# 2026 PMP Street & Utility Improvements

## Feasibility Report

City of Arden Hills

July 2025

Real People. Real Solutions.

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# Certification

Feasibility Report

For

2026 PMP Street & Utility Improvements

City of Arden Hills
Arden Hills, Minnesota
City Project No. PW-26-0100
BMI Project No. 25X.137753

July 14, 2025

**PROFESSIONAL ENGINEER**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: Bradley Fisher

Typed or Printed Name: Brad Fisher, PE

Date: 07/14/2025 License Number: 56595

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# I. INTRODUCTION

The Arden Hills City Council approved a Professional Services Agreement on March 10, 2025 which ordered the preparation of a Feasibility Report for the 2026 Pavement Management Program (PMP) Street & Utility Improvements project. This report will examine the feasibility of proposed improvements to the roadway and utilities within the 2026 PMP project area. The following streets, trail segments, and the surrounding areas, are proposed for improvements:

- Karth Lake Drive from the west cul-de-sac to Pleasant Drive
- Pleasant Drive from Amble Drive to the north cul-de-sac
- Pleasant Circle from the west cul-de-sac to Lexington Avenue (CSAH 51)
- Amble Drive from Karth Lake Drive to Lexington Avenue
- Amble Circle from Amble Drive to the north cul-de-sac
- Karth Lake Circle from Hamline Avenue (CSAH 50) to the south cul-de-sac
- Cummings Park Drive from the west cul-de-sac to Lexington Avenue
- Select trail segments on the east side of Cummings Park, connecting to the Lexington Avenue trail

See Figure 1 in Appendix A for the proposed project location map.

This report reviews the existing conditions in the project area and discusses, in detail, the proposed improvements. These proposed street improvements consist of two construction methods, each determined as a result of deteriorating street pavement conditions and proposed improvements to the watermain, sanitary sewer, and storm sewer infrastructure. The first pavement improvement method is the milling and overlaying of the existing roadway pavement with a new wearing course. The second method is the full depth reclamation of the roadway, a process that pulverizes the existing roadway to create a suitable base for new non-wear course and wear course pavement to be installed. The report also provides preliminary cost estimates for the proposed improvements with financing for the project coming from a combination of special assessments, the City's general tax levy, and the City's utility funds.

If the City decides to proceed with the proposed street and utility improvements described in this report, it is anticipated construction would begin in 2026 as shown in the detailed project schedule found later in this report.

# II. BACKGROUND

The city's Capital Improvement Plan (CIP) identifies proposed projects, their associated costs, and funding for a five-year period. The streets evaluated in this report were identified in The City of Arden Hills's 2025 CIP for construction in the year 2026. The project area is primarily residential with a park area separating the residential properties from the industrial properties surrounding Cummings Park Drive. The project areas were originally constructed as part of five platted developments identified to have been completed primarily in the late 1970's. The proposed improvements discussed in this report took into consideration the available documents and data related to the project areas, including but not limited to the City of Arden Hills 2040 Comprehensive Plan, record drawings, geotechnical reports, Pavement Condition Index (PCI) ratings, sanitary sewer televising inspections, watermain break and leak history, and field observations conducted by city public works staff.

# III. EXISTING CONDITIONS

## A. Streets

The streets within the proposed project area are all predominantly residential streets with urban street sections consisting of bituminous pavement and B618 or surmountable concrete curb and gutter. The roadways provide a drive lane in each direction and parking along the curb lines. The exception to this is Cummings Park Drive, which consists of a partially median divided urban street section with no parking. The project areas were originally constructed as part of five platted developments identified in the RFP as having been completed primarily between 1977 and 1979 except for the Boston Scientific campus, which was re-platted in 2015. Since the infrastructure's initial construction, city pavement management records indicate the most recent structural pavement improvement projects include:

- Amble Drive – 1994 Reconstruction
- Amble Circle, Karth Lake Drive, Pleasant Drive (between the north and south cul-de-sacs), and Pleasant Circle – 2003 Mill & Overlay
- Cummings Park Drive and Pleasant Drive (from Amble Drive to the south cul-de-sac) – 2003 Reconstruction
- Karth Lake Circle – 2007 Reclamation

The project area includes over 130 properties adjacent to the street improvements. **Table 1** below shows the existing street widths from face of curb to face of curb, approximate right-of-way widths, and current PCI ratings of the street pavements.

**Table 1 – Existing Streets**

| Street Name | Extents | Street Width | ROW Width | PCI Rating |
|---|---|---|---|---|
| Karth Lake Circle | Hamline Avenue to South cul-de-sac | 34-ft | 60-ft | 66 |
| Karth Lake Drive | West cul-de-sac to Pleasant Drive | 34-ft | 60-ft | 45 |
| Pleasant Circle | West cul-de-sac to Lexington Avenue | 34-ft | 60-ft | 45 |
| Amble Drive | Karth Lake Drive to Lexington Avenue | 34-ft | 60-ft | 20 |
| Pleasant Drive | Amble Drive to South cul-de-sac | 28-ft | 60-ft | 45 |
| Pleasant Drive | South cul-de-sac to North cul-de-sac | 34-ft | 60-ft | 45 |
| Amble Circle | Amble Drive to North cul-de-sac | 34-ft | 60-ft | 18 |
| Cummings Park Drive | West cul-de-sac to Lexington Avenue | 42-ft – 70-ft | 75-ft – 100-ft | 39 |

The current PCI ratings for the proposed project streets range from 18 to 45, except for Karth Lake Circle, which is rated 66. The bituminous pavement within the study area exhibits wear and distress due to traffic loading as well as typical weathering effects experienced with aged asphalt pavement. The existing pavement contains surface delamination, transverse cracking, longitudinal cracking, some potholing, and some alligator-type cracking.

Alligator cracking in pavement is an indicator of potential subgrade problems. The street pavements are in generally poor condition and have seen an increased need for maintenance operations which are all indications that the street pavements are in need of varying levels of rehabilitation.

Cores with soil borings and a geotechnical evaluation were completed throughout the project area by Braun Intertec and the report is included in Appendix F. The existing bituminous pavement thickness generally ranges from 3.5 to 5.5 inches with a few select areas of thicker pavement, up to 11 inches. The existing aggregate base thickness generally ranges from 5 to 8 inches, with a few areas of thicker aggregate base and a couple of locations of thinner aggregate base. The areas with thinner aggregate base may require additional stabilization and will need to be identified during construction. Existing subgrade soils found beneath the aggregate base are predominantly a mixture of clayey and sandy soils, with low organic content indicating the material is suitable for reuse onsite during utility work.

B. Sanitary Sewer

City records show the sanitary sewer system was installed during the various phases of development. The project area is served primarily by polyvinyl chloride (PVC) pipe sanitary sewer mains. The gravity sanitary sewer is part of sewer district M059, with the sewer along Cummings Park Drive being part of sewer district M051, and is predominately 8-inch diameter. The comprehensive sewer plan does not identify changes in pipe diameter within the project area.

The existing condition of the sanitary sewer system was documented by videotaping of the sewer main. City Public Works staff completed this televised documentation in the spring of 2025. The televising revealed that the pipes were in generally good condition, with approximately four locations that were identified as needing rehabilitation or repairs. A project questionnaire to property owners indicated that some properties are experiencing sewer service issues but they primarily appear to be issues related to the private service line itself and not the connection to the main.

Some of the defects found in the sanitary sewer were pipe deflections, root intrusions, gasket issues, and groundwater infiltration at joints. The groundwater infiltration adds to the volume of wastewater being treated and subsequently the wastewater treatment costs. Sags and offset joints can interfere with the flow of sewage, creating a higher maintenance cost.

The project area also includes sanitary Lift Station 13, located at the northwest corner of Pleasant Drive and Karth Lake Drive. The lift station pumps to a 6-inch DIP forcemain which runs west and outlets to the gravity sanitary sewer system on the west side of Hamline Avenue, just south of Karth Lake Circle. Lift Station 13 was last rehabilitated in 2023 and is in excellent condition and the forcemain has no history of breaks.

C. Watermain

City records indicate that existing watermain within the project area is primarily Ductile Iron Pipe (DIP), varying in size between 6-inches and 8-inches, with 12-inch diameter pipe located on Cummings Park Drive. The watermain system runs throughout the project area and connects to a looped system at most roadway connections. Additionally, there is a watermain loop within utility easements that serves a few properties north of Karth Lake Drive, along County Road 96. This looped watermain runs approximately under the south curb line of County Road 96 and has had a history of some breaks. These breaks cause impacts to the county road which adds additional coordination and expense to the repairs.

Beyond the County Road 96 watermain, a review of the City's watermain break historical records did not identify any further breaks or leaks in the project area other than isolated leaky valves, damaged valves, damaged hydrants, and bent valve boxes. This indicates the majority of the watermain pipes are still in good operating condition. City public works staff identified the need for an additional hydrant along Amble Drive and also identified a number of curb stop boxes that are either buried or sticking out of the ground. The comprehensive water plan does not identify changes in pipe diameter within the project area.

D. Storm Sewer

The existing drainage system has limited storm sewer with outlets into Karth Lake and storm ponds located along Lexington Avenue and CSAH 96. City records indicate that the existing storm sewer within the project area is primarily comprised of Reinforced Concrete Pipe (RCP). The existing drainage pattern within the project area is generally from the exterior project limits in towards Karth Lake. Some of the existing storm outlet aprons are partially or fully submerged within Karth Lake.

The City's Public Works staff completed inspections of the existing storm sewer and found these pipes to be in good condition, with minor manhole repairs and replacement of existing castings as necessary. Storm sewer televising identified approximately eight locations with joint separation, cracking, and/or offset joints, that will need to be addressed.

E. Stormwater Management

Existing grit chambers are located in all storm systems prior to the storm outlets, except the Karth Lake Circle outlet, in an effort to collect sediment and debris before discharging into Karth Lake. A significant amount of overland drainage from the industrial/commercial properties to the south enters Karth Lake along the southeast bank. A previous project was completed in this area to reduce erosion by stabilizing the slope and providing for a culvert crossing under the trails south of Karth Lake.

There are a total of five storm water outlet locations included in this project scope within Karth Lake which have accumulated sediment over time (there are six total outlet locations into the lake). These delta locations have collected sediment over time that entered the lake from the storm sewer system.

F. Karth Lake Pump System

Karth Lake is a natural occurring lake and is a Public Water as identified by the Minnesota Department of Natural Resources (MnDNR) on their Public Waters Inventory (PWI). There is no emergency overflow for the lake where water can escape to during high water levels without causing flooding conditions. The 100-year floodplain elevation is 938.19 (NAVD 88). As a result, the City installed and operates a manually deployed pump and forcemain system to manage the lake level. The pumped outlet consists of a pump system with a sump pump mounted on a floating raft that pumps through a 6-inch forcemain to the southwest where it outlets in the city storm sewer system at the north side of the Cummings Park Drive cul-de-sac. This system was installed in the early 2000's and is permitted through the MnDNR to maintain lake levels between an elevation of 934.0 and 936.0.

G. Trails

Existing trails exist within Cummings Park and along the south side of Cummings Park Drive. City staff identified trail segments within Cummings Park, extending west from Lexington Avenue, and along the south side of Cummings Park Drive on the east end, which are in particularly poor condition. These trails are constructed of bituminous pavement and are

generally in a deteriorated condition with significant surface delamination and cracking throughout. Other surrounding trails have received more recent maintenance operations are in acceptable to good conditions. The existing trail back to the Karth Lake pump station is only gravel and contributes to erosion in the area.

Cores with shallow borings and a geotechnical evaluation were completed throughout the project area by Braun Intertec and the report is included in Appendix F. The existing bituminous trail thickness is generally around 2-inches with the existing aggregate base thickness generally around 2-inches as well.

H. Retaining Wall

An existing retaining wall surrounds the Karth Lake pump station and electrical box. It is a three-tiered timber retaining wall that is in poor condition and contributes to erosion along the steep bank slopes into Karth Lake.

## IV. PROPOSED IMPROVEMENTS

A. Streets

There are two street pavement rehabilitation methods proposed for this project that are based on roadway age, surface deterioration, PCI ratings, and subgrade soils. Streets will be rehabilitated with either a full depth reclamation or mill and overlay based on recommendations from the geotechnical report. Full depth reclamation is a process that pulverizes the existing roadway pavement and mixes it with the existing underlying aggregate material to create a new suitable aggregate base material. The reclaim material is graded and recompacted for the proposed roadway with excess material being hauled away and 4-inches of new bituminous pavement installed in two lifts. A mill and overlay is a process that grinds off the top layer of bituminous pavement and approximately 2-inches of new wear course bituminous pavement is installed over the remaining base bituminous pavement.

Both rehabilitation methods will include spot curb and gutter replacements, select base pavement repairs and/or subgrade corrections, and casting or valve box adjustments to the new pavement grade. The spot curb and gutter replacements will be utilized to address sunken or severely damaged curb throughout the project area that inhibits proper drainage. No driveway work is proposed, except as necessitated by spot curb replacements or utility work. All disturbed boulevard areas will be restored with 5-inches of topsoil and new sod or seed and blanket. Select street signs and street name blades are identified for replacement based on a city inventory completed in the summer of 2025.

Based on the observed weathering and deterioration found in the pavement cores and soil borings, a 2-inch to 2.5-inch mill and overlay is proposed for the following street:

- Karth Lake Circle from Hamline Avenue (CSAH 50) to the south cul-de-sac

Based on the observed weathering and deterioration found in the pavement cores and soil borings, an 8-inch to 10-inch full-depth reclamation is proposed for the following streets:

- Karth Lake Drive from the west cul-de-sac to Pleasant Drive
- Pleasant Drive from Amble Drive to the north cul-de-sac
- Pleasant Circle from the west cul-de-sac to Lexington Avenue (CSAH 51)
- Amble Drive from Karth Lake Drive to Lexington Avenue
- Amble Circle from Amble Drive to the north cul-de-sac
- Cummings Park Drive from the west cul-de-sac to Lexington Avenue

In areas of thinner pavement section, stockpiling of the reclaim to allow for approximately 2-inches of additional subgrade excavation and replacement of the reclaim material to ensure a 6-inch reclaim aggregate base section beneath the bituminous pavement may be necessary. However, the specific limits of these potential areas will not be known until they are under construction for evaluation and will need to be addressed during construction operations, if necessary. See Figure 1 in Appendix A for the proposed project layout identifying the limits of each rehabilitation method.

B. Sanitary Sewer

Based on the existing sewer pipe age, material type, and televising results, the existing sanitary sewer was found to be in generally good condition. There are a few select defects that are proposed to be rehabilitated as part of the project by means of Cured In Place Pipe (CIPP) sewer lining, sewer pipe grouting, and spot open cut pipe replacement. Most of the proposed sanitary rehabilitation methods are trenchless which will not disturb the above ground infrastructure as all access to the sewer is through existing manholes along the pipe and all services or laterals will be reopened robotically from within the pipe.

All sanitary sewer manhole castings within the project areas will be replaced and installed to final grade to provide a smooth/drivable street surface in conjunction with the street resurfacing portion of the project. This work will also include the replacement of all concrete adjustment rings and the installation of an external chimney seal for each applicable manhole structure to reduce inflow of stormwater into the sanitary sewer system. Additionally, “painted on” internal chimney seals will be installed to mitigate deterioration of the concrete adjusting rings and mortar to reduce the need for long term maintenance. No work on structures outside of the street pavement is proposed, unless otherwise identified on the identified utility improvements figure or those identified to be trenchless improvements.

City staff completed an inventory of the height of concrete adjusting rings on each sanitary manhole throughout the project area. Those manhole structures identified to have 16-inches of rings or more will be reconstructed, which is the process of removing the top cone section, adding a 1-ft barrel section to the structure, then replacing the cone section.

See Figure 5 and Figure 6 in Appendix A for the proposed utility improvements.

C. Watermain

Based on the existing watermain pipe age and size, the existing watermain was found to be in generally good condition. Proposed watermain improvements include relocation of the watermain on south side of CSAH 96, approximately under the existing curb line. The existing will be abandoned in place and the new watermain will be located approximately 20-ft south, to maintain a 10-ft separation from the existing sanitary sewer that runs parallel. The watermain will be replaced in-kind with 6-inch DIP. All water service lines connected to this segment of watermain are proposed for replacement from the watermain to the property line with new 1-inch diameter copper pipe to individual residences. Curb stops and boxes will be installed at the ROW where the new service pipe connects to the existing service pipe. Constructability will be further evaluated during final design to mitigate impacts to adjacent retaining walls. This may necessitate connecting to the existing water service prior to the retaining walls and potentially a second curb stop on the same service line.

Beyond this segment of watermain replacement, water system improvements will include addition of a new hydrant, addition of a new gate valve, replacement of select hydrants, replacement of select gate valves and boxes, and adjusting the remaining gate valve boxes

within the project pavement areas to final grade to provide a smooth/drivable street surface in conjunction with the street resurfacing portion of the project. Some damaged valve box tops may require replacement. Hydrant replacements will include the associated gate valve and lead. Existing curb stop boxes identified to be buried or significantly sticking up above the surrounding ground level will be adjusted to the proper ground level. A few curb stops that were not located by city staff will have exploratory excavations completed as part of the project in an effort to locate them or replace them further upstream on the service line to be accessible.

See Figure 5 and Figure 6 in Appendix A for the proposed utility improvements.

D. Storm Sewer

Based on the existing storm sewer age, size, and performance, the existing storm sewer was found to be in generally good condition. Storm sewer improvements will include rehabilitations at select locations including CIPP lining, minor pipe replacement, select structure replacements, and riprap rehabilitations at select outlet locations. Some of the work identified will be taking place outside of the roadway area in easements that may necessitate tree removal and restoration of temporary access impacts, including private landscaping facilities in some areas.

Stormwater quality improvements will also be implemented to help remove sediments and pollutant loads from entering Karth Lake. This will include the replacement of the last storm sewer structure in the street prior to its outfall into Karth Lake, where an existing grit chamber does not exist. This structure will be replaced with a new structure that includes a sump and SAFL Baffle to capture sediment from continuing downstream. This will allow city maintenance staff to easily access the structure and vac out accumulated sediment.

Beyond the work identified above, the remaining storm sewer manhole castings within the pavement of the project areas will be adjusted to final grade to provide a smooth/drivable street surface in conjunction with the street resurfacing portion of the project. Some damaged castings may require replacement (assuming 50%). This work will include the replacement of all concrete adjustment rings for each applicable manhole structure within the pavement limits. Additionally, “painted on” internal chimney seals will be installed to mitigate deterioration of the concrete adjusting rings and mortar to reduce the need for long term maintenance. Catch basins within the existing concrete curb and gutter will not be adjusted, unless otherwise identified for structure replacement or curb replacement surrounding the structure.

See Figure 5 and Figure 6 in Appendix A for the proposed utility improvements.

1. Risk Assessment of Submerged Culverts in Karth Lake

A bathymetric survey was performed in April 2025 to assess the sediment load near the five submerged outlets to Karth Lake. The survey found some organic sediment was accumulating near the outlets, but the majority of sediment is being pushed out further into the lake and forming sediment deltas. These deltas do not negatively affect the performance of the submerged inlets. There was a noticeable ‘hard-bottom’ at each outlet location assumed to be a mix of gravel and rock erosion delivered by the storm outlets. However, the limits of the sediment deltas relative to the ‘hard-bottom’ of Karth Lake’s natural lakebed is difficult to delineate. The outlets likely deliver suspended solids and particulates to Karth Lake without creating a clogging issue. Each inlet is clear of sediment and debris and has a free outfall condition.

The four of the five outlet pipes to Karth Lake are submerged and fully below the

normal water level. Submerged pipes that outlet stormwater into static, or landlocked, water bodies typically build up sediment due to standing water. The outlets into Karth Lake were unobstructed likely due to the following:

- Sufficient Flow Rate and Velocity - MnDOT recommends RCP stormwater pipes are designed to have a full flow velocity of at least 3 feet per second. This velocity is typically found to 'self-clean' stormwater pipes. Sand and small suspended solids are unable to drop out of the stormwater flow.
- Depth of Receiving Water - Karth Lake has sufficient depth and volume for water to freely exit each outfall. No underwater deltas have formed creating a hydraulic jump for water and sediment to backflow into the storm outfalls.

Additional risks associated with submerged pipes include:

- Freeze/Thaw Cycles – Submerged pipes are subject to increased risk of pitting and cracking due to expanding ice in winter months. Throughout the lifespan of the pipe the structural integrity is much lower than a non-submerged pipe. Many factors can contribute to how fast a submerged pipe cracks including water depth, bedding material, pipe diameter, and weather.

  Ice build-up is another risk that could lead to upstream flooding particularly in snow melt events. If an outlet is completely blocked with ice, snow melt will be unable to discharge from the drainage system and present surface flooding issues. The amount of freezing weather in any winter season will drive the depth of ice in Karth Lake. The deepest outlets are approximately five feet under the ordinary high water level in Karth Lake and are unlikely to fully freeze. The shallower outlets are more susceptible to being encapsulated by fully freezing conditions but the weather will play a factor in the effect freeze/thaw cycles have on backups to the system and long-term effects.
- Sediment Build-Up – No sediment build-up is occurring at these submerged outlets, but the risk is higher than non-submerged outlets. It is possible that in a future snowmelt event or large rain event that transports an unusually high amount of suspended solids and organic matter will clog and fill the pipe. This may create flooding upstream of the clogged outlet and present surface flooding issues. That being said, these observations may be due to the fact that the majority of the existing outlets into the lake have existing grit chambers that are properly performing in general to minimize sediment transport. The fact that there are additional proposed improvements to add or improve sediment capture devices prior to outletting stormwater at remaining locations should help alleviate this concern further.

No improvements to the storm outlets are proposed and it is recommended to complete regular condition inspections on each apron to address repairs/replacements on an as-needed basis. Additional evaluation can be completed if proactive improvements are desired which would likely include adding an inline storm structure and flattening the outlet apron to be above the ordinary high water level.

E. Stormwater Management

1. Accumulated Sediment Removal

A bathymetric survey was performed in April 2025 to assess the sediment load near the five outlets into Karth Lake. The survey found some organic sediment was

accumulating near the outlets, but the majority of sediment is being pushed out further into the lake and forming sediment deltas. There was a noticeable 'hard-bottom' at each outlet location assumed to be a mix of gravel and rock erosion delivered by the storm outlets. However, the limits of the sediment deltas relative to the 'hard-bottom' of Karth Lake's natural lakebed is difficult to delineate and therefore the total accumulated sediment at each delta is not accurately quantified.

Braun Intertec completed sediment sampling from the five outlet locations within Karth Lake to characterize the in-place sediment (future dredge material). These sediment samples were tested and evaluated in accordance with the Minnesota Pollution Control Agency's (MPCA) current best management practice for Managing Dredged Materials. Sediments observed during the completion of the borings consisted primarily of dark brown to black silty sand with organic materials noted at four of the locations. Based on analytical results from the sampling and testing, sediment from location O-1 falls within the management Level 1 characteristic, sediment from locations O-2, O-4, and O-5 falls within the management Level 2 characteristic, and sediment from location O-3 falls within the management Level 3 characteristic. Therefore, sediment removal operation will require segregation of material from each location, or it all will be required to be treated at the most restrictive sediment management level.

Unlike stormwater ponds, it is not possible to completely drain Karth Lake to perform sediment removal operations. Therefore, specialty construction methods will be required to conduct the operations. It is assumed that the accumulated sediment is generally contained within an approximate 100-foot radius of the outlet location. Easements exist over each of the four storm sewer outlets that run between residential houses and the fifth outlet comes from within Cummings Park, which is property owned by the City. However, the grades down to the lake, trees, and private landscaping features may make access to each location difficult or infeasible within the confines of the existing easements, especially as it relates to trucking out the excavated sediment. Three options for sediment removal operations were considered as part of this report but additional data collection and evaluation would be required during final design to verify feasibility of the selected option at each location, if proposed for inclusion as part of the project.

- Cofferdams and dewatering – This operation involves the installation of temporary steel sheet piling around the anticipated sediment delta to create a cofferdam at each outlet location. This would then allow for the outlet locations to be dewatered utilizing pumps to expose the lake bottom. The accumulated sediment would then be removed by means of an excavator and hauled off in dump trucks. Dump truck access to the water within the existing easements appears unlikely due to existing grades. Therefore, the excavator will likely need to stockpile the material on the bank of the lake and then have it transported up to dump trucks at the street via skid steers or similar small equipment that can better traverse the landscape. Each easement will require tree removal and most will require removal of private landscaping features to accommodate access. At the conclusion of sediment removal operations, the steel sheet piling is removed and impacted areas are restored.
- Hydraulic dredging – This operation involves the removal of accumulated sediment using hydraulic forces from a boat/barge to suction up the materials. This is most commonly used to maintain channel depths for marine

travel but has a number of other applications, including targeted sediment removal. This operation is less exact as verification of where the material is removed from and the exact volume is not accurately defined and the boat will not be able to get into shallow waters. The benefit to this operation is that only a singular access point to the lake is required and it is less impactful. However, to the best of our knowledge, there is no existing access location that can accommodate a boat launch which means one would need to be temporarily constructed. It is anticipated that this access would come from the Cummings Park area and would require significant tree removal and re-grading to accommodate.

- Vacuum trailer – This operation involves sucking out accumulated sediment utilizing suction. Similar to a vacuum truck, a vacuum trailer is a smaller piece of equipment that is hitch mounted to a pickup truck which allows for it to be more accessible. This operation is the least exact as verification of the material removed and quantity is not accurately defined. However, it will certainly provide benefit in removing accumulated sediment to the extent practical. Pickup truck and trailer access to the water is required and may require temporary improvements within easements to accommodate. Each easement will require tree removal and most will require removal of private landscaping features to accommodate access. At the conclusion of sediment removal operations, impacted areas are restored.

Consideration was made to performing sediment removal operations in the winter, when the lake is frozen to allow for easier access to the various outlet locations. However, a lack of safe means to access the sediment beneath the ice for removal limited the considerations for this option. Based on the options evaluated relative to the City's stated goal for sediment removal, costs were evaluated for the cofferdams and dewatering option and included as a design alternate to keep costs separated for consideration on whether or not to incorporate with the project. If the accumulated sediment is not removed as part of the project, there are limited risks in the short term as the storage capacity is so large on a lake of this size, however, its removal provides benefit to the lake's water quality. With other improvements proposed as part of the project, sediment making its way to the lake via the storm sewer system should be further minimized. The only remaining major contributors to sediment accumulation in the lake after the project includes erosion from the banks of the lake and organic matter falling from trees around the lake (assuming the sediment capture devices incorporated into the storm sewer system are regularly maintained).

