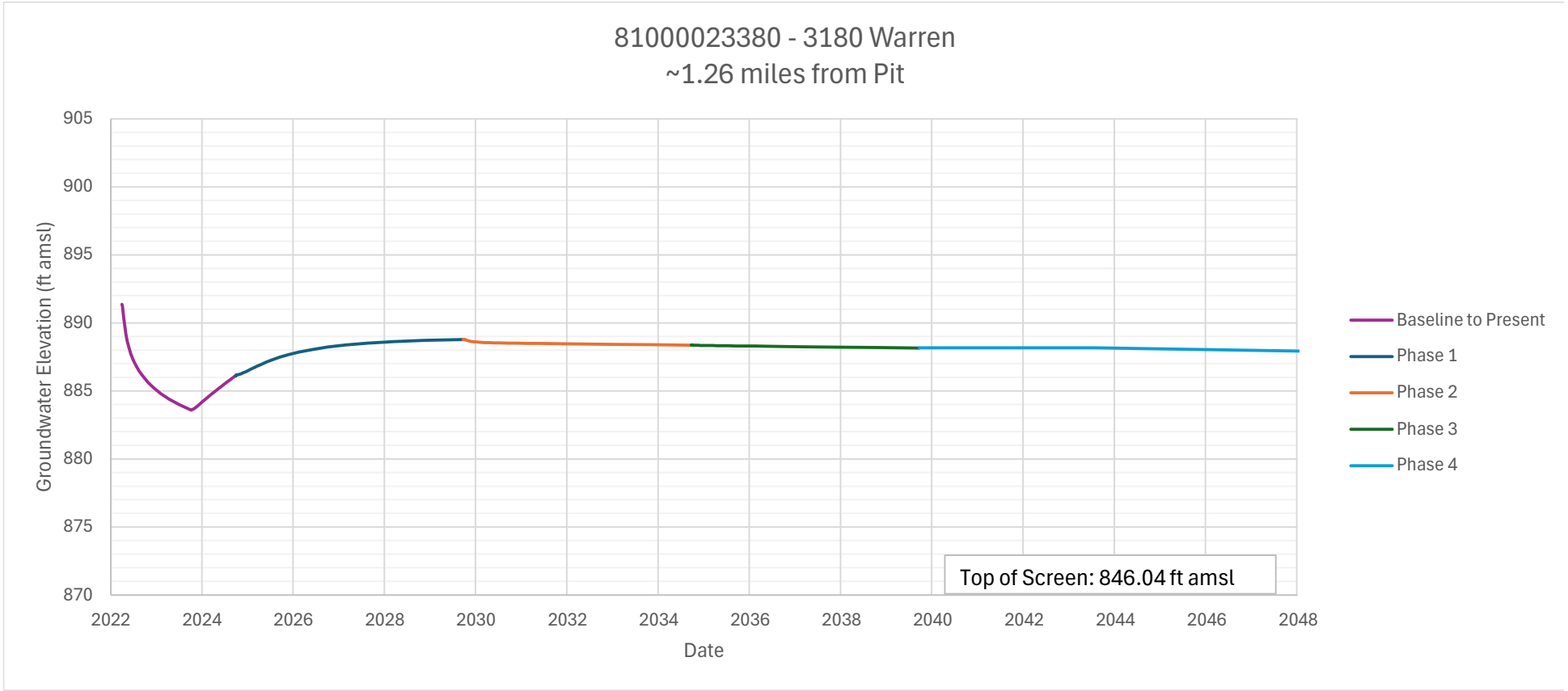

81000023553 - 3909 Earhart
~0.74 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 849.87 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

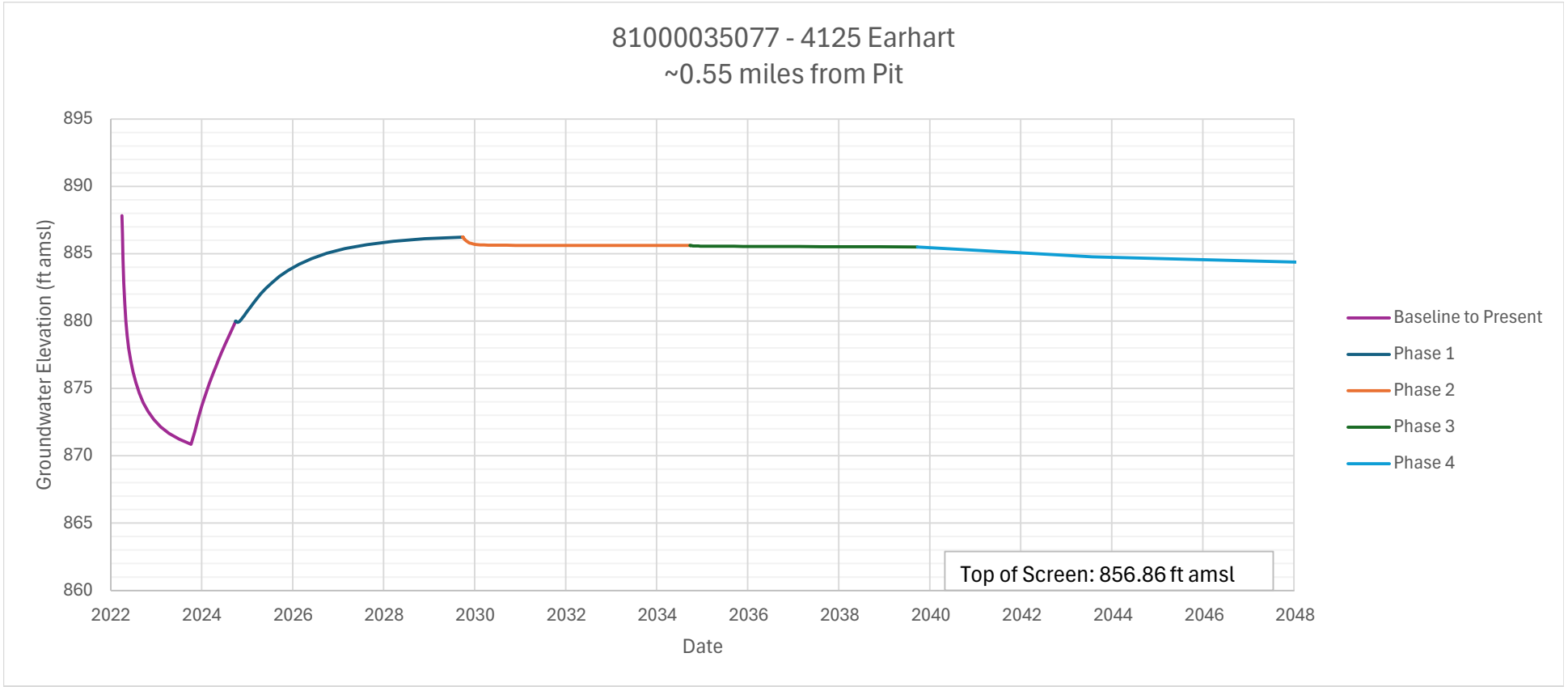

8100012751 - 3177 Warren Rd
~1.149 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 853.43 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

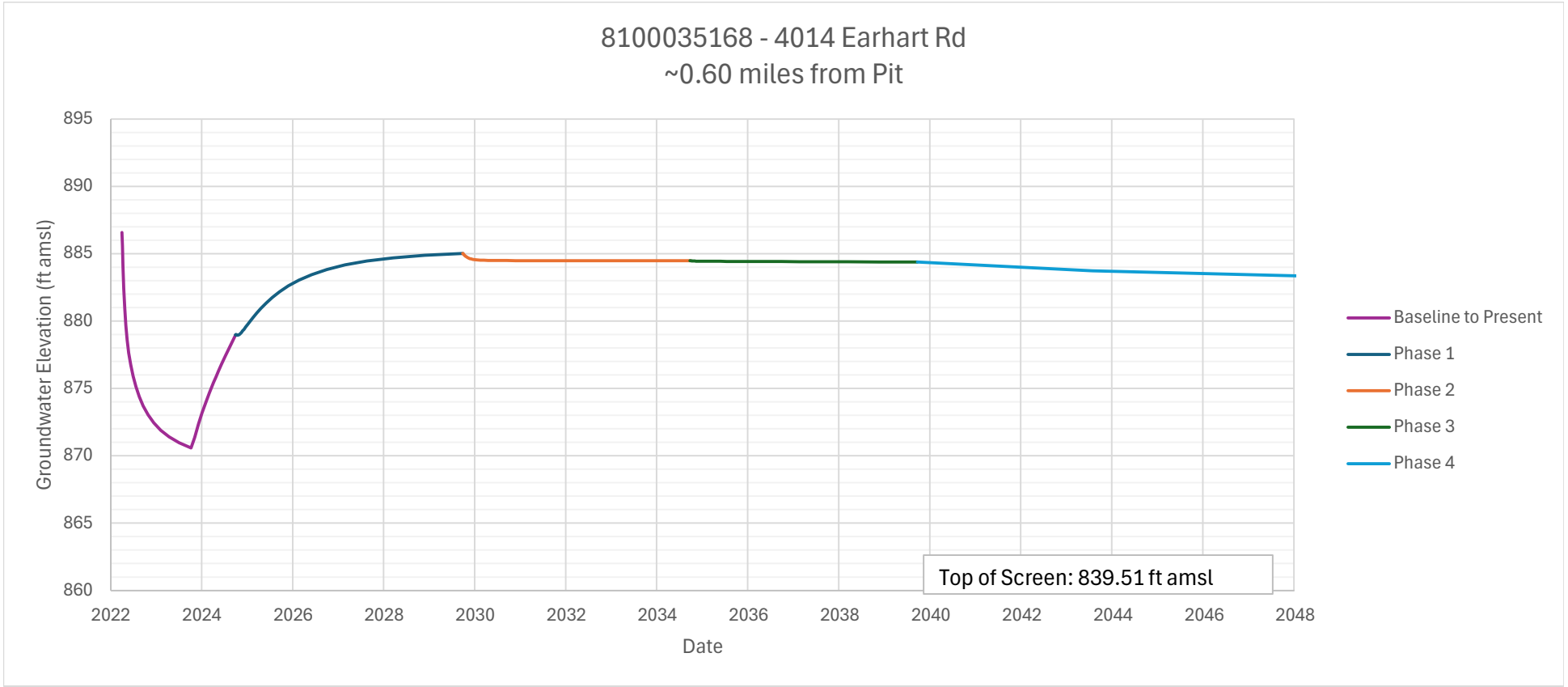

81000035072 - 4429 Grandeur Oaks
~0.35 miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 836.36 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

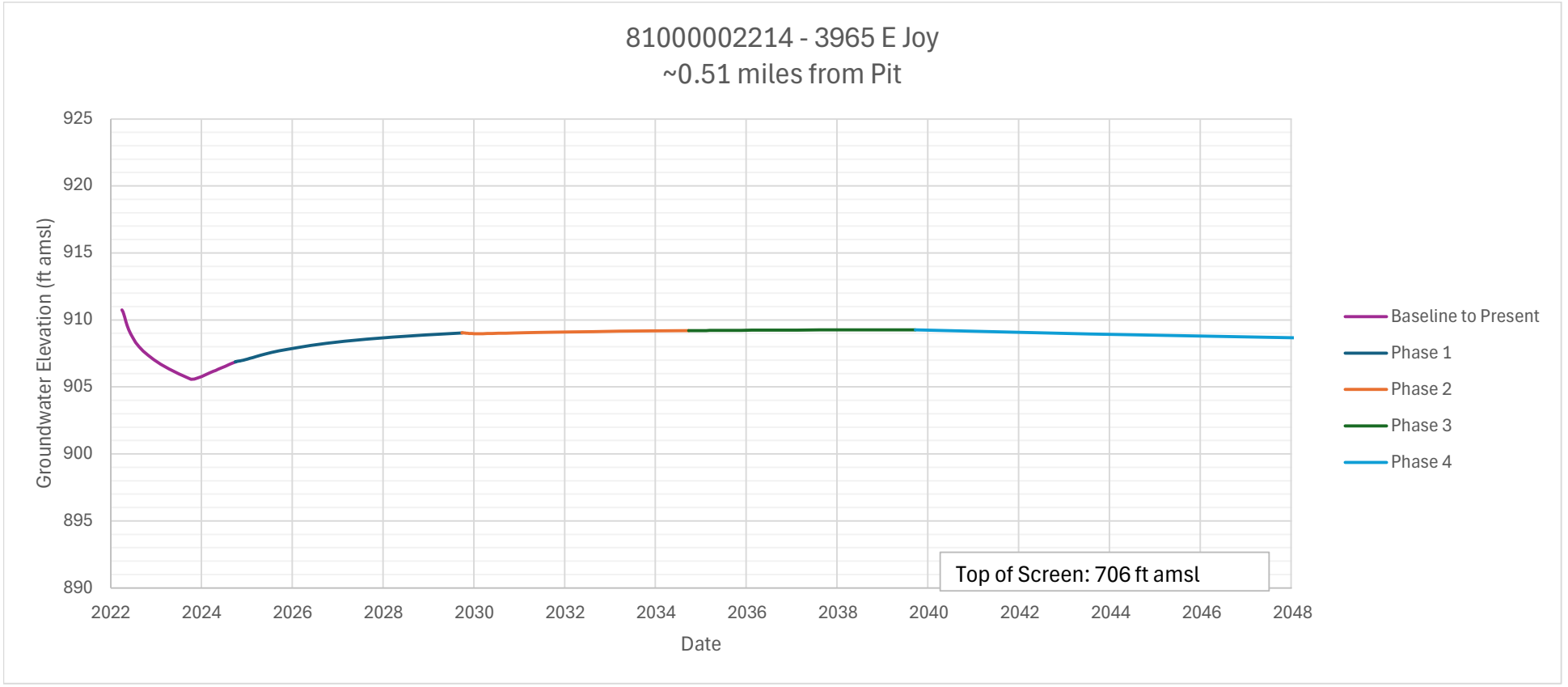

8100004822 - 2797 Trailwood
~ 1.55 miles from Pit
Groundwater Elevation (ft amsl)
905
900
895
890
885
880
875
870
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 872.35 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top

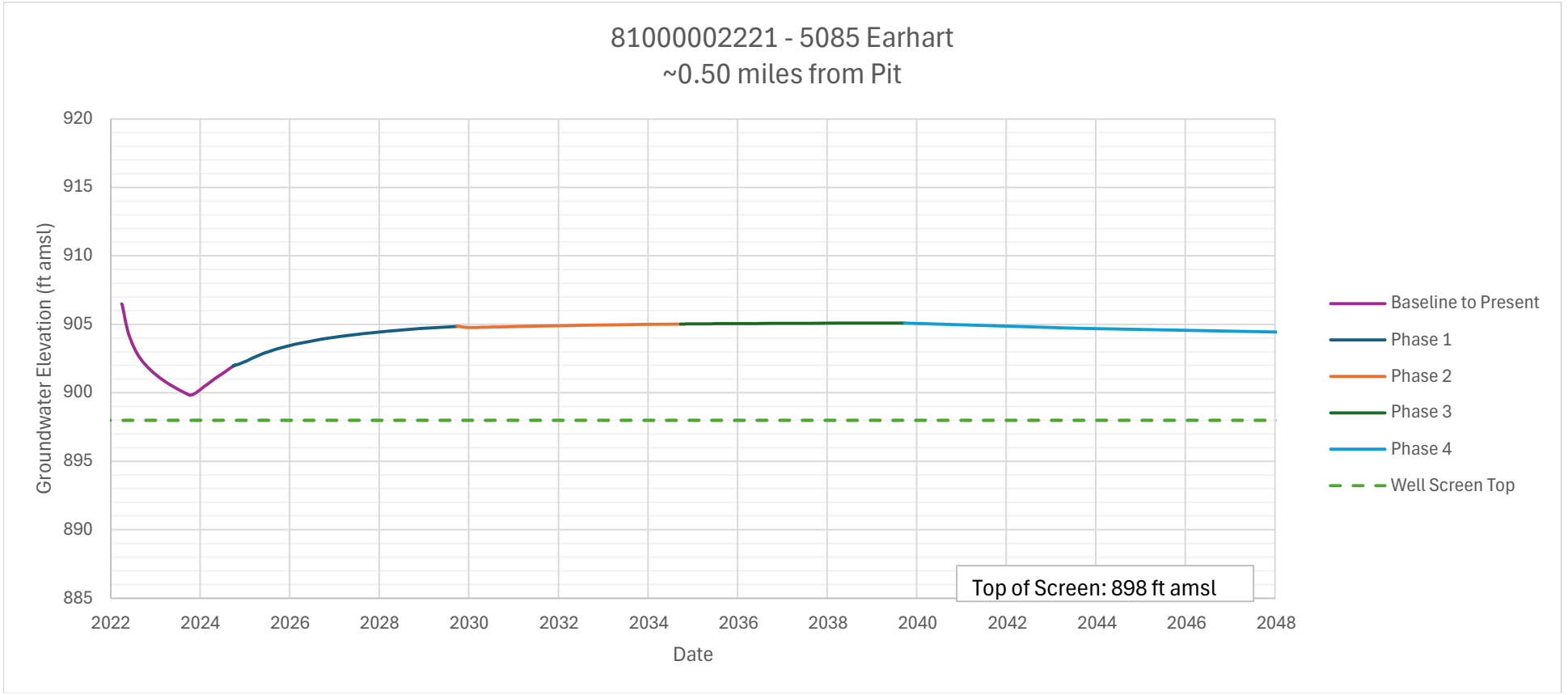

81000004751 - 3177 Warren
~1.19 miles from Pit
Groundwater Elevation (ft amsl)
905
900
895
890
885
880
875
870
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 870.38 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top

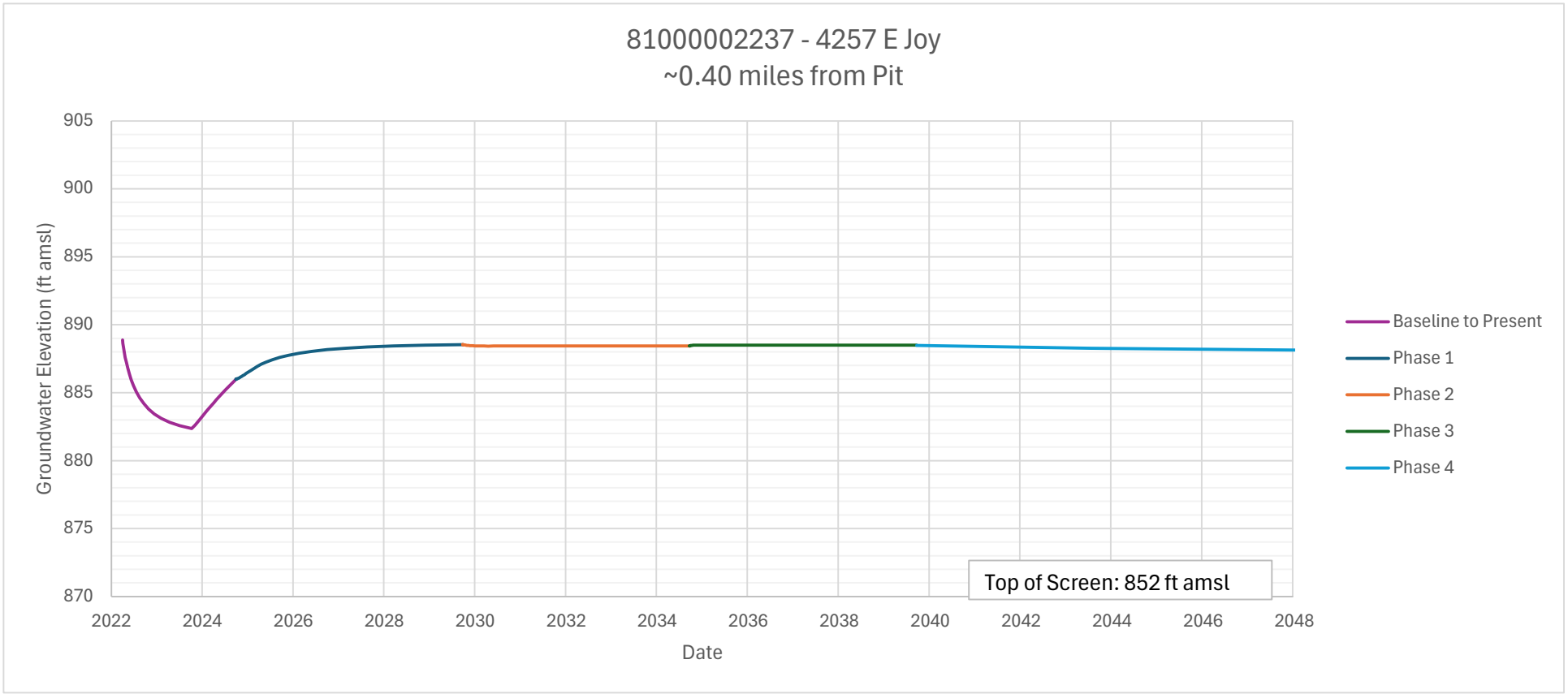

81000023380 - 3180 Warren
~1.26 miles from Pit
Groundwater Elevation (ft amsl)
905
900
895
890
885
880
875
870
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 846.04 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

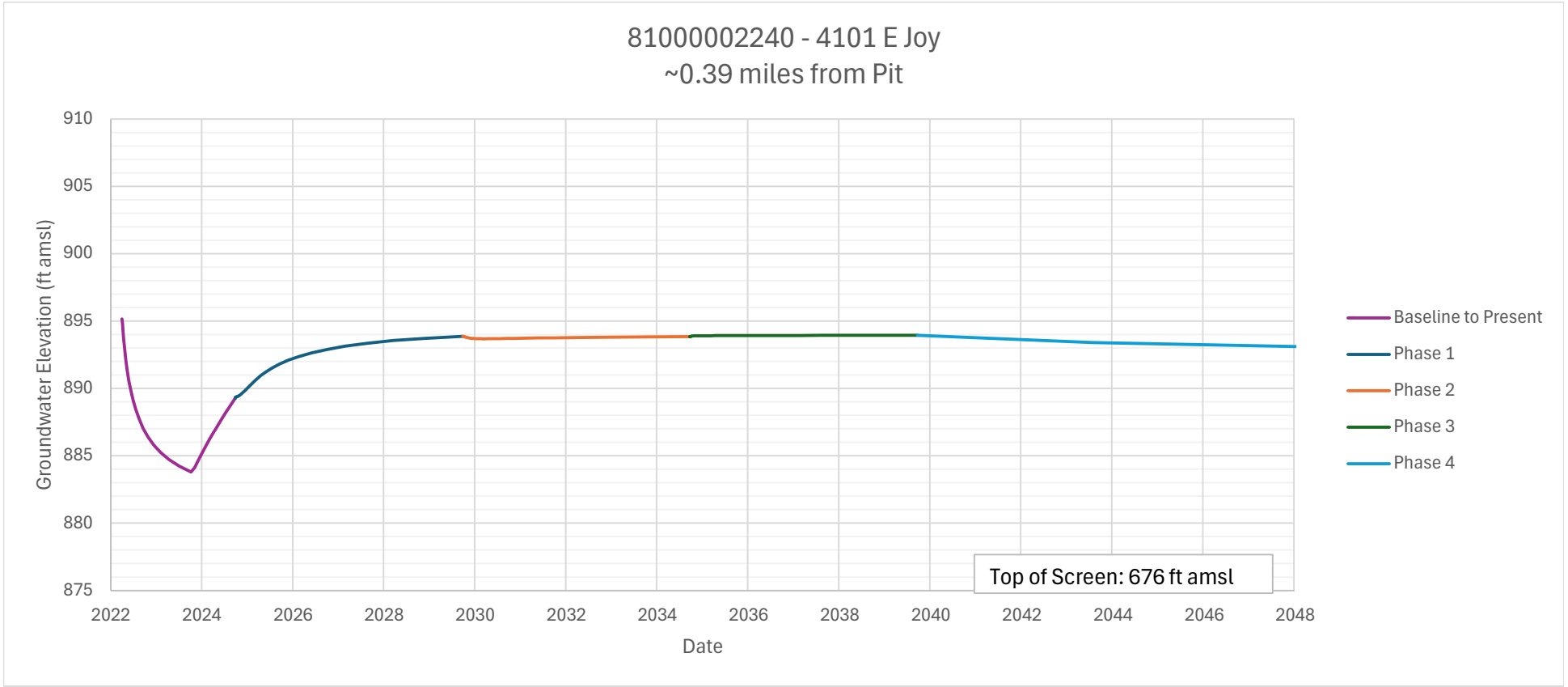

81000035077 - 4125 Earhart
~0.55 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 856.86 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

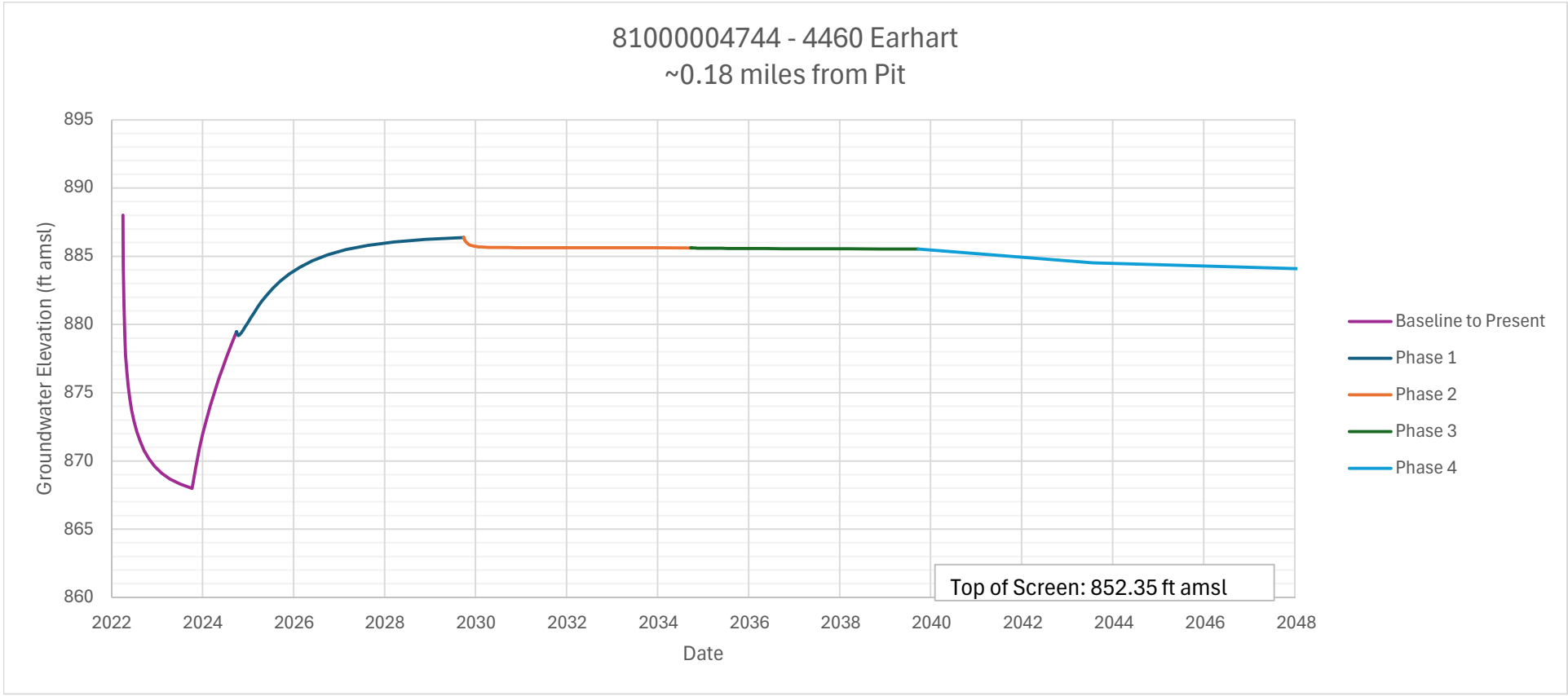

8100035168 - 4014 Earhart Rd
~0.60 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 839.51 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

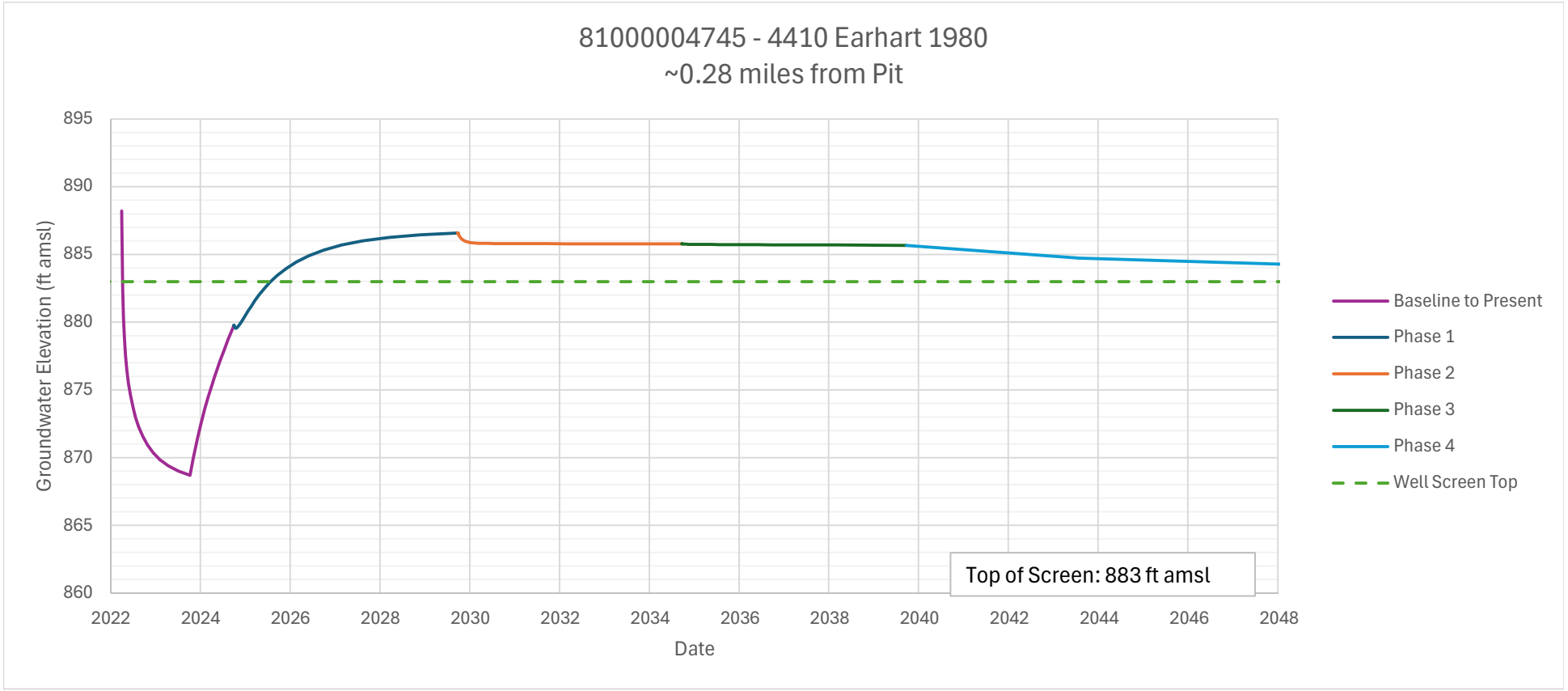

81000002214 - 3965 E Joy
~0.51 miles from Pit
Groundwater Elevation (ft amsl)
925
920
915
910
905
900
895
890
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 706 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

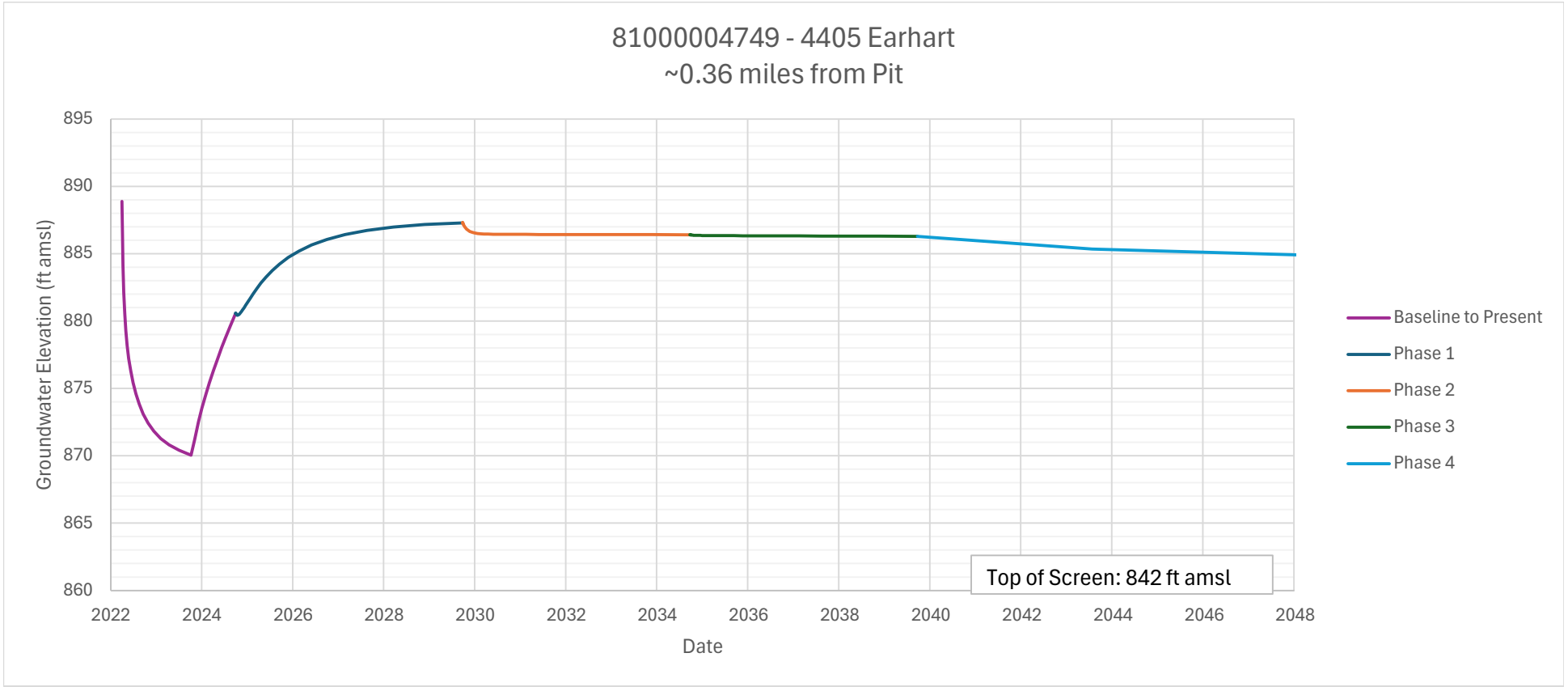

81000002221 - 5085 Earhart
~0.50 miles from Pit
Groundwater Elevation (ft amsl)
920
915
910
905
900
895
890
885
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 898 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top

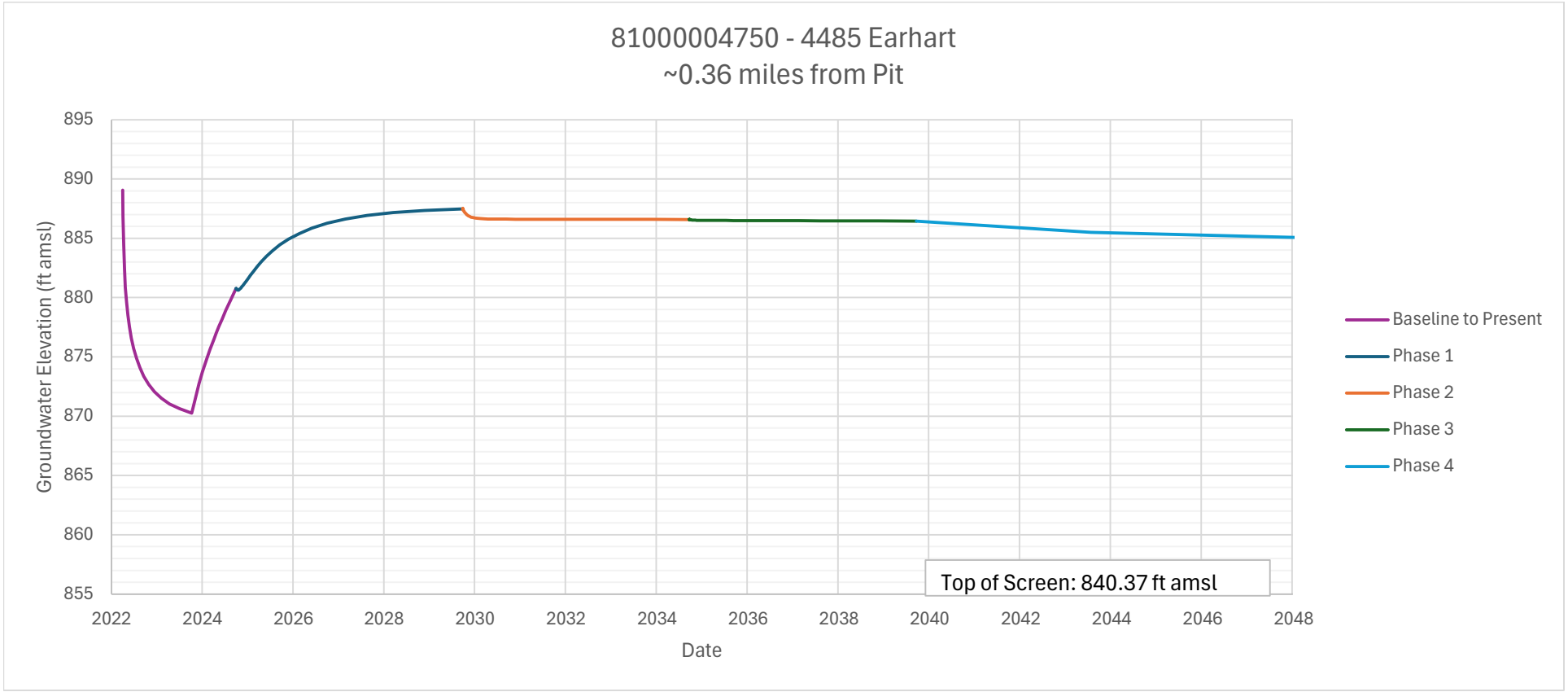

81000002237 - 4257 E Joy
~0.40 miles from Pit
Groundwater Elevation (ft amsl)
905
900
895
890
885
880
875
870
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 852 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