See Figure 1 in Appendix A for the proposed project layout identifying the limits of each proposed sediment removal location in Karth Lake. The sediment sampling data and associated report completed by Braun Intertec is included in Appendix F.

2. Stormwater Pond BMP – Phase 2

Steep slopes from the industrial/commercial properties to the south towards Karth Lake to the north have caused major erosion and sediment pollution into the southern end of Karth Lake. A study was performed by Ulteig Engineers, Inc. in 2020 to explore a solution. The "Phase 1" project solutions included realigning the existing eroded swale to a zig-zag pattern to reduce slope and establishing a vegetated bottom and sides to minimize soil disturbance and erosion. As part of that study, a "Phase 2" improvement to treat the runoff was identified.

The Phase 2 improvement is proposed for design and construction as part of the 2026 PMP project and includes installation of a stormwater BMP to treat stormwater runoff from the Boston Scientific Campus and Cummings Park before it reaches Karth Lake. The stormwater BMP retention pond would be located at the southeast side of the lake, where the Phase 1 improvement outlets under the trail. No water from the site is currently treated causing pollutant concerns for Karth Lake and Valentine Lake, which receives the pumped flow leaving Karth Lake. Valentine Lake is impaired for chloride and nutrients and will benefit from any water quality benefits to Karth Lake.

Two BMP options, a wet pond and an infiltration basin, were explored to treat this stormwater runoff. With the proximity to Karth Lake, groundwater elevation will likely be within 3 feet of the final infiltration depth and make infiltration infeasible. A wet pond is likely the best option for this site. This location receives approximately 11 acres of drainage area, with 5.5 acres of that being impervious. According to Rice Creek Watershed Districts rule of 1.1 inches of runoff over the contributing impervious area, the water quality volume that would be required if the entire area was developed or reconstructed today is listed in the table below:

| Storage Goals | | |
|---|---|---|
| Stage | Volume Required (Ac-Ft) | Volume (Cu-Ft) |
| Dead Pool | 0.452 | 19674 |
| Live/WQV | 0.499 | 21746 |
| Total | 0.951 | 41420 |

In order to accommodate that volume of pond, it is estimated that the pond itself will be approximately ¼ acre in size and its impacts will extend beyond that to tie into existing grades and for associated storm sewer installations. However, there isn't sufficient space between the Phase 1 outlet and Karth Lake to accommodate that area of pond. Therefore, it is proposed to design the pond to the maximum size feasible with the space available. Based on the scale of the proposed stormwater pond and the proposed location, it should be noted that significant tree removals will be necessary to accommodate its construction. This improvement was originally identified as part of the Karth Lake Management Action Plan. See Figure 1 in Appendix A for the proposed stormwater BMP retention pond location.

F. Karth Lake Pump System

The Karth Lake Improvement District (KLID) consists of Karth Lake's lakefront property owners. The KLID modeled the pump operations and has made a recommendation to revise operations to limit the lake to a 6-inch bounce level between 935.0 and 935.5 to help alleviate shoreline erosion by allowing vegetative growth to maintain and stabilize the shoreline. Three options to implement this improvement to the pump system were evaluated as part of this feasibility report. The KLID had previously conducted their own research and coordinated with Joy Loughry, Water Monitoring and Surveys Unit Supervisor for the MnDNR which were all considered in development of these options.

**Option 1**

Maintain the existing ~350 GPM deployable pump and install a cloud-connected water logging device to more accurately determine when to deploy and remove the pump from Karth Lake.

It is recommended to utilize an *In-Situ Vulink* with a *Rugged Troll 200* water logging device. This device will sit in an anchored *Rugged Buoy* near the deployable pump location in Karth Lake. The *Rugged Troll 200* Data Logger is capable of monitoring surface water and will allow the city to monitor the water level of Karth Lake from an online application. The batteries included with the In-Situ Vulink will power the logger with a manufacturer estimated 10-year lifespan.

a. Approximate Construction Cost: $10,000

Annual inspections of the system are recommended to keep the system operating as it should but battery replacement and an annual telemetry subscription are the only anticipated ongoing maintenance/costs over the life of the system.

**Option 2**

Install a new 48-inch diameter, 6-foot deep concrete manhole structure to place the existing deployable pump in. Install a submerged 18-inch RCP skimmer pipe below the normal lake level to direct lake water from Karth Lake to the pump manhole while also mitigating the influences of wave action and wind on the water logging device. This installation to connect the system to the lake will require specialty installation measures to allow for installation of the culvert within the lake footprint, such as temporary steel sheet piling or similar. Install water monitoring logger and create automated on/off water elevation triggers. The existing ~350 GPM pump will be deployed from spring to fall and will operate automatically to maintain desired water levels. The pump will connect from the new location to the existing 6-inch forcemain that outlets to the gravity storm network on Cummings Park Drive.

It is recommended to use the *OTT PLS 500* Pressure Level Sensor. This water logging device will be housed in the manhole structure or stilling well. The OTT PLS 500 will be paired with a Sutron SatLink3, or approved equal, to log and transmit data. Power to the system will be supplied with 12V DC power from a solar panel. Electrical components needed include a 33 AH battery, 20W solar panel, solar regulator, equipment enclosure, mounting, and orifice line conduit.

a. Approximate Construction Cost: $80,000

Annual inspections of the system are recommended to keep the system operating as it should but minor part replacements and annual telemetry subscription are the only anticipated ongoing maintenance/costs over the life of the system.

**Option 3**

Install a new permanent lift station that includes an 18-inch skimmer pipe installed below the normal water level for Karth Lake, that directs water to a lift station vault with a permanent stormwater pump and potentially upgraded forcemain. This installation to connect the system to the lake will require specialty installation measures to allow for installation of the culvert within the lake footprint, such as temporary steel sheet piling or similar. This upgrade will also include a cloud connected water logging device and will likely require an upgraded electrical service to the lift station to provide adequate power for the proposed pump.

To efficiently maintain a bounce of 0.5 feet in Karth Lake a new lift station was preliminarily sized with the limited information available to understand associated costs. The existing pumped flow rate of ~350 GPM was found to be inefficient and require pumping for extended periods of time to return Karth Lake to the ordinary high water surface elevation. This option includes upsizing the existing pump to quickly return Karth Lake to pre-rainfall levels and maintain a more consistent bounce. When installing a new pump, the existing 6-

inch force main will likely need to be upsized to handle the increased flow rate, but additional evaluation will be required based on the selected improvements. The electrical service will also need to be upgraded to provide sufficient power to the pump.

The pump will be placed in a concrete vault along with an automated water surface float. This float will trigger the pump on and off according to preset water levels. This is the most robust and expensive of the options but provides the greatest benefit to the residents of Karth Lake and the city.

b. Approximate Construction Cost: $500,000+

Annual inspections of the system will be required and ongoing maintenance/costs will be similar to other lift stations throughout the city. It is assumed that if this option were selected, City Public Works staff would provide information on components utilized on existing lift stations throughout the city to provide seamless integration and operation for staff. If selected, a more thorough analysis of the existing system, required pump size, required electric needs, and whether the forcemain requires replacement or not will be required. Understanding long lead times for control panels, it should be noted that this option will likely take in the neighborhood of 18 months to construct, depending on final selections.

**Conclusions**

While Option 3 is the best option for monitoring and operation, it also comes with significantly higher construction costs than the other options. Options 1 and 2 both provide cost-effective improvements that can be implemented with relative ease. All three options can be further customized to meet the city's needs and final costs will depend on the options selected, including preference for cellular or satellite telemetry. While the city's current operations meet the requirements of their permit, it is difficult for the limited city resources to always stay apprised of the current lake conditions and needs. Therefore, improvements could be made to alleviate staff time allocated to monitoring the lake elevation and/or pump deployment/removal and free that time up for other important city services. And improvements would help to meet the request of the KLID board to better manage the lake elevations to a more restrictive level than is required under the city's permit requirements. The City and the KLID board should have discussions on potential cost sharing options and what improvement option best fits with the goals of each organization. The selected option will be further evaluated and incorporated into the final design of the project. **Costs for these improvements are not included in the base project costs but are separated out as options for the City's consideration.**

G. Trails

Given the thin existing trail section, reclamation of the trails is not recommended. The proposed trail improvements for select trail segments in Cummings Park include removal of the existing bituminous pavement (where applicable), supplementing the existing remaining gravel as needed to construct the proper aggregate base section, and repaving the trails with new bituminous on the aggregate base materials. For the identified segment of existing trail that is only gravel, it will be top-dressed with additional reclaim material as necessary, graded, and paved to provide access to the Karth Lake pump station. The trail replacement limits were extended west to the Cummings Park entrance due to damage anticipated with construction access to the Karth Lake pump station and the proposed new stormwater pond. The trails are proposed to be replaced, in kind, matching the existing trail alignments, widths, and elevations except where improvements make sense to improve drainage patterns. Due to the existing site topography, some segments of these existing trails appear

to be quite steep and may not be feasible to improve to strict compliance with Americans with Disabilities Act (ADA) requirements.

Additionally, ADA improvements will be implemented at two pedestrian ramp locations on the west end of Cummings Park Drive. The trail coming from the north is proposed to be realigned west to provide for a shorter and more perpendicular pedestrian crossing. The older trail pavement along the south side of Cummings Park Drive will also be replaced as part of the project (the first approximately 500-feet from Lexington Avenue). Finally, the trail segment along the south side of County Road 96 will also require replacement due to impacts from the proposed watermain work in the area.

See Figure 1 in Appendix A for the proposed project layout identifying the trails to be rehabilitated and the locations of ADA pedestrian ramp improvements.

H. Retaining Walls

In coordination with the trail improvements, the existing three-tiered timber retaining wall near the Karth Lake pump station is proposed for replacement. It will be replaced with a modular block retaining wall or a slope/bank stabilization product and designed to mitigate undermining and erosion directly into Karth Lake. The constructability of this retaining wall improvement will be further evaluated during final design to determine impacts to the existing electric service box behind the existing wall. Depending on options, the electric service box may necessitate relocation.

See Figure 6 in Appendix A for the proposed retaining wall replacement.

## V. STAKEHOLDER COORDINATION

A. Private Utilities

A private utility coordination meeting will be held with private utility companies that have facilities within the project area to understand the presence of existing overhead or underground facilities and plans for infrastructure upgrades or necessary relocations during the final design phase of the project. Based on the scope of this project primarily being a rehabilitation project, major conflicts are not anticipated but will be verified during the final design process. During coordination with these companies, the potential for coordinating fiber installations to provide home service will be discussed to minimize long-term impacts, if there are plans to provide this service.

B. Public Involvement

An online survey, posted from March to April 25, 2025, provided residents and property owners with an opportunity to provide feedback on the proposed improvements and identify information on the existing conditions within the project area. The mailing area included all properties adjacent to the proposed street improvements, as well as all properties along Karth Lake as part of the Karth Lake Improvement District (KLID) due to the considerations given to work in/along the lake. The feedback received included a lot of property specific information, but several common themes were also identified from the completed surveys. The common themes include concerns over impacts to irrigation systems, dog fences, private electric wiring, and landscaping, concerns regarding erosion over Cummings Park trails, concerns over street patches due to private sewer repairs, concerns over how the project will be assessed, existing drainage issues, interest in attracting telecom companies to install fiber internet, interest in adding street lighting, support for sediment capture BMP's prior to it entering the lake and general water quality improvements, and support for the KLID board's request for lake level monitoring/pumping

improvements including to the associated retaining wall, hose and control panel. The general consensus over the condition of the existing roadway pavement throughout the project area is that it is deteriorated to fair, generally showing public support for the proposed street improvements. The results of this survey were considered during the development of this feasibility report and items within the scope of the project were incorporated to address the feedback received. It should be noted that to align with city policy, potential damage to irrigation systems will be repaired as part of the project by the selected contractor, however, potential damage to dog fences is the responsibility of the homeowner to repair.

A summary of the responses received from the resident survey can be found in Appendix E, with personal information redacted.

Another opportunity for public involvement will be at a public open house, tentatively scheduled for November of 2025, to share the proposed project design. Feedback from the open house will be considered and incorporated into the final design as directed by city staff. A final public informational meeting will be held after the final design is better defined but prior to construction of the project.

C. RCWD Grant Opportunities

RCWD indicated they are supportive of the proposed Karth Lake pumping improvements to implement lake level monitoring and potential automation of the pump system. It was indicated that they would be a potential funding partner depending on what improvements are proposed for implementation and what the associated financial impact is associated with the improvements. City staff will approach RCWD again after receiving direction on the Karth Lake pumping improvements to continue discussions on potential financial support. Any potential financial support for these improvements would not be through a grant program and would be through other funding mechanisms to help support the goals of the watershed. Their support stems from a desire to help stabilize the shoreline level at 935.0 to 935.5 (as opposed to 934.0 to 936.0) which would help alleviate shoreline erosion by allowing vegetative growth to maintain and stabilize the shoreline.

Existing RCWD grants are available this fiscal year and there are three improvements identified with this project that were confirmed to be eligible for application through these programs. The RCWD's Stormwater Management Grant is a 50/50 cost share with up to a $100k grant award, in total. Applications are due around mid-December with awards anticipated in Spring of 2026. This application timeline aligns well with the proposed schedule for the 2026 PMP project. The incorporation of new sump storm structures with SAFL Baffles to help trap sediment from continuing downstream and into Karth Lake is one eligible improvement for this grant. The other improvement would be the construction of a new stormwater pond to treat stormwater before entering Karth Lake (a continuation of the previously completed "Phase 1" slope stabilization project).

The RCWD's Water Quality Grant opens at the beginning of the year and is available until funds run out. Given the proposed schedule for the 2026 PMP project, this may or may not be available when plans are finalized and ready for submission. If available, the replacement of the retaining wall near the Karth Lake pump station would be eligible for this grant to alleviate erosion coming from the failing wall.

## VI. RIGHT-OF-WAY, EASEMENTS, AND PERMITS

All work on the project is anticipated to take place within existing city right-of-way or easements.

However, after completing final design, it is possible that temporary easements or right-of-entries may be necessary to construct the project. For various work items, minor encroachment onto private property may be beneficial in order to achieve a better overall quality of work. It is assumed that project staff will discuss these with property owners and obtain right-of-entries on a case-by-case basis. These items include water service and curb box installation, sanitary service installation, retaining wall installation, and driveway connections. This will be evaluated in detail towards the end of the final design process to identify any temporary easement or right-of-entry needs, particularly as it relates to the work beyond the roadways.

The project area is within the jurisdiction of the Rice Creek Watershed District (RCWD) and therefore requires compliance with their rules and regulations. A meeting was held with RCWD staff on May 29th, 2025 to understand how their rules and regulations apply to the proposed project. The project falls under the Public Linear Project category for Stormwater Management rules and therefore stormwater management is not required unless the project disturbs one acre or more of new or reconstructed impervious surface's underlying native soils. Being that the project is primarily a rehabilitation project and plans to leave the existing base pavement, aggregate base, and/or reclamation material in place, the disturbance to underlying native soils where impervious surface is proposed is currently calculated to be under the one-acre threshold and stormwater management permitting is not anticipated. An Erosion & Sediment Control Plan permit will be required through the RCWD associated with the project's erosion control plan.

A wetland delineation was conducted during the spring of 2025 to identify the wetlands surrounding the proposed improvements and submitted to the appropriate agencies for concurrence of wetland types and boundaries. Permitting associated with anticipated wetland impacts will be submitted to the appropriate agencies for approval at the conclusion of final design and is expected to meet the conditions for a temporary impact permit associated with the Wetland Conservation Act (WCA) requirements.

Karth Lake is identified as a Public Water and therefore additional permitting is required for the dewatering of Karth Lake associated with the accumulated sediment removal work, if approved. This will require, at a minimum, a Minnesota Department of Natural Resources (MnDNR) Public Waters Work Permit. Additionally, existing, adjacent wetlands have potential additional associated permitting needs related to the accumulated sediment removal work, if approved. It is recommended the project's final design scope be modified to complete the necessary topographic surveys and wetland delineations to move forward with the proposed backyard storm sewer improvement work, if approved for final design.

- MPCA Construction Stormwater Permit
- MDH Public Watermain Plan Review Permit
- Ramsey County ROW Permit
- RCWD Erosion & Sediment Control Permit (Rule D)
- RCWD Floodplain Alteration Permit (Rule E)
- RCWD Appropriation of Public Waters (Rule J)
- WCA Permits & RCWD Wetland Alteration (Rule F)
- MnDNR Public Waters Work Permit
    - Including confirmation of any adjustments to the city's existing permit for pumping operations due to adjusting the OHWL

## VII. ESTIMATED COSTS

Detailed estimates of probable construction costs have been prepared for the improvements described in this report and are included in Appendix B. All costs are based on anticipated unit prices for the 2026 construction season based on actual bid prices for similar projects. Actual costs will be determined through competitive bids following the final design for the project. All estimated costs also include a 10% contingency and 27% overhead allowance for legal, engineering, administrative, and finance costs. Table 2 below contains a summary of the estimated total project costs for the recommended base project improvements, inclusive of construction costs, contingency, and overhead allowance.

**Table 2 – Estimated Base Project Costs**

| Proposed Improvements | Residential Mill & Overlay Areas | Residential Reclamation Areas | Industrial Reclamation Areas | Trails & Retaining Wall | Karth Lake | Total Project Costs |
|---|---|---|---|---|---|---|
| Streets | $163,000 | $1,229,000 | $401,000 | - | - | $1,793,000 |
| Storm Sewer | $55,000 | $148,000 | $13,000 | - | - | $216,000 |
| Sanitary Sewer | $23,000 | $152,000 | $11,000 | - | - | $186,000 |
| Watermain | $49,000 | $344,000 | $74,000 | - | - | $467,000 |
| Trails | - | - | - | $248,000 | - | $248,000 |
| Karth Lake | - | - | - | - | $179,000 | $179,000 |
| **Total Project Costs** | **$290,000** | **$1,873,000** | **$499,000** | **$248,000** | **$179,000** | **$3,089,000** |

One design alternate was evaluated as part of the preliminary design for the potential removal of accumulated sediment at five delta locations in Karth Lake. Also, three options were evaluated for improvements to the Karth Lake pump system to better monitor the lake level and possibly automate the pump operations. A summary of the estimated project costs associated with the design alternate and the estimated project costs associated with the three design options is presented in Table 3 below (includes 10% contingency and 27% overhead).

**Table 3 – Estimated Alternate Project Costs**

| Proposed Improvements | Karth Lake | Total Construction Costs |
|---|---|---|
| Alternate 1 - Karth Lake Sediment Removal | $575,000 | $575,000 |
| Option 1 – Karth Lake Pump System Improvements | $14,000 | $14,000 |
| Option 2 – Karth Lake Pump System Improvements | $112,000 | $112,000 |
| Option 3 – Karth Lake Pump System Improvements | $500,000+ | $500,000+ |

It is planned to bid the project with a bid alternate for the Karth Lake dredging work and the Karth Lake pump system improvements, if approved. This will allow flexibility to include or remove these work items from the project based on the actual prices bid by the contractor to complete the work.

## VIII. FUNDING & ASSESSMENTS

Assessments for street improvement costs are proposed to be levied to benefiting properties as outlined in Minnesota Statute 429 and the City of Arden Hills Assessment Policy. A preliminary assessment roll was compiled for all adjacent benefitting properties per the City's assessment policy and is included in Appendix C. Identified properties were proposed to be assessed at a calculated assessment rate of 50% of the street project costs for residential properties and 70% of the street project costs for commercial/industrial properties. The street project costs were split between mill & overlay improvements and reclamation improvements for each property zoning classification.

To determine properties eligible for assessment, each property's frontage and access to the street(s) proposed for improvements were evaluated (including access via private roads and shared driveways, specifically in the case of Cummings Park Drive). As indicated in the City's assessment policy, properties with frontage abutting a street identified for improvement shall be assessed on a unit basis at the calculated assessment rate, however, corner lots shall be assessed on the street that is used for the mailing address. Further, "the City Council shall retain the right to review each project on its own merit and deviate from any portion of the Assessment Policy Manual, as it deems proper. These deviations may occur in unique situations or where application of the policy produces unfair or undesirable results. The residential equivalent assessment rate shall be determined by the City Council."

The project area includes a few unique property situations as it relates to the city's assessment policy. Five of the industrial properties identified for assessments have access to Cummings Park Drive, either directly, from a private road, or from a shared driveway, but do not have a Cummings Park Drive address. Further, one of these properties has alternative access options to County Road F. Each of these properties have been included in the assessment calculations but the City Council should specifically evaluate these properties, in addition to the project as a whole, to determine if the City's assessment policy was accurately applied.

Assessments for the proposed street improvements were calculated using the Residential Equivalent Unit (REU) method as outlined in the City's assessment policy. Each property eligible for assessment was identified as either a residential mill & overlay property, residential reclamation property, or industrial reclamation property based on the proposed street improvement classification and the associated property zoning. The assessable costs for each improvement/zoning category were divided by the number of eligible REU's to determine an assessment rate for each improvement/zoning category. Calculations for the estimated assessment rates are provided below:

**Residential Mill & Overlay Areas**

50% Estimated Street Project Costs = $81,500

Residential Equivalent Units = 21

Calculated Assessment Rate = $3,880 per REU

**Residential Reclamation Areas**

50% Estimated Street Project Costs = $614,500

Residential Equivalent Units = 105

Calculated Assessment Rate = $5,850 per REU

**Industrial Reclamation Areas**

70% Estimated Street Project Costs = $280,000

Residential Equivalent Units = 334 (assumes 3 REU's per Acre)

Calculated Assessment Rate = $840 per REU

To ensure the calculations resulting from the application of the City's assessment policy are in line with an appraiser's opinion of benefit to the properties in each improvement/zoning category, the City enlisted the services of Nagell Appraisal & Consulting to conduct a general benefit appraisal on the properties throughout each unique project area. The general benefit appraisals are included in Appendix D. The general benefit appraisals resulted in a range of benefit values for each improvement/zoning category, as indicated below:

**Residential Mill & Overlay Areas**

SF Residential Non-Lakefront Lot Benefit Appraisal Assessment Rate = $3,000 to $4,000 per REU

SF Residential Lakefront Lot Benefit Appraisal Assessment Rate = $4,000 to $5,000 per REU

**Residential Reclamation Areas**

SF Residential Non-Lakefront Lot Benefit Appraisal Assessment Rate = $8,000 to $10,000 per REU

SF Residential Lakefront Lot Benefit Appraisal Assessment Rate = $9,000 to $11,000 per REU

**Industrial Reclamation Areas**

Office/Industrial Benefit Appraisal Assessment Rate (up to 5 Acres) = $0.15 to $0.25 per SF

Office/Industrial Benefit Appraisal Assessment Rate (exceeding 5 Acres) = $0.02 to $0.05 per SF

Since the assessment rates calculated based on the City's assessment policy fell within or below the assessment rate range for each improvement/zoning category, it is proposed to maintain the assessment rates calculated based on the City's assessment policy for the project, or as directed by the City Council. See Figure 2 through Figure 4 in Appendix A for the assessable properties map that correlates with the parcel numbers on the preliminary assessment roll.

The project costs for the remaining street costs and for the storm sewer, sanitary sewer, watermain, trails, and Karth Lake improvements will be the cost responsibility of the City. Proposed project funding sources are a combination of the City's Permanent Improvements Revolving (PIR) fund, utility funds, special assessments for street improvements, possible grant funds if grant applications are successful, and the potential for KLID participation.

The proposed project assessments and funding summary are based on preliminary estimated project costs for the recommended base project improvements. These costs may be revised at the time of the final assessment hearing depending on the final design of the project, required right-of-way and/or easements, soil conditions, bids received, and actual work performed. The assessments are proposed to be assessed over a 10-year period at an interest rate to be set by the City Council.

A summary of the funding breakdown, **exclusive of design alternates/options** and assuming the total assessments amount is based on the calculated assessment rates, is presented in Table 4 below.

| Table 4 – Estimated Funding Breakdown | |
|---|---|
| **Funding Source** | **Project Total Cost** |
| PIR Fund | $1,110,000 |
| Assessments | $931,000 |
| Utility Fund – Sanitary Sewer | $186,000 |
| Utility Fund – Water | $467,000 |
| Utility Fund – Surface Water Management | $395,000 |
| **Total** | **$3,089,000** |

## IX. PROJECT SCHEDULE

The proposed project schedule is shown below:

*Feasibility Public Survey* ..... *March-April 2025*

*Council Work Session for Direction on Preliminary Design** ..... *June 23, 2025*

Accept Feasibility Report and Order Public Improvement Hearing* ..... July 14, 2025

Public Improvement Hearing* ..... July 28, 2025

Order Improvements and Authorize Preparation of Plans and Specifications* ..... July 28, 2025

Public Open House ..... November 2025

Approve Final Plans & Specifications and Authorize Advertisement for Bids* ..... January 2026

Bid Opening ..... February 2026

Accept Bids and Order Public Assessment Hearing* ..... February 2026

Public Open House ..... March 2026

Public Assessment Hearing/Adopt Assessment Roll/Award Construction Contract* ..... March 2026

Construction Begins ..... Spring 2026

Construction Substantial Completion ..... Fall 2026

City Certifies Assessments to County ..... November 2026

** City Council Meeting*

# X. CONCLUSION

This report has been prepared to investigate the potential for rehabilitating the roadways in the 2026 PMP Street & Utility Improvements project areas and associated work. This report identified the recommended improvements to the infrastructure, provided estimated costs of the recommended improvements, and identified applicable funding to finance the improvements.

From an engineering standpoint, this project, as proposed, is feasible, cost effective, and necessary and it can best be accomplished by letting competitive bids for the work. It is recommended that the work be done under one contract in order to complete the work in an orderly and efficient manner. The City and the persons assessed will have to determine the economic feasibility of the proposed improvements.