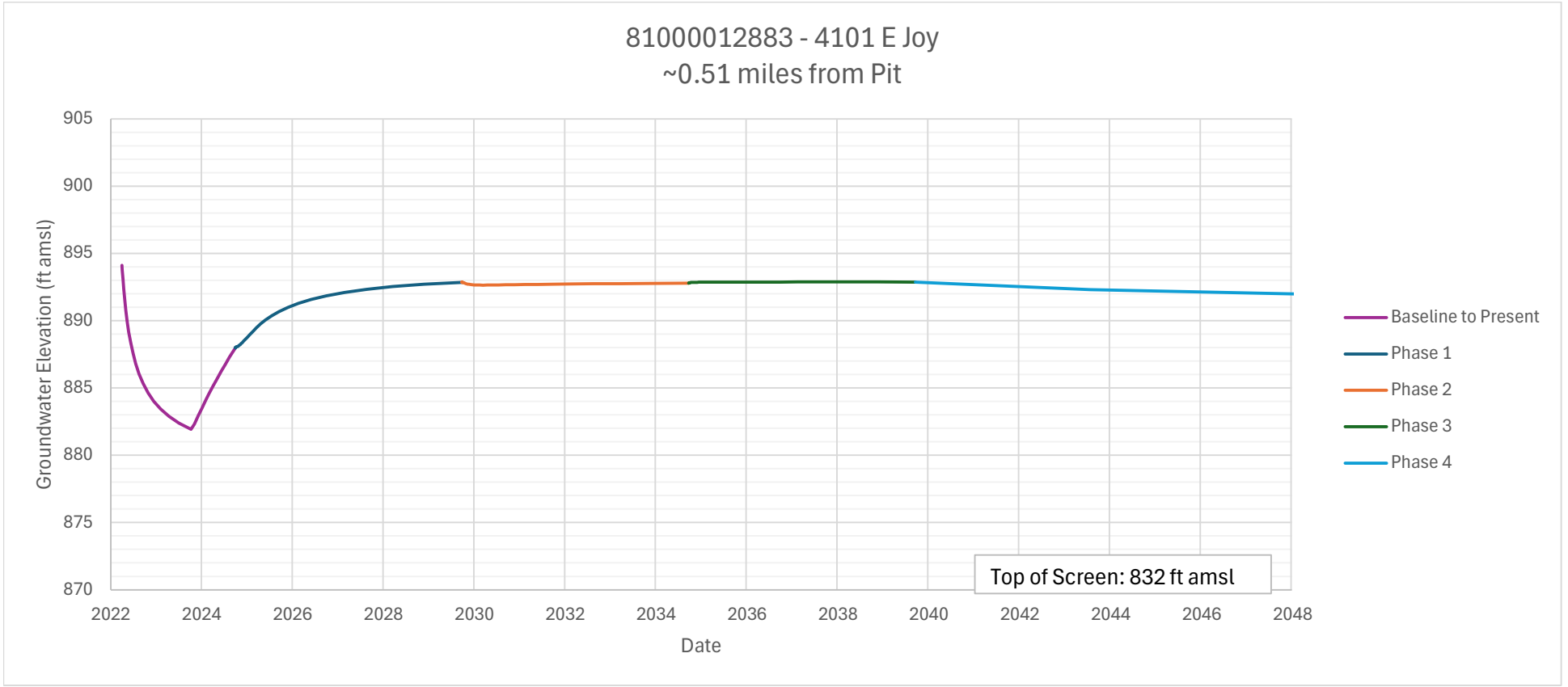

81000002240 - 4101 E Joy
~0.39 miles from Pit
Groundwater Elevation (ft amsl)
910
905
900
895
890
885
880
875
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 676 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

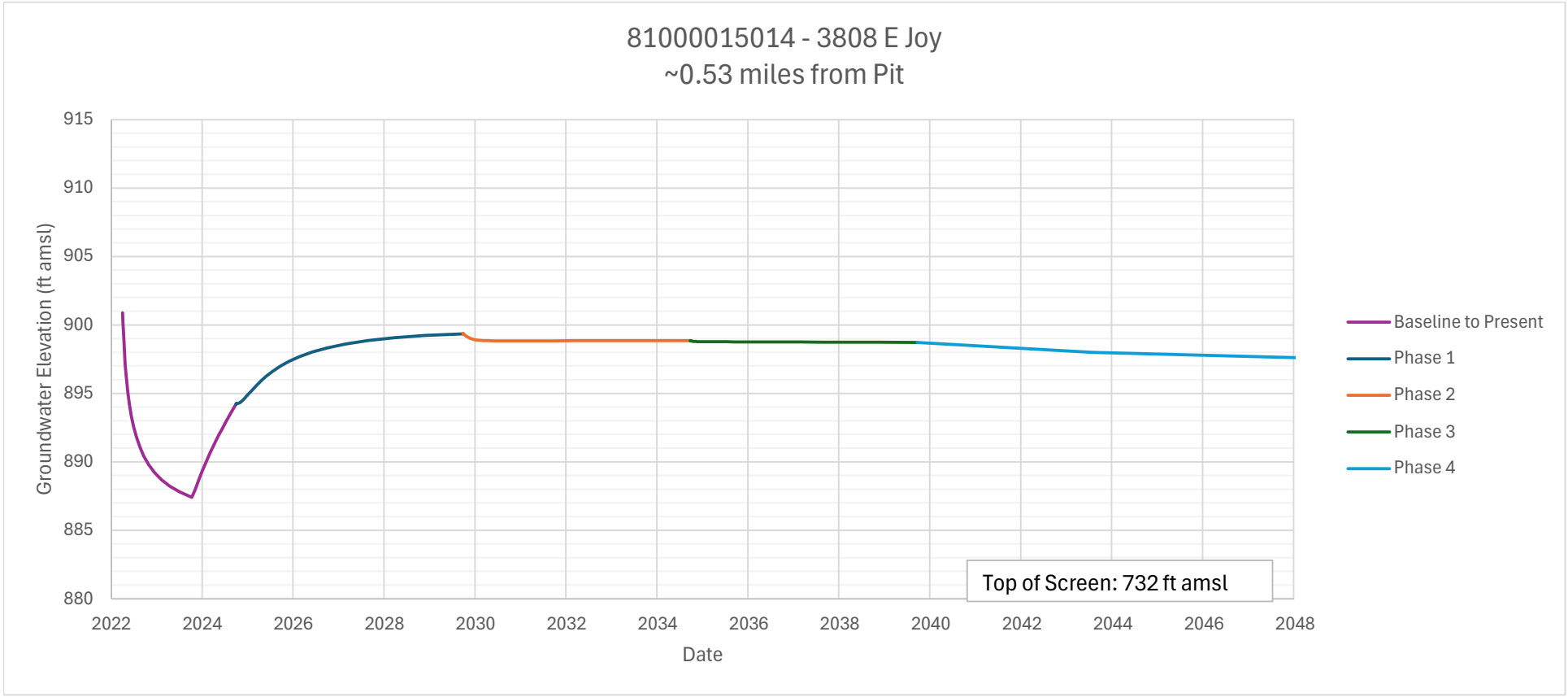

81000004744 - 4460 Earhart
~0.18 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 852.35 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

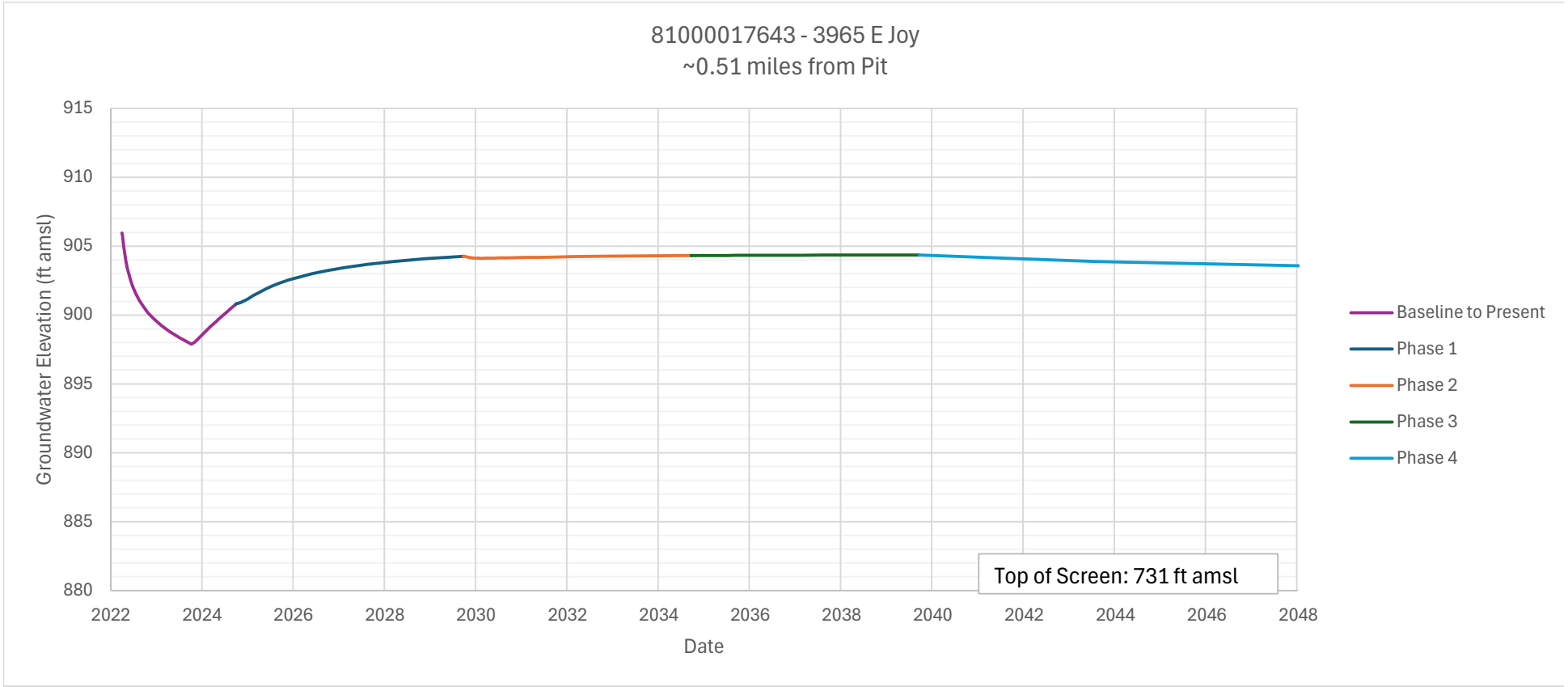

81000004745 - 4410 Earhart 1980
~0.28 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 883 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4
Well Screen Top

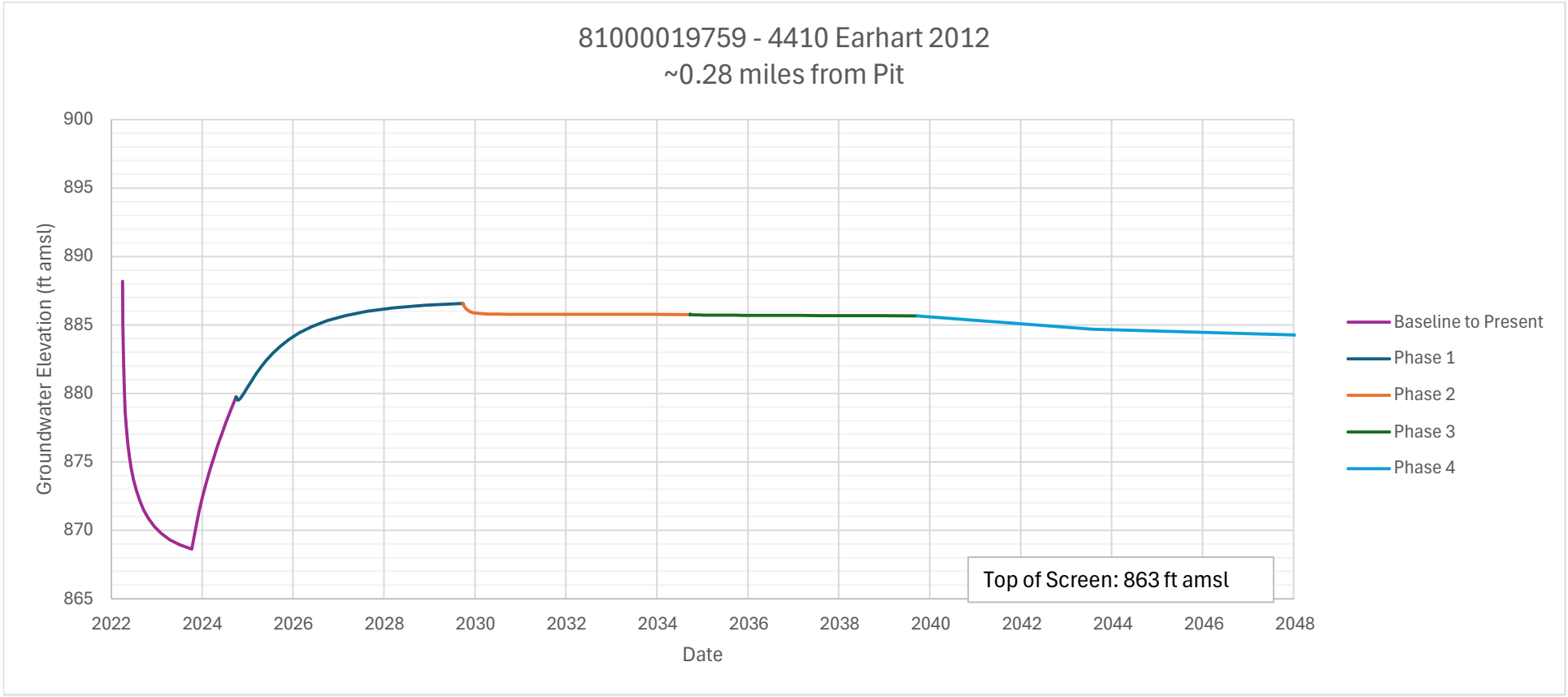

81000004749 - 4405 Earhart
~0.36 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 842 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

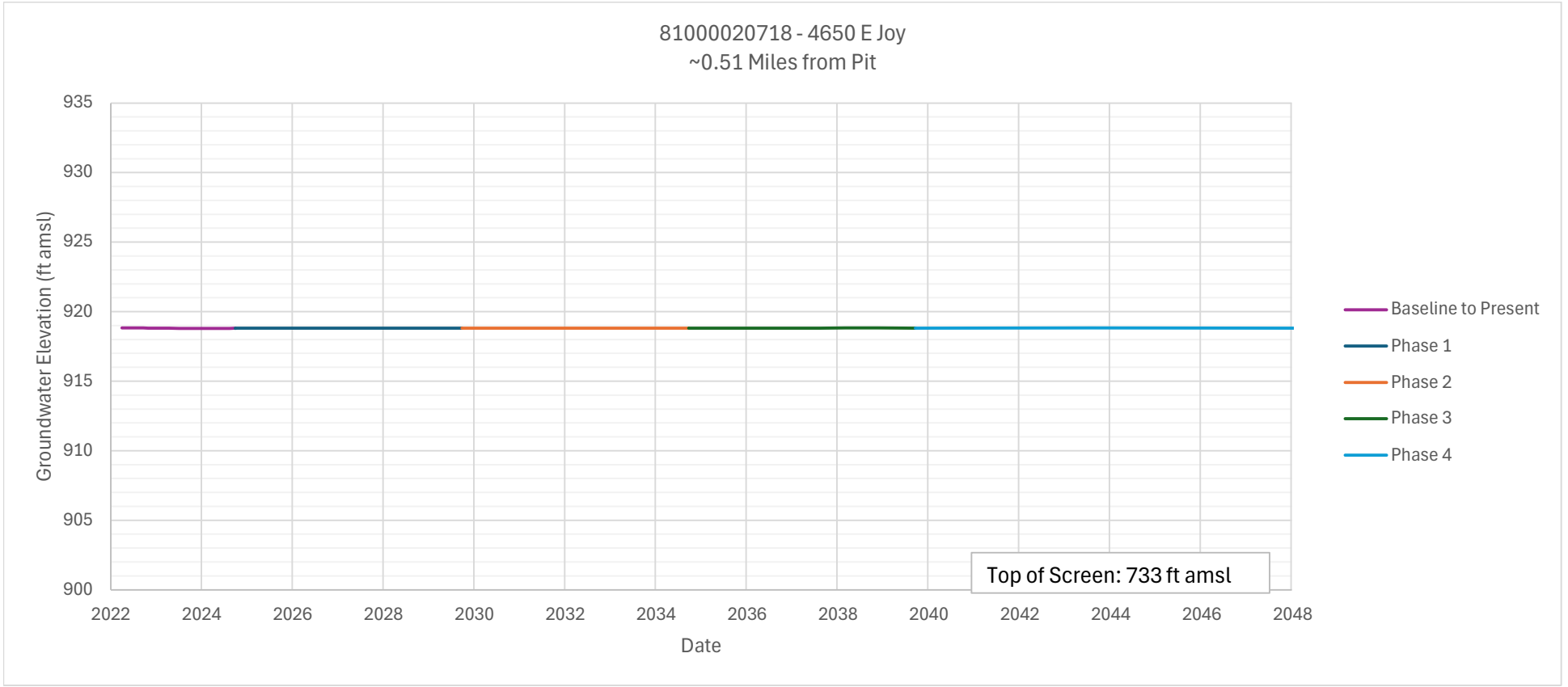

81000004750 - 4485 Earhart
~0.36 miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 840.37 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

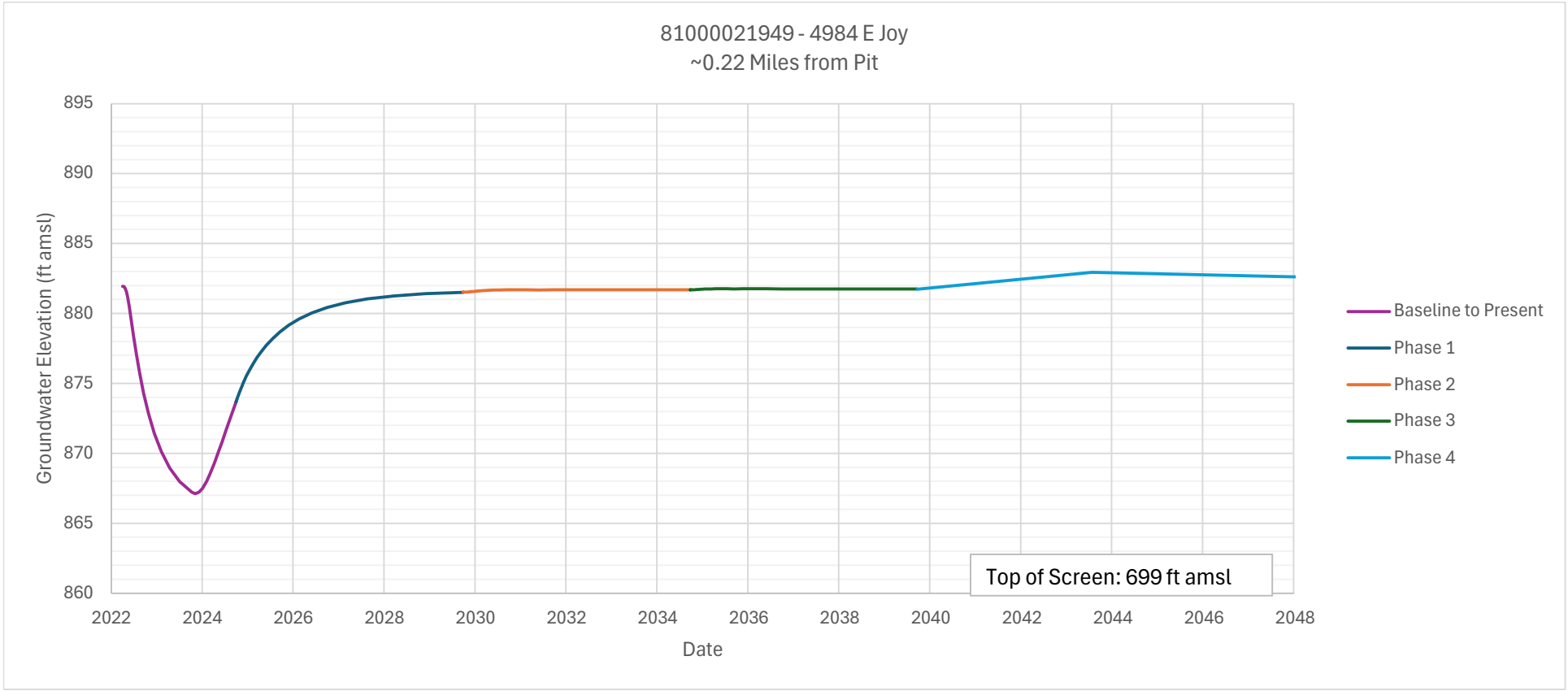

81000012883 - 4101 E Joy
~0.51 miles from Pit
Groundwater Elevation (ft amsl)
905
900
895
890
885
880
875
870
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 832 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

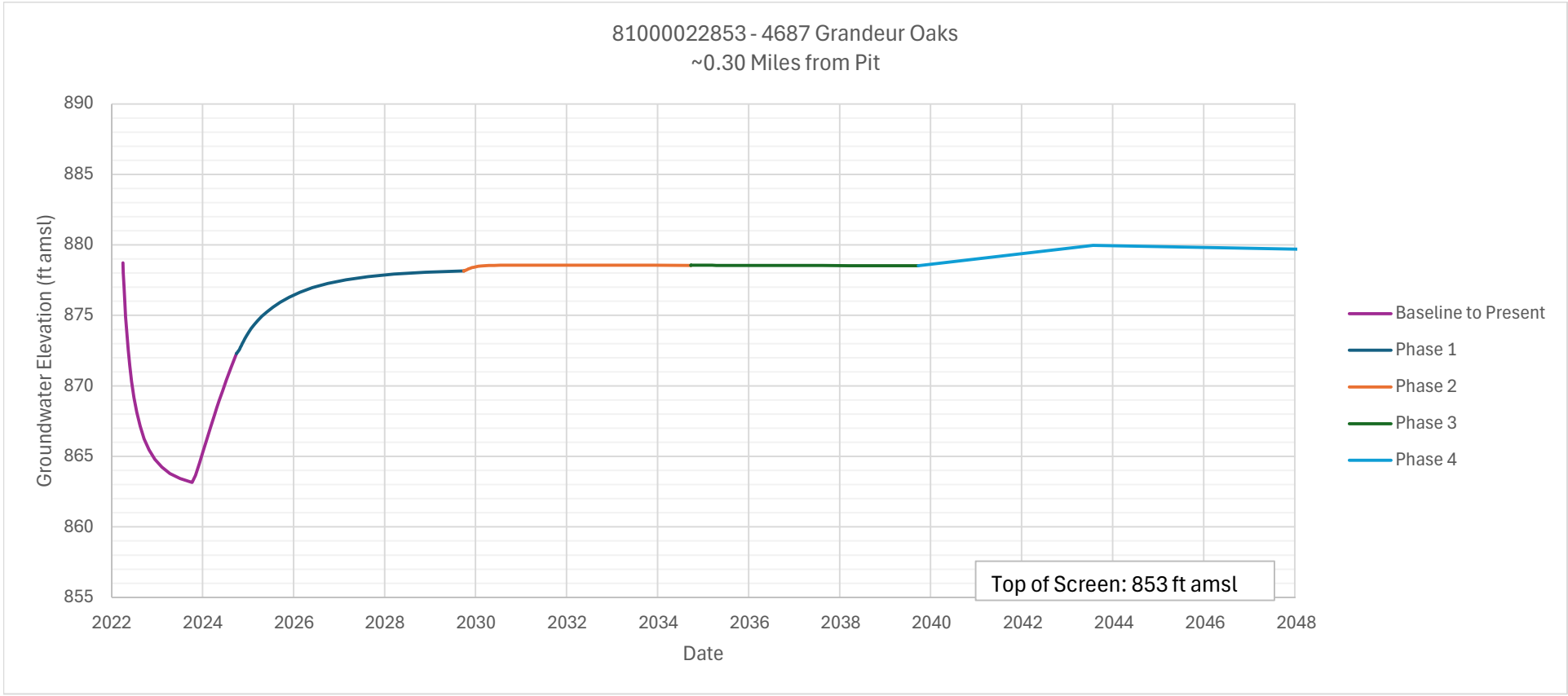

81000015014 - 3808 E Joy
~0.53 miles from Pit
Groundwater Elevation (ft amsl)
915
910
905
900
895
890
885
880
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 732 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

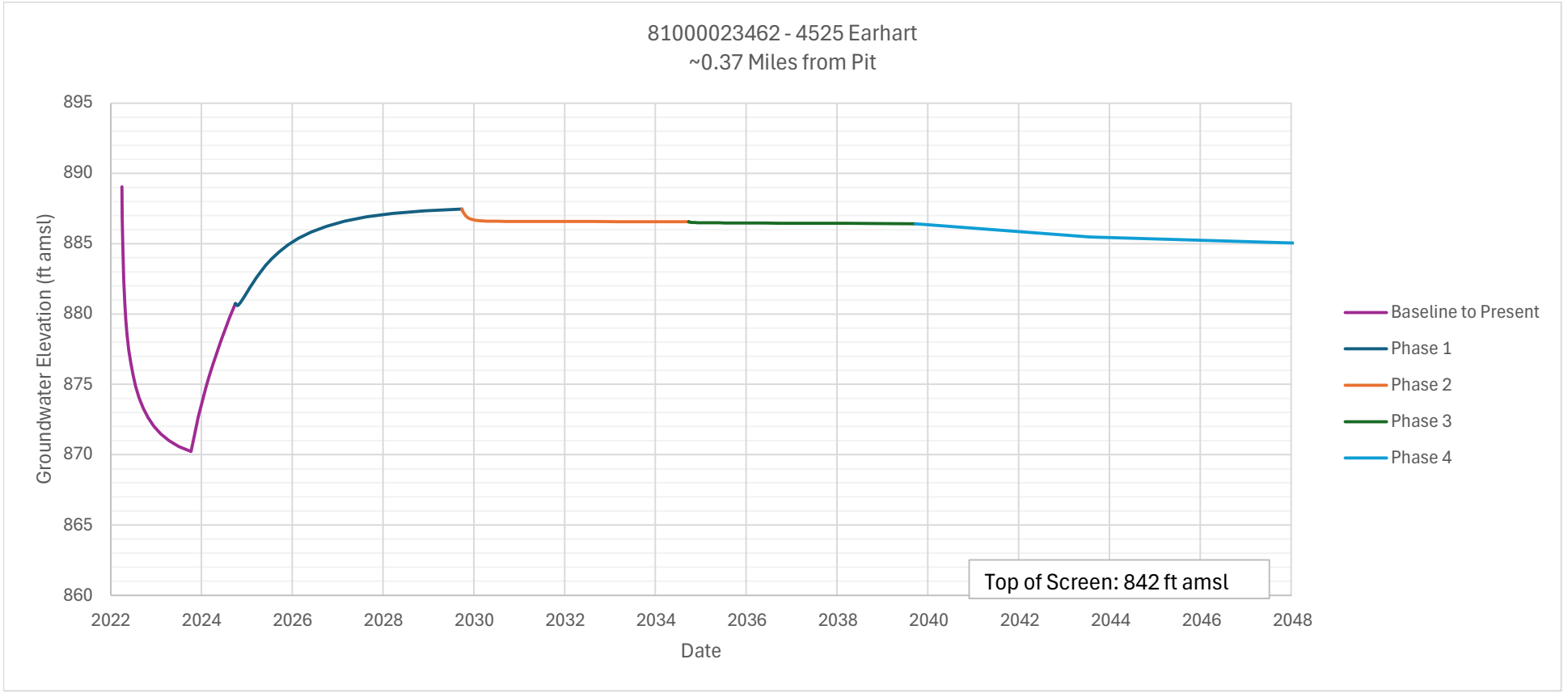

81000017643 - 3965 E Joy
~0.51 miles from Pit
Groundwater Elevation (ft amsl)
915
910
905
900
895
890
885
880
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 731 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

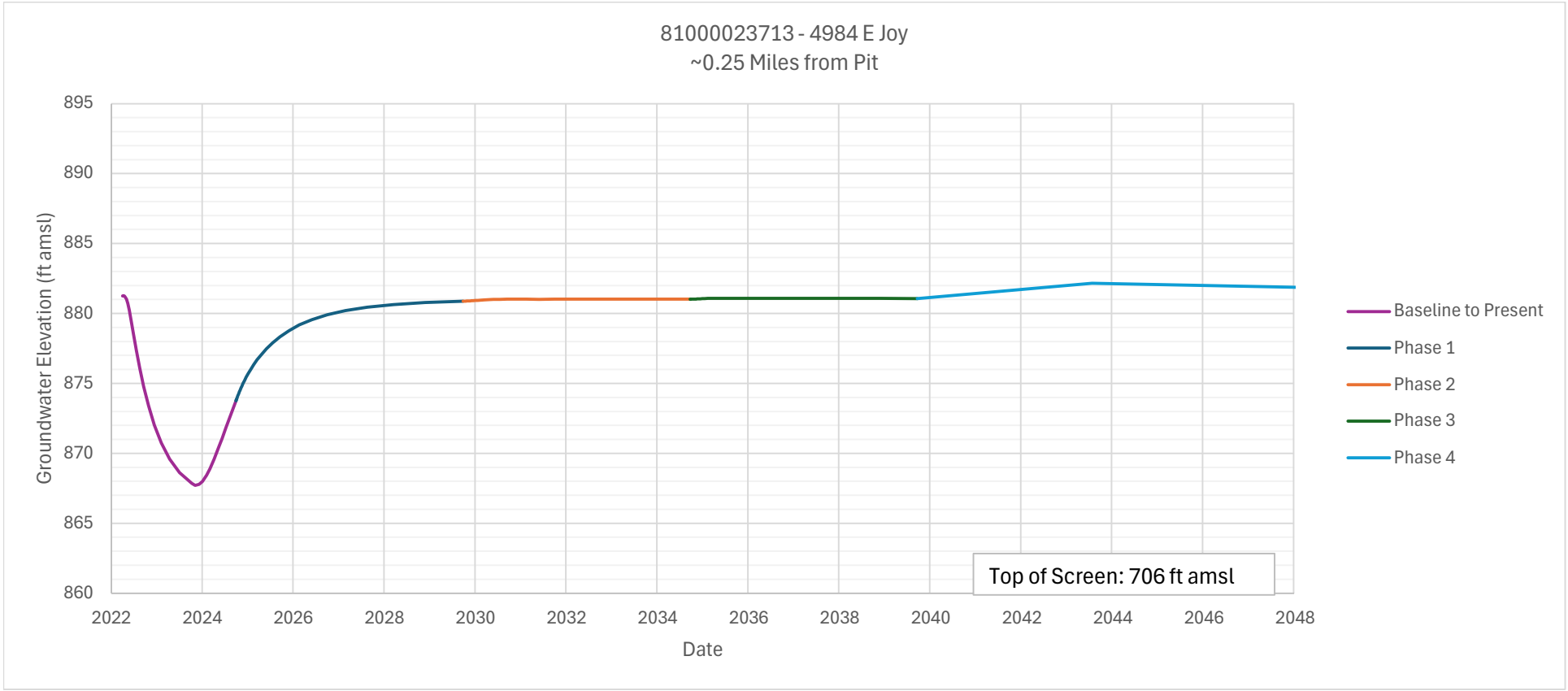

81000019759 - 4410 Earhart 2012
~0.28 miles from Pit
Groundwater Elevation (ft amsl)
900
895
890
885
880
875
870
865
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 863 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

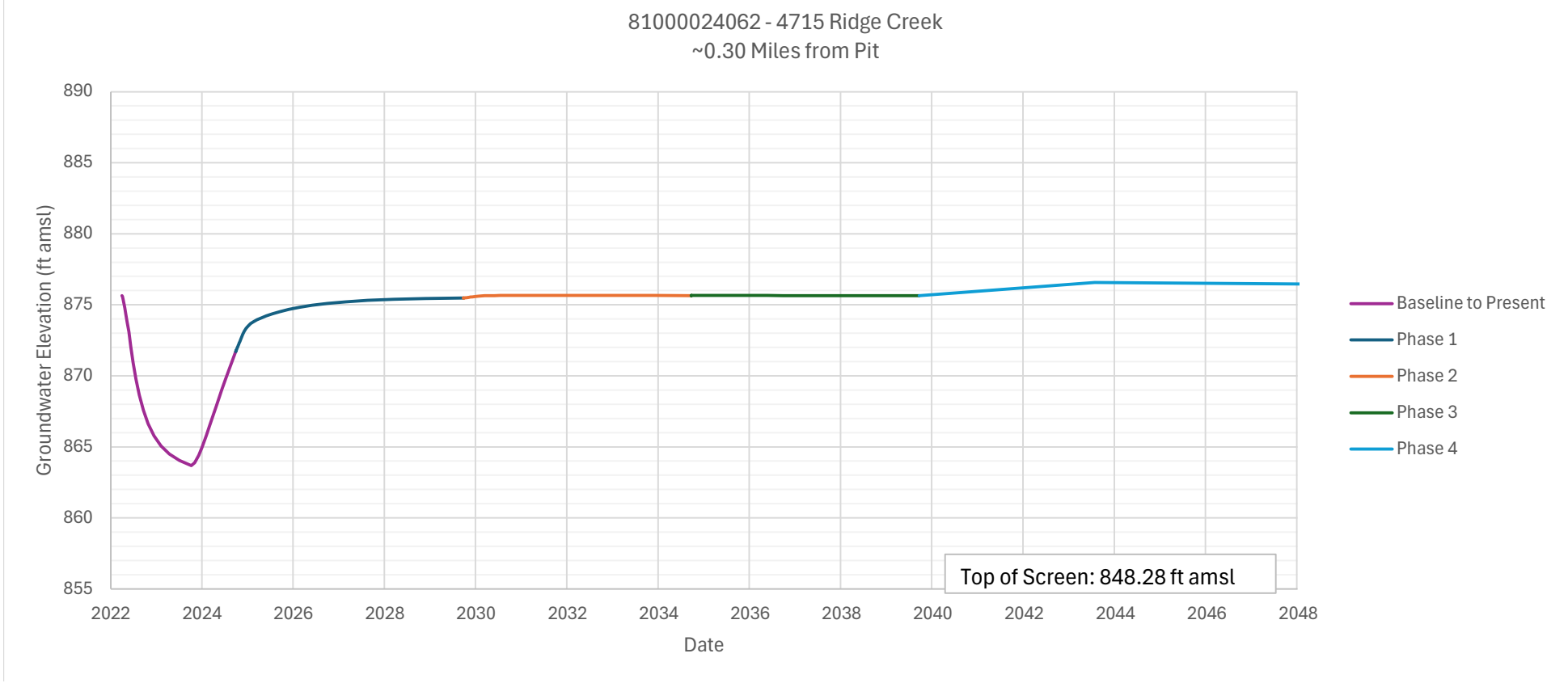

81000020718 - 4650 E Joy
~0.51 Miles from Pit
Groundwater Elevation (ft amsl)
935
930
925
920
915
910
905
900
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 733 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