# Appendix A: Figures

# 2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS

## FIGURE 1: PROJECT LAYOUT

JUNE 2025

COUNTY RD 96 W

KARTH LAKE CIR

KARTH LAKE DR

HAMLINE AVE N (CSAH 50)

PLEASANT DR

PLEASANT CIR

AMBLE DR

PLEASANT DR

LEXINGTON AVE N (CSAH 51)

AMBLE CIR

CUMMINGS PARK DR

INNOVATION WAY

**LEGEND**

- PROPOSED RESIDENTIAL MILL & OVERLAY
- PROPOSED RESIDENTIAL FULL DEPTH RECLAIMATION
- PROPOSED INDUSTRIAL FULL DEPTH RECLAIMATION
- PROPOSED TRAIL REHABILITATION
- PROPOSED SEDIMENT REMOVAL LOCATION
- PROPOSED STORMWATER BMP
- (1) ADA PEDESTRIAN RAMP IMPROVEMENT

HORZ. SCALE 130 260 FEET

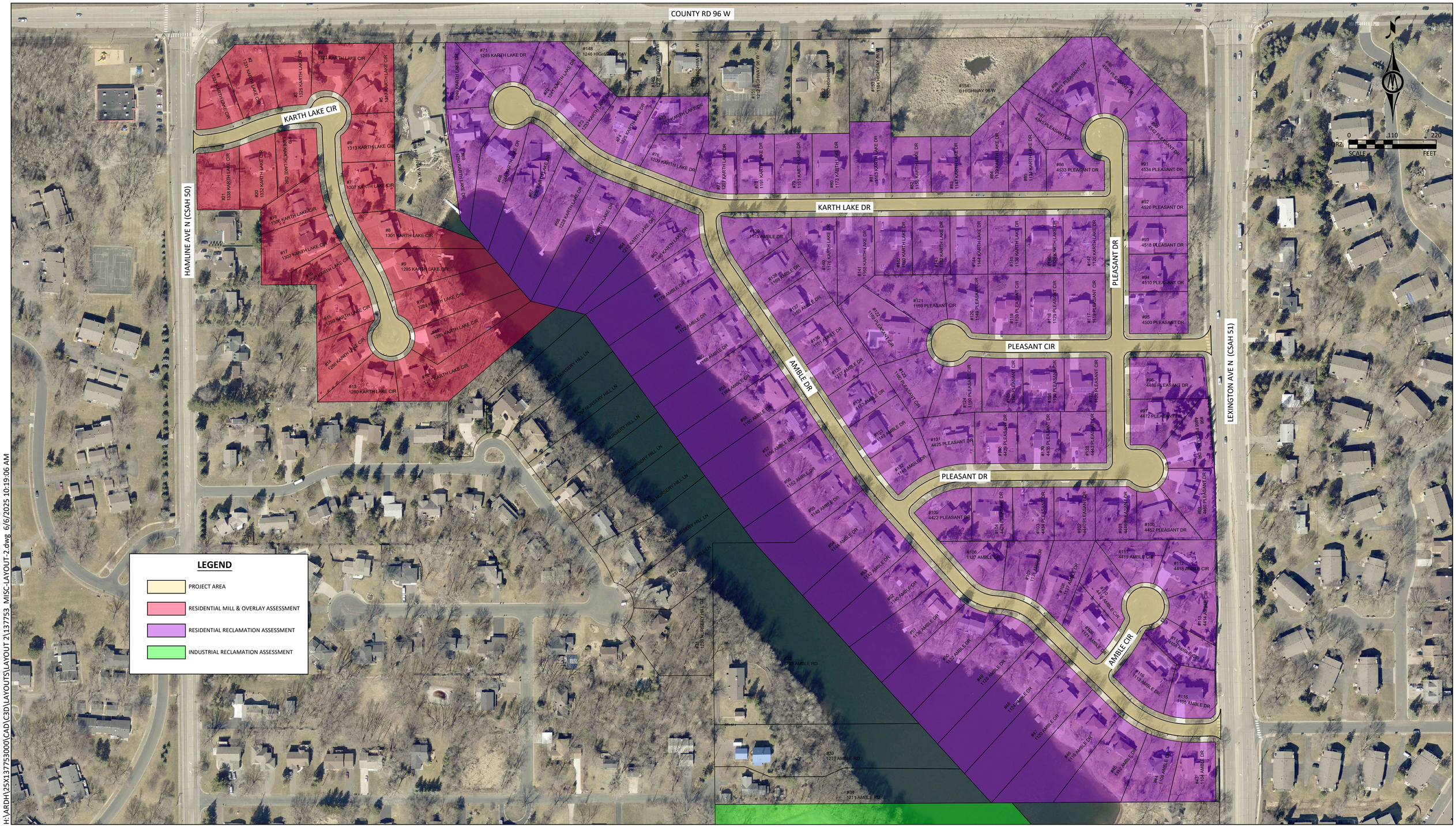
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# 2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS

# FIGURE 2: ASSESSABLE PARCELS MAP (NORTH)

JUNE 2025




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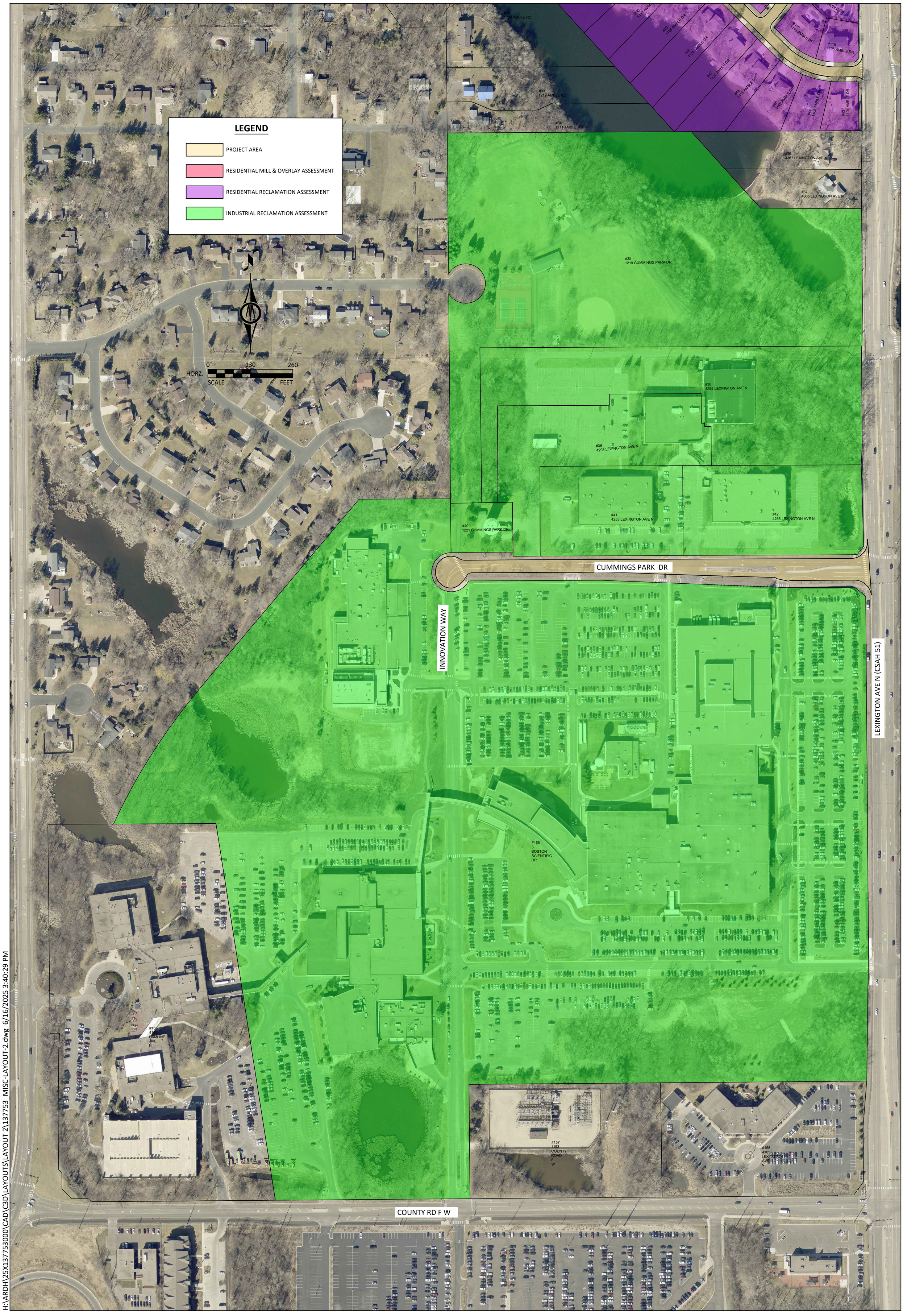
# 2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS

# FIGURE 3: ASSESSABLE PARCELS MAP (SOUTH)

JUNE 2025

BOLTON & MENK




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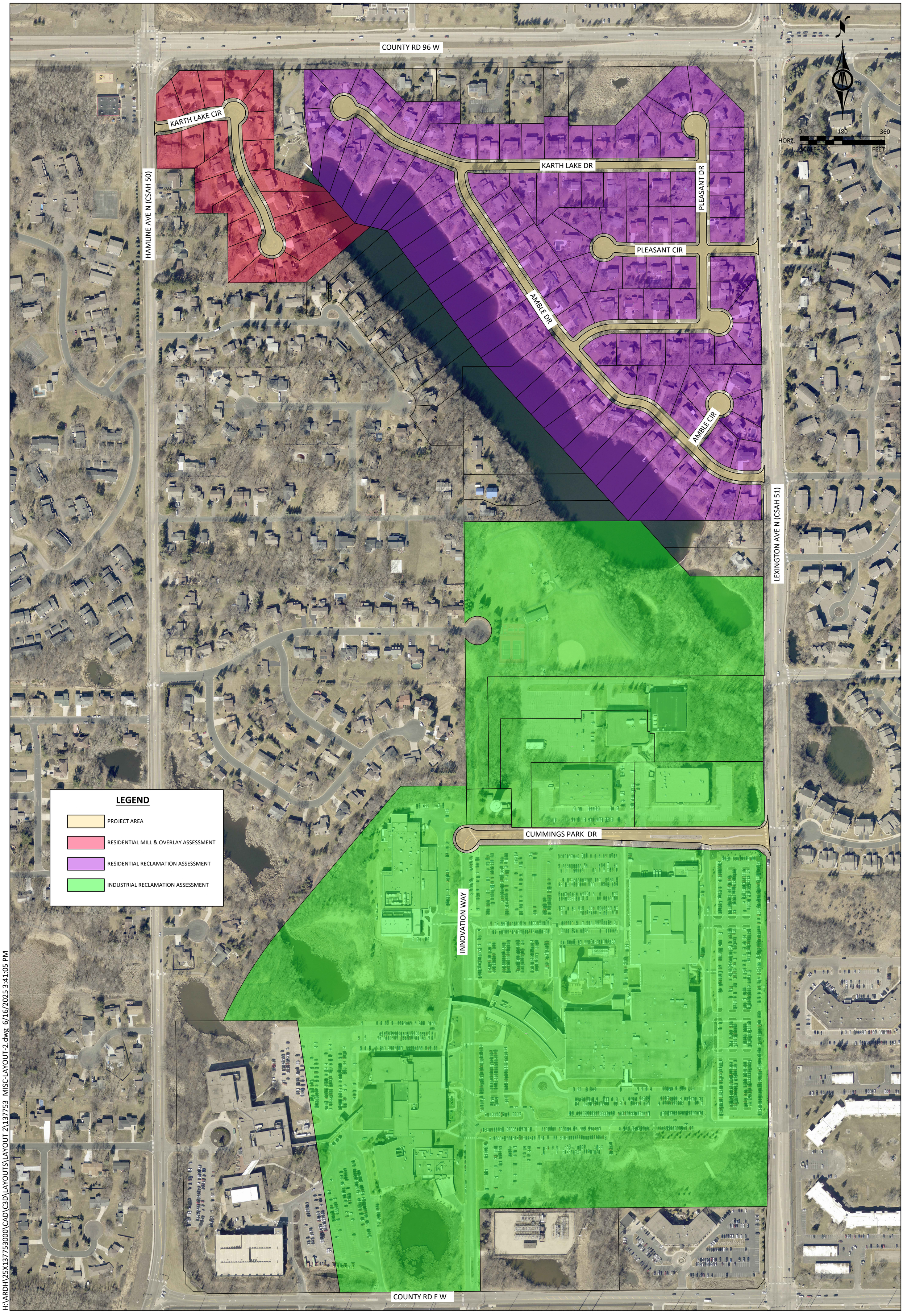
ARDEN HILLS CITY OF ARDEN HILLS

# 2026 PMP STREET & UTILITY IMPROVEMENTS

JUNE 2025

# FIGURE 4: ASSESSABLE PARCELS MAP (OVERVIEW)

BOLTON & MENK




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ARDEN HILLS

# 2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS

## FIGURE 5: UTILITY IMPROVEMENTS (NORTH)

JUNE 2025

BOLTON & MENK




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# 2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS

## FIGURE 6: UTILITY IMPROVEMENTS (SOUTH)

JUNE 2025

BOLTON & MENK

RETAINING WALL REPLACEMENT

ACCESS ROUTE

PROPOSED STORMWATER BMP

0.29 ACRES CLEARING & GRUBBING

ADD GV & BOX TO WM (WEST OF HYDRANT)

CUMMINGS PARK DR

INNOVATION WAY

LEXINGTON AVE N (CSAH 51)

#33 1213 AMBLE RD

#31 1215 AMBLE RD

#40 1221 CUMMINGS PARK DR

#35 1219 CUMMINGS PARK DR

#36 4367 LEXINGTON AVE N

#37 4365 LEXINGTON AVE N

#38 4295 LEXINGTON AVE N

#39 4293 LEXINGTON AVE N

#41 4255 LEXINGTON AVE N

#42 4265 LEXINGTON AVE N

HORZ SCALE: 0 110 220 FEET

**LEGEND**

- PROJECT AREA
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER PIPE
- PROPOSED STORM SEWER PIPE
- TREE REMOVAL
- 1 REPLACE RINGS AND CASTING
- 2 MUD STRUCTURE/INVERT
- 3 SUMP & SAFL BAFFLE
- 4 REPLACE STRUCTURE
- 5 PROPOSED STRUCTURE
- 6 MANHOLE RECONSTRUCT
- 7 REPLACE SANITARY RINGS & CASTING/ADD CHIMNEY SEAL
- 8 ADJUST CURB STOP
- 9 ADD RIP RAP
- 10 ADJUST APRON
- 11 ADD HYDRANT & GATE VALVE
- 12 REPLACE GATE VALVE & BOX
- 13 ADJUST VALVE BOX
- 14 DOCUMENTED CURB PONDING
- 15 CONNECT TO EX. WATER SERVICE
- 16 REPLACE HYDRANT, GATE VALVE, & LEAD

H:\ARDH\25X137753000\CAD\C3D\LAYOUTS\LAYOUT 4\137753_MISC_LAYOUT-3.dwg 6/6/2025 12:42:32 PM

# Appendix B: Preliminary Cost Estimate

***PRELIMINARY ENGINEER'S ESTIMATE***

2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS, MINNESOTA

CITY PROJECT NO. PW-26-0100

BMI PROJECT NO. 25X.137753

| ITEM NO. | SPEC. REF | DESCRIPTION | NOTES | UNIT | RESIDENTIAL MILL & OVERLAY AREAS | | | | RESIDENTIAL RECLAMATION AREAS | | | | INDUSTRIAL RECLAMATION AREAS | | | | TRAILS & RETAINING WALL | KARTH LAKE | TOTAL ESTIMATED QUANTITY | ESTIMATED UNIT PRICE | ESTIMATED TOTAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | | | | | |
| **SCHEDULE "A" - BASE BID** | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2021.501 | MOBILIZATION | | LUMP SUM | 0.05 | 0.02 | 0.01 | 0.02 | 0.40 | 0.05 | 0.05 | 0.11 | 0.13 | 0.00 | 0.00 | 0.02 | 0.08 | 0.06 | 1.00 | $100,000.00 | $ 100,000.00 |
| 2 | 2101.502 | CLEARING | | EACH | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 14.00 | $650.00 | $ 9,100.00 |
| 3 | 2101.502 | GRUBBING | | EACH | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 14.00 | $250.00 | $ 3,500.00 |
| 4 | 2101.505 | CLEARING | | ACRE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0.50 | $25,000.00 | $ 12,500.00 |
| 5 | 2101.505 | GRUBBING | | ACRE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0.50 | $10,000.00 | $ 5,000.00 |
| 6 | 2104.502 | REMOVE CASTING | (1) | EACH | 7 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 55.00 | $200.00 | $ 11,000.00 |
| 7 | 2104.502 | REMOVE GATE VALVE & BOX | | EACH | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 2 | 0 | 0 | 14.00 | $900.00 | $ 12,600.00 |
| 8 | 2104.502 | REMOVE VALVE BOX | (1) | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 5.00 | $350.00 | $ 1,750.00 |
| 9 | 2104.502 | REMOVE HYDRANT | | EACH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 7.00 | $1,250.00 | $ 8,750.00 |
| 10 | 2104.502 | REMOVE DRAINAGE STRUCTURE | | EACH | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.00 | $550.00 | $ 3,300.00 |
| 11 | 2104.502 | REMOVE SIGN | | EACH | 3 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 39.00 | $50.00 | $ 1,950.00 |
| 12 | 2104.502 | SALVAGE PIPE APRON | | EACH | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8.00 | $400.00 | $ 3,200.00 |
| 13 | 2104.502 | SALVAGE SIGN | | EACH | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 9.00 | $75.00 | $ 675.00 |
| 14 | 2104.502 | SALVAGE MAILBOX SUPPORT | (2) | EACH | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | $250.00 | $ 1,250.00 |
| 15 | 2104.503 | SAWING CONCRETE PAVEMENT (FULL DEPTH) | | LIN FT | 0 | 0 | 0 | 0 | 84.44 | 0 | 0 | 0 | 10.56 | 0 | 0 | 0 | 0 | 0 | 95.00 | $6.00 | $ 570.00 |
| 16 | 2104.503 | SAWING BITUMINOUS PAVEMENT (FULL DEPTH) | | LIN FT | 75.57 | 0 | 0 | 0 | 247.71 | 0 | 0 | 0 | 459.72 | 0 | 0 | 0 | 0 | 0 | 783.00 | $4.00 | $ 3,132.00 |
| 17 | 2104.503 | REMOVE WATERMAIN | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 16 | 0 | 0 | 81.00 | $10.00 | $ 810.00 |
| 18 | 2104.503 | REMOVE SEWER PIPE (STORM) | | LIN FT | 0 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20.00 | $15.00 | $ 300.00 |
| 19 | 2104.503 | REMOVE CURB & GUTTER (SPOT) | (3) | LIN FT | 363 | 0 | 0 | 0 | 2068 | 0 | 0 | 0 | 632 | 0 | 0 | 0 | 0 | 0 | 3063.00 | $12.00 | $ 36,756.00 |
| 20 | 2104.503 | REMOVE RETAINING WALL | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 0 | 79.00 | $40.00 | $ 3,160.00 |
| 21 | 2104.504 | REMOVE CONCRETE DRIVEWAY PAVEMENT | EX FOR AC | SQ YD | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47.00 | $25.00 | $ 1,175.00 |
| 22 | 2104.504 | REMOVE BITUMINOUS DRIVEWAY PAVEMENT | EX FOR AC | SQ YD | 5.31 | 0 | 0 | 0 | 124.69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130.00 | $10.00 | $ 1,300.00 |
| 23 | 2104.518 | REMOVE BITUMINOUS WALK | (P) | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24014 | 0 | 24014.00 | $1.00 | $ 24,014.00 |
| 24 | 2104.518 | REMOVE CONCRETE WALK | EX FOR AC | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 160.00 | $2.50 | $ 400.00 |
| 25 | 2104.603 | ABANDON WATERMAIN | *** | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 580 | 0 | 0 | 0 | 0 | 0 | 0 | 580.00 | $20.00 | $ 11,600.00 |
| 26 | 2106.507 | EXCAVATION - SUBGRADE | (EV)(4) | CU YD | 0 | 0 | 0 | 0 | 581.04 | 0 | 0 | 0 | 178.96 | 0 | 0 | 0 | 0 | 0 | 760.00 | $35.00 | $ 26,600.00 |
| 27 | 2106.507 | EXCAVATION - CHANNEL AND POND | (EV)(P) | CU YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1540 | 1540.00 | $20.00 | $ 30,800.00 |
| 28 | 2106.507 | COMMON EMBANKMENT (POND) | (CV)(P) | CU YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 500.00 | $12.00 | $ 6,000.00 |
| 29 | 2106.507 | STABILIZING AGGREGATE | (CV)(4) | CU YD | 0 | 0 | 0 | 0 | 290.52 | 0 | 0 | 0 | 89.48 | 0 | 0 | 0 | 0 | 0 | 380.00 | $35.00 | $ 13,300.00 |
| 30 | 2112.604 | SUBGRADE PREPARATION (TRAIL) | (P)(17) | SQ YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10.00 | $2.75 | $ 27.50 |
| 31 | 2123.610 | EXPLORATORY EXCAVATION | (4) | HOUR | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 0 | 0 | 45.00 | $500.00 | $ 22,500.00 |
| 32 | 2215.504 | FULL DEPTH RECLAMATION (STREET) | (P) | SQ YD | 0 | 0 | 0 | 0 | 23366.92 | 0 | 0 | 0 | 7197.08 | 0 | 0 | 0 | 0 | 0 | 30564.00 | $5.00 | $ 152,820.00 |
| 33 | 2215.507 | HAUL FULL DEPTH RECLAMATION | (CV)(5) | CU YD | 0 | 0 | 0 | 0 | 771.4 | 0 | 0 | 0 | 237.6 | 0 | 0 | 0 | 0 | 0 | 1009.00 | $20.00 | $ 20,180.00 |
| 34 | 2231.604 | REMOVE AND PATCH BITUMINOUS PAVEMENT | (6) | SQ YD | 433 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 433.00 | $35.00 | $ 15,155.00 |
| 35 | 2232.504 | MILL BITUMINOUS SURFACE (2.5") | (P) | SQ YD | 4330 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4330.00 | $2.25 | $ 9,742.50 |
| 36 | 2357.506 | BITUMINOUS MATERIAL FOR TACK COAT | | GAL | 259.73 | 0 | 0 | 0 | 1387.82 | 0 | 0 | 0 | 427.45 | 0 | 0 | 0 | 0 | 0 | 2075.00 | $3.00 | $ 6,225.00 |
| 37 | 2360.504 | TYPE SP 9.5 WEARING COURSE MIXTURE (2,B) 3.0" THICK | (7) | SQ YD | 5.02 | 0 | 0 | 0 | 117.98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123.00 | $65.00 | $ 7,995.00 |
| 38 | 2360.509 | TYPE SP 9.5 WEARING COURSE MIXTURE (3,C) | | TON | 618.26 | 0 | 0 | 0 | 5285.72 | 0 | 0 | 0 | 1628.02 | 0 | 0 | 0 | 0 | 0 | 7532.00 | $90.00 | $ 677,880.00 |
| 39 | 2411.618 | MODULAR BLOCK RETAINING WALL | | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 254 | 0 | 254.00 | $70.00 | $ 17,780.00 |
| 40 | 2501.502 | 18" RC PIPE APRON | (8) | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $1,600.00 | $ 1,600.00 |
| 41 | 2501.502 | INSTALL PIPE APRON | | EACH | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8.00 | $750.00 | $ 6,000.00 |
| 42 | 2502.503 | 4" PERF TP PIPE DRAIN | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 0 | 79.00 | $14.00 | $ 1,106.00 |
| 43 | 2503.503 | 12" RC PIPE SEWER | | LIN FT | 0 | 2.5 | 0 | 0 | 0 | 2.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | $70.00 | $ 350.00 |
| 44 | 2503.503 | 15" RC PIPE SEWER | | LIN FT | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.00 | $80.00 | $ 800.00 |
| 45 | 2503.503 | 18" RC PIPE SEWER | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 30.00 | $85.00 | $ 2,550.00 |
| 46 | 2503.602 | CONNECT TO EXISTING STORM SEWER | | EACH | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 19.00 | $1,250.00 | $ 23,750.00 |
| 47 | 2503.602 | SANITARY SEWER SPOT REPAIR | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | $6,000.00 | $ 6,000.00 |
| 48 | 2503.602 | JOINT SEALING SANITARY MANHOLE | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | $3,000.00 | $ 3,000.00 |
| 49 | 2503.602 | REINSTATE LATERALS | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | $150.00 | $ 150.00 |
| 50 | 2503.602 | LINING SEWER PIPE 15" (SHORT LINER) | | EACH | 0 | 1 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.00 | $5,000.00 | $ 45,000.00 |
| 51 | 2503.603 | LINING SEWER PIPE 8" | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300.00 | $55.00 | $ 16,500.00 |
| 52 | 2504.602 | CONNECT TO EXISTING WATERMAIN | | EACH | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 5 | 0 | 0 | 19.00 | $2,000.00 | $ 38,000.00 |
| 53 | 2504.602 | HYDRANT | | EACH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 8.00 | $7,000.00 | $ 56,000.00 |
| 54 | 2504.602 | VALVE BOX | (1)(10) | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 5.00 | $800.00 | $ 4,000.00 |
| 55 | 2504.602 | 1" CORPORATION STOP | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | $600.00 | $ 3,000.00 |
| 56 | 2504.602 | 6" GATE VALVE & BOX | | EACH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | 10.00 | $3,200.00 | $ 32,000.00 |
| 57 | 2504.602 | 8" GATE VALVE & BOX | | EACH | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 7.00 | $4,000.00 | $ 28,000.00 |
| 58 | 2504.602 | 12" GATE VALE & BOX | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1.00 | $6,000.00 | $ 6,000.00 |
| 59 | 2504.602 | 1" CURB STOP & BOX | (9) | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | $750.00 | $ 3,750.00 |
| 60 | 2504.602 | ADJUST CURB BOX | *** | EACH | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 54.00 | $300.00 | $ 16,200.00 |
| 61 | 2504.603 | 1" TYPE K COPPER PIPE | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 96.00 | $42.00 | $ 4,032.00 |
| 62 | 2504.603 | 6" WATERMAIN DUCTILE IRON CL 52 | | LIN FT | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 625 | 0 | 0 | 0 | 10 | 0 | 0 | 651.00 | $72.00 | $ 46,872.00 |