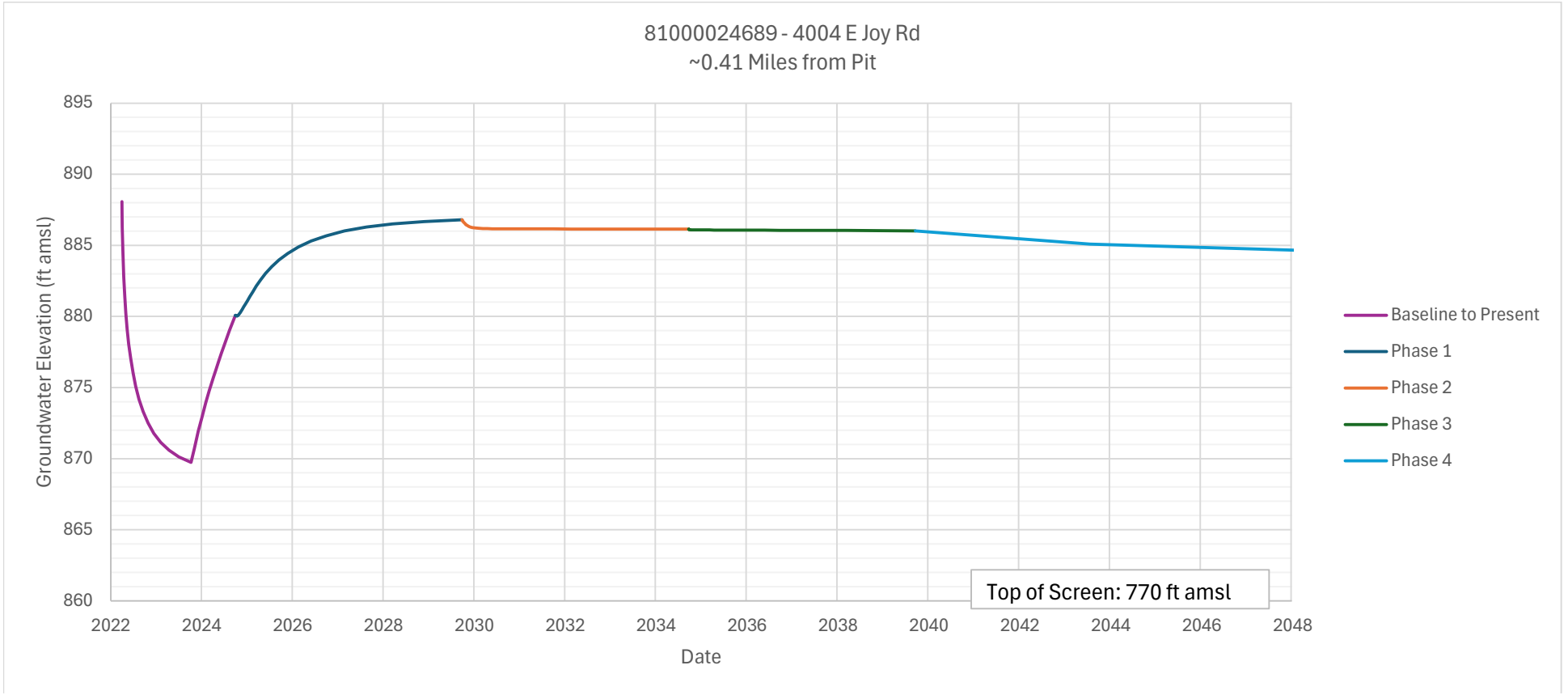

81000021949 - 4984 E Joy
~0.22 Miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 699 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

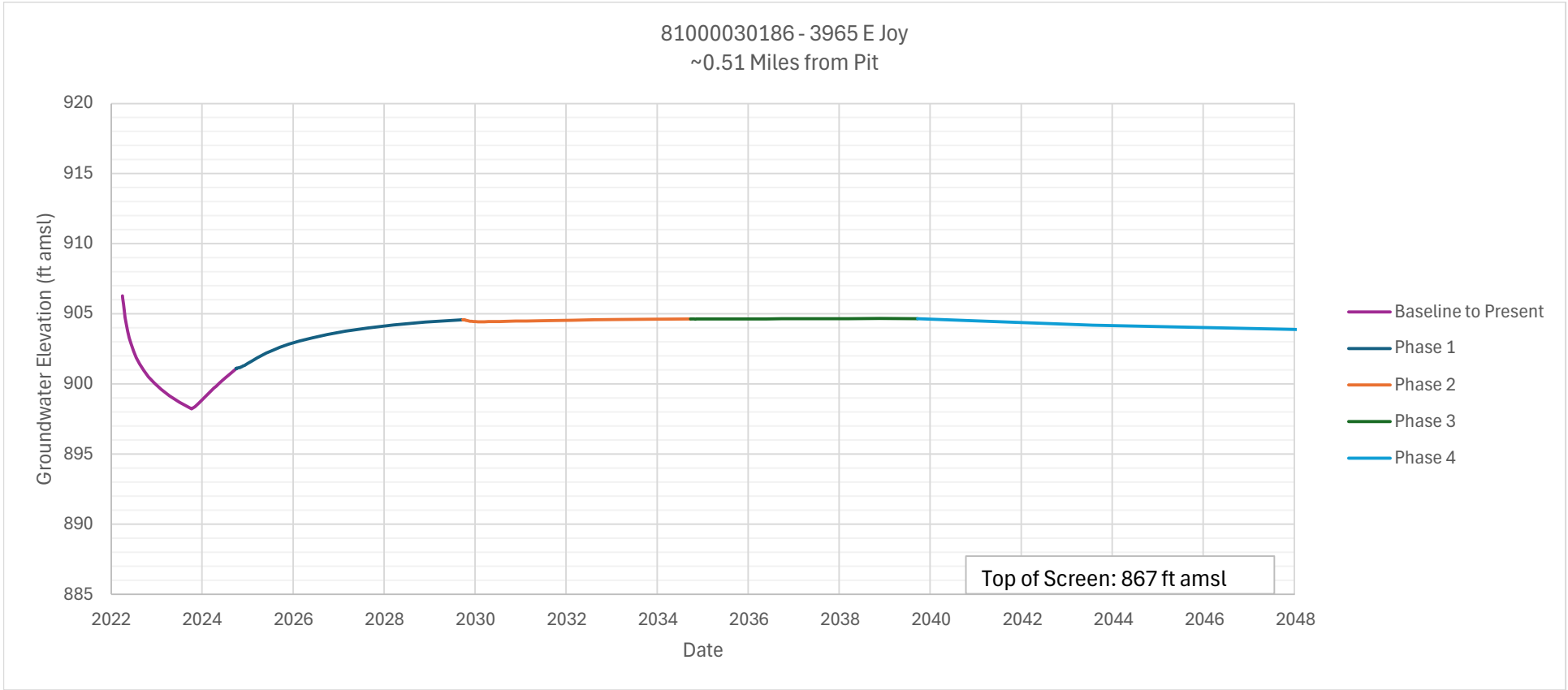

81000022853 - 4687 Grandeur Oaks
~0.30 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 853 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

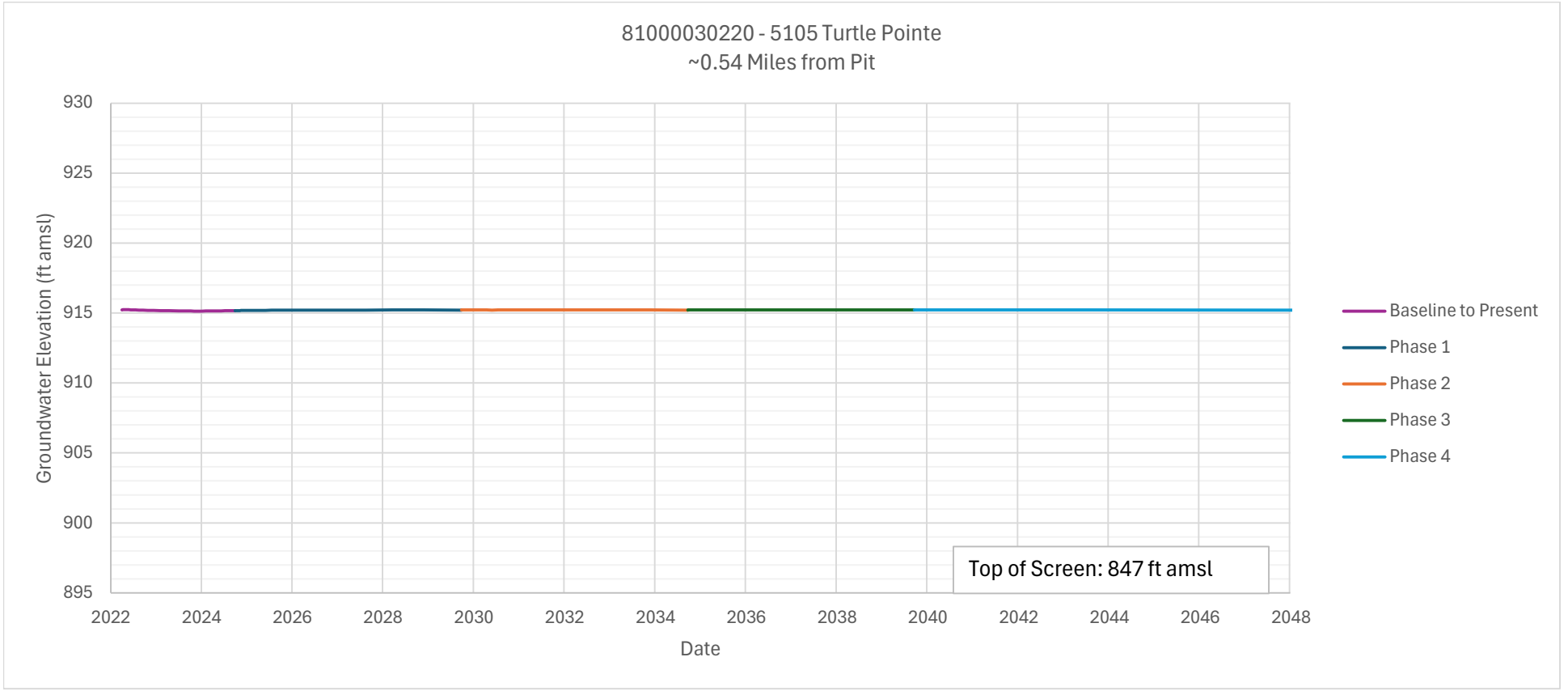

81000023462 - 4525 Earhart
~0.37 Miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 842 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

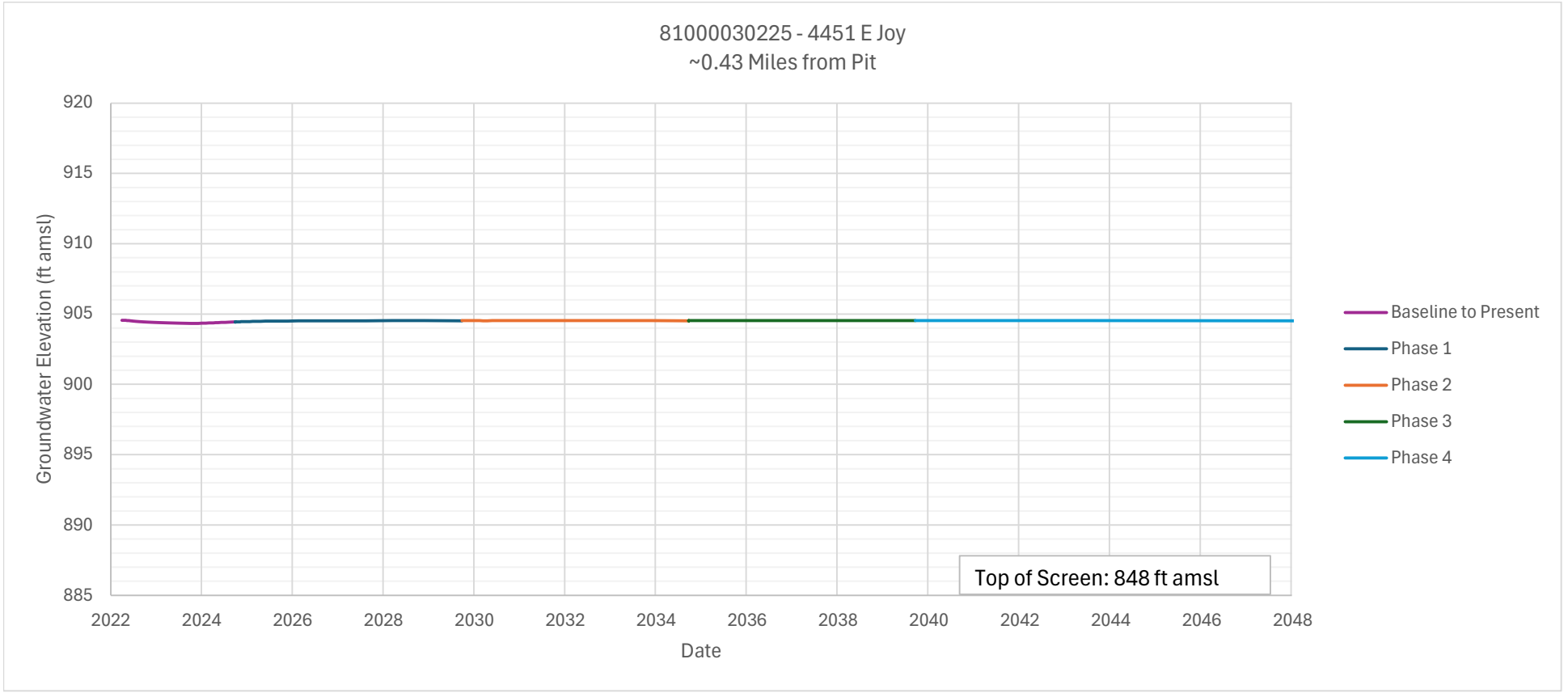

81000023713 - 4984 E Joy
~0.25 Miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 706 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000024062 - 4715 Ridge Creek
~0.30 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 848.28 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000024689 - 4004 E Joy Rd
~0.41 Miles from Pit
Groundwater Elevation (ft amsl)
895
890
885
880
875
870
865
860
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 770 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000030186 - 3965 E Joy
~0.51 Miles from Pit
Groundwater Elevation (ft amsl)
920
915
910
905
900
895
890
885
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 867 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000030220 - 5105 Turtle Pointe
~0.54 Miles from Pit
Groundwater Elevation (ft amsl)
930
925
920
915
910
905
900
895
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 847 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000030225 - 4451 E Joy
~0.43 Miles from Pit
Groundwater Elevation (ft amsl)
920
915
910
905
900
895
890
885
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 848 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

81000035064 - 4700 Walnut Woods Dr
~0.43 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
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2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
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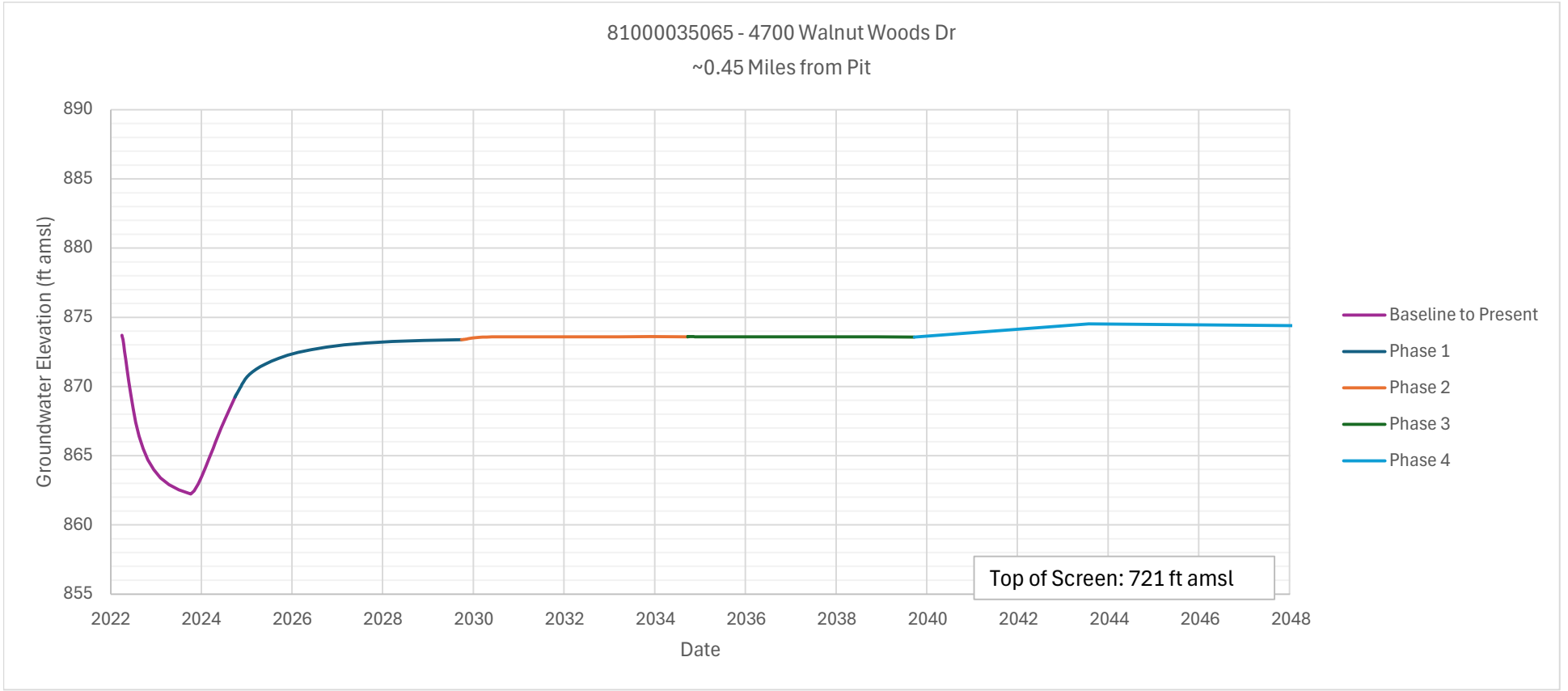
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4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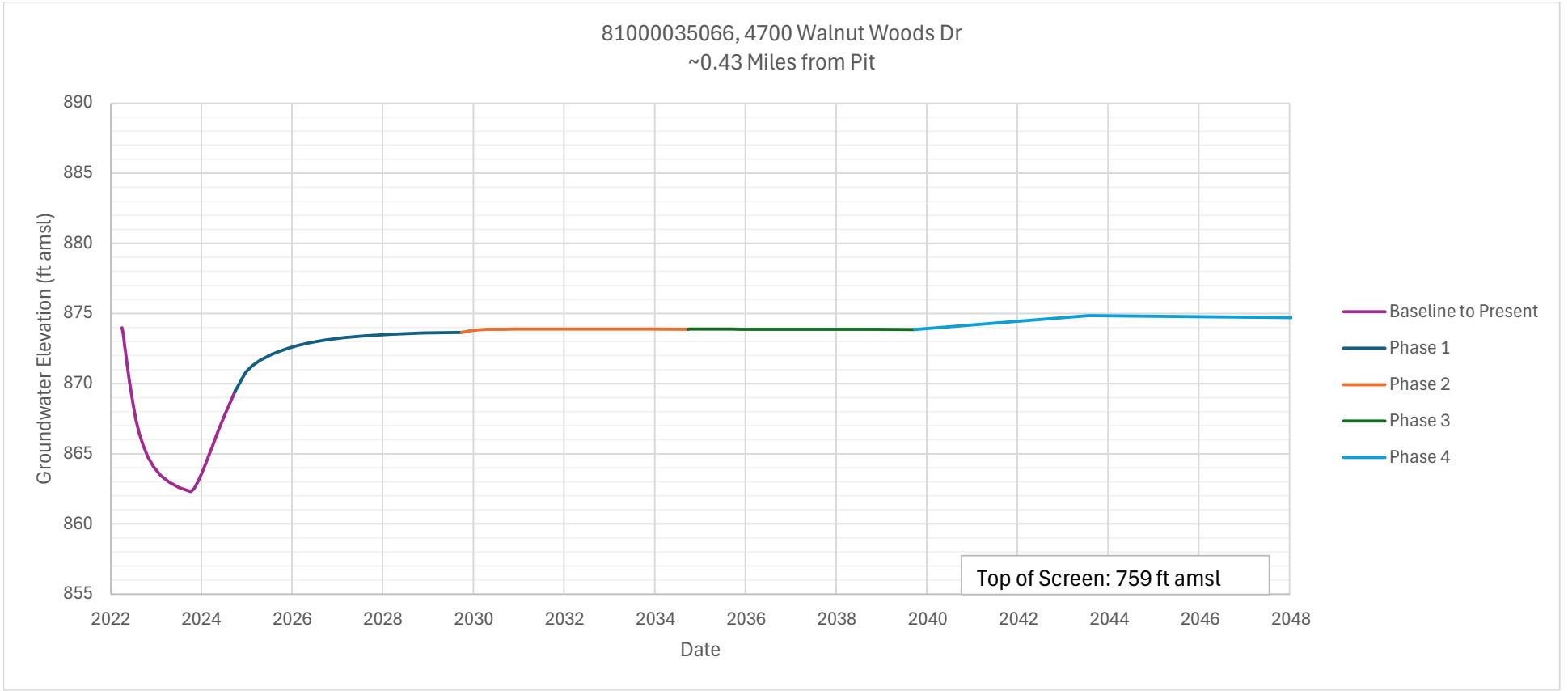
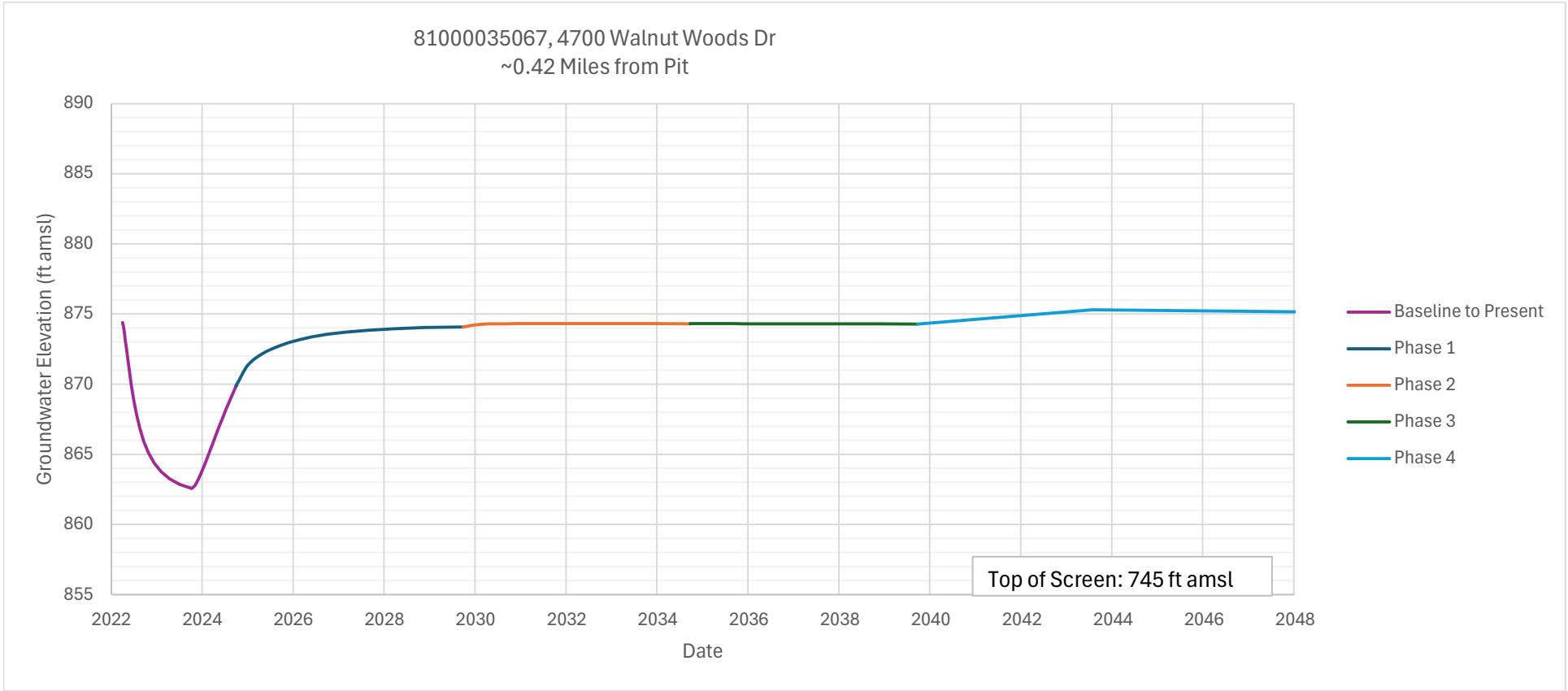
~0.45 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 721 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000035066, 4700 Walnut Woods Dr
~0.43 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 759 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4


81000035067, 4700 Walnut Woods Dr
~0.42 Miles from Pit
Groundwater Elevation (ft amsl)
890
885
880
875
870
865
860
855
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
Date
Top of Screen: 745 ft amsl
Baseline to Present
Phase 1
Phase 2
Phase 3
Phase 4

ATTACHMENT D
Erosion Control Plan

Erosion Control Narrative

There are no new erosion control measures proposed. The current soil erosion control measures are shown on the SESC Plan. The mining areas of the property are internally drained to the existing pond system and designed to retain stormwater on site. Stormwater diversion berms have been constructed along the eastern boundary of the site, near the processing area, in order to retain stormwater from the processing area on site. The exterior berms along the north, northwest, west, and south have been completely vegetated since at least 2024. Silt fence has been installed and maintained at the toe of these berms along the south, west, northwest, and north boundaries of the mining area. As mining continues, berms will continue to be maintained in order to retain stormwater on site. Exterior berms will be monitored to ensure vegetation continues to be adequate to stabilize and keep sediment from washing off the berms. If there are areas of exterior berms that show signs of erosion, additional erosion control measures (straw wattles and silt fence) will be installed and maintained while the berm is regraded and revegetated. Existing silt fence at the toe of the berms will be maintained regularly.

Erosion control measures will be inspected after significant rain events totaling more than 1 inch. Maintenance will be conducted as needed to ensure continued integrity of the erosion control measures.

Areas of the site that are wooded will continue to be segregated from mine activities and will allow stormwater to flow overland and infiltrate. There are no existing or proposed stormwater management structures beyond the eastern stormwater diversion berms.

LEGEND

- CONSTRUCTION ENTRANCE/ENTRANCE
- EARTH DISRUPTION AREA
- GRASSED AREA
- GRAVEL BERM
- SILT FENCE
- STOCKPILE
- STORMWATER DIVERSION BERM
- VEGETATED BERM
- TOPOGRAPHIC CONTOUR, 2-FT INTERVAL
- TOPOGRAPHIC CONTOUR, 10-FT INTERVAL, WITH ELEVATION IN FEET
- SOIL MAP UNIT
- DELINEATED WETLAND
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. TAX ID NUMBER(S): I-09-01-200-002
LAND SITUATED IN THE TOWNSHIP OF ANN ARBOR, IN THE COUNTY OF WASHTENAW, IN THE STATE OF MICHIGAN THE NORTHWEST FRACTIONAL 1/4 OF SECTION 1, EXCEPT BEGINNING IN THE NORTH LINE OF SECTION AT A POINT WHICH IS 26 RODS WEST OF NORTH 1/4 CORNER OF SECTION 1; THENCE EAST 26 RODS TO NORTH 1/4 CORNER OF SECTION 1; THENCE SOUTH 40 RODS IN THE NORTH AND SOUTH 1/4 LINE; THENCE WEST 14 RODS; THENCE NORTHWESTERLY TO THE POINT OF BEGINNING. ALSO EXCEPT NORTH 417.2 FEET OF WEST 417.42 FEET OF NORTHWEST 1/4 OF SECTION 1. ALSO COMMENCING AT SOUTH 1/4 CORNER OF SECTION 1; THENCE NORTH 86 DEGREES 49 MINUTES 07 SECONDS WEST 1214.13 FEET; THENCE NORTH 02 DEGREES 07 MINUTES 34 SECONDS EAST 2597.57 FEET TO POINT OF BEGINNING; THENCE CONTINUE NORTH 02 DEGREES 07 MINUTES 34 SECONDS EAST 42.92 FEET; THENCE SOUTH 86 DEGREES 18 MINUTES 02 SECONDS EAST 1159.09 FEET; THENCE SOUTH 00 DEGREES 55 MINUTES 22 SECONDS WEST 78.75 FEET; THENCE NORTH 84 DEGREES 32 MINUTES 15 SECONDS WEST 1162.27 FEET TO POINT OF BEGINNING. BEING PART OF THE WEST 1/2 OF SECTION 1,TOWN 2 SOUTH, RANGE 6 EAST.

3. AERIAL IMAGERY SOURCE: NEARMAP, 12 JUNE 2024

N

0 200 400 600 800
SCALE IN FEET

SOIL KEY

BnB = Boyer loamy sand, 1 to 6 percent slopes
BnC = Boyer loamy sand, 6 to 12 percent slopes
BnE = Boyer loamy sand, 18 to 25 percent slopes
BnF = Boyer loamy sand, 25 to 50 percent slopes
Br = Brookston loam
CoB = Conover loam, 0 to 4 percent slopes
CpA = Conover-Brookston loams, 0 to 2 percent slopes
Gf = Gilford sandy loam, till plain, 0 to 2 percent slopes
Gp = Gravel pit
HgtahA = Houghton muck, 0 to 1 percent slopes
MmF = Miami loam, 25 to 35 percent slopes
W = Water
WawabB = Wawasee loam, 2 to 6 percent slopes
WawabC = Wawasee loam, 6 to 12 percent slopes
WawabD = Wawasee loam, 12 to 18 percent slopes
WawabE = Wawasee loam, 18 to 25 percent slopes

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN 48105

SOIL EROSION AND SEDIMENTATION CONTROL PLAN

JANUARY 2025

FIGURE 1

GIS FILE PATH: I:\Projects\0208\GIS_Vella - Bnd\2208_GIS_EARHART01_ANNARBOR.aprx — USER: kolsen01 — LAST SAVED: 1/13/2025 1:14 PM

ATTACHMENT E
Pollution Incident Prevention Plan

Pollution Incident Prevention Plan (PIPP)

For
AMC-WSG, LLC (MMM-Vella Pit)

4984 Earhart Rd.
Ann Arbor Township, MI 48105

April 2025

I. Facility Identification Information [Rule 6(1)(a)]

Facility Owner, Mailing Address and Telephone:

Mid-Michigan Materials
Vella Pit
4984 Earhart Rd.
Ann Arbor Township, MI 48105
Robert Wilson, Vice President (810) 275-3664

Facility Operator, Site Address and Telephone:

Mid-Michigan Materials-Vella Pit
4984 Earhart Rd.
Washtenaw County
Ann Arbor Township, Michigan 48105
Robert Wilson, Vice President (810) 275-3664

Designated Spill Prevention Control Coordinator:
Primary:

Mr. Jonathan Vaughn, Technical Services Coordinator
Mid-Michigan Materials-Vella Pit
4984 Earhart Rd.
Ann Arbor Township, MI 48105
Phone: (810) 363-1322

Alternate:
Ms. Kathleen Anderson
Environmental Consultant for Mid-Michigan Materials
Vella Pit
4984 Earhart Rd.
Ann Arbor Township, MI 48105
Phone: (810) 845-3925

24-Hour Emergency Facility Contacts:

Mr. Robert Wilson
Vice President
Cell: (810) 275-3664

Kathleen Anderson, Environmental
Work Phone: (810) 845-3925

II. Notification Procedures to Entities Outside of Facility 9 [Rule 6(1)(b)]

A. PEAS Hotline (Reportable Releases in MI)	(800) 292-4706
B. National Response Center	(800) 424-8802
C. EGLE-Jackson Michigan District	(517) 416-5992
D. Local Emergency Planning Committee Washtenaw County Emergency Mgt.	(734) 973-4900
E. Local Fire Department Ann Arbor Charter Township FD	911 or (734) 741-5900
F. Local Police Department	911
G. Spill Clean Up Contractor	
National Industrial Maintenance	1 (800) 952-0111
Marine Pollution Control (MPC)	1 (313) 849-2333
H. Washtenaw County Health Department Environmental Health	(734) 544-6700

III. Spill Control Clean Up Procedures

A. Inventory and Location of Equipment On-Site:

Equipment	**Location**	**Quantity**
Shovels	Chemical Storage Area	1
Broom	Chemical Storage Area	1
Absorbent Floor Dry	Chemical Storage Area	6 bags
Front End Loader	Yard Area	1
Sand	Yard Area	20 cubic yards+
Safety Equipment	Office/Scale House	Various
Fire Extinguishers	Office/Scale House/Chemical Storage	4

B. Inventory and Location of Equipment Off-Site

Equipment	**Location**	**Quantity**
Booms	Contractor's Location	2+
Absorbent Socks (10 foot)	Contractor's Location	4+
Vacuum Truck	Contractor's Location	1
Steel Drums	Contractor's Location	10+
Dumpsters, etc.	Contractor's Location	4+

Employees also carry portable cell phones capable of quick and efficient communication. In the event of an emergency, these phones can be used to communicate evacuation procedures to employees, subcontractors or other agencies that may be on-site.

C. Procedures for Response and Clean Up

1. Assess the situation; follow health and safety precautions according to the type of material and quantity spilled. Call all **facility emergency contacts** to notify them of the spill. **See Appendix A for "When a Release Would Be Reportable".**

2. If there is a threat to the health and safety of employees, or the public, evacuate the facility and notify the local emergency response agencies. Follow their instructions.

3. If there is reason to believe that polluting materials have reached the waters of the state via storm drains, ditches, sewers; immediately call the EGLE PEAS Hotline and report the spill.

4. Take steps to minimize the release of polluting material to the environment. This may include, but is not limited to the following:

    a. Call the emergency response contractor if the spill cannot be contained on site or if there is a threat that the spill will reach waters of the State.
    b. Do not flush the area with water unless directed to do so.
    c. Shut off valves, and pumps to stop the release.
    d. Turn off power sources especially if the release was a flammable or combustible material.
    e. Dike or absorb the material using sand or other absorbents.
    f. Keep material from entering drains, sewers, ditches, or bodies of water.
    g. Redirect flows to a contained area.
    h. Keep open communication between response personnel, agencies, etc.
    i. Conduct debriefing meeting with employees and contractors.
    j. Review and revise PIPP at a later date, if necessary.
    k. Clean and/or replace inventories of response equipment.
    l. Prepare a written report to EGLE within 10 days of the incident, if applicable. Use the Michigan EGLE Spill Reporting Form EQP 3465.

D. Procedures for Characterization and Disposal of Recovered Materials

a. Clean up all contaminated material. Excavate soils if necessary.
b. Properly store and label contaminated waste by stockpiling or drumming.
c. Cover stockpiles with plastic or tarps (under and over the pile).
d. Characterize the waste and take samples of the waste, if necessary.
e. Use a qualified waste hauler and disposal site for the waste generated.
f. Recycle material where appropriate.

IV. Polluting Material Inventory

Materials stored on site consist of motor oil, transmission fluid, hydraulic oil, various lubricants, antifreeze/coolant, welding gases, propane, cleaners and degreasers. The following is a list of oils and other polluting materials stored on site over Threshold Management Quantities (TMQIn addition, the Threshold Reportable Quantity (TRQ) is listed for each material.

TABLE 1. Material Inventory Exceeding Threshold Management Quantities (TMQs)

Product Name	Chemical Name	CAS Number	Michigan Part 5 Rules (PIPP) Release Reporting Quantity	Amount Stored On-Site	Location of Material
Motor Oils	Petroleum products	Various	Any amount that causes turbidity, sheen, foaming or discoloration, etc. to the waters of the State	900 gallons (3-300-gallon tanks)	Inside Shop
Antifreeze	Ethylene Glycol	107-21-1	500 lbs. or 52 gallons	300 gallons + 500 gallons used	Inside Shop
No. 2 Diesel Fuel	Diesel Fuel	68476-34-6	Any amount that causes turbidity, sheen, foaming or discoloration, etc. to the waters of the State	3600 gallons	Outside Shop
Gasoline	Gasoline	8006-61-9	Any amount that causes turbidity, sheen, foaming or discoloration, etc. to the waters of the State	1,000 gallons	Outside of Shop
Used Oil	Various motor oils	Various	Any amount that causes turbidity, sheen, foaming, or discoloration, etc. to the waters of the Sate	500 gallons	Inside Shop
Used Antifreeze	Antifreeze	107-21-1	500 lbs. or 52 gallons	500 gallons	Inside Shop

V. Site Plan

POND
POND
POND
SEPTIC FIELD
TRANSITORIES
OFFICE TRAILER
POTABLE WATER WELL
OPEN SHED
PROPOSED LOCATION OF DETENTION BASIN AND STORMWATER
PROPOSED LOCATION OF DETENTION BASIN AND STORMWATER
MEYERDIRK 12-FOOT EASEMENT
AGRICULTURE
WOODED AREA
WOODED AREA
WETLAND
RESIDENCE
RESIDENCE
RESIDENCE
SCHOOL
GARHART ROAD (60' WIDE, GRT)
GARHART ROAD (60' WIDE, GRT)
ADVERTISING
RESIDENCE

VI. Outdoor Secondary Containment for Liquid Polluting Materials

A. Secondary Containment for Oils

Tanks

Fuel oil tanks are double walled and/or situated on poured concrete pads. The concrete pads extend approximately 2' beyond the size of the tank on all sides. All tanks are properly labeled with the supplier number, flammable placard, contents, and warning labels. Tanks are grounded and equipped with standard safety equipment, such as automatic shut off valves. Tanks are inspected daily for spills. Minor spills will be cleaned up with sand or other absorbent material and disposed of properly or recycled. Employees are instructed not to leave mobile equipment unattended while re-fueling.

Drums

On occasion 55-gallon drums may be purchased for the facility, however, bulk containers are currently preferred. If drums of oils are utilized on site they will be stored in a covered and locked equipment trailer or in the shop located on the property. The trailers are equipped with absorbent material in the event of small spills. Drums are to be capped at all times unless in use. Adequate secondary containment is provided.

B. Precipitation Management

Stormwater is contained on site and is collected in large detention ponds/recycled lagoons that recycle process water and stormwater that falls on the site. Stormwater does not leave the site.