***PRELIMINARY ENGINEER'S ESTIMATE***

2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS, MINNESOTA

CITY PROJECT NO. PW-26-0100

BMI PROJECT NO. 25X.137753

| ITEM NO. | SPEC. REF | DESCRIPTION | NOTES | UNIT | RESIDENTIAL MILL & OVERLAY AREAS | | | | RESIDENTIAL RECLAMATION AREAS | | | | INDUSTRIAL RECLAMATION AREAS | | | | TRAILS & RETAINING WALL | KARTH LAKE | TOTAL ESTIMATED QUANTITY | ESTIMATED UNIT PRICE | ESTIMATED TOTAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | | | | | |
| 63 | 2504.603 | 12" WATERMAIN DUCTILE IRON CL 52 | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8.00 | $105.00 | $ 840.00 |
| 64 | 2504.604 | 4" POLYSTYRENE INSULATION | (4) | SQ YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 21.00 | $55.00 | $ 1,155.00 |
| 65 | 2504.608 | DUCTILE IRON FITTINGS | | LB | 0 | 0 | 0 | 61.65 | 0 | 0 | 0 | 361.09 | 0 | 0 | 0 | 79.26 | 0 | 0 | 502.00 | $14.00 | $ 7,028.00 |
| 66 | 2505.602 | ADJUST VALVE BOX | | EACH | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 5 | 0 | 0 | 14.00 | $500.00 | $ 7,000.00 |
| 67 | 2506.502 | CASTING ASSEMBLY (SANITARY) | (10)(11) | EACH | 0 | 0 | 6 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 31.00 | $1,300.00 | $ 40,300.00 |
| 68 | 2506.502 | CASTING ASSEMBLY (STORM) | (10) | EACH | 0 | 1 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 24.00 | $1,100.00 | $ 26,400.00 |
| 69 | 2506.502 | ADJUST FRAME & RING CASTING (STORM) | (10) | EACH | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.00 | $650.00 | $ 2,600.00 |
| 70 | 2506.503 | CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL (2'X3' CB) | (12) | LIN FT | 0 | 10.86 | 0 | 0 | 0 | 7.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.00 | $600.00 | $ 10,800.00 |
| 71 | 2506.503 | CONSTRUCT DRAINAGE STRUCTURE DESIGN 48-4020 | | LIN FT | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.00 | $650.00 | $ 4,550.00 |
| 72 | 2506.503 | CONSTRUCT DRAINAGE STRUCTURE DESIGN 48-4022 | (13) | LIN FT | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.00 | $650.00 | $ 4,550.00 |
| 73 | 2506.503 | RECONSTRUCT DRAINAGE STRUCTURE (SANITARY) | *** | LIN FT | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.00 | $1,000.00 | $ 7,000.00 |
| 74 | 2506.602 | CONCTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL (OCS) | *** | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $7,500.00 | $ 7,500.00 |
| 75 | 2506.602 | GROUT CATCH BASIN OR MANHOLE | | EACH | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.00 | $350.00 | $ 2,100.00 |
| 76 | 2506.602 | INTERNAL CHIMNEY SEAL | ND STORM | EACH | 0 | 0 | 7 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 59.00 | $850.00 | $ 50,150.00 |
| 77 | 2506.602 | SAFL BAFFLE | | EACH | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.00 | $7,500.00 | $ 15,000.00 |
| 78 | 2511.507 | RANDOM RIPRAP CLASS III | (14) | CU YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 24 | 42.00 | $150.00 | $ 6,300.00 |
| 79 | 2521.518 | 6" CONCRETE WALK | (7) | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 226 | 0 | 226.00 | $16.00 | $ 3,616.00 |
| 80 | 2521.518 | 3" BITUMINOUS WALK | | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26115 | 0 | 26115.00 | $2.75 | $ 71,816.25 |
| 81 | 2521.602 | DRILL & GROUT REINF BAR (EPOXY COATED) | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 96.00 | $13.00 | $ 1,248.00 |
| 82 | 2531.503 | CONCRETE CURB & GUTTER DESIGN SPECIAL SURMOUNTABLE (SPOT) | (3) | LIN FT | 326.78 | 0 | 0 | 0 | 1107.22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1434.00 | $40.00 | $ 57,360.00 |
| 83 | 2531.503 | CONCRETE CURB & GUTTER DESIGN B618 (SPOT) | (3) | LIN FT | 36.29 | 0 | 0 | 0 | 960.85 | 0 | 0 | 0 | 631.86 | 0 | 0 | 0 | 0 | 0 | 1629.00 | $40.00 | $ 65,160.00 |
| 84 | 2531.503 | CONCRETE CURB DESIGN V | (4) | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 20.00 | $50.00 | $ 1,000.00 |
| 85 | 2531.504 | 6" CONCRETE DRIVEWAY PAVEMENT | (7) | SQ YD | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45.00 | $85.00 | $ 3,825.00 |
| 86 | 2531.618 | TRUNCATED DOMES | | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 0 | 76.00 | $60.00 | $ 4,560.00 |
| 87 | 2540.602 | INSTALL MAILBOX SUPPORT | (2) | EACH | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.00 | $275.00 | $ 1,375.00 |
| 88 | 2563.601 | TRAFFIC CONTROL | | LUMP SUM | 0.05 | 0.02 | 0.01 | 0.02 | 0.40 | 0.05 | 0.05 | 0.11 | 0.13 | 0.00 | 0.00 | 0.02 | 0.08 | 0.06 | 1.00 | $40,000.00 | $ 40,000.00 |
| 89 | 2564.502 | INSTALL SIGN | (15) | EACH | 3 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 39.00 | $325.00 | $ 12,675.00 |
| 90 | 2564.518 | SIGN PANELS TYPE C | (15) | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 44.00 | $65.00 | $ 2,860.00 |
| 91 | 2564.518 | SIGN PANELS TYPE SPECIAL (STREET NAME BLADES) | (15) | EACH | 3 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.00 | $250.00 | $ 4,500.00 |
| 92 | 2571.502 | DECIDUOUS TREE 2.5" CAL B&B | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 14.00 | $750.00 | $ 10,500.00 |
| 93 | 2572.602 | TREE PRUNING | (4) | HOUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 20.00 | $250.00 | $ 5,000.00 |
| 94 | 2573.501 | STABILIZED CONSTRUCTION EXIT | | LUMP SUM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $3,000.00 | $ 3,000.00 |
| 95 | 2573.502 | STORM DRAIN INLET PROTECTION | | EACH | 4.35 | 0 | 0 | 0 | 27.21 | 0 | 0 | 0 | 5.44 | 0 | 0 | 0 | 0 | 0 | 37.00 | $170.00 | $ 6,290.00 |
| 96 | 2573.503 | FLOTATION SILT CURTAIN TYPE STILL WATER | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 290 | 290.00 | $30.00 | $ 8,700.00 |
| 97 | 2573.503 | SEDIMENT CONTROL LOG TYPE WOOD FIBER | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1500 | 1500.00 | $5.00 | $ 7,500.00 |
| 98 | 2574.507 | COMMON TOPSOIL BORROW | (LV) | CU YD | 22.69 | 0 | 0 | 0 | 129.28 | 0 | 0 | 0 | 39.51 | 0 | 0 | 0 | 204.08 | 234.44 | 630.00 | $40.00 | $ 25,200.00 |
| 99 | 2575.504 | SODDING TYPE LAWN | | SQ YD | 193.65 | 0 | 0 | 0 | 1103.2 | 0 | 0 | 0 | 337.15 | 0 | 0 | 0 | 0 | 0 | 1634.00 | $20.00 | $ 32,680.00 |
| 100 | 2575.504 | ROLLED EROSION PREVENTION CATEGORY 20 W/ SEED MIXTURE (XX-XXX) | (16) | SQ YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1741 | 2000 | 3741.00 | $4.50 | $ 16,834.50 |
| 101 | 2582.503 | 4" SOLID LINE MULTI-COMPONENT | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 515 | 0 | 0 | 0 | 0 | 0 | 515.00 | $1.50 | $ 772.50 |
| 102 | 2582.503 | 4" BROKEN LINE MULTI-COMPONENT | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 728 | 0 | 0 | 0 | 0 | 0 | 728.00 | $1.50 | $ 1,092.00 |
| 103 | 2582.503 | 4" DOUBLE SOLID LINE MULTI-COMPONENT | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1068 | 0 | 0 | 0 | 0 | 0 | 1068.00 | $3.00 | $ 3,204.00 |
| 104 | 2582.518 | PAVEMENT MESSAGE MULTI-COMPONENT | | SQ FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 198.00 | $20.00 | $ 3,960.00 |
| 105 | 2582.518 | CROSSWALK MULTI-COMPONENT | | SQ FT | 0 | 0 | 0 | 0 | 312 | 0 | 0 | 0 | 648 | 0 | 0 | 0 | 0 | 0 | 960.00 | $8.00 | $ 7,680.00 |
| **ESTIMATED SCHEDULE "A" - BASE BID CONSTRUCTION SUBTOTAL** | | | | | **$ 116,675.67** | **$ 38,941.00** | **$ 16,150.00** | **$ 34,565.10** | **$ 879,579.24** | **$ 105,559.00** | **$ 108,100.00** | **$ 245,792.26** | **$ 286,343.29** | **$ 9,300.00** | **$ 7,250.00** | **$ 52,529.64** | **$ 176,825.45** | **$ 127,527.60** | | | **$ 2,205,138.25** |
| **10% CONTINGENCY** | | | | | **$ 11,668.00** | **$ 3,894.00** | **$ 1,615.00** | **$ 3,457.00** | **$ 87,958.00** | **$ 10,556.00** | **$ 10,810.00** | **$ 24,579.00** | **$ 28,634.00** | **$ 930.00** | **$ 725.00** | **$ 5,253.00** | **$ 17,683.00** | **$ 12,753.00** | | | **$ 220,515.00** |
| **ESTIMATED SCHEDULE "A" - BASE BID CONSTRUCTION TOTAL** | | | | | **$ 128,343.67** | **$ 42,835.00** | **$ 17,765.00** | **$ 38,022.10** | **$ 967,537.24** | **$ 116,115.00** | **$ 118,910.00** | **$ 270,371.26** | **$ 314,977.29** | **$ 10,230.00** | **$ 7,975.00** | **$ 57,782.64** | **$ 194,508.45** | **$ 140,280.60** | | | **$ 2,425,653.25** |
| **27% OVERHEAD** | | | | | **$ 34,653.00** | **$ 11,565.00** | **$ 4,797.00** | **$ 10,266.00** | **$ 261,235.00** | **$ 31,351.00** | **$ 32,106.00** | **$ 73,000.00** | **$ 85,044.00** | **$ 2,762.00** | **$ 2,153.00** | **$ 15,601.00** | **$ 52,517.00** | **$ 37,876.00** | | | **$ 654,926.00** |
| **ESTIMATED SCHEDULE "A" - BASE BID PROJECT TOTAL** | | | | | **$ 162,996.67** | **$ 54,400.00** | **$ 22,562.00** | **$ 48,288.10** | **$ 1,228,772.24** | **$ 147,466.00** | **$ 151,016.00** | **$ 343,371.26** | **$ 400,021.29** | **$ 12,992.00** | **$ 10,128.00** | **$ 73,383.64** | **$ 247,025.45** | **$ 178,156.60** | | | **$ 3,080,579.25** |

***PRELIMINARY ENGINEER'S ESTIMATE***

2026 PMP STREET & UTILITY IMPROVEMENTS

CITY OF ARDEN HILLS, MINNESOTA

CITY PROJECT NO. PW-26-0100

BMI PROJECT NO. 25X.137753

| ITEM NO. | SPEC. REF | DESCRIPTION | NOTES | UNIT | RESIDENTIAL MILL & OVERLAY AREAS | | | | RESIDENTIAL RECLAMATION AREAS | | | | INDUSTRIAL RECLAMATION AREAS | | | | TRAILS & RETAINING WALL | KARTH LAKE | TOTAL ESTIMATED QUANTITY | ESTIMATED UNIT PRICE | ESTIMATED TOTAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | STREET | STORM | SANITARY | WATER | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| **SCHEDULE "B" - ALTERNATE 1 (KARTH LAKE DREDGING)** | | | | | | | | | | | | | | | | | | | | | |
| 106 | 2021.501 | MOBILIZATION | | LUMP SUM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $20,000.00 | $ 20,000.00 |
| 107 | 2101.502 | CLEARING | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23.00 | $650.00 | $ 14,950.00 |
| 108 | 2101.502 | GRUBBING | | EACH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23.00 | $250.00 | $ 5,750.00 |
| 109 | 2106.507 | EXCAVATION - CHANNEL AND POND | (EV)(P)(18) | CU YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1100 | 1100.00 | $80.00 | $ 88,000.00 |
| 110 | 2106.601 | POND DEWATERING | (18) | LUMP SUM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $75,000.00 | $ 75,000.00 |
| 111 | 2106.601 | CONSTRUCT ACCESS ROAD | (18) | LUMP SUM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $32,500.00 | $ 32,500.00 |
| 112 | 2452.601 | STEEL SHEET PILING (TEMPORARY) | (18) | LUMP SUM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.00 | $150,000.00 | $ 150,000.00 |
| 113 | 2573.503 | FLOTATION SILT CURTAIN TYPE STILL WATER | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | 600.00 | $30.00 | $ 18,000.00 |
| 114 | 2573.503 | SILT FENCE, TYPE MS | | LIN FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 321 | 321.00 | $3.50 | $ 1,123.50 |
| 115 | 2575.504 | ROLLED EROSION PREVENTION CATEGORY 20 W/ SEED MIXTURE (XX-XXX) | (16) | SQ YD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1354 | 1354.00 | $4.50 | $ 6,093.00 |
| **ESTIMATED SCHEDULE "B" - ALTERNATE 2 CONSTRUCTION SUBTOTAL** | | | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 411,416.50 | | | $ 411,416.50 |
| **10% CONTINGENCY** | | | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 41,142.00 | | | $ 41,142.00 |
| **ESTIMATED SCHEDULE "B" - ALTERNATE 2 CONSTRUCTION TOTAL** | | | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 452,558.50 | | | $ 452,558.50 |
| **27% OVERHEAD** | | | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 122,191.00 | | | $ 122,191.00 |
| **ESTIMATED SCHEDULE "B" - ALTERNATE 2 PROJECT TOTAL** | | | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 574,749.50 | | | $ 574,749.50 |
| | | | | | | | | | | | | | | | | | | | | | |
| **ESTIMATED CONSTRUCTION SUBTOTAL (SCHEDULES A-B)** | | | | | $ 116,675.67 | $ 38,941.00 | $ 16,150.00 | $ 34,565.10 | $ 879,579.24 | $ 105,559.00 | $ 108,100.00 | $ 245,792.26 | $ 286,343.29 | $ 9,300.00 | $ 7,250.00 | $ 52,529.64 | $ 176,825.45 | $ 538,944.10 | | | $ 2,616,554.75 |
| **10% CONTINGENCY** | | | | | $ 11,668.00 | $ 3,894.00 | $ 1,615.00 | $ 3,457.00 | $ 87,958.00 | $ 10,556.00 | $ 10,810.00 | $ 24,579.00 | $ 28,634.00 | $ 930.00 | $ 725.00 | $ 5,253.00 | $ 17,683.00 | $ 53,895.00 | | | $ 261,657.00 |
| **ESTIMATED CONSTRUCTION TOTAL (SCHEDULES A-B)** | | | | | $ 128,343.67 | $ 42,835.00 | $ 17,765.00 | $ 38,022.10 | $ 967,537.24 | $ 116,115.00 | $ 118,910.00 | $ 270,371.26 | $ 314,977.29 | $ 10,230.00 | $ 7,975.00 | $ 57,782.64 | $ 194,508.45 | $ 592,839.10 | | | $ 2,878,211.75 |
| **27% OVERHEAD (SCHEDULES A-B)** | | | | | $ 34,653.00 | $ 11,565.00 | $ 4,797.00 | $ 10,266.00 | $ 261,235.00 | $ 31,351.00 | $ 32,106.00 | $ 73,000.00 | $ 85,044.00 | $ 2,762.00 | $ 2,153.00 | $ 15,601.00 | $ 52,517.00 | $ 160,067.00 | | | $ 777,117.00 |
| **ESTIMATED PROJECT TOTAL (SCHEDULES A-B)** | | | | | $ 162,996.67 | $ 54,400.00 | $ 22,562.00 | $ 48,288.10 | $ 1,228,772.24 | $ 147,466.00 | $ 151,016.00 | $ 343,371.26 | $ 400,021.29 | $ 12,992.00 | $ 10,128.00 | $ 73,383.64 | $ 247,025.45 | $ 752,906.10 | | | $ 3,655,328.75 |

# Appendix C: Preliminary Assessment Roll

***PRELIMINARY ASSESSMENT ROLL***
2026 PMP STREET & UTILITY IMPROVEMENTS
CITY OF ARDEN HILLS, MINNESOTA
BMI PROJECT NO. 25X.137753
**JULY, 2025**

| Parcel # on Map | Parcel ID | Owner | Site Address | Site City/State/Zip Code | Owner Address | Owner City/State/Zip Code | Residential Equivalent Units (REU) | Assessable REU's | Street Improvement Type | Benefit Appraisal Assessment Range | | Calculated Improvement Assessment Rate | Estimated Assessment Amount | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Lower Limit | Upper Limit | | | |
| 1 | 2302312000 | JACQUELINE MARIE QUIGLEY | 1337 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1337 KARTH LAKE CIR | NEW BRIGHTON MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 2 | 2302312000 | DOUA S VANG | 1331 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1331 KARTH LAKE CIR | NEW BRIGHTON MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 3 | 2302312000 | VINCENT P ANDERSON | 1325 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1325 KARTH LAKE CIR | ST PAUL MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 4 | 2302312001 | BYUNG H LEE | 1321 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1321 KARTH LAKE CIR | ARDEN HILLS MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 5 | 2302312001 | SCOTT T JOHNSON | 1317 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1317 KARTH LAKE CIR | ARDEN HILLS MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 6 | 2302312001 | ERIC P HAUTH SCHMID | 1313 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1313 KARTH LAKE CIR | NEW BRIGHTON MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 7 | 2302312001 | ROBERT J BESSER | 1307 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1307 KARTH LAKE CIR | ARDEN HILLS MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 8 | 2302312001 | SUSANNE P YERICH | 1301 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1301 KARTH LAKE CIR | ARDEN HILLS MN 55112-5759 | 1.0 | 1.0 | RES. MILL | $ 4,000.00 | $ 5,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 9 | 2302312001 | STENNES FAMILY REV TR | 1295 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1295 KARTH LAKE CIR | ARDEN HILLS MN 55112-4782 | 1.0 | 1.0 | RES. MILL | $ 4,000.00 | $ 5,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 10 | 2302312001 | NICHOLAS MICHAEL JANNAKOS | 1289 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1289 KARTH LAKE CIR | ARDEN HILLS MN 55112-5782 | 1.0 | 1.0 | RES. MILL | $ 4,000.00 | $ 5,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 11 | 2302312001 | JASON M RAHN | 1285 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1285 KARTH LAKE CIR | ARDEN HILLS MN 55112-5782 | 1.0 | 1.0 | RES. MILL | $ 4,000.00 | $ 5,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 12 | 2302312001 | JAMES THOMAS ZUBRZYCKI | 1281 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1281 KARTH LAKE CIR | ARDEN HILLS MN 55112-5782 | 1.0 | 1.0 | RES. MILL | $ 4,000.00 | $ 5,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 13 | 2302312001 | JADE SCHIESSER | 1280 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1280 KARTH LAKE CIR | ARDEN HILLS MN 55112-5711 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 14 | 2302312002 | KENNETH D ENGBERG | 1286 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1286 KARTH LAKE CIR | ST PAUL MN 55112-5711 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 15 | 2302312002 | EVAN M KASEMEOTES | 1292 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1292 KARTH LAKE CIR | ARDEN HILLS MN 55112-5711 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 16 | 2302312006 | ANTHONY A HOESCHEN | 1298 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1298 KARTH LAKE CIR | NEW BRIGHTON MN 55112-5711 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 17 | 2302312007 | THOMAS J MOORE | 1302 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1302 KARTH LAKE CIR | ARDEN HILLS MN 55112-5760 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 18 | 2302312002 | ABUBAKER M BUSHAGOUR TR | 1306 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1306 KARTH LAKE CIR | ARDEN HILLS MN 55112-5760 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 19 | 2302312002 | CHRISTOPHER S CHAPMAN | 1326 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1326 KARTH LAKE CIR | NEW BRIGHTON MN 55112-5760 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 20 | 2302312002 | YIU LEE | 1332 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1332 KARTH LAKE CIR | ARDEN HILLS MN 55112-5160 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 21 | 2302312002 | JONAH P BERNDT | 1338 KARTH LAKE CIR | ARDEN HILLS MN 55112 | 1338 KARTH LAKE CIR | ARDEN HILLS MN 55112-5760 | 1.0 | 1.0 | RES. MILL | $ 3,000.00 | $ 4,000.00 | $ 3,880.00 | $ 3,880.00 | |
| 35 | 2302314003 | CITY OF ARDEN HILLS | 1219 CUMMINGS PARK DR | ARDEN HILLS MN 55112 | 1245 HIGHWAY 96 W | ARDEN HILLS MN 55112-5400 | 53.0 | | IND. RECLAIM | $ 43,734.24 | $ 82,110.60 | $ 840.00 | $ - | PUBLIC PROPERTY - NO ASSESSMENT |
| 38 | 2302341001 | PNL INVEST LLC | 4295 LEXINGTON AVE N | ARDEN HILLS MN 55126 | 500 N AKARD ST STE 2800 | DALLAS TX 75201-3308 | 20.0 | 20.0 | IND. RECLAIM | $ 34,273.01 | $ 58,457.52 | $ 840.00 | $ 16,800.00 | NOT A CUMMINGS PARK DR ADDRESS BUT HAS DIRECT ACCESS TO CUMMINGS PARK DR |
| 39 | 2302341001 | PNL INVEST LLC | 4293 LEXINGTON AVE N | ARDEN HILLS MN 55126 | 500 N AKARD ST STE 2800 | DALLAS TX 75201-3308 | 10.0 | 10.0 | IND. RECLAIM | $ 22,346.28 | $ 37,243.80 | $ 840.00 | $ 8,400.00 | NOT A CUMMINGS PARK DR ADDRESS BUT HAS DIRECT ACCESS TO CUMMINGS PARK DR |
| 40 | 2302341000 | CITY OF ARDEN HILLS | 1221 CUMMINGS PARK DR | ARDEN HILLS MN 55112 | 1245 HIGHWAY 96 W | ARDEN HILLS MN 55112-5400 | 1.0 | | IND. RECLAIM | $ 4,247.10 | $ 7,078.50 | $ 840.00 | $ - | PUBLIC PROPERTY - NO ASSESSMENT |
| 41 | 2302341001 | ARDEN HILLS LLC | 4255 LEXINGTON AVE N | ARDEN HILLS MN 55126 | 14301 EWING AVE S | BURNSVILLE MN 55306-4885 | 8.0 | 8.0 | IND. RECLAIM | $ 18,033.84 | $ 30,056.40 | $ 840.00 | $ 6,720.00 | NOT A CUMMINGS PARK DR ADDRESS BUT HAS DIRECT ACCESS TO CUMMINGS PARK DR |
| 42 | 2302341001 | PNL INVEST LLC | 4265 LEXINGTON AVE N | ARDEN HILLS MN 55126 | 500 N AKARD ST STE 2800 | DALLAS TX 75201-3308 | 10.0 | 10.0 | IND. RECLAIM | $ 22,672.98 | $ 37,788.30 | $ 840.00 | $ 8,400.00 | NOT A CUMMINGS PARK DR ADDRESS BUT HAS DIRECT ACCESS TO CUMMINGS PARK DR |
| 43 | 2302314001 | LEONARD E GALLUS TR | 1104 AMBLE DR | ARDEN HILLS MN 55112 | 1104 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 44 | 2302314001 | ANTHONY M PELESKA | 1108 AMBLE DR | ARDEN HILLS MN 55112 | 1108 AMBLE DR | NEW BRIGHTON MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 45 | 2302314001 | CARL V REYNOLDS TR | 1112 AMBLE DR | ARDEN HILLS MN 55112 | 1112 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 46 | 2302314002 | INESS YEN TR | 1116 AMBLE DR | ARDEN HILLS MN 55112 | 1116 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 47 | 2302314002 | RENEE D MARINO | 1120 AMBLE DR | ARDEN HILLS MN 55112 | 1120 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 48 | 2302314002 | SCOTT A HANSOHN | 1124 AMBLE DR | ARDEN HILLS MN 55112 | 1124 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 49 | 2302314002 | SUBBAYA SUBRAMANIAN | 1128 AMBLE DR | ARDEN HILLS MN 55112 | 1128 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 50 | 2302314002 | JONATHAN M HANSEN | 1132 AMBLE DR | ARDEN HILLS MN 55112 | 1132 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 51 | 2302314002 | MICHAEL G GRAFF | 1136 AMBLE DR | ARDEN HILLS MN 55112 | 1136 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 52 | 2302314000 | ERIK K LINDMARK | 1140 AMBLE DR | ARDEN HILLS MN 55112 | 1140 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 53 | 2302314000 | THOMAS E HEIDEMAN | 1142 AMBLE DR | ARDEN HILLS MN 55112 | 1142 AMBLE DR | SAINT PAUL MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 54 | 2302311006 | CESAR FARELL | 1144 AMBLE DR | ARDEN HILLS MN 55112 | 1144 AMBLE DR | SAINT PAUL MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 55 | 2302311000 | JEFFERY P WENDT | 1148 AMBLE DR | ARDEN HILLS MN 55112 | 1148 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 56 | 2302311000 | DAVID JOE SNIDER | 1152 AMBLE DR | ARDEN HILLS MN 55112 | 1152 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 57 | 2302311000 | DAVID C YAUCH | 1156 AMBLE DR | ARDEN HILLS MN 55112 | 1156 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 58 | 2302311000 | ABBY J OLSON | 1160 AMBLE DR | ARDEN HILLS MN 55112 | 1160 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 59 | 2302311000 | WYATT PARTRIDGE | 1164 AMBLE DR | ARDEN HILLS MN 55112 | 1164 AMBLE DR | SAINT PAUL MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 60 | 2302311000 | RILEY J ODOM | 1168 AMBLE DR | ARDEN HILLS MN 55112 | 1168 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 61 | 2302312003 | YEVGENIY ZHITNITSKIY | 1172 AMBLE DR | ARDEN HILLS MN 55112 | 1172 AMBLE DR | ARDEN HILLS MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 62 | 2302312003 | KELLY M ACOSTA | 1176 AMBLE DR | ARDEN HILLS MN 55112 | 1176 AMBLE DR | NEW BRIGHTON MN 55112-5713 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 63 | 2302312003 | MARCIA L CHENEY | 1180 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1180 KARTH LAKE DR | SAINT PAUL MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 64 | 2302312003 | ANDREW J ELMQUIST | 1212 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1212 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 65 | 2302312003 | BRUCE A JOHNSON | 1220 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1220 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 66 | 2302312004 | THE PAUL AND MARY ANN SCHMIDT TRUST | 1228 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1228 KARTH LAKE DR | SAINT PAUL MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 67 | 2302312004 | GARY H GERDING | 1236 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1236 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 68 | 2302312004 | CLAUDIA D LANDGRAF | 1244 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1244 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 69 | 2302312004 | KEN A SPANGLER | 1250 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1250 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 9,000.00 | $ 11,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 70 | 2302312004 | HAKKI ISIK | 1249 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1249 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 71 | 2302312004 | CHARLES E WEAVER TR | 1245 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1245 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 72 | 2302312004 | NORIYUKI NONAKA | 1241 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1241 KARTH LAKE RD | NEW BRIGHTON MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 73 | 2302312004 | YI LI | 1233 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1233 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 74 | 2302312004 | MATTHEW J ETHEN | 1225 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1225 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 75 | 2302312005 | WILLIAM S THELEN | 1217 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1217 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 76 | 2302312005 | GREGORY W SCHLINK | 1209 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1209 KARTH LAKE DR | NEW BRIGHTON MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 77 | 2302311006 | MARGARET J LIEDHOLM | 1201 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1201 KARTH LAKE DR | ARDEN HILLS MN 55112-5714 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 78 | 2302311006 | MAGGIE GIGLER | 1191 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1191 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 79 | 2302311007 | DONALD C KELLY TR | 1181 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1181 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 80 | 2302311007 | CLAYTON A LARSON | 1173 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1173 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 81 | 2302311007 | BART J JOHNSON | 1163 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1163 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 82 | 2302311005 | KYUNGHYE YOON | 1155 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1155 KARTH LAKE DR | SAINT PAUL MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 83 | 2302311005 | KATY MUCKALA | 1147 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1147 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 84 | 2302311005 | CHAD A LAJINESS | 1139 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1139 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 85 | 2302311005 | CHRISTOPHER B MERTZ | 1131 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1131 KARTH LAKE DR | ARDEN HILLS MN 55112-5757 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 86 | 2302311005 | SALAMAAN A KHAN | 4533 PLEASANT DR | ARDEN HILLS MN 55112 | 4533 PLEASANT DR | ARDEN HILLS MN 55112-5749 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 87 | 2302311005 | WARREN W PAKULSKI | 4545 PLEASANT DR | ARDEN HILLS MN 55112 | 4545 PLEASANT DR | ARDEN HILLS MN 55112-5749 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 88 | 2302311005 | NICHOLAS A SLATTERY | 4551 PLEASANT DR | ARDEN HILLS MN 55112 | 4551 PLEASANT DR | ARDEN HILLS MN 55112-5749 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 89 | 2302311005 | ENVER CERIC | 4550 PLEASANT DR | ARDEN HILLS MN 55112 | 4550 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 90 | 2302311005 | RANDALL V HALL | 4542 PLEASANT DR | ARDEN HILLS MN 55112 | 4542 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 91 | 2302311006 | ISRAEL ANDERSON | 4534 PLEASANT DR | ARDEN HILLS MN 55112 | 4534 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 92 | 2302311006 | M COLLIN EID TR | 4526 PLEASANT DR | ARDEN HILLS MN 55112 | 4526 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 93 | 2302311006 | JASON VARGHESE | 4518 PLEASANT DR | ARDEN HILLS MN 55112 | 4518 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 94 | 2302311006 | ELLEN C CHRISTOFFERSON | 4510 PLEASANT DR | ARDEN HILLS MN 55112 | 4510 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 95 | 2302311006 | CHENG XIONG | 4500 PLEASANT DR | ARDEN HILLS MN 55112 | 4500 PLEASANT DR | ARDEN HILLS MN 55112-5129 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 96 | 2302311004 | DAVID GRUFMAN | 4480 PLEASANT DR | ARDEN HILLS MN 55112 | 4480 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 97 | 2302311004 | DONALD G EATON | 4472 PLEASANT DR | ARDEN HILLS MN 55112 | 4472 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 98 | 2302311007 | ROBBEN F TODD | 4466 PLEASANT DR | ARDEN HILLS MN 55112 | 4466 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 99 | 2302311004 | DANNY C BICKHAM | 4460 PLEASANT DR | ARDEN HILLS MN 55112 | 4460 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 100 | 2302311004 | SEAN H MCDONAGH | 4452 PLEASANT DR | ARDEN HILLS MN 55112 | 4452 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 101 | 2302311004 | JEFFREY P GAZICH | 4446 PLEASANT DR | ARDEN HILLS MN 55112 | 4446 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 102 | 2302311004 | LARRY R VEENSTRA | 4440 PLEASANT DR | ARDEN HILLS MN 55112 | 4440 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 103 | 2302311004 | TOU DOUA THAO | 4434 PLEASANT DR | ARDEN HILLS MN 55112 | 4434 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 104 | 2302311004 | GENTRY L WALKER | 4428 PLEASANT DR | ARDEN HILLS MN 55112 | 4428 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 105 | 2302311004 | GREGORY A CLIFFORD | 4422 PLEASANT DR | ARDEN HILLS MN 55112 | 4422 PLEASANT DR | ARDEN HILLS MN 55112-5716 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 106 | 2302314001 | LAUREL BRUDEVOLD | 1137 AMBLE DR | ARDEN HILLS MN 55112 | 1137 AMBLE DR | ARDEN HILLS MN 55112-5748 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 107 | 2302314001 | JOSEPH M FREXING | 1131 AMBLE DR | ARDEN HILLS MN 55112 | 1131 AMBLE DR | ARDEN HILLS MN 55112-5748 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 108 | 2302314001 | PAUL R TUFTS | 1127 AMBLE DR | ARDEN HILLS MN 55112 | 1127 AMBLE DR | ARDEN HILLS MN 55112-5748 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 109 | 2302314001 | JEROME K PEARSON | 1121 AMBLE DR | ARDEN HILLS MN 55112 | 1121 AMBLE DR | ARDEN HILLS MN 55112-5748 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |

***PRELIMINARY ASSESSMENT ROLL***
2026 PMP STREET & UTILITY IMPROVEMENTS
CITY OF ARDEN HILLS, MINNESOTA
BMI PROJECT NO. 25X.137753
**JULY, 2025**

| Parcel # on Map | Parcel ID | Owner | Site Address | Site City/State/Zip Code | Owner Address | Owner City/State/Zip Code | Residential Equivalent Units (REU) | Assessable REU's | Street Improvement Type | Benefit Appraisal Assessment Range | | Calculated Improvement Assessment Rate | Estimated Assessment Amount | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Lower Limit | Upper Limit | | | |
| 110 | 2302314400 12 | PETER T DANN | 4415 AMBLE CIR | ARDEN HILLS MN 55112 | 4415 AMBLE CIR | ARDEN HILLS MN 55112-5704 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 111 | 2302314400 11 | RUSSELL J BERTSCH | 4419 AMBLE CIR | ARDEN HILLS MN 55112 | 4419 AMBLE CIR | ARDEN HILLS MN 55112-5704 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 112 | 2302314400 43 | GEOFFREY M PREGO | 4418 AMBLE CIR | ARDEN HILLS MN 55112 | 4418 AMBLE CIR | ARDEN HILLS MN 55112-5704 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 113 | 2302314400 42 | DEREK BRYANT | 4414 AMBLE CIR | ARDEN HILLS MN 55112 | 4414 AMBLE CIR | ARDEN HILLS MN 55112-5704 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 114 | 2302314400 41 | ROBERT A LASKA | 4408 AMBLE CIR | ARDEN HILLS MN 55112 | 4408 AMBLE CIR | ARDEN HILLS MN 55112-5704 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 115 | 2302314400 38 | C GREGORY PETERSON | 1105 AMBLE DR | ARDEN HILLS MN 55112 | 1105 AMBLE DR | ARDEN HILLS MN 55112-5779 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 116 | 2302314400 28 | RANDY J RICHGRUBER | 1113 AMBLE DR | ARDEN HILLS MN 55112 | 1113 AMBLE DR | NEW BRIGHTON MN 55112-5779 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 117 | 2302311001 7 | BEVERLY J MCKIBBEN | 1119 PLEASANT CIR | ARDEN HILLS MN 55112 | 1119 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 118 | 2302311001 8 | MICHELLE HAMES | 1129 PLEASANT CIR | ARDEN HILLS MN 55112 | 1129 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 119 | 2302311001 9 | TARAS POKHIL | 1139 PLEASANT CIR | ARDEN HILLS MN 55112 | 1139 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 120 | 2302311002 0 | GEORGE SLADE SCHUSTER | 1149 PLEASANT CIR | ARDEN HILLS MN 55112 | 1149 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 121 | 2302311002 1 | LLOYD A KELLER TR | 1159 PLEASANT CIR | ARDEN HILLS MN 55112 | 1159 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 122 | 2302311002 2 | DENISE A SCHEUNEMAN | 1169 PLEASANT CIR | ARDEN HILLS MN 55112 | 1169 PLEASANT CIR | NEW BRIGHTON MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 123 | 2302311002 3 | YOUNGCHOL LIM | 1160 PLEASANT CIR | ARDEN HILLS MN 55112 | 1160 PLEASANT CIR | NEW BRIGHTON MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 124 | 2302311002 4 | DAVID B JOHNSON | 1150 PLEASANT CIR | ARDEN HILLS MN 55112 | 1150 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 125 | 2302311002 5 | WILLIAM J HANSEN | 1140 PLEASANT CIR | ARDEN HILLS MN 55112 | 1140 PLEASANT CIR | NEW BRIGHTON MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 126 | 2302311002 6 | LIXIN ZHU | 1130 PLEASANT CIR | ARDEN HILLS MN 55112 | 1130 PLEASANT CIR | NEW BRIGHTON MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 127 | 2302311002 7 | SUSANNE U TROST | 1120 PLEASANT CIR | ARDEN HILLS MN 55112 | 1120 PLEASANT CIR | ARDEN HILLS MN 55112-5717 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 128 | 2302311002 8 | LAUREL RICHMOND | 4443 PLEASANT DR | ARDEN HILLS MN 55112 | 4443 PLEASANT DR | ARDEN HILLS MN 55112-5751 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 129 | 2302311002 9 | BRADLEY ZUNKER | 4435 PLEASANT DR | ARDEN HILLS MN 55112 | 4435 PLEASANT DR | NEW BRIGHTON MN 55112-5751 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 130 | 2302311003 0 | JON B CHRISTIANSON | 4429 PLEASANT DR | ARDEN HILLS MN 55112 | 4429 PLEASANT DR | ARDEN HILLS MN 55112-5751 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 131 | 2302311003 1 | RIAN HEASLIP | 4425 PLEASANT DR | ARDEN HILLS MN 55112 | 4425 PLEASANT DR | ARDEN HILLS MN 55112-5751 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 132 | 2302311003 2 | BRYAN R LILLEHAUGEN | 1145 AMBLE DR | ARDEN HILLS MN 55112 | 1145 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 133 | 2302311003 3 | KATIE FROKJER | 1149 AMBLE DR | ARDEN HILLS MN 55112 | 1149 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 134 | 2302311003 4 | MASON M CHEN | 1153 AMBLE DR | ARDEN HILLS MN 55112 | 1153 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 135 | 2302311003 5 | MATTHEW J ROUSSEAU | 1157 AMBLE DR | ARDEN HILLS MN 55112 | 1157 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 136 | 2302311003 6 | CHENG HSIEN TSAI | 1161 AMBLE DR | ARDEN HILLS MN 55112 | 1161 AMBLE DR | ST PAUL MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 137 | 2302311003 7 | ALEXANDER KING | 1165 AMBLE DR | ARDEN HILLS MN 55112 | 1165 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 138 | 2302311003 8 | TIMOTHY M DOUGHERTY | 1169 AMBLE DR | ARDEN HILLS MN 55112 | 1169 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 139 | 2302311003 9 | RACHEL MAGENNIS SCHNOBRICH | 1175 AMBLE DR | ARDEN HILLS MN 55112 | 1175 AMBLE DR | ARDEN HILLS MN 55112-5747 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 140 | 2302311000 9 | JASON R HEFFELFINGER | 1176 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1176 KARTH LAKE DR | ARDEN HILLS MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 141 | 2302311001 0 | LESLIE JEAN MEYERS | 1168 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1168 KARTH LAKE DR | SAINT PAUL MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 142 | 2302311001 1 | LEIF R HANSEN | 1160 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1160 KARTH LAKE DR | ARDEN HILLS MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 143 | 2302311001 2 | BRAD A REASONER | 1152 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1152 KARTH LAKE DR | SAINT PAUL MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 144 | 2302311001 3 | JOHN B SHIELDS | 1144 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1144 KARTH LAKE DR | ARDEN HILLS MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 145 | 2302311001 4 | AMY WIELINSKI | 1136 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1136 KARTH LAKE DR | NEW BRIGHTON MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 146 | 2302311001 5 | MARK R MATUAL TR | 1128 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1128 KARTH LAKE DR | ARDEN HILLS MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 147 | 2302311001 6 | CALEB MATTHEW CORDES | 1120 KARTH LAKE DR | ARDEN HILLS MN 55112 | 1120 KARTH LAKE DR | ARDEN HILLS MN 55112-5758 | 1.0 | 1.0 | RES. RECLAIM | $ 8,000.00 | $ 10,000.00 | $ 5,850.00 | $ 5,850.00 | |
| 156 | 2302343001 0 | CARDIAC PACEMAKERS INC | 3 BOSTON SCIENTIFIC DR | ARDEN HILLS 55112 | 4100 HAMLINE AVE N | NEW BRIGHTON MN 55112-5700 | 232.0 | 232.0 | IND. RECLAIM | $ 95,727.46 | $ 212,093.64 | $ 840.00 | $ 194,880.00 | NOT A CUMMINGS PARK DR ADDRESS BUT HAS DIRECT ACCESS TO CUMMINGS PARK DR |
| | | | | | | | | | | | | **TOTAL ASSESSMENTS** | **$ 930,930.00** | |

# Appendix D: General Benefit Appraisals

**Report Type**
Real Estate Consulting
Letter Report (Restricted Appraisal)

**Effective Date**
June 28, 2025

**Client**

City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

**Subject Property**

**Street Improvement Project**
Karth Lake Circle
Arden Hills, MN 55112




**File # V2505001 – Karth Lake Circle**

**Prepared By:**
Ethan Waytas, MAI, Appraiser
William R. Waytas, SRA, Appraiser

**Nagell Appraisal Incorporated**
12805 Highway 55, Suite 300
Plymouth, Minnesota 55441
Tel: 952.544.8966 | Fax: 952.544.8969

# NAGELL APPRAISAL INCORPORATED

**12805 Highway 55 #300**
**Plymouth, MN 55441**
***Established in 1968***

**Phone** **952-544-8966**
**Fax** **952-544-8969**


City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

Report Date: July 2, 2025

To Brad Fisher:

Per your request, this is a letter report to assist the city for guidance regarding a street improvement project within Arden Hills (see attached map for the location of the streets in the project).

The following information outlines the scope and intent of this document:

**Client:** Arden Hills

**Intended User:** Arden Hills

**Note:** Only the client and name intended user can rely upon this report.

**Effective Date:** June 28, 2025

**Report Type:** Restricted Appraisal (as a restricted appraisal, this report may not contain supporting rationale for all of the opinions and conclusions as stated. This information is retained in the workfile)

**Intended Use:** The intended use of this report is for decision-making purposes regarding a road project and potential special assessments.

**Value Provided:** Market Value, see rear of report for definition

**Interest Provided:** Fee Simple

**Subject Property:** This document is not an appraisal of a specific property, rather, it provides a benefit range for similar property types within the project area. These ranges are applicable to the properties within the project area. The project boundaries are clearly identified in this report. Information regarding individual properties can be provided upon request.

**Scope of Work:** William R. Waytas drove the streets in the project area on June 28, 2025. The appraiser reviewed sales, rents, listings, and costs in the market. A drive-by viewing of properties in the project area and streets was completed. The market was analyzed to indicate a benefit range that would be applicable to the project. In addition, the appraiser has completed a cursory review of the zoning and future land use plan. Other research includes prior discussions with market participants and discussion with the city regarding the project.

**Sales Comparison Approach:** Sales data was analyzed to indicate a market benefit range.

**Income Approach:** This approach was not applied at this time, as it is considered less reliable given the project and scope of assignment.

**Cost Approach:** This approach was considered regarding new road costs and physical depreciation.

**Uses in Project Area:** Uses in the project area are single-family residential.

**Report Assistance:** Ethan Waytas, MAI wrote the report and analyzed the market data. William R. Waytas read the report and agreed with the conclusions. Ethan Waytas, MAI viewed the project area and took photos.

**Note:** This report is not an appraisal (value) of a specific property but rather provides a preliminary opinion of a general range of market benefit, if any, for similar properties. Relevant information and analysis are retained in the workfile. If an appraisal of a specific property was performed, the findings of that report are considered likely to be consistent with the findings in this document (but could vary). The letter can function as a test of reasonableness for the proposed assessments.

## *PROJECT*

The City of Arden Hills is proposing to complete a **mill & overlay** of the existing road in the project area. The project will result in 2” to 2.5” of existing asphalt to be milled from the road. Concrete curb and gutter will be replaced as needed. New asphalt, with a depth of 2” to 2.5”, will be paved; this results in a new road surface.

Per request, you desire to know the benefit (if any) as it impacts properties in the project area.

Motivation for the road improvement project appears to stem from deteriorating road surface.

## AREA DESCRIPTION

Arden Hills in a suburban community located about 8 miles northeast of Downtown Minneapolis and 8 miles northwest of Downtown St. Paul. Arden Hills is home to Bethel University, Northwestern College, the Twin Cities Army Ammunition Plant, and popular recreational lakes (Lake Johanna and Lake Josephine). Arden Hills is a stable community with shopping and major commerce nearby. Access to Downtown Minneapolis/St. Paul and surrounding communities is good.

The population was 9,552 as of 2010 census (a decrease of 1.0% from the 2000 census). The 2020 population is 9,939 (an increase of 4.1% from 2010). The 2022 population estimate is 9,592, a decrease of 3.5% from 2020.

The city is comprised of a variety of commercial, industrial, religious, single-family, multi-family, park, and agricultural uses. Most existing buildings in the area are of average quality.

Single family homes generally range in value between $350,000 and $650,000+ within city limits. The higher end homes are on the nearby lakes. The average home price over the past 1.5 years is around $575,000 (MLS statistics). Most homes are average to good quality.

## SUBJECT PROPERTIES

The project area consists of single-family residential homes (some homes have frontage on Karth Lake).

## EXISTING STREETS & UTILITIES

**Physical Condition of the Existing Road:** The existing road improvements are asphalt with concrete curb and gutter. The road condition, based on the visual inspection of the streets, is rated to be fair. There are signs of transverse, longitudinal, and alligator cracking along with pavement discoloration. There are also areas of raveling.

**Physical Condition of Existing Utilities:** The utilities in the area are public water, sanitary sewer, public electricity, and natural gas. There are no proposed utility updates for this project.

**Functional Design of the Road:** The existing road is dated, in fair overall condition, and does have substantial large cracks, raveling, etc. The road condition is rated to be fair.

Road and utility infrastructure in poor to fair condition do not meet the expectations of typical market participants in this suburban market for re-development, resale price, and/or updating the current uses. Overall, the existing street improvements are in fair condition, are beginning to look dated (or function) and reflect likewise on the adjoining and side street properties.

## *PROPOSED IMPROVEMENTS*

The City of Arden Hills is proposing to complete a **mill & overlay** of the existing road in the project area. The project will result in 2" to 2.5" of existing asphalt to be milled from the road. Concrete curb and gutter will be replaced as needed. New asphalt, with a depth of 2" to 2.5", will be paved; this results in a new road surface.

Given the existing condition of the road, the proposed project is logical.

If any of the above descriptions change, the benefit due to the project could differ.

## *HIGHEST AND BEST USE*

The subject project area is located in the northeastern portion of the city in an area of residential, office, industrial, and commercial uses.

Owners in the subject area appear to update their property as needed when site and building components wear out or become dated. Owners in the overall area commonly pave their driveways or maintain parking lots as needed, recognizing it adds value when done. Therefore, it is logical to update the road and/or utility infrastructure to the subject properties as needed, as these are essential property characteristics that are expected in this market.

An informed buyer would consider the condition of the road, traffic flow/management, and utilities. A well-constructed and good condition road provides aesthetic appeal to a property and efficient/safe traffic flow. Given a choice, a potential informed buyer would likely prefer a newer road with good traffic flow over a deteriorating road with fair traffic flow. Additionally, a potential informed buyer would likely prefer newer utility infrastructure as compared to older, dated and inferior utility infrastructure.

If replacement of components of real estate near the end of their economic life in a home or building is postponed, it can be costlier in the long run; delays in replacing components can result in incurring higher interim maintenance costs and potential difficulty in marketing the property. Also, it is typical for the cost of the replacement of an improvement to increase over time. That said it is logical and prudent for market participants to update/replace dated components when needed.

Therefore, the highest and best use of the surrounding properties in the project area is for the continued various uses with the proposed infrastructure improvements.

## *DISCUSSION OF MARKET BENEFIT – MILL & OVERLAY*

Listed below are the factors that will be taken into consideration concerning the potential benefit to the properties.

| Description | Existing Improvements | Change |
|---|---|---|
| **1) Road Surface** | **Fair** | **New, asphalt** |
| **2) Base Condition** | Average | Average |
| **3) Curb** | **Fair to Average** | **Spot replacement as needed** |
| **4) Drainage** | Average | Average |
| **5) Storm Sewer** | Yes | Yes |
| **6) City water** | Average | Average |
| **7) City sewer** | Average | Average |
| **8) Sidewalk** | None | None |
| **9) Street Lights** | None | None |
| **10) Functional Design of Road** | **Dated** | **Good, new** |
| **11) Traffic Management** | **Fair** | **Good** |
| **12) Pedestrian Use (biking, walking, etc.)** | **Fair** | **Good** |
| **13) Median** | n/a | n/a |
| **14) Road Proximity to Properties** | n/a | n/a |
| **15) Dust** | n/a | n/a |
| **16) Visual Impact on Properties** | **Fair** | **Good** |

Based on the preceding grid, the subject properties will improve in 6 of the 16 categories. Market participants generally recognize that roads and utility infrastructure need replacing when nearing the end of a long economic life.

A typical buyer in the subject market commonly prefers a good condition paved road surface versus an inferior paved road. In addition to visual benefit, new street improvements provide better and safer use for pedestrians (biking, walking, stroller, rollerblading, etc.) and drivers. The new streets will enhance potential for new development, redevelopment, and/or updating current properties.

Based on past appraisals, experience, and general market information, it is not uncommon for properties similar to those in the subject market to realize an increase in price for new street improvements.

Given the scope of the project, the age/quality/condition of existing structures, properties in the area with newer street improvements could see an average price benefit of:

- **Single-Family Residential – Non Lakefront Lots** — $3,000 to $4,000 per buildable homesite
- **Single-Family Residential – Lakefront Lots** — $4,000 to $5,000 per buildable homesite

**Note:** The above benefit considers only the scope of the project. Higher value buildings/homes or larger lots are on the upper end of the range. Properties on corners, with one street being improved and the other not, might receive less than the above ranges (for example 50% of the benefit).

## *CONCLUSION*

**The benefit amounts noted above should not be construed or relied on as being an appraisal of a specific property, but are general observations based on the overall market.** If an appraisal were made on the individual properties, the actual benefit amount could vary from market observations above.

If you have additional questions, please do not hesitate to contact us.

Sincerely,



Ethan Waytas, MAI
Certified General MN 40368613

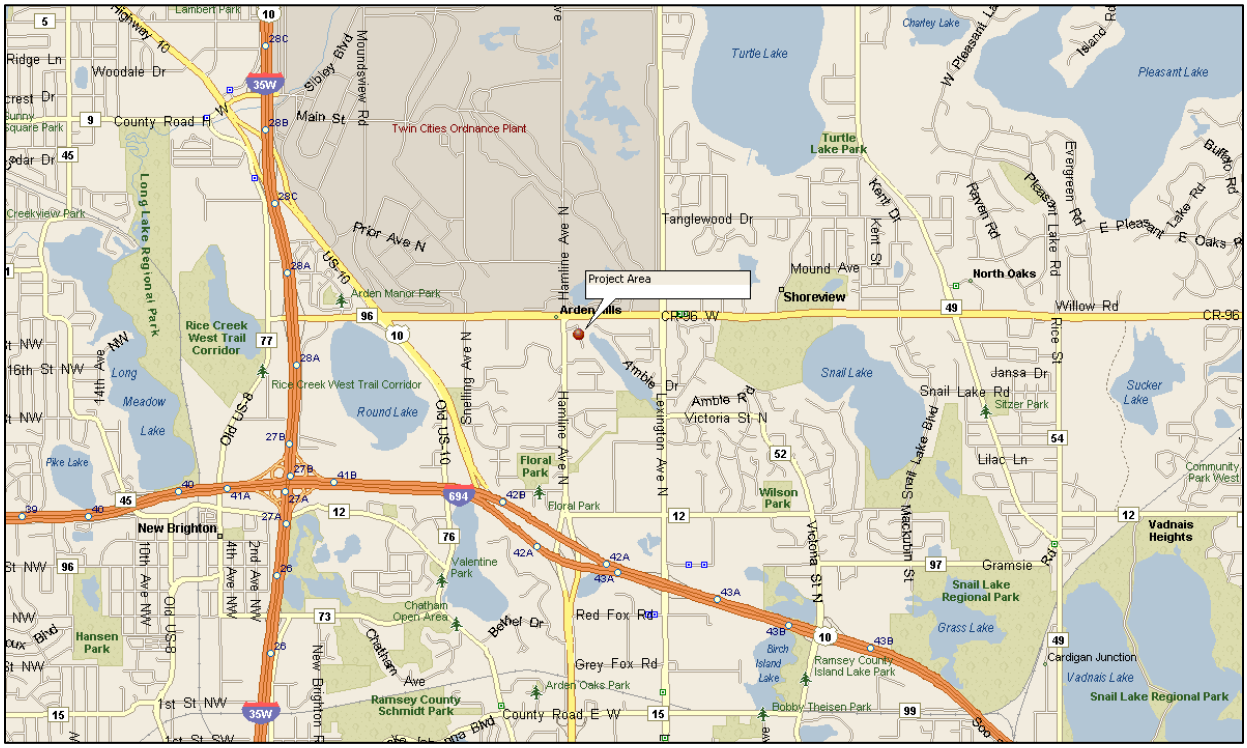


William R. Waytas, SRA
Certified General MN 4000813

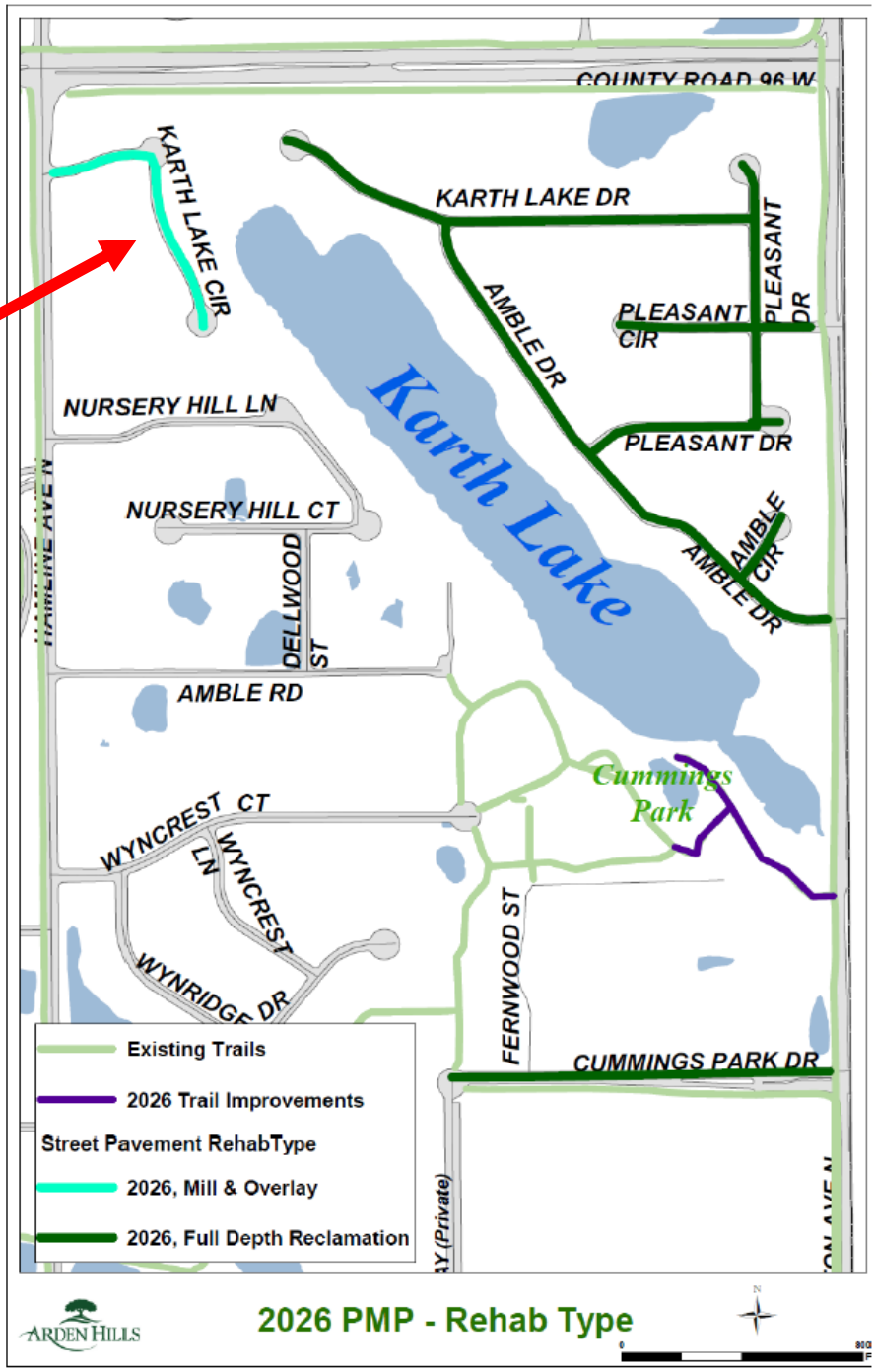
**Enclosures:** Location Map, Aerial Map View of Project, Subject Photos, Qualifications

## LOCATION MAP



## PROJECT MAP




*Above exhibit provided by the client. The subject project area is indicated by the red arrow.