Stormwater is diverted away from liquid storage areas by containing materials in equipment trailers, secondary containment units or buildings. Fuel tanks are not covered from the elements, but are viewed on a daily basis for leaks or spills.

VII. Other Control Mechanisms and Facility Security

Good Housekeeping

Good housekeeping practices are a part of each employee's daily operations at the sand and gravel pit. Such practices help to ensure that all facility operations and work areas are kept in a clean and orderly fashion and are generally the most effective means in preventing pollution from entering the water detention lagoons.

Preventative Maintenance

Preventative maintenance is also an important operational procedure that takes place throughout the year as needed. This may include replacing hoses, valves,

conveyor belts, and motors, etc. on all process and other equipment. In addition, during operations, a general inspection is performed by employees several times a day.

Employee Training

Employee training includes an introductory spill prevention and response program. Employees are trained on how to prevent, detect and control spills. This includes discussion concerning the facility's responsibility to preventing contamination of storm water and all components of the PIPP. Refresher training will take place once per year in the form of a "tool box talk" or other appropriate method of training and/or communication. Inspection results requiring corrective action are communicated to management personnel. Corrective action requirements are part of employee training.

Hose Connections

Hose connections in the liquid materials loading and unloading areas are equipped with shutoff valves and put in the shutoff position when not in use.

Delivery of Materials

Plant personnel are typically present at the site when deliveries of liquid materials are made. Truck drivers are instructed to check in with the plant operator before loading or off-loading materials. Verbal instructions are given to drivers at that time.

Security

During non-operational hours, the fuel tanks are locked at the pump nozzles so that non-authorized persons cannot open the valves. The shop is locked when not in use and a limited amount of personnel have access to this building.

VII. Plan Preparation, Submittal, and Update Requirements

A. A copy of this plan will be kept at the plant location and will be available for inspection.

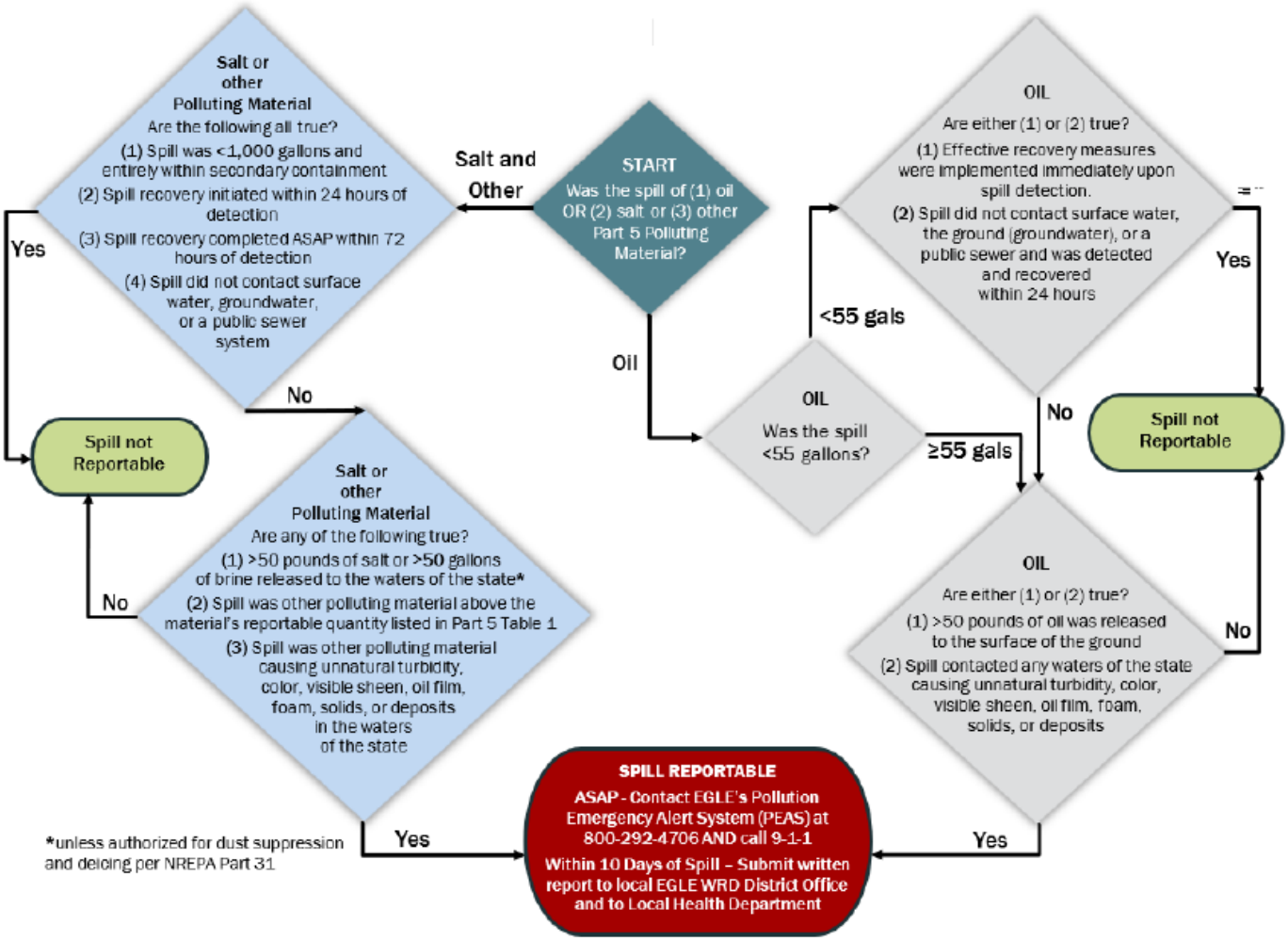
B. Notification that this PIPP has been prepared and certification of compliance with Part 5 Rules sent to the EGLE-Water Resources Division Office within 30 days of its preparation.

C. A notification has been sent to the Local Emergency Planning Committee (LEPC) for Washtenaw County, Michigan, as well as the local health department in Washtenaw County, MI.

D. A copy of this plan will be made available to the requesting agency within 30 days of the request.

E. This plan will be evaluated every 3 years or when there is a location change, or after a release requiring implementation of this plan. Upon that time notifications will be sent to all agencies stating re-certification and re-notification to the State of Michigan EGLE, LEPC and local health department.

APPENDIX A


START
Was the spill of (1) oil OR (2) salt or (3) other Part 5 Polluting Material?
Salt and Other
Oil
Salt or other Polluting Material
Are the following all true?
(1) Spill was <1,000 gallons and entirely within secondary containment
(2) Spill recovery initiated within 24 hours of detection
(3) Spill recovery completed ASAP within 72 hours of detection
(4) Spill did not contact surface water, groundwater, or a public sewer system
Yes
No
Spill not Reportable
Salt or other Polluting Material
Are any of the following true?
(1) >50 pounds of salt or >50 gallons of brine released to the waters of the state*
(2) Spill was other polluting material above the material's reportable quantity listed in Part 5 Table 1
(3) Spill was other polluting material causing unnatural turbidity, color, visible sheen, oil film, foam, solids, or deposits in the waters of the state
No
Yes
*unless authorized for dust suppression and deicing per NREPA Part 31
OIL
Was the spill <55 gallons?
<55 gals
≥55 gals
OIL
Are either (1) or (2) true?
(1) Effective recovery measures were implemented immediately upon spill detection.
(2) Spill did not contact surface water, the ground (groundwater), or a public sewer and was detected and recovered within 24 hours
Yes
No
Spill not Reportable
OIL
Are either (1) or (2) true?
(1) >50 pounds of oil was released to the surface of the ground
(2) Spill contacted any waters of the state causing unnatural turbidity, color, visible sheen, oil film, foam, solids, or deposits
No
Yes
SPILL REPORTABLE
ASAP - Contact EGLE's Pollution Emergency Alert System (PEAS) at 800-292-4706 AND call 9-1-1
Within 10 Days of Spill – Submit written report to local EGLE WRD District Office and to Local Health Department

ATTACHMENT F
Environmental Impact Analysis

HALEY & ALDRICH OF MICHIGAN, INC.
Mailing Address:
PO Box 505
Ann Arbor, Michigan 48106
734.887.8400

Deliveries:
24 Frank Lloyd Wright Drive
Suite L-4000
Ann Arbor, Michigan 48105

August 22, 2025
File No. 0207666-010

Mid Michigan Materials
1955 Lakeville Road
Oxford, Michigan 48371

Attention: Rob Wilson
President

Subject: Environmental Impact Analysis for
Mid Michigan Materials – Vella Pit
Ann Arbor Township, Michigan

Dear Mr. Wilson:

This Environmental Impact Analysis (EIA) summarizes the results of the evaluation performed by Haley & Aldrich of Michigan, Inc. (Haley & Aldrich), on behalf of Mid Michigan Materials (MMM), at the Vella Pit located at 4984 Earhart Road in Ann Arbor Township, Washtenaw County, Michigan (the site). Attachments referenced in this EIA are included in the Conditional Use Permit Application Renewal, of which this EIA is also an attachment.

The EIA framework is based on the requirements in the Ann Arbor Township Mining Ordinance, 74.592a, Section 2, d 1 (g) (5): Potential Environmental Impacts and (o): Environmental Impact Analysis. The EIA evaluates potential environmental impacts and includes mitigation measures to be used as necessary to eliminate or minimize these impacts.

The following sections address specific requirements in the ordinance.

74.592a, Section 2, d 1 (g) (5): Potential Environmental Impacts

5. **Potential Environmental Impacts.** A narrative that documents existing site conditions and identifies potential short-term and long-term impacts on the Township water resources during and after the proposed Extraction Operations shall be provided. At a minimum, this section must contain the following elements:

    i. Description of present land use and the relationship of the site to surrounding properties. The site location map shall be used for this description.

The present land use is sand and gravel mining, as it has been since operations began in 1956. Some sections of the site parcel are forested or used for agricultural purposes. Land use adjacent to the site is primarily forest, agricultural, and low-density residential. Additional descriptions and maps of the site and surrounding properties are provided in the Hydrogeological Investigation Report (Attachment C).

    ii. Discussion of the proposed Extraction Operation and schedule, along with the intended future use of site. The topographic map showing proposed extent of the Extraction Operation and different phases, if applicable.

Extraction occurs generally from March through November annually, dependent on weather. The anticipated additional duration of mining planned under this CUP renewal application is approximately 6 years. This has been modified from the duration described in the Hydrogeologic Investigation Report based on the schedule agreed to with Ann Arbor Township. The intended future use of the property, following completion of mining operations, is either residential, recreational, or a combination of the two uses. The proposed final extent of mining and conceptual phasing of mining and reclamation are shown on Figures 2 and 3, respectively, of the main report.

    iii. Water quality impacts on existing surface water and groundwater quality and quantity, and an analysis and conclusion discussing the expected impacts.

Based on the reclamation plans included in the 2020 CUP Application and the extensive groundwater evaluation documented in the Hydrogeologic Investigation Report, planned future operations and reclamation will not degrade the water quality of existing surface water or groundwater quantity or quality.

Potential effects on surface water resources from mining activity and the resulting lake creation are also regulated under Part 301, Inland Lakes and Streams, of Michigan's Natural Resources and Environmental Protection Act of 1994, as amended (herein referred to as "Part 301"). The proposed activity requires a Part 301 permit, which is being obtained separately from the Conditional Use Permit. The proposed mining and reclamation activity will be conducted in accordance with Part 301 permit and regulatory requirements to avoid negative impacts to surface water resources, including the final reclamation lake at the site.

    iv. If applicable, prepare maps and cross-sections showing the nature and extent of the hydrogeologic impact(s), (e.g. water-level decline or increase).

The Hydrogeological Investigation Report includes maps and cross sections showing hydrogeologic conditions, including maps of modeled future hydrogeologic conditions. Based on the hydrogeologic

investigation and modeling results, the current and future mining operations are not expected to have a negative impact on the water table or surrounding water supply wells.

v. Elevations of groundwater (e.g. project water level decline/rise in each aquifer) and surface water bodies on and proximate to the site, considering both short-term and long- term potential impacts.

This information is provided in the Hydrogeologic Investigation Report, including the numerical modeling results documented and evaluated in that report.

vi. If the Mineral Mining Operation creates or enlarges an excavated lake, the evaporation impact shall be analyzed through a water budget analysis using EGLE 's applicable guidance for how to perform this analysis.

At the request of the Michigan Department of Environment, Great Lakes, and Energy, evaporation impact was analyzed through numerical modeling as documented in the Joint Permit Application for Inland Lakes and Streams, Great Lakes, Wetlands, Floodplains, Dams, Environmental Areas, High Risk Erosion Areas, and Critical Dune Areas (ILS Permit Application; Attachment B) and the included Hydrogeologic Investigation Report.

74.592a, Section 2, d 1 (o): Environmental Impact Analysis

1. At a minimum the statement should address the following: noise; dust; mud; drainage; erosion; sedimentation; views of the mine site from adjacent roads and properties; wetlands; floodplains; special habitats; threatened or endangered species; areas and features of historic, archeological and natural significance; truck traffic and access to and from the site; traffic study; compatibility with adjacent land uses; impacts to residents adjacent to site and along transportation route; changes in social patterns and/or economic conditions of residents; and any additional items that the applicant, Planning Commission or Board of Trustees deems significant. This section is intended to provide an environmental impact analysis using the assembled data identified in the previous sections. The applicant should analyze how the various data interrelate and how the proposed operation will affect the human and natural environments. Environmental impacts identified in the hydrogeological study should be incorporated into the EIA and related to the discussions of other impacts; although the hydrogeological support data does not have to be re-stated, it should be referenced in the environmental impact analysis.

The following text addresses the items specified in Section 2(d)(1)(o)(1).

NOISE AND DUST

MMM has a Dust control plan that is followed in order to minimize dust from the mine operation leaving the property. The plan includes watering interior roads, surfaces, and stockpiles to minimize dust creation. The Dust control plan is included as Attachment H.

MMM utilizes white noise back up alarms on their equipment to minimize disturbance from equipment noise in the area. Additionally, the berms around the mine operation limit the amount of noise that reaches the property boundaries. A noise control plan is included as Attachment G. This plan includes

monitoring for noise emissions and mitigation measures to be taken in the event that noise emissions exceed applicable limits.

EROSION, DRAINAGE, AND SEDIMENTATION

MMM has an erosion and sedimentation control plan (see Attachment D). Stormwater is internally drained with the exception of the exterior berms of the mine. The exterior berms are vegetated and several of the exterior berms were regraded and reseeded in 2024 to address historical concerns with erosion.

VIEWS OF THE MINE SITE FROM ADJACENT ROADS AND PROPERTY

MMM has constructed berms along the sides of the mine property where the mine would otherwise be visible from adjacent roads or properties. Additionally, trees have been planted at the tops of the berms in some portions of the property boundary to reduce the view of the mine operation.

WETLANDS, FLOODPLAINS, AND SPECIAL HABITATS

Haley & Aldrich conducted a desktop review of publicly available data (United States Geological Survey topographic quadrangle maps, United States Fish and Wildlife Service (USFWS) National Wetlands Inventory maps, Natural Resources Conservation Service County Soil survey, Federal Emergency Management Agency Flood Insurance maps, the National Hydrography Dataset, Michigan Resource Inventory System, and recent aerial photography) to evaluate the presence of mapped wetlands and streams at the site.

Haley & Aldrich also performed a wetland and stream delineation, which is documented in the Wetland Delineation Report dated May 6, 2024 (see Appendix D of the Hydrogeologic Investigation Report [Attachment C]). There are wetlands on the property but as documented in the Hydrogeologic Investigation Report, the mine activity is not expected to impact the wetlands on the property or off-site wetlands. Based on the delineated wetland extent and final extent of mining shown in Figure 2 of the main report, mining will not occur near the wetlands. This lateral separation between the wetlands and the mined area will prevent direct surface impacts to the wetlands. This separation will also prevent deterioration of the low-permeability upper till unit that separates the wetlands from the underlying aquifer, further limiting potential effects on the wetlands.

There are no floodplains within the mine footprint. There are no known special habitats within the mine footprint.

THREATENED OR ENDANGERED SPECIES

Haley & Aldrich reviewed available records on the USFWS Environmental Conservation Online System (ECOS) website regarding threatened and endangered species. Three endangered species were identified in Washtenaw County:

- *American burying beetle: Nicrophorus americanus (Invertebrate)*
- *Indiana bat: Myotis sodalis (Mammal)*
- *Mitchell's satyr: Neonympha mitchellii mitchellii (Invertebrate)*

However, the ECOS mapper-did not identify any critical habitats on or near the site. Additionally, there were no critical habitats for threatened and endangered species identified on the USFWS online habitat mapper.

HISTORICAL, ARCHEOLOGICAL, AND NATURAL SIGNIFICANCE

Haley & Aldrich reviewed the records available on the Michigan State Historical Preservation website and on the National Register of Historic Places. There were no listings for the site address or adjacent properties.

TRUCK TRAFFIC AND ACCESS

Truck traffic to and from the site will remain the same as it has since the mine was permitted by MMM through Ann Arbor Township in 2020. This includes an average of 50 trucks per day, with a peak of 80 trucks per day during peak season. Access to the site will remain the single driveway entrance from Earhardt Road.

COMPATIBILITY WITH ADJACENT LAND USE

The mine operation will continue to be compatible with the adjacent forested, agricultural, and low-density residential land uses. This has not changed since the 2020 CUP Application (Attachment A) that was approved by Ann Arbor Township, which evaluated compatibility with adjacent land use.

IMPACT TO RESIDENTS

The impacts to residents adjacent to the site and along transportation route will not change from current conditions. Truck traffic patterns will not change or increase.

SOCIAL AND ECONOMIC IMPACTS

There are no expected changes in social patterns and/or economic conditions of residents due to the continued operation of the mine.

ADDITIONAL ELEMENTS

2. In addition to the items in section immediately above, the EIA shall address the following issues:

The following paragraphs address the additional items specified in Section 2(d)(1)(o)(2).

(i) An inventory of the physical environmental elements of the proposed site;

(ii) A description of the quality of the environment as it exists prior to commencement of mining activity or, for a renewal, as it exists at the time of renewal;

The physical environmental elements of the site are the mine-created ponds, the mining equipment, the wash plant, office trailer, truck scale, maintenance building, two potable water wells, and two septic systems. There are wetlands at the site, located outside of the berm that surrounds the mine and unimpacted by the mine operation. Stormwater that comes in contact with mine operations is contained

on site and does not discharge. There is no current wastewater discharge off site, although the National Pollutant Discharge Elimination System permit is still in effect.

(iii) A description of the environment as projected at the end of mining activity;

The conceptual site reclamation plan is shown in Figure 2. Natural features outside of the mined extent, which were shown in the 2020 CUP Application (see Attachment A, Figure 2), are expected to remain unimpacted. At the end of mining activity, the property will have increased value for recreation or residential purposes due to the creation of a large inland lake as a result of the mining activities.