## *AERIAL VIEW OF PROJECT MAP*




*Red line reflects the approximate project area

## SUBJECT PHOTOGRAPHS



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

## *DEFINITIONS*

**MARKET VALUE** - The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

***(A) buyer and seller are typically motivated;***

***(B) both parties are well informed or well advised, and acting in what they consider their own best interests;***

***(C) a reasonable time is allowed for exposure in the open market;***

***(D) payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and***

***(E) the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.***

**Source: Dictionary of Real Estate Appraisal, Seventh Edition, Appraisal Institute**

## *EXTRAORDINARY ASSUMPTIONS & HYPOTHETICAL CONDITIONS*

**As stated by USPAP;**

**Extraordinary Assumption:** An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions of conclusions.

None

**Hypothetical Condition:** That which is contrary to what exists but is supposed for the purpose of analysis.

The provided conclusions assume the project is completed on the same day as the effective date.

The above noted assumptions might have affected the assignment results.

## *CERTIFICATION*

### I certify that, to the best of my knowledge and belief:

1) The statements of fact contained in this report are true and correct.

2) The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analysis, opinions, and conclusions.

3) I have no present or prospective interest in the property that is the subject of this report, and no personal interest with respect to the parties involved.

4) I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.

5) My engagement in this assignment was not contingent upon developing or reporting predetermined results.

6) My compensation for completing this assignment is not contingent upon the development or reporting of predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.

7) My analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

8) The reported analyses, opinions and conclusions were developed, and this report has been prepared in conformity with the requirements of the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice, which includes the Uniform Standards of Appraisal Practice.

9) **William R. Waytas, SRA** has made a personal inspection of the streets that are in the project area, as well as viewing surrounding properties. Ethan Waytas, MAI did not personally inspect the project area. Ethan Waytas wrote, analyzed, and selected all the data in the report. William R. Waytas read the report, concurred with the findings, and then co-signed the report.

10) No one provided significant professional assistance to the person signing this report.

11) In accordance with the competency provision USPAP, I have verified that my knowledge, experience and education are sufficient to allow me to competently complete this appraisal. See attached qualifications.

12) As of the date of this report, William R. Waytas and Ethan Waytas have completed the requirements of the continuing education program of the appraisal institute.

13) The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representative.

14) We **have not** provided services as an appraiser, regarding properties in the project area within the 3-year period immediately preceding acceptance to this assignment.



Ethan Waytas, MAI
Certified General MN 40368613
Date: see report



William R. Waytas, SRA
Certified General MN 4000813
Date: see report

## *QUALIFICATIONS*

**Appraisal Experience**

Presently and since 2006, **Ethan Waytas, MAI** has been employed as an employee of Nagell Appraisal Incorporated, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. He is currently a full-time licensed certified general real estate appraiser, partner, and director of the company's IT department.

**Properties appraised:**

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, cinema, numerous special use properties, golf courses, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

**Testimony**

-- Court, commission, mediation testimony, etc. has been given

**Professional Membership, Associations & Affiliations**

License: Certified General Real Property Appraiser, MN License #40368613
Holds the MAI designation from the Appraisal Institute

**Education**

-- Graduate of the University of Minnesota: College of Science and Engineering, Twin Cities Campus
Bachelor of Science in Computer Science, with distinction, 3.86 GPA.

-- **General & Professional Practice Courses & Seminars**
-- Basic Appraisal Procedures
-- Basic Appraisal Principles
-- 2012-2013 15-Hour National Uniform Standards of Professional Appraisal Practice
-- General Appraiser Sales Comparison Approach
-- General Appraiser Income Approach – Part 1
-- General Appraiser Income Approach – Part 2
-- Advanced Income Capitalization
-- General Appraiser Report Writing and Case Studies
-- Real Estate Finance, Statistics and Valuation Modeling
-- 2014-2015 7-hour National USPAP Update Course
-- General Appraiser Site Valuation & Cost Approach
-- Advanced Market Analysis and Highest & Best Use
-- Advanced Concepts & Case Studies
-- Quantitative Analysis

## Appraisal Experience

Presently and since 1985, **William R. Waytas** has been employed as a full-time real estate appraiser. Currently a partner and President of the Nagell Appraisal & Consulting, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. Mr. Waytas was employed with Iver C. Johnson & Company, Ltd., Phoenix, AZ from 1985 to 1987.

## Properties appraised:

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, hotel, hotel water park, bed & breakfast, cinema, marina, numerous special use properties, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Review*** *– residential, commercial and land development.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

## Professional Membership, Associations & Affiliations

License: Certified General Real Property Appraiser, MN License #4000813.
Appraisal Institute: SRA, Senior Residential Appraiser Designation,
General Associate Member
Employee Relocation Council: CRP Certified Relocation Professional Designation.
International Right-Of-Way Association: Member
HUD/FHA: On Lender Selection Roster and Review Appraiser
DNR: Approved appraiser for Department of Natural Resources

## Testimony

-- Court, deposition, commission, arbitration & administrative testimony given.

## Mediator

-- Court appointed in Wright County.

## Committees

-- President of Metro/Minnesota Chapter, 2002, Appraisal Institute.
-- Chairman of Residential Admissions, Metro/MN Chapter, AI.
-- Chairman Residential Candidate Guidance, Metro/Minnesota Chapter, AI.
-- Elm Creek Watershed Commission, Medina representative 3 years.
-- Medina Park Commission, 3 years.

## Education

-- Graduate of Bemidji State University, Minnesota. B.S. degree in Bus. Ad.
-- During college, summer employment in building trades (residential and commercial).
-- Graduate of Cecil Lawter Real Estate School. Past Arizona Real Estate License.

-- **General & Professional Practice Courses & Seminars**
-- Course 101-Introduction to Appraising Real Property.
-- Numerous Standards of Professional Practice Seminar.
-- Fair Lending Seminar.
-- Eminent Domain & Condemnation Appraising.
-- Eminent Domain (An In-Depth Analysis)
-- Property Tax Appeal
-- Eminent Domain
-- Business Practices and Ethics
-- Scope of Work
-- Construction Disturbances and Temporary Loss of Going Concern
-- Uniform Standards for Federal Land Acquisitions (Yellow Book Seminar)
-- Partial Interest Valuation Divided (conservation easements, historic preservation easements, life estates, subsurface rights, access easements, air rights, water rights, transferable development rights)

**Commercial/Industrial/Subdivision Courses & Seminars**
-- Capitalization Theory & Techniques
-- Highest & Best Use Seminar
-- General & Residential State Certification Review Seminar
-- Subdivision Analysis Seminar.
-- Narrative Report Writing Seminar (general)
-- Advanced Income Capitalization Seminar
-- Advanced Industrial Valuation
-- Appraisal of Local Retail Properties
-- Appraising Convenience Stores
-- Analyzing Distressed Real Estate
-- Evaluating Commercial Construction
-- Fundamentals of Separating Real Property, Personal Property and Intangible Business Assets

**Residential Courses & Seminars**
-- Course 102-Applied Residential Appraising
-- Narrative Report Writing Seminar (residential)
-- HUD Training session local office for FHA appraisals
-- Familiar with HUD Handbook 4150.1 REV-1 & other material from local FHA office.
-- Appraiser/Underwriter FHA Training
-- Residential Property Construction and Inspection
-- Numerous other continuing education seminars for state licensing & AI

## Speaking Engagements

-- Bankers
-- Auditors
-- Assessors
-- Relocation (Panel Discussion)

## Publications

-- Real Estate Appraisal Practice (book): Acknowledgement
-- Articles for Finance & Commerce and Minnesota Real Estate Journal

**Sales in Project Area:**

The property at 1289 Karth Lake Circle sold on January 12, 2024 for $675,000. The property was listed on MLS for 115 days.

The property at 1280 Karth Lake Circle sold on August 10, 2023 for $702,500. The property was listed on MLS for 8 days.

**Report Type**
Real Estate Consulting
Letter Report (Restricted Appraisal)

**Effective Date**
June 28, 2025

**Client**

City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

**Subject Property**

**Street Improvement Project**
Karth Lake Drive, Amble Drive, Pleasant Drive,
Pleasant Circle, & Amble Circle
Arden Hills, MN 55112



**File # V2505001 – NE of Karth Lake**


**Prepared By:**
Ethan Waytas, MAI, Appraiser
William R. Waytas, SRA, Appraiser

**Nagell Appraisal Incorporated**
12805 Highway 55, Suite 300
Plymouth, Minnesota 55441
Tel: 952.544.8966 | Fax: 952.544.8969

# NAGELL APPRAISAL INCORPORATED

**12805 Highway 55 #300**
**Plymouth, MN 55441**
***Established in 1968***

**Phone** **952-544-8966**
**Fax** **952-544-8969**


City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

Report Date: July 2, 2025

To Brad Fisher:

Per your request, this is a letter report to assist the city for guidance regarding a street improvement project within Arden Hills (see attached map for the location of the streets in the project).

The following information outlines the scope and intent of this document:

**Client:** Arden Hills

**Intended User:** Arden Hills

**Note:** Only the client and name intended user can rely upon this report.

**Effective Date:** June 28, 2025

**Report Type:** Restricted Appraisal (as a restricted appraisal, this report may not contain supporting rationale for all of the opinions and conclusions as stated. This information is retained in the workfile)

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**Sales Comparison Approach:** Sales data was analyzed to indicate a market benefit range.

**Income Approach:** This approach was not applied at this time, as it is considered less reliable given the project and scope of assignment.

**Cost Approach:** This approach was considered regarding new road costs and physical depreciation.

**Uses in Project Area:** Uses in the project area are single-family residential.

**Report Assistance:** Ethan Waytas, MAI wrote the report and analyzed the market data. William R. Waytas read the report and agreed with the conclusions. Ethan Waytas, MAI viewed the project area and took photos.

**Note:** This report is not an appraisal (value) of a specific property but rather provides a preliminary opinion of a general range of market benefit, if any, for similar properties. Relevant information and analysis are retained in the workfile. If an appraisal of a specific property was performed, the findings of that report are considered likely to be consistent with the findings in this document (but could vary). The letter can function as a test of reasonableness for the proposed assessments.

## *PROJECT*

The City of Arden Hills is proposing to complete a **full-depth reclamation** of the existing roads in the project area. The city indicates the following scope:

> "Reclamation involves grinding up all of the existing asphalt and mixing it with the underlying aggregate base to essentially create a new aggregate base for the rehabilitated road (reclaim material). Excess material (roughly a 4" depth) is removed from the site and the remainder is re-graded/compacted and paved with 4" of new asphalt in 2 lifts. The concrete curb and gutter would be spot replaced as needed".

Per request, you desire to know the benefit (if any) as it impacts properties in the project area.

Motivation for the road improvement project appears to stem from deteriorating road surface.

## AREA DESCRIPTION

Arden Hills in a suburban community located about 8 miles northeast of Downtown Minneapolis and 8 miles northwest of Downtown St. Paul. Arden Hills is home to Bethel University, Northwestern College, the Twin Cities Army Ammunition Plant, and popular recreational lakes (Lake Johanna and Lake Josephine). Arden Hills is a stable community with shopping and major commerce nearby. Access to Downtown Minneapolis/St. Paul and surrounding communities is good.

The population was 9,552 as of 2010 census (a decrease of 1.0% from the 2000 census). The 2020 population is 9,939 (an increase of 4.1% from 2010). The 2022 population estimate is 9,592, a decrease of 3.5% from 2020.

The city is comprised of a variety of commercial, industrial, religious, single-family, multi-family, park, and agricultural uses. Most existing buildings in the area are of average quality.

Single family homes generally range in value between $350,000 and $650,000+ within city limits. The higher end homes are on the nearby lakes. The average home price over the past 1.5 years is around $575,000 (MLS statistics). Most homes are average to good quality.

## SUBJECT PROPERTIES

The project area consists of single-family residential homes (some homes have frontage on Karth Lake).

## EXISTING STREETS & UTILITIES

**Physical Condition of the Existing Road:** The existing road improvements are asphalt with concrete curb and gutter. The road condition, based on the visual inspection of the streets, is rated to be fair. There are signs of transverse, longitudinal, and alligator cracking along with pavement discoloration. There are also areas of raveling.

**Physical Condition of Existing Utilities:** The utilities in the area are public water, sanitary sewer, public electricity, and natural gas. There are no proposed utility updates for this project.

**Functional Design of the Road:** The existing road is dated, in fair overall condition, and does have substantial large cracks, raveling, etc. The road condition is rated to be fair.

Road and utility infrastructure in poor to fair condition do not meet the expectations of typical market participants in this suburban market for re-development, resale price, and/or updating the current uses. Overall, the existing street improvements are in fair condition, are beginning to look dated (or function) and reflect likewise on the adjoining and side street properties.

## PROPOSED IMPROVEMENTS

The City of Arden Hills is proposing to complete a **full depth reclamation** of the existing roads in the project area. The city indicates the following scope:

> "Reclamation involves grinding up all of the existing asphalt and mixing it with the underlying aggregate base to essentially create a new aggregate base for the rehabilitated road (reclaim material). Excess material (roughly a 4" depth) is removed from the site and the remainder is re-graded/compacted and paved with 4" of new asphalt in 2 lifts. The concrete curb and gutter would be spot replaced as needed".

Given the existing condition of the road, the proposed project is logical.

If any of the above descriptions change, the benefit due to the project could differ.

## HIGHEST AND BEST USE

The subject project area is located in the northeastern portion of the city in an area of residential, office, industrial, and commercial uses.

Owners in the subject area appear to update their property as needed when site and building components wear out or become dated. Owners in the overall area commonly pave their driveways or maintain parking lots as needed, recognizing it adds value when done. Therefore, it is logical to update the road and/or utility infrastructure to the subject properties as needed, as these are essential property characteristics that are expected in this market.

An informed buyer would consider the condition of the road, traffic flow/management, and utilities. A well-constructed and good condition road provides aesthetic appeal to a property and efficient/safe traffic flow. Given a choice, a potential informed buyer would likely prefer a newer road with good traffic flow over a deteriorating road with fair traffic flow. Additionally, a potential informed buyer would likely prefer newer utility infrastructure as compared to older, dated and inferior utility infrastructure.

If replacement of components of real estate near the end of their economic life in a home or building is postponed, it can be costlier in the long run; delays in replacing components can result in incurring higher interim maintenance costs and potential difficulty in marketing the property. Also, it is typical for the cost of the replacement of an improvement to increase over time. That said it is logical and prudent for market participants to update/replace dated components when needed.

Therefore, the highest and best use of the surrounding properties in the project area is for the continued various uses with the proposed infrastructure improvements.

## *DISCUSSION OF MARKET BENEFIT – RECLAMATION*

Listed below are the factors that will be taken into consideration concerning the potential benefit to the properties.

| Description | Existing Improvements | Change |
|---|---|---|
| **1) Road Surface** | **Fair** | **New, asphalt** |
| **2) Base Condition** | **Fair to Average** | **Regraded** |
| **3) Curb** | **Fair to Average** | **Spot replacement as needed** |
| **4) Drainage** | Average | Average |
| **5) Storm Sewer** | Yes | Yes |
| **6) City water** | Average | Average |
| **7) City sewer** | Average | Average |
| **8) Sidewalk** | None | None |
| **9) Street Lights** | None | None |
| **10) Functional Design of Road** | **Dated** | **Good, new** |
| **11) Traffic Management** | **Fair** | **Good** |
| **12) Pedestrian Use (biking, walking, etc.)** | **Fair** | **Good** |
| **13) Median** | n/a | n/a |
| **14) Road Proximity to Properties** | n/a | n/a |
| **15) Dust** | n/a | n/a |
| **16) Visual Impact on Properties** | **Fair** | **Good** |

Based on the preceding grid, the subject properties will improve in 7 of the 16 categories. Market participants generally recognize that roads and utility infrastructure need replacing when nearing the end of a long economic life.

A typical buyer in the subject market commonly prefers a good condition paved road surface versus an inferior paved road. In addition to visual benefit, new street improvements provide better and safer use for pedestrians (biking, walking, stroller, rollerblading, etc.) and drivers. The new streets will enhance potential for new development, redevelopment, and/or updating current properties.

Based on past appraisals, experience, and general market information, it is not uncommon for properties similar to those in the subject market to realize an increase in price for new street improvements.

Given the scope of the project, the age/quality/condition of existing structures, properties in the area with newer street improvements could see an average price benefit of:

- **Single-Family Residential – Non Lakefront Lots** — $8,000 to $10,000 per buildable homesite
- **Single-Family Residential – Lakefront Lots** — $9,000 to $11,000 per buildable homesite

**Note:** The above benefit considers only the scope of the project. Higher value buildings/homes or larger lots are on the upper end of the range. Properties on corners, with one street being improved and the other not, might receive less than the above ranges (for example 50% of the benefit).

## *CONCLUSION*

**The benefit amounts noted above should not be construed or relied on as being an appraisal of a specific property, but are general observations based on the overall market.** If an appraisal were made on the individual properties, the actual benefit amount could vary from market observations above.

If you have additional questions, please do not hesitate to contact us.

Sincerely,



Ethan Waytas, MAI
Certified General MN 40368613

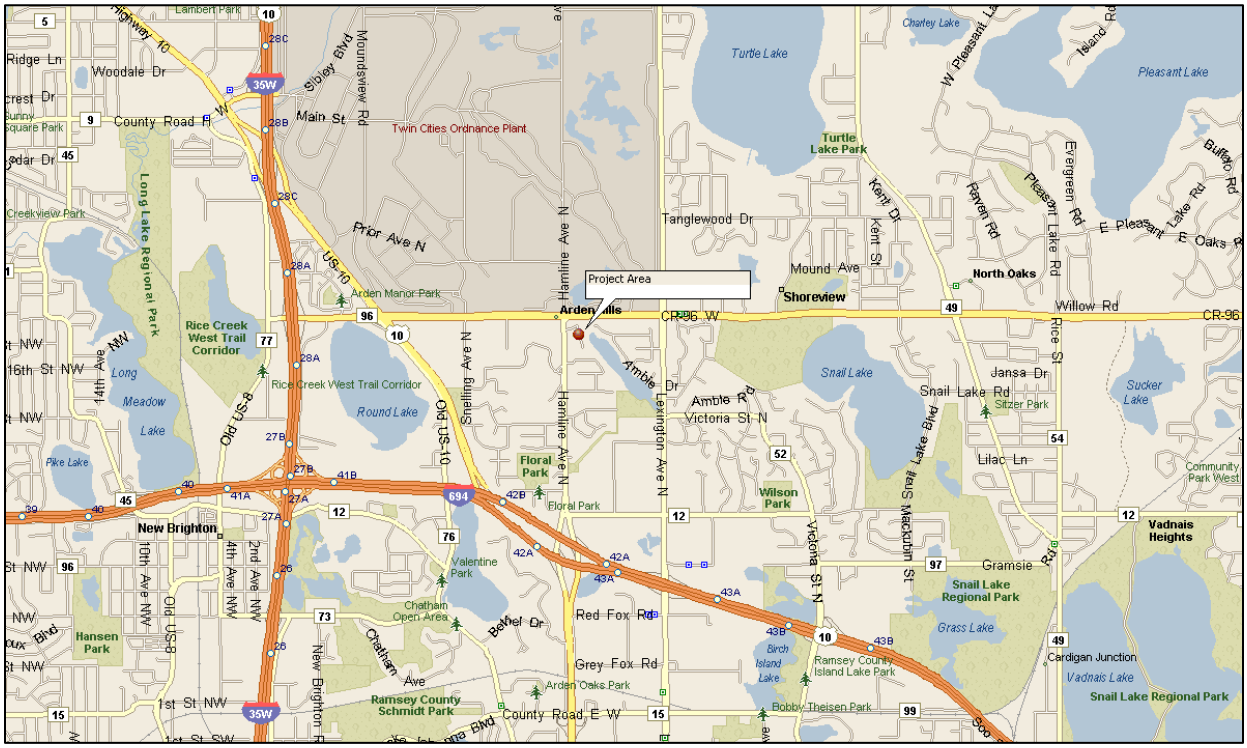


William R. Waytas, SRA
Certified General MN 4000813

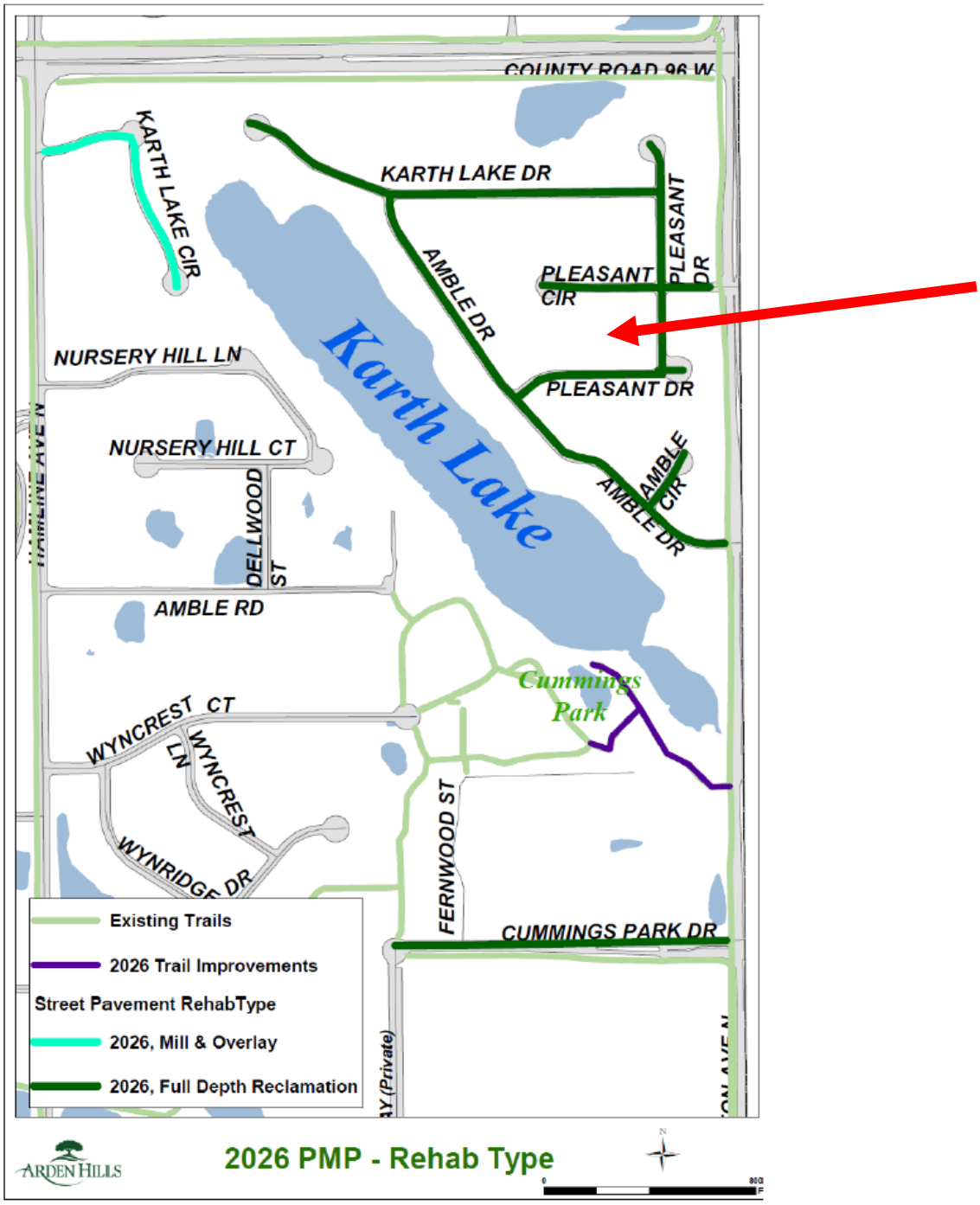
**Enclosures:** Location Map, Aerial Map View of Project, Subject Photos, Qualifications