(iv) Compatibility of the proposed extraction activity with adjacent existing land uses and future land use plans/Township Master Plan;

Compatibility with adjacent land uses is evaluated in the previous sections above. Compatibility with the Township Master Plan was evaluated in the previously approved 2020 CUP Application.

(v) Impact of the proposed extraction activity on flora and wildlife habitats;

As discussed above, there are no known wildlife habitats within the footprint of the mine and the mine activity is not expected to impact local flora or wildlife.

(vi) Economic impact of the proposed extraction activity on the surrounding area;

The mine will continue to have a positive economic impact on the Southeast Michigan region where the mine is located, as discussed in the 2020 Market Study Report included as Appendix F of the 2020 CUP Application.

Potential impacts on property values were also evaluated in the 2020 CUP Application, which indicated that "The proposed use is consistent with the current use and past use for several decades," and "being consistent with decades of use, the proposed use will preserve and not negatively impact property values."

(vii) Effects of the proposed extraction activity on groundwater supply, level, quality, and flow on site and within two miles of the proposed extraction activity;

The current and future mine operation is not expected to impact groundwater supply, level, quality or flow. Please refer to the Hydrogeologic Investigation Report (Attachment C) for additional evaluation and supporting hydrogeological data and modeling.

(viii) Effects of the proposed activity on adjacent surface water resources;

The mine operation is not expected to impact surface water resources. Please refer to the Hydrogeologic Investigation Report for additional evaluation and supporting hydrogeological data and modeling.

The proposed mining and reclamation activity will be conducted in accordance with Part 301 permit and regulatory requirements to avoid negative impacts to surface water resources, including adjacent surface water resources.

(ix) Effect of the proposed activity on air quality within one thousand (1,000') feet of the proposed extraction; and

The mine has an air quality permit and a Dust control plan (Attachment H). With adherence to the permit, the mine is not expected to impact air quality outside the mine footprint.

(x) Whether the proposed activity is located within one thousand (1,000) feet of a residence, two thousand (2,000) feet of a school, and/or 500 feet of a commercial development.

There are seven residences within 1,000 feet of the mine footprint. There is a school (Spiritus Sanctus Academy Ann Arbor) located within 2,000 feet of the mine footprint. However, the residences and school have been coexisting with the mine since MMM began operations in 2020 and before 2020 with the previous owners. There are no changes expected in the mining process that will negatively impact the residences or the school. There are no commercial developments located within 500 feet of the mine footprint.

Conclusion

Based on the above evaluation, there are no expected environmental impacts that will need mitigation beyond the plans and procedures referenced here.

Sincerely yours,
HALEY & ALDRICH OF MICHIGAN, INC.

Leslie M. Nelson, P.E.
Senior Technical Expert

Enclosures:
References

\\haleyaldrich.com\share\CF\Projects\0207666\Deliverables\Vella Pit\AA Township Mining Ordinance\2025 Application Attachments\Attachment F - Environmental Impact Analysis\2025_0822_HAMI_Environmental Impact Analysis_F.docx

References

1. United States Army Corps of Engineers. 1987. *Corps of Engineers Wetland Delineation Manual*. Environmental Laboratory, Vicksburg, MS, 92 pp.

2. United States Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest*. United States Army Engineer Research and Development Center, Vicksburg, MS, 162 pp.

3. Cowardin, L.M., et al. 1979. *Classification of wetlands and deepwater habitats of the United States*. United States Department of the Interior, Fish and Wildlife Service, Washington D.C. 131 pp.

4. United States Environmental Protection Agency. 2024. Level III and IV Ecoregions of Michigan.

5. Huron River Watershed Council. 2024. Explore the Huron River Watershed. https://www.hrwc.org/our-watershed/maps/. Accessed April 1, 2024.

ATTACHMENT G
Noise Control Plan

Noise Control Plan

INTRODUCTION AND PURPOSE

This Noise Control Plan (NCP) has been prepared in general accordance with the Ann Arbor Charter Township Mining Mineral Code Section 74-592a to manage noise emissions associated with the operation of the mine.

Section 74-592a requires a noise control plan and establishes the following noise limits as shown below in Table 1:

Table 1: Monitoring Locations

Location	Time	Limit	Units	Condition
Property Boundary	Operational Hours	65	LAeq (dBA)	Single measurement (1-sec)
Transportation route	Operational Hours	82	LASmax (dBA)	Single measurement
Transportation route	Operational Hours	74	Arithmetic average of all valid LASmax (dBA) readings during operating	Arithmetic average during 7am-7pm on working days

Notes:

dBA – A-weighted decibels
LAeq – equivalent continuous sound pressure level
LASmax – maximum sound level

This plan details the noise monitoring and mitigation activities to be conducted by Mid Michigan Materials during operations at the Vella Pit mine.

METHODS AND UNITS OF MEASUREMENT

To collect data relevant to the above-referenced sound level limits for “single occurrence” events, measurement of sound levels will be taken via a Class 1 integrating sound level meter capable of recording equivalent continuous sound level with A-frequency weighting (LAeq) in the range of at least 30 dBA to 100 dBA logging at a frequency of no less than 1 measurement per second at each sound monitoring location as shown on Figure 1.

To collect data relevant to the above-referenced sound level limits for “daily maximum average” events, measurement of sound levels will be monitored via a Class 1 integrating sound level meter capable of recording A-frequency weighted, slow time-response, maximum sound level (LASmax) in the range of at least 30 dBA to 100 dBA logging at a frequency of no less than 1 measurement per second at each sound monitoring location as shown on Figure 1. The arithmetic average of LASmax readings collected during a given day’s operating hours will be calculated during processing and analysis of recorded sound data.

Sound level measurements will be stored locally on each meter, to be downloaded and processed manually no less frequently than once per calendar month. Video and/or photo monitoring equipment will be mounted on sound monitoring stations to collect visual information.

BACKGROUND NOISE LEVELS

Environmental, meteorological, and external commercial and residential conditions (such as wind, precipitation, temperature inversion, flora, fauna, residential car traffic, residential and commercial landscaping and construction activities, and commercial traffic) are expected to and have been observed to impact noise levels at the mine boundary and along the transportation route. Determination of external noise sources and the impact of external conditions on sound level meter readings is critical to development of a robust procedure for identifying and mitigating excess noise. Therefore, to develop a baseline for monitoring and managing noise at the mine, a background noise study will be conducted during non-operation conditions as described below.

A minimum of two periods of non-operation will be monitored during times of day consistent with weekday operational hours, during differing weather conditions. At least one monitoring period will be during active precipitation. Sound monitoring locations will be patrolled and external conditions recorded throughout the monitoring period, to correlate events and conditions with sound measurements.

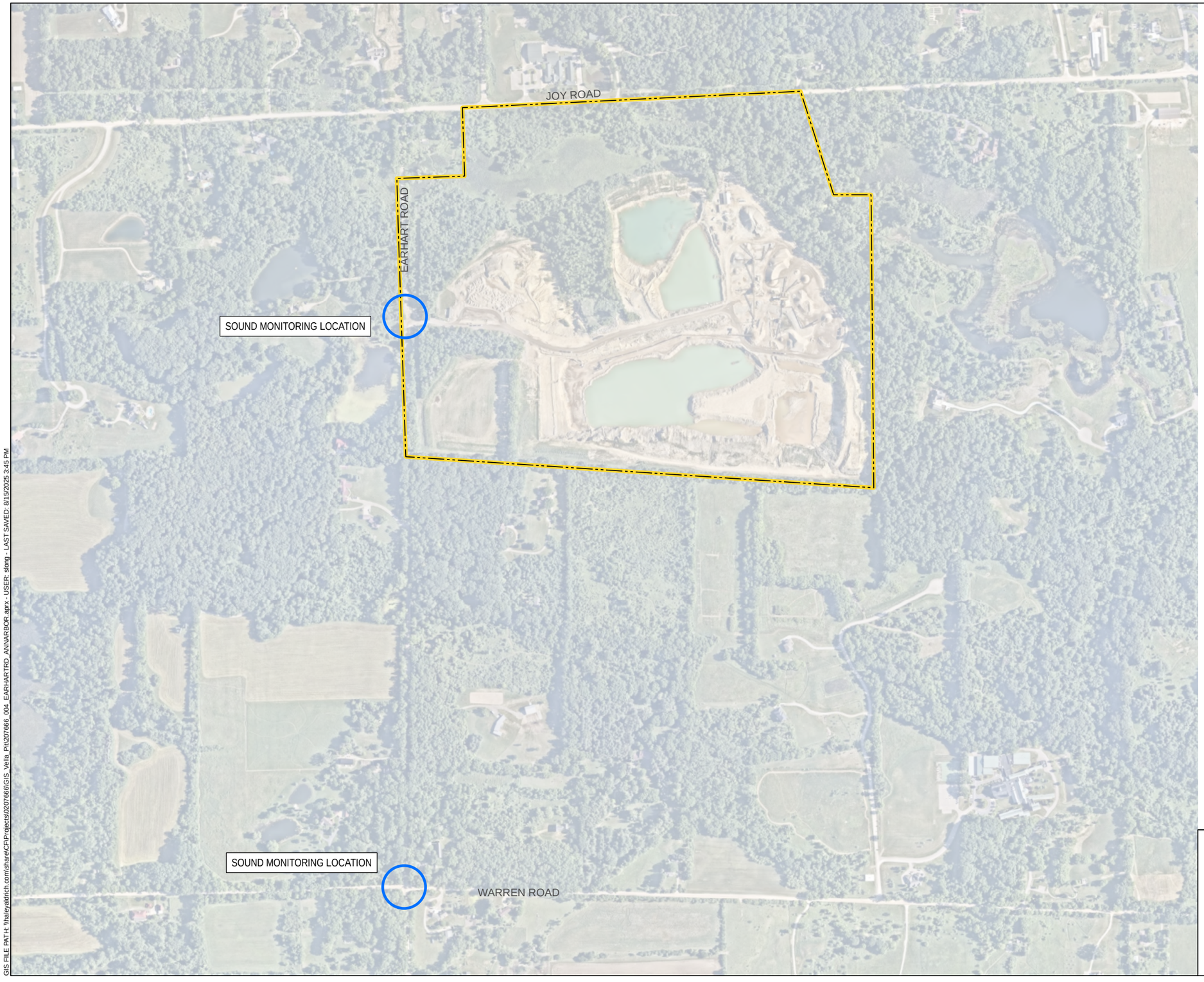
Data and observations collected from baseline monitoring will be used to process and analyze sound level data collected during operation, as well as to investigate and manage potential sound level exceedances.

EXCEEDANCES AND MANAGEMENT

If sound level data from monitoring locations included in this NCP indicates an exceedance of the limits shown in Table 1, site personnel will promptly investigate the conditions during the exceedance period. If sound levels in excess of the limits are determined to be related to site activities, noise mitigation and buffering measures will be taken as necessary or required to reduce sound level emissions in excess of the limits shown in Table 1. Specifically, if the daily calculated sound level averages exceed the applicable limit and the excess noise is due to site-related truck traffic, MMM will work in good faith with the Township and Washtenaw County Road Commission to address the cause(s) of such exceedances to reduce such notice readings specifically related to truck traffic until such noise readings fall within the permitted daily average limit of 74 dB.

REPORTING

A summary of noise monitoring and control activities related to this NCP will be provided to the Township upon request.



LEGEND

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. AERIAL IMAGERY SOURCE: NEARMAP, JUNE 12, 2024

3. SOUND MONITORING LOCATIONS (BLUE CIRCLES) ASSUME ANN ARBOR CHARTER TOWNSHIP CAN PROVIDE ACCESS AND INSTALL MONITORS AT ANY OFF-SITE LOCATIONS.

N

0 350 700

SCALE IN FEET

HALEY ALDRICH

MID-MICHIGAN MATERIALS, INC. - VELLA PIT
4984 EARHART RD
ANN ARBOR TOWNSHIP, MICHIGAN

SOUND MONITORING LOCATIONS

AUGUST 2025

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CP\Projects\0207666\GIS_Vella_Pit\207666_004_EARHARTRD_ANNARBOR.aprx - USER: slong - LAST SAVED: 8/15/2025 3:45 PM

ATTACHMENT H
Dust Control Plan

MAA Guide for the Aggregate Industry in Michigan: Fugitive Dust Control Plan

This document is to be used as a general guide and it is not intended as a sole source for information, nor is it intended to provide legal advice. Users are encouraged to seek technical advice from qualified professionals familiar with the site and fugitive dust management requirements. MAA is not responsible for any acts or omissions taken by any party using this document for reference.

Note that not all methods or techniques may be appropriate depending on the weather conditions. For example, the use of water when the temperature is near or below freezing may cause operational and safety concerns.

- Mine Property
  - Disturbed areas will be limited in such a way as to only expose areas that are being actively mined or are a part of ancillary activities servicing the mine. Other areas will be vegetated as feasible to avoid dust production.
  - Barriers including fencing, berms and vegetative buffers will be utilized when and where feasible to limit dust from traveling off site.

- Site Roadways / Plant Yard
  - The dust on the site roadways and the plant yard shall be controlled by applications of water, calcium chloride or other acceptable and approved fugitive dust control compounds. Applications of dust suppressants shall be completed as often as necessary to stay below applicable emission limits.
  - All paved roadways and plant yards shall be cleaned by vacuum sweeping or power brooming on an as-needed basis.
    - *"An as-needed basis" means the frequency or quantity of application necessary to minimize visible particulate matter emissions.*
    - Power brooming should be performed while wet from either rain or application of water.
  - For unpaved roads and parking lots they should be either:
    - Paved with asphalt or concrete
    - Treated with emulsified asphalt on an as-needed basis
    - Treated with water, calcium chloride or other acceptable dust suppressants on an as-needed basis
    - Double chip and seal and maintained on as as-needed basis
  - Any material spillage on roads shall be cleaned up immediately upon observation. Prior to closing the site at night, ensure that there is no spillage on the roads.
  - If feasible, sprayers should be utilized during operations which produce significant dust (i.e. blasting, crushing, etc.)
  - Other suggested BMPs that are commonly utilize at aggregate sites on a site specific and as needed basis include:
    - Wheel wash
    - Transfer point enclosures, chutes
    - Covering screens
    - Covering conveyors
    - Water spray at key locations on aggregate plant
    - Rumble strips on roadways

MAA Guide for the Aggregate Industry in Michigan: Fugitive Dust Control Plan

- Blasting
  - Spray area with water prior to blasting to minimize airborne material.

- Conveyance of Aggregates
  - The drop distance at each transfer point shall be reduced to the minimum the equipment can achieve.
  - Apply water at the feed and intermediate points on an as-needed basis.

- Transferring of Aggregates
  - Minimize the vehicular distance between the transfer points.
  - Enclose the transfer points (when applicable).
  - Apply water on transfer points on an as-needed basis.

- Storage Piles
  - Stockpiling of all nonmetallic minerals shall be performed to minimize drop distance and control potential dust problems.
  - Stockpiles shall be watered on an as needed basis in order to meet the opacity limit of 5 percent. Equipment to apply water or dust suppressant shall be available at the site or on call for use at the site within a given operating day.
  - Maintain minimum size and number of stock piles of aggregate.
  - Treat around the stockpile area with water on an as-needed basis.
  - When practical, treat stockpiles with bonding agent (or polymer spray) to reduce the possibility from material to become airborne.

- Truck Traffic
  - On-site vehicles shall be loaded to prevent their contents from dropping, leaking, blowing or otherwise escaping. This shall be accomplished by loading so that no part of the load shall come in contact within 6 inches of the top of any side board, side panel or tailgate. Otherwise, the truck shall be tarped.
  - The drop distance during each transfer into a truck shall be reduced to the minimum the loading equipment can achieve.
  - Maintain vehicle bodies in a condition to prevent leakage.
  - Spray the aggregates with water.
  - Maintain a 15-mph speed limit in the yard.

- Unloading of Material
  - Reduce free fall distance to a minimum.
  - Reduce the rate of discharge of the aggregate.
  - Spray the aggregate with water on an as-needed basis.

adopted by MAA BOD on 5/23/18

ATTACHMENT I
Letters of Support

ENVIRONMENTAL
Wood Solutions

(248) 391-9446
3500 Giddings Road, Lake Orion, MI 48359

Jeffery A. McConnell
Operations
Mid-Michigan Materials

Dear Mid-Michigan Material's,

I hope this message finds you well.

I am writing to express concern regarding the potential changes to Mid-Michigan Material's operating hours that we understand may be under consideration. As a company that relies heavily on the availability of your services, any reduction in business hours would have a direct and significant impact on our operations.

Our team coordinates closely with yours to meet tight schedules, serve our customers efficiently, and maintain the high standards both our companies are known for. A change in the availability, especially during peak periods, could create delays, disrupt workflow, and affect our ability to meet commitments.

We value our ongoing partnership and are hopeful that decisions about Mid-Michigan Material's hours of operation will consider the broader network of businesses that depend on their accessibility.

Sincerely,

Joe Corrigan
President
Environmental Wood Solutions

NATIONAL BLOCK COMPANY
WWW.NATIONALBLOCK.COM

MAKERS OF CONCRETE BLOCKS
PHONE 734•721•4056

TRANSIT MIXED CONCRETE
PHONE 734•721•4050

39000 FORD ROAD • WESTLAND, MICHIGAN 48185

NATIONAL ready-mix
FAX 734•721•2080

Subject: Concerns Regarding Proposed Change to Vella Pit Hours of Operation

Dear Members of the Township Council,

I am writing on behalf of National Block & Ready-Mix to express our concerns regarding the proposed changes to the hours of operation for Mid-Michigan Materials Vella pit.

Our business relies heavily on the timely and consistent availability of materials from this site to maintain our operations. Any reduction or shift in operating hours would significantly disrupt our daily operations and increase operational costs. These impacts are not only financial but also affect our workforce scheduling and obligations to our customers.

Aggregate supply is a time-sensitive component of our work, particularly in the construction and infrastructure sectors where early morning access is often necessary to meet project demands. Shortened or altered hours would create a bottleneck that extends far beyond our company, potentially impacting other local businesses, contractors, and development efforts in the region.

We respectfully request that the council take into consideration the economic and operational impact this change would have, not only on our business but on the broader network of companies that depend on this site.

Sincerely,

Milo Eisenstein

President

FARMER UNDERWOOD

5/14/25

To Whom it May Concern

Here at Farmer Underwood Trucking we have been in the sand and gravel hauling business for over 65 years and have made many great relationships along the way. One of those relationships being with Mid-Michigan Materials, specifically the Vella Pit. In our profession time is of the utmost importance and any reduction operating hours negatively impacts our business. We are a family owned, seasonal company in construction supply so our window for us and our employees to make a profit is already small. This season we have many projects committed to come from Vella and our customers expect us to service their jobs properly. Any hinderance in our service window would not only affect us but our customer's businesses as well as all employees involved. Please keep companies and employees like us in mind in your decision.

Thank you,

Austin Farmer

Sales Manager