## LOCATION MAP



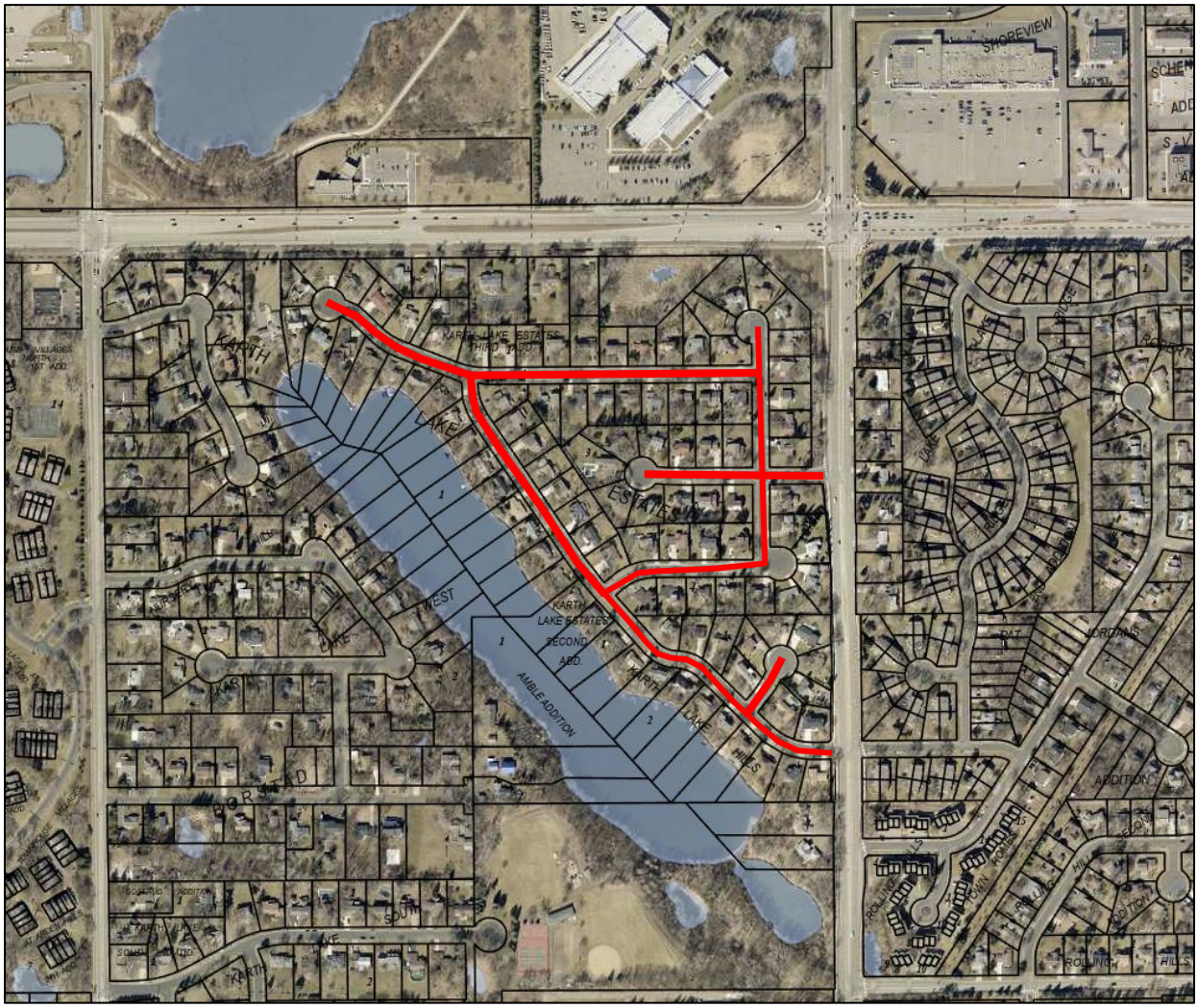



## PROJECT MAP




*Above exhibit provided by the client. The subject project area is indicated by the red arrow.

## *AERIAL VIEW OF PROJECT MAP*




*Red line reflects the approximate project area

## SUBJECT PHOTOGRAPHS



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

## *DEFINITIONS*

**MARKET VALUE** - The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

***(A) buyer and seller are typically motivated;***

***(B) both parties are well informed or well advised, and acting in what they consider their own best interests;***

***(C) a reasonable time is allowed for exposure in the open market;***

***(D) payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and***

***(E) the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.***

**Source: Dictionary of Real Estate Appraisal, Seventh Edition, Appraisal Institute**

## *EXTRAORDINARY ASSUMPTIONS & HYPOTHETICAL CONDITIONS*

**As stated by USPAP;**

**Extraordinary Assumption:** An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions of conclusions.

None

**Hypothetical Condition:** That which is contrary to what exists but is supposed for the purpose of analysis.

The provided conclusions assume the project is completed on the same day as the effective date.

The above noted assumptions might have affected the assignment results.

## *CERTIFICATION*

### I certify that, to the best of my knowledge and belief:

1) The statements of fact contained in this report are true and correct.

2) The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analysis, opinions, and conclusions.

3) I have no present or prospective interest in the property that is the subject of this report, and no personal interest with respect to the parties involved.

4) I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.

5) My engagement in this assignment was not contingent upon developing or reporting predetermined results.

6) My compensation for completing this assignment is not contingent upon the development or reporting of predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.

7) My analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

8) The reported analyses, opinions and conclusions were developed, and this report has been prepared in conformity with the requirements of the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice, which includes the Uniform Standards of Appraisal Practice.

9) **William R. Waytas, SRA** has made a personal inspection of the streets that are in the project area, as well as viewing surrounding properties. Ethan Waytas, MAI did not personally inspect the project area. Ethan Waytas wrote, analyzed, and selected all the data in the report. William R. Waytas read the report, concurred with the findings, and then co-signed the report.

10) No one provided significant professional assistance to the person signing this report.

11) In accordance with the competency provision USPAP, I have verified that my knowledge, experience and education are sufficient to allow me to competently complete this appraisal. See attached qualifications.

12) As of the date of this report, William R. Waytas and Ethan Waytas have completed the requirements of the continuing education program of the appraisal institute.

13) The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representative.

14) We **have not** provided services as an appraiser, regarding properties in the project area within the 3-year period immediately preceding acceptance to this assignment.



Ethan Waytas, MAI
Certified General MN 40368613
Date: see report



William R. Waytas, SRA
Certified General MN 4000813
Date: see report

## *QUALIFICATIONS*

**Appraisal Experience**

Presently and since 2006, **Ethan Waytas, MAI** has been employed as an employee of Nagell Appraisal Incorporated, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. He is currently a full-time licensed certified general real estate appraiser, partner, and director of the company's IT department.

**Properties appraised:**

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, cinema, numerous special use properties, golf courses, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

**Testimony**

-- Court, commission, mediation testimony, etc. has been given

**Professional Membership, Associations & Affiliations**

License: Certified General Real Property Appraiser, MN License #40368613
Holds the MAI designation from the Appraisal Institute

**Education**

-- Graduate of the University of Minnesota: College of Science and Engineering, Twin Cities Campus
Bachelor of Science in Computer Science, with distinction, 3.86 GPA.

-- **General & Professional Practice Courses & Seminars**
-- Basic Appraisal Procedures
-- Basic Appraisal Principles
-- 2012-2013 15-Hour National Uniform Standards of Professional Appraisal Practice
-- General Appraiser Sales Comparison Approach
-- General Appraiser Income Approach – Part 1
-- General Appraiser Income Approach – Part 2
-- Advanced Income Capitalization
-- General Appraiser Report Writing and Case Studies
-- Real Estate Finance, Statistics and Valuation Modeling
-- 2014-2015 7-hour National USPAP Update Course
-- General Appraiser Site Valuation & Cost Approach
-- Advanced Market Analysis and Highest & Best Use
-- Advanced Concepts & Case Studies
-- Quantitative Analysis

## Appraisal Experience

Presently and since 1985, **William R. Waytas** has been employed as a full-time real estate appraiser. Currently a partner and President of the Nagell Appraisal & Consulting, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. Mr. Waytas was employed with Iver C. Johnson & Company, Ltd., Phoenix, AZ from 1985 to 1987.

## Properties appraised:

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, hotel, hotel water park, bed & breakfast, cinema, marina, numerous special use properties, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Review*** *– residential, commercial and land development.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

## Professional Membership, Associations & Affiliations

License: Certified General Real Property Appraiser, MN License #4000813.
Appraisal Institute: SRA, Senior Residential Appraiser Designation,
General Associate Member
Employee Relocation Council: CRP Certified Relocation Professional Designation.
International Right-Of-Way Association: Member
HUD/FHA: On Lender Selection Roster and Review Appraiser
DNR: Approved appraiser for Department of Natural Resources

## Testimony

-- Court, deposition, commission, arbitration & administrative testimony given.

## Mediator

-- Court appointed in Wright County.

## Committees

-- President of Metro/Minnesota Chapter, 2002, Appraisal Institute.
-- Chairman of Residential Admissions, Metro/MN Chapter, AI.
-- Chairman Residential Candidate Guidance, Metro/Minnesota Chapter, AI.
-- Elm Creek Watershed Commission, Medina representative 3 years.
-- Medina Park Commission, 3 years.

## Education

-- Graduate of Bemidji State University, Minnesota. B.S. degree in Bus. Ad.
-- During college, summer employment in building trades (residential and commercial).
-- Graduate of Cecil Lawter Real Estate School. Past Arizona Real Estate License.

-- **General & Professional Practice Courses & Seminars**
-- Course 101-Introduction to Appraising Real Property.
-- Numerous Standards of Professional Practice Seminar.
-- Fair Lending Seminar.
-- Eminent Domain & Condemnation Appraising.
-- Eminent Domain (An In-Depth Analysis)
-- Property Tax Appeal
-- Eminent Domain
-- Business Practices and Ethics
-- Scope of Work
-- Construction Disturbances and Temporary Loss of Going Concern
-- Uniform Standards for Federal Land Acquisitions (Yellow Book Seminar)
-- Partial Interest Valuation Divided (conservation easements, historic preservation easements, life estates, subsurface rights, access easements, air rights, water rights, transferable development rights)

**Commercial/Industrial/Subdivision Courses & Seminars**
-- Capitalization Theory & Techniques
-- Highest & Best Use Seminar
-- General & Residential State Certification Review Seminar
-- Subdivision Analysis Seminar.
-- Narrative Report Writing Seminar (general)
-- Advanced Income Capitalization Seminar
-- Advanced Industrial Valuation
-- Appraisal of Local Retail Properties
-- Appraising Convenience Stores
-- Analyzing Distressed Real Estate
-- Evaluating Commercial Construction
-- Fundamentals of Separating Real Property, Personal Property and Intangible Business Assets

**Residential Courses & Seminars**
-- Course 102-Applied Residential Appraising
-- Narrative Report Writing Seminar (residential)
-- HUD Training session local office for FHA appraisals
-- Familiar with HUD Handbook 4150.1 REV-1 & other material from local FHA office.
-- Appraiser/Underwriter FHA Training
-- Residential Property Construction and Inspection
-- Numerous other continuing education seminars for state licensing & AI

## Speaking Engagements

-- Bankers
-- Auditors
-- Assessors
-- Relocation (Panel Discussion)

## Publications

-- Real Estate Appraisal Practice (book): Acknowledgement
-- Articles for Finance & Commerce and Minnesota Real Estate Journal

**Sales in Project Area:**

The property at 1168 Amble Drive sold on December 5, 2022 for $61,000. The property was listed on MLS for 14 days.

The property at 4500 Pleasant Drive sold on April 24, 2023 for $415,000. The property was listed on MLS for 1 day.

The property at 4425 Pleasant Drive sold on August 15, 2022 for $615,000. The property was listed on MLS for 1 day.

The property at 4480 Pleasant Drive sold on June 7, 2024 for $596,555. The property was listed on MLS for 6 days.

The property at 1191 Karth Lake Drive sold on November 23, 2022 for $470,000. The property was listed on MLS for 68 days.

**Report Type**
Real Estate Consulting
Letter Report (Restricted Appraisal)

**Effective Date**
June 28, 2025

**Client**

City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

**Subject Property**

**Street Improvement Project**
Cummings Park Drive
Arden Hills, MN 55112




**File # V2505001 – Cummings Park Drive**

**Prepared By:**
Ethan Waytas, MAI, Appraiser
William R. Waytas, SRA, Appraiser

**Nagell Appraisal Incorporated**
12805 Highway 55, Suite 300
Plymouth, Minnesota 55441
Tel: 952.544.8966 | Fax: 952.544.8969

# NAGELL APPRAISAL INCORPORATED

**12805 Highway 55 #300**
**Plymouth, MN 55441**
***Established in 1968***

**Phone** **952-544-8966**
**Fax** **952-544-8969**


City of Arden Hills
Attn: Brad Fisher, PE of Bolton & Menk
12224 Nicollet Avenue
Burnsville, MN 55337

Report Date: July 2, 2025

To Brad Fisher:

Per your request, this is a letter report to assist the city for guidance regarding a street improvement project within Arden Hills (see attached map for the location of the streets in the project).

The following information outlines the scope and intent of this document:

**Client:** Arden Hills

**Intended User:** Arden Hills

**Note:** Only the client and name intended user can rely upon this report.

**Effective Date:** June 28, 2025

**Report Type:** Restricted Appraisal (as a restricted appraisal, this report may not contain supporting rationale for all of the opinions and conclusions as stated. This information is retained in the workfile)

**Intended Use:** The intended use of this report is for decision-making purposes regarding a road project and potential special assessments.

**Value Provided:** Market Value, see rear of report for definition

**Interest Provided:** Fee Simple

**Subject Property:** This document is not an appraisal of a specific property, rather, it provides a benefit range for similar property types within the project area. These ranges are applicable to the properties within the project area. The project boundaries are clearly identified in this report. Information regarding individual properties can be provided upon request.

**Scope of Work:** William R. Waytas drove the streets in the project area on June 28, 2025. The appraiser reviewed sales, rents, listings, and costs in the market. A drive-by viewing of properties in the project area and streets was completed. The market was analyzed to indicate a benefit range that would be applicable to the project. In addition, the appraiser has completed a cursory review of the zoning and future land use plan. Other research includes prior discussions with market participants and discussion with the city regarding the project.

**Sales Comparison Approach:** Sales data was analyzed to indicate a market benefit range.

**Income Approach:** This approach was not applied at this time, as it is considered less reliable given the project and scope of assignment.

**Cost Approach:** This approach was considered regarding new road costs and physical depreciation.

**Uses in Project Area:** Uses in the project area are industrial and office.

**Report Assistance:** Ethan Waytas, MAI wrote the report and analyzed the market data. William R. Waytas read the report and agreed with the conclusions. Ethan Waytas, MAI viewed the project area and took photos.

**Note:** This report is not an appraisal (value) of a specific property but rather provides a preliminary opinion of a general range of market benefit, if any, for similar properties. Relevant information and analysis are retained in the workfile. If an appraisal of a specific property was performed, the findings of that report are considered likely to be consistent with the findings in this document (but could vary). The letter can function as a test of reasonableness for the proposed assessments.

## *PROJECT*

The City of Arden Hills is proposing to complete a **full depth reclamation** of the existing roads in the project area. The city indicates the following scope:

> "Reclamation involves grinding up all of the existing asphalt and mixing it with the underlying aggregate base to essentially create a new aggregate base for the rehabilitated road (reclaim material). Excess material (roughly a 4" depth) is removed from the site and the remainder is re-graded/compacted and paved with 4" of new asphalt in 2 lifts. The concrete curb and gutter would be spot replaced as needed".

Per request, you desire to know the benefit (if any) as it impacts properties in the project area.

Motivation for the road improvement project appears to stem from deteriorating road surface.

## AREA DESCRIPTION

Arden Hills in a suburban community located about 8 miles northeast of Downtown Minneapolis and 8 miles northwest of Downtown St. Paul. Arden Hills is home to Bethel University, Northwestern College, the Twin Cities Army Ammunition Plant, and popular recreational lakes (Lake Johanna and Lake Josephine). Arden Hills is a stable community with shopping and major commerce nearby. Access to Downtown Minneapolis/St. Paul and surrounding communities is good.

The population was 9,552 as of 2010 census (a decrease of 1.0% from the 2000 census). The 2020 population is 9,939 (an increase of 4.1% from 2010). The 2022 population estimate is 9,592, a decrease of 3.5% from 2020.

The city is comprised of a variety of commercial, industrial, religious, single-family, multi-family, park, and agricultural uses. Most existing buildings in the area are of average quality.

Single family homes generally range in value between $350,000 and $650,000+ within city limits. The higher end homes are on the nearby lakes. The average home price over the past 1.5 years is around $575,000 (MLS statistics). Most homes are average to good quality.

## SUBJECT PROPERTIES

The project area consists of industrial and office uses.

## EXISTING STREETS & UTILITIES

**Physical Condition of the Existing Road:** The existing road improvements are asphalt with concrete curb and gutter. The road condition, based on the visual inspection of the streets, is rated to be fair. There are signs of transverse, longitudinal, and alligator cracking along with pavement discoloration. There are also areas of raveling.

**Physical Condition of Existing Utilities:** The utilities in the area are public water, sanitary sewer, public electricity, and natural gas. There are no proposed utility updates for this project.

**Functional Design of the Road:** The existing road is dated, in fair overall condition, and does have substantial large cracks, raveling, etc. The road condition is rated to be fair.

Road and utility infrastructure in poor to fair condition do not meet the expectations of typical market participants in this suburban market for re-development, resale price, and/or updating the current uses. Overall, the existing street improvements are in fair condition, are beginning to look dated (or function) and reflect likewise on the adjoining and side street properties.

## PROPOSED IMPROVEMENTS

The City of Arden Hills is proposing to complete a **full depth reclamation** of the existing roads in the project area. The city indicates the following scope:

> "Reclamation involves grinding up all of the existing asphalt and mixing it with the underlying aggregate base to essentially create a new aggregate base for the rehabilitated road (reclaim material). Excess material (roughly a 4" depth) is removed from the site and the remainder is re-graded/compacted and paved with 4" of new asphalt in 2 lifts. The concrete curb and gutter would be spot replaced as needed".

Given the existing condition of the road, the proposed project is logical.

If any of the above descriptions change, the benefit due to the project could differ.

## HIGHEST AND BEST USE

The subject project area is located in the northeastern portion of the city in an area of residential, office, industrial, and commercial uses.

Owners in the subject area appear to update their property as needed when site and building components wear out or become dated. Owners in the overall area commonly pave their driveways or maintain parking lots as needed, recognizing it adds value when done. Therefore, it is logical to update the road and/or utility infrastructure to the subject properties as needed, as these are essential property characteristics that are expected in this market.

An informed buyer would consider the condition of the road, traffic flow/management, and utilities. A well-constructed and good condition road provides aesthetic appeal to a property and efficient/safe traffic flow. Given a choice, a potential informed buyer would likely prefer a newer road with good traffic flow over a deteriorating road with fair traffic flow. Additionally, a potential informed buyer would likely prefer newer utility infrastructure as compared to older, dated and inferior utility infrastructure.

If replacement of components of real estate near the end of their economic life in a home or building is postponed, it can be costlier in the long run; delays in replacing components can result in incurring higher interim maintenance costs and potential difficulty in marketing the property. Also, it is typical for the cost of the replacement of an improvement to increase over time. That said it is logical and prudent for market participants to update/replace dated components when needed.

Therefore, the highest and best use of the surrounding properties in the project area is for the continued various uses with the proposed infrastructure improvements.

## *DISCUSSION OF MARKET BENEFIT – RECLAMATION*

Listed below are the factors that will be taken into consideration concerning the potential benefit to the properties.

| Description | Existing Improvements | Change |
|---|---|---|
| **1) Road Surface** | **Fair** | **New, asphalt** |
| **2) Base Condition** | **Fair to Average** | **Regraded** |
| **3) Curb** | **Fair to Average** | **Spot replacement as needed** |
| **4) Drainage** | Average | Average |
| **5) Storm Sewer** | Yes | Yes |
| **6) City water** | Average | Average |
| **7) City sewer** | Average | Average |
| **8) Sidewalk** | None | None |
| **9) Street Lights** | None | None |
| **10) Functional Design of Road** | **Dated** | **Good, new** |
| **11) Traffic Management** | **Fair** | **Good** |
| **12) Pedestrian Use (biking, walking, etc.)** | **Fair** | **Good** |
| **13) Median** | n/a | n/a |
| **14) Road Proximity to Properties** | n/a | n/a |
| **15) Dust** | n/a | n/a |
| **16) Visual Impact on Properties** | **Fair** | **Good** |

Based on the preceding grid, the subject properties will improve in 7 of the 16 categories. Market participants generally recognize that roads and utility infrastructure need replacing when nearing the end of a long economic life.

A typical buyer in the subject market commonly prefers a good condition paved road surface versus an inferior paved road. In addition to visual benefit, new street improvements provide better and safer use for pedestrians (biking, walking, stroller, rollerblading, etc.) and drivers. The new streets will enhance potential for new development, redevelopment, and/or updating current properties.

Based on past appraisals, experience, and general market information, it is not uncommon for properties similar to those in the subject market to realize an increase in price for new street improvements.

Given the scope of the project, the age/quality/condition of existing structures, properties in the area with newer street improvements could see an average price benefit of:

- **Office/Industrial (base site of 5 acres)** $0.15 to $0.25 per SF of usable site area
- **Office/Industrial (site exceeding 5 acres)** $0.02 to $0.05 per SF of usable site area

As an example, assuming a 10 acre site, the first 5 acres would have a benefit range of $0.15 to $0.25 per SF of usable site area. The second 5 acres would have a benefit range of $0.02 to $0.05 per SF of usable site area.

**Note:** The above benefit considers only the scope of the project. Higher value buildings/homes or larger lots are on the upper end of the range. Properties on corners, with one street being improved and the other not, might receive less than the above ranges (for example 50% of the benefit).

## *CONCLUSION*

**The benefit amounts noted above should not be construed or relied on as being an appraisal of a specific property, but are general observations based on the overall market.** If an appraisal were made on the individual properties, the actual benefit amount could vary from market observations above.

If you have additional questions, please do not hesitate to contact us.

Sincerely,



Ethan Waytas, MAI
Certified General MN 40368613

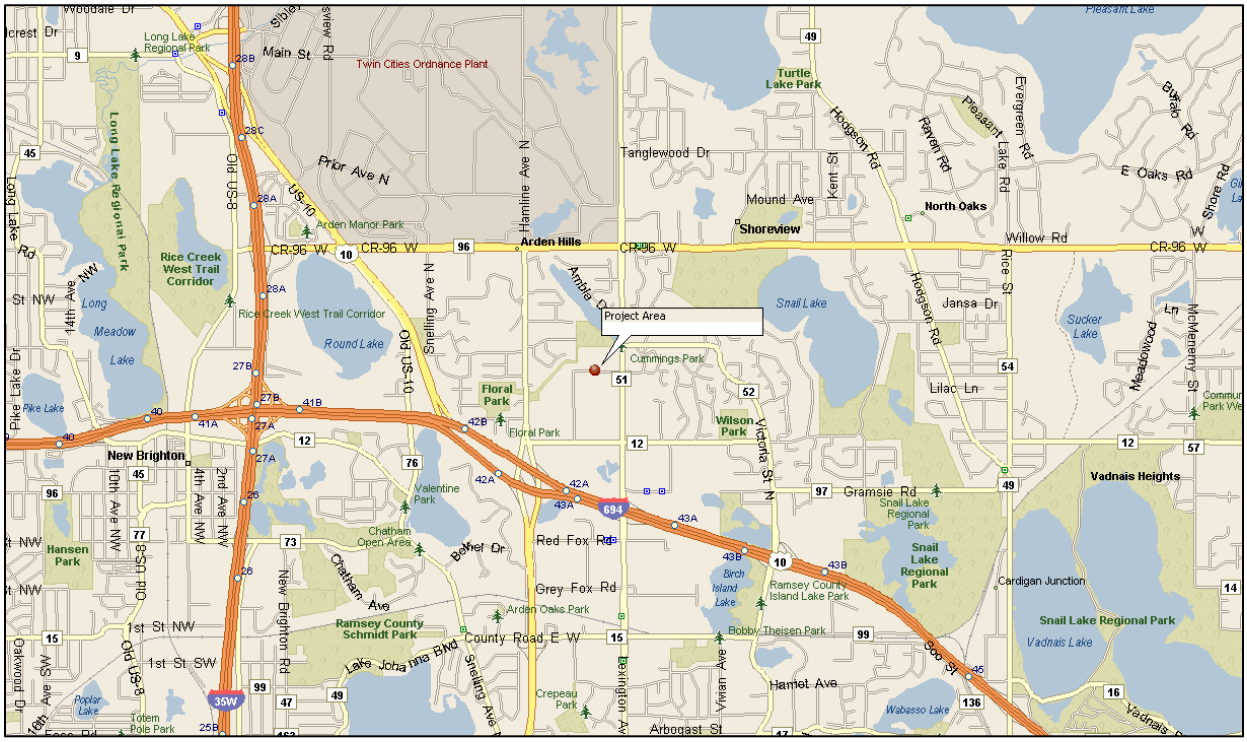


William R. Waytas, SRA
Certified General MN 4000813

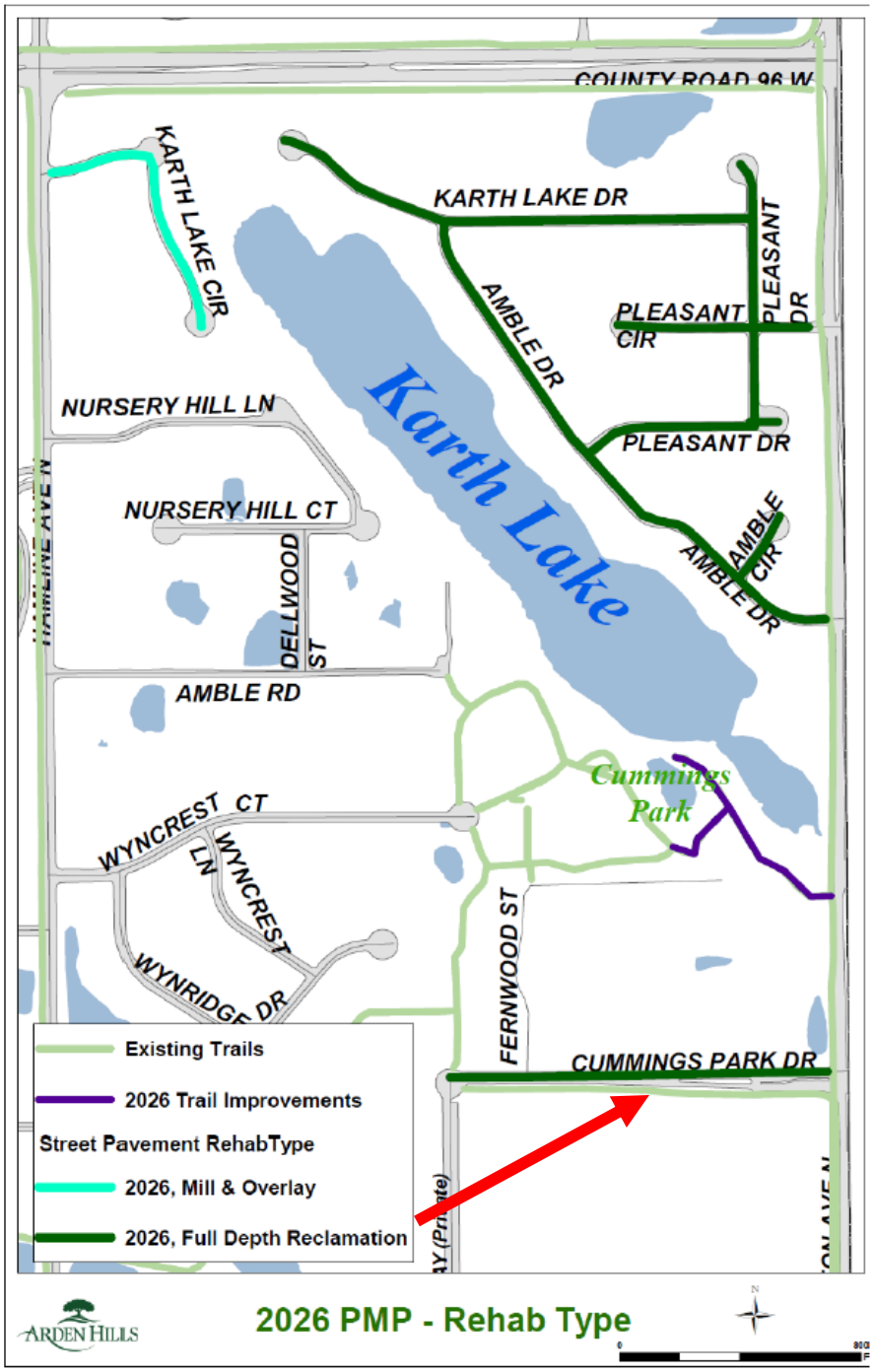
**Enclosures:** Location Map, Aerial Map View of Project, Subject Photos, Qualifications

## LOCATION MAP



## PROJECT MAP




*Above exhibit provided by the client. The subject project area is indicated by the red arrow.

## *AERIAL VIEW OF PROJECT MAP*




*Red line reflects the approximate project area

## *SUBJECT PHOTOGRAPHS*



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

Subject Photographs – continued



Street view



Street view



Street view



Street view

## *DEFINITIONS*

**MARKET VALUE** - The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

***(A) buyer and seller are typically motivated;***

***(B) both parties are well informed or well advised, and acting in what they consider their own best interests;***

***(C) a reasonable time is allowed for exposure in the open market;***

***(D) payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and***

***(E) the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.***

**Source: Dictionary of Real Estate Appraisal, Seventh Edition, Appraisal Institute**

## *EXTRAORDINARY ASSUMPTIONS & HYPOTHETICAL CONDITIONS*

**As stated by USPAP;**

**Extraordinary Assumption:** An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions of conclusions.

None

**Hypothetical Condition:** That which is contrary to what exists but is supposed for the purpose of analysis.

The provided conclusions assume the project is completed on the same day as the effective date.

The above noted assumptions might have affected the assignment results.

## *CERTIFICATION*

### I certify that, to the best of my knowledge and belief:

1) The statements of fact contained in this report are true and correct.

2) The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analysis, opinions, and conclusions.

3) I have no present or prospective interest in the property that is the subject of this report, and no personal interest with respect to the parties involved.

4) I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.

5) My engagement in this assignment was not contingent upon developing or reporting predetermined results.

6) My compensation for completing this assignment is not contingent upon the development or reporting of predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.

7) My analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

8) The reported analyses, opinions and conclusions were developed, and this report has been prepared in conformity with the requirements of the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice, which includes the Uniform Standards of Appraisal Practice.

9) **William R. Waytas, SRA** has made a personal inspection of the streets that are in the project area, as well as viewing surrounding properties. Ethan Waytas, MAI did not personally inspect the project area. Ethan Waytas wrote, analyzed, and selected all the data in the report. William R. Waytas read the report, concurred with the findings, and then co-signed the report.

10) No one provided significant professional assistance to the person signing this report.

11) In accordance with the competency provision USPAP, I have verified that my knowledge, experience and education are sufficient to allow me to competently complete this appraisal. See attached qualifications.

12) As of the date of this report, William R. Waytas and Ethan Waytas have completed the requirements of the continuing education program of the appraisal institute.

13) The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representative.

14) We **have** provided services (tax appeal consulting) as an appraiser on four properties in the project area (4295 Lexington Ave N, 4293 Lexington Ave N, 4255 Lexington Ave N, and 4265 Lexington Ave N) within the 3-year period immediately preceding acceptance to this assignment. No other services to properties in the project area, as an appraiser or non-appraiser, have been provided in the past 3 years.



Ethan Waytas, MAI
Certified General MN 40368613
Date: see report



William R. Waytas, SRA
Certified General MN 4000813
Date: see report

## *QUALIFICATIONS*

**Appraisal Experience**

Presently and since 2006, **Ethan Waytas, MAI** has been employed as an employee of Nagell Appraisal Incorporated, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. He is currently a full-time licensed certified general real estate appraiser, partner, and director of the company's IT department.

**Properties appraised:**

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, cinema, numerous special use properties, golf courses, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

**Testimony**

-- Court, commission, mediation testimony, etc. has been given

**Professional Membership, Associations & Affiliations**

License: Certified General Real Property Appraiser, MN License #40368613
Holds the MAI designation from the Appraisal Institute

**Education**

-- Graduate of the University of Minnesota: College of Science and Engineering, Twin Cities Campus
Bachelor of Science in Computer Science, with distinction, 3.86 GPA.

-- **General & Professional Practice Courses & Seminars**
-- Basic Appraisal Procedures
-- Basic Appraisal Principles
-- 2012-2013 15-Hour National Uniform Standards of Professional Appraisal Practice
-- General Appraiser Sales Comparison Approach
-- General Appraiser Income Approach – Part 1
-- General Appraiser Income Approach – Part 2
-- Advanced Income Capitalization
-- General Appraiser Report Writing and Case Studies
-- Real Estate Finance, Statistics and Valuation Modeling
-- 2014-2015 7-hour National USPAP Update Course
-- General Appraiser Site Valuation & Cost Approach
-- Advanced Market Analysis and Highest & Best Use
-- Advanced Concepts & Case Studies
-- Quantitative Analysis

## Appraisal Experience

Presently and since 1985, **William R. Waytas** has been employed as a full-time real estate appraiser. Currently a partner and President of the Nagell Appraisal & Consulting, an independent appraisal firm (11 employees) who annually prepare 1,500 +/- appraisal reports of all types. Mr. Waytas was employed with Iver C. Johnson & Company, Ltd., Phoenix, AZ from 1985 to 1987.

## Properties appraised:

- ***Commercial*** *- low and high-density multi-family, retail, office, industrial, restaurant, church, strip-mall, fast-food, convenience stores, auto-service and repair, hotel, hotel water park, bed & breakfast, cinema, marina, numerous special use properties, and subdivision analysis.*
- ***Residential*** *– single-family residences, hobby farms, lakeshore, condominiums, townhouses, REO and land.*
- ***Eminent Domain*** *– extensive partial and total acquisition appraisal services provided to numerous governmental agencies and private owners.*
- ***Special Assessment*** *– numerous street improvement and utilities projects for both governmental and private owners.*
- ***Review*** *– residential, commercial and land development.*
- ***Clients*** *- served include banks, savings and loan associations, trust companies, corporations, governmental bodies, relocation companies, attorneys, REO companies, accountants and private individuals.*
- ***Area of Service -*** *most appraisal experience is in the greater Twin Cities Metro Area (typically an hour from downtown metro). Numerous assignments throughout Minnesota.*

## Professional Membership, Associations & Affiliations

License: Certified General Real Property Appraiser, MN License #4000813.
Appraisal Institute: SRA, Senior Residential Appraiser Designation,
General Associate Member
Employee Relocation Council: CRP Certified Relocation Professional Designation.
International Right-Of-Way Association: Member
HUD/FHA: On Lender Selection Roster and Review Appraiser
DNR: Approved appraiser for Department of Natural Resources

## Testimony

-- Court, deposition, commission, arbitration & administrative testimony given.

## Mediator

-- Court appointed in Wright County.

## Committees

-- President of Metro/Minnesota Chapter, 2002, Appraisal Institute.
-- Chairman of Residential Admissions, Metro/MN Chapter, AI.
-- Chairman Residential Candidate Guidance, Metro/Minnesota Chapter, AI.
-- Elm Creek Watershed Commission, Medina representative 3 years.
-- Medina Park Commission, 3 years.

## Education

-- Graduate of Bemidji State University, Minnesota. B.S. degree in Bus. Ad.
-- During college, summer employment in building trades (residential and commercial).
-- Graduate of Cecil Lawter Real Estate School. Past Arizona Real Estate License.

-- **General & Professional Practice Courses & Seminars**
-- Course 101-Introduction to Appraising Real Property.
-- Numerous Standards of Professional Practice Seminar.
-- Fair Lending Seminar.
-- Eminent Domain & Condemnation Appraising.
-- Eminent Domain (An In-Depth Analysis)
-- Property Tax Appeal
-- Eminent Domain
-- Business Practices and Ethics
-- Scope of Work
-- Construction Disturbances and Temporary Loss of Going Concern
-- Uniform Standards for Federal Land Acquisitions (Yellow Book Seminar)
-- Partial Interest Valuation Divided (conservation easements, historic preservation easements, life estates, subsurface rights, access easements, air rights, water rights, transferable development rights)

**Commercial/Industrial/Subdivision Courses & Seminars**
-- Capitalization Theory & Techniques
-- Highest & Best Use Seminar
-- General & Residential State Certification Review Seminar
-- Subdivision Analysis Seminar.
-- Narrative Report Writing Seminar (general)
-- Advanced Income Capitalization Seminar
-- Advanced Industrial Valuation
-- Appraisal of Local Retail Properties
-- Appraising Convenience Stores
-- Analyzing Distressed Real Estate
-- Evaluating Commercial Construction
-- Fundamentals of Separating Real Property, Personal Property and Intangible Business Assets

**Residential Courses & Seminars**
-- Course 102-Applied Residential Appraising
-- Narrative Report Writing Seminar (residential)
-- HUD Training session local office for FHA appraisals
-- Familiar with HUD Handbook 4150.1 REV-1 & other material from local FHA office.
-- Appraiser/Underwriter FHA Training
-- Residential Property Construction and Inspection
-- Numerous other continuing education seminars for state licensing & AI

## Speaking Engagements

-- Bankers
-- Auditors
-- Assessors
-- Relocation (Panel Discussion)

## Publications

-- Real Estate Appraisal Practice (book): Acknowledgement
-- Articles for Finance & Commerce and Minnesota Real Estate Journal

**Sales in Project Area:**

None noted.

# Appendix E: Public Feedback

# Q1 What is your name?

Answered: 49 Skipped: 0

| # | RESPONSES | DATE |
|---|---|---|
| 1 | | 4/24/2025 4:54 PM |
| 2 | | 4/23/2025 5:47 PM |
| 3 | | 4/23/2025 10:06 AM |
| 4 | | 4/23/2025 9:27 AM |
| 5 | | 4/23/2025 8:52 AM |
| 6 | | 4/22/2025 6:41 PM |
| 7 | | 4/22/2025 11:54 AM |
| 8 | | 4/22/2025 9:13 AM |
| 9 | | 4/22/2025 6:55 AM |
| 10 | | 4/21/2025 7:37 PM |
| 11 | | 4/21/2025 12:03 PM |
| 12 | | 4/21/2025 8:47 AM |
| 13 | | 4/21/2025 8:44 AM |
| 14 | | 4/20/2025 1:41 PM |
| 15 | | 4/20/2025 10:06 AM |
| 16 | | 4/19/2025 10:20 PM |
| 17 | | 4/19/2025 7:01 PM |
| 18 | | 4/19/2025 3:23 PM |
| 19 | | 4/19/2025 2:38 PM |
| 20 | | 4/19/2025 9:52 AM |
| 21 | | 4/19/2025 8:37 AM |
| 22 | | 4/18/2025 7:55 PM |
| 23 | | 4/18/2025 5:56 PM |
| 24 | | 4/18/2025 3:48 PM |
| 25 | | 4/18/2025 3:33 PM |
| 26 | | 4/18/2025 3:31 PM |
| 27 | | 4/18/2025 2:55 PM |
| 28 | | 4/15/2025 8:36 AM |
| 29 | | 4/12/2025 7:52 AM |
| 30 | | 4/9/2025 8:05 PM |
| 31 | | 4/6/2025 11:25 AM |
| 32 | | 4/3/2025 7:35 AM |
| 33 | | 3/30/2025 10:23 PM |

| | | | |
|---|---|---|---|
| 34 | | | 3/30/2025 1:16 PM |
| 35 | | | 3/28/2025 7:20 PM |
| 36 | | | 3/27/2025 6:28 PM |
| 37 | | | 3/27/2025 6:23 PM |
| 38 | | | 3/26/2025 4:26 PM |
| 39 | | | 3/24/2025 9:30 PM |
| 40 | | | 3/24/2025 11:49 AM |
| 41 | | | 3/24/2025 11:37 AM |
| 42 | | | 3/24/2025 9:19 AM |
| 43 | | | 3/24/2025 6:41 AM |
| 44 | | | 3/23/2025 7:34 PM |
| 45 | | | 3/23/2025 5:26 PM |
| 46 | | | 3/23/2025 12:52 PM |
| 47 | | | 3/23/2025 10:53 AM |
| 48 | | | 3/22/2025 10:06 PM |
| 49 | | | 3/22/2025 6:58 PM |

# Q2 What is your address?

Answered: 49 Skipped: 0

| # | RESPONSES | DATE |
|---|---|---|
| 1 | | 4/24/2025 4:54 PM |
| 2 | | 4/23/2025 5:47 PM |
| 3 | | 4/23/2025 10:06 AM |
| 4 | | 4/23/2025 9:27 AM |
| 5 | | 4/23/2025 8:52 AM |
| 6 | | 4/22/2025 6:41 PM |
| 7 | | 4/22/2025 11:54 AM |
| 8 | | 4/22/2025 9:13 AM |
| 9 | | 4/22/2025 6:55 AM |
| 10 | | 4/21/2025 7:37 PM |
| 11 | | 4/21/2025 12:03 PM |
| 12 | | 4/21/2025 8:47 AM |
| 13 | | 4/21/2025 8:44 AM |
| 14 | | 4/20/2025 1:41 PM |
| 15 | | 4/20/2025 10:06 AM |
| 16 | | 4/19/2025 10:20 PM |
| 17 | | 4/19/2025 7:01 PM |
| 18 | | 4/19/2025 3:23 PM |
| 19 | | 4/19/2025 2:38 PM |
| 20 | | 4/19/2025 9:52 AM |
| 21 | | 4/19/2025 8:37 AM |
| 22 | | 4/18/2025 7:55 PM |
| 23 | | 4/18/2025 5:56 PM |
| 24 | | 4/18/2025 3:48 PM |
| 25 | | 4/18/2025 3:33 PM |
| 26 | | 4/18/2025 3:31 PM |
| 27 | | 4/18/2025 2:55 PM |
| 28 | | 4/15/2025 8:36 AM |
| 29 | | 4/12/2025 7:52 AM |
| 30 | | 4/9/2025 8:05 PM |
| 31 | | 4/6/2025 11:25 AM |
| 32 | | 4/3/2025 7:35 AM |
| 33 | | 3/30/2025 10:23 PM |

| | | | |
|---|---|---|---|
| 34 | | | 3/30/2025 1:16 PM |
| 35 | | | 3/28/2025 7:20 PM |
| 36 | | | 3/27/2025 6:28 PM |
| 37 | | | 3/27/2025 6:23 PM |
| 38 | | | 3/26/2025 4:26 PM |
| 39 | | | 3/24/2025 9:30 PM |
| 40 | | | 3/24/2025 11:49 AM |
| 41 | | | 3/24/2025 11:37 AM |
| 42 | | | 3/24/2025 9:19 AM |
| 43 | | | 3/24/2025 6:41 AM |
| 44 | | | 3/23/2025 7:34 PM |
| 45 | | | 3/23/2025 5:26 PM |
| 46 | | | 3/23/2025 12:52 PM |
| 47 | | | 3/23/2025 10:53 AM |
| 48 | | | 3/22/2025 10:06 PM |
| 49 | | | 3/22/2025 6:58 PM |

# Q3 What is your email?

Answered: 48 Skipped: 1

| # | RESPONSES | DATE |
|---|---|---|
| 1 | | 4/24/2025 4:54 PM |
| 2 | | 4/23/2025 5:47 PM |
| 3 | | 4/23/2025 10:06 AM |
| 4 | | 4/23/2025 9:27 AM |
| 5 | | 4/23/2025 8:52 AM |
| 6 | | 4/22/2025 6:41 PM |
| 7 | | 4/22/2025 11:54 AM |
| 8 | | 4/22/2025 9:13 AM |
| 9 | | 4/22/2025 6:55 AM |
| 10 | | 4/21/2025 7:37 PM |
| 11 | | 4/21/2025 12:03 PM |
| 12 | | 4/21/2025 8:47 AM |
| 13 | | 4/21/2025 8:44 AM |
| 14 | | 4/20/2025 1:41 PM |
| 15 | | 4/20/2025 10:06 AM |
| 16 | | 4/19/2025 10:20 PM |
| 17 | | 4/19/2025 7:01 PM |
| 18 | | 4/19/2025 3:23 PM |
| 19 | | 4/19/2025 2:38 PM |
| 20 | | 4/19/2025 9:52 AM |
| 21 | | 4/19/2025 8:37 AM |
| 22 | | 4/18/2025 7:55 PM |
| 23 | | 4/18/2025 5:56 PM |
| 24 | | 4/18/2025 3:48 PM |
| 25 | | 4/18/2025 3:33 PM |
| 26 | | 4/18/2025 3:31 PM |
| 27 | | 4/18/2025 2:55 PM |
| 28 | | 4/15/2025 8:36 AM |
| 29 | | 4/12/2025 7:52 AM |
| 30 | | 4/9/2025 8:05 PM |
| 31 | | 4/6/2025 11:25 AM |
| 32 | | 4/3/2025 7:35 AM |
| 33 | | 3/30/2025 10:23 PM |

| | | | |
|---|---|---|---|
| 34 | | | 3/30/2025 1:16 PM |
| 35 | | | 3/28/2025 7:20 PM |
| 36 | | | 3/27/2025 6:28 PM |
| 37 | | | 3/27/2025 6:23 PM |
| 38 | | | 3/26/2025 4:26 PM |
| 39 | | | 3/24/2025 9:30 PM |
| 40 | | | 3/24/2025 11:49 AM |
| 41 | | | 3/24/2025 11:37 AM |
| 42 | | | 3/24/2025 9:19 AM |
| 43 | | | 3/23/2025 7:34 PM |
| 44 | | | 3/23/2025 5:26 PM |
| 45 | | | 3/23/2025 12:52 PM |
| 46 | | | 3/23/2025 10:53 AM |
| 47 | | | 3/22/2025 10:06 PM |
| 48 | | | 3/22/2025 6:58 PM |

# Q4 What is your phone number?

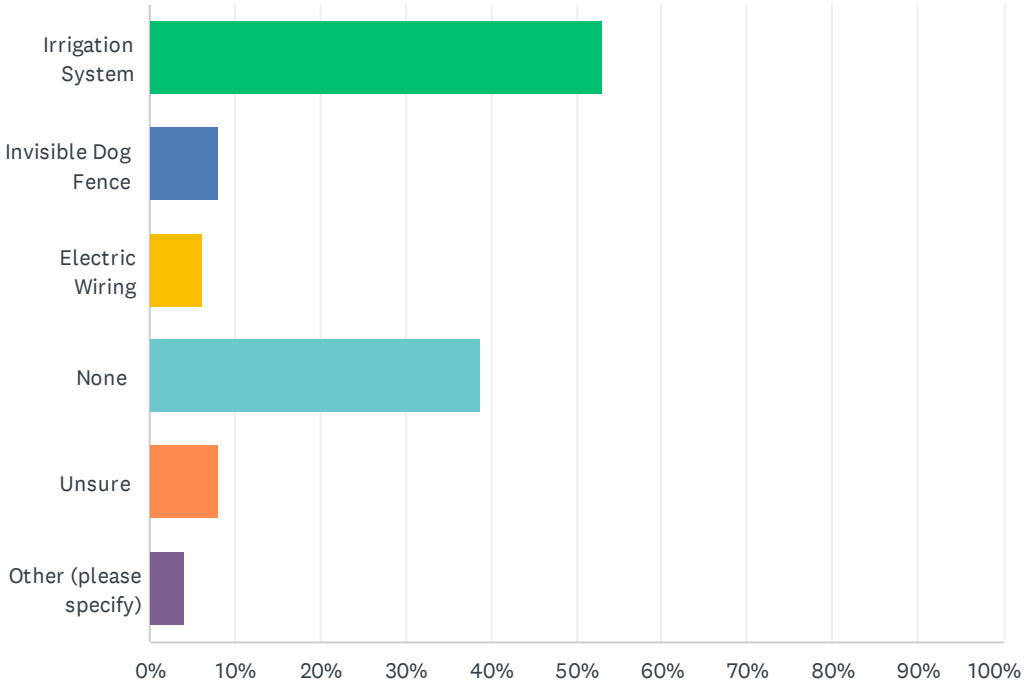
Answered: 45 Skipped: 4

| # | RESPONSES | DATE |
|---|---|---|
| 1 | | 4/24/2025 4:54 PM |
| 2 | | 4/23/2025 5:47 PM |
| 3 | | 4/23/2025 10:06 AM |
| 4 | | 4/23/2025 9:27 AM |
| 5 | | 4/23/2025 8:52 AM |
| 6 | | 4/22/2025 6:41 PM |
| 7 | | 4/22/2025 11:54 AM |
| 8 | | 4/22/2025 9:13 AM |
| 9 | | 4/22/2025 6:55 AM |
| 10 | | 4/21/2025 7:37 PM |
| 11 | | 4/21/2025 12:03 PM |
| 12 | | 4/21/2025 8:47 AM |
| 13 | | 4/21/2025 8:44 AM |
| 14 | | 4/20/2025 10:06 AM |
| 15 | | 4/19/2025 10:20 PM |
| 16 | | 4/19/2025 7:01 PM |
| 17 | | 4/19/2025 3:23 PM |
| 18 | | 4/19/2025 2:38 PM |
| 19 | | 4/19/2025 9:52 AM |
| 20 | | 4/19/2025 8:37 AM |
| 21 | | 4/18/2025 7:55 PM |
| 22 | | 4/18/2025 5:56 PM |
| 23 | | 4/18/2025 3:48 PM |
| 24 | | 4/18/2025 3:33 PM |
| 25 | | 4/18/2025 3:31 PM |
| 26 | | 4/18/2025 2:55 PM |
| 27 | | 4/15/2025 8:36 AM |
| 28 | | 4/12/2025 7:52 AM |
| 29 | | 4/9/2025 8:05 PM |
| 30 | | 4/6/2025 11:25 AM |
| 31 | | 4/3/2025 7:35 AM |
| 32 | | 3/30/2025 10:23 PM |
| 33 | | 3/30/2025 1:16 PM |

| | | | |
|---|---|---|---|
| 34 | | | 3/27/2025 6:28 PM |
| 35 | | | 3/27/2025 6:23 PM |
| 36 | | | 3/26/2025 4:26 PM |
| 37 | | | 3/24/2025 9:30 PM |
| 38 | | | 3/24/2025 11:49 AM |
| 39 | | | 3/24/2025 11:37 AM |
| 40 | | | 3/24/2025 9:19 AM |
| 41 | | | 3/23/2025 7:34 PM |
| 42 | | | 3/23/2025 12:52 PM |
| 43 | | | 3/23/2025 10:53 AM |
| 44 | | | 3/22/2025 10:06 PM |
| 45 | | | 3/22/2025 6:58 PM |

# Q5 Do you have a private underground facility within the right-of-way, approximately 15-feet from the street? (Check all that apply)

Answered: 49 Skipped: 0

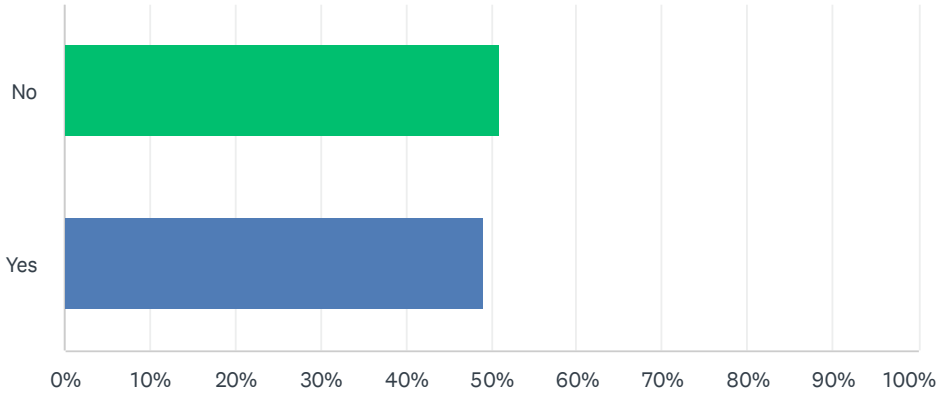



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Irrigation System | 53.06% | 26 |
| Invisible Dog Fence | 8.16% | 4 |
| Electric Wiring | 6.12% | 3 |
| None | 38.78% | 19 |
| Unsure | 8.16% | 4 |
| Other (please specify) | 4.08% | 2 |
| Total Respondents: 49 | | |

| # | OTHER (PLEASE SPECIFY) | DATE |
|---|---|---|
| 1 | Waterfall (hence Electrical Wiring) | 4/18/2025 5:56 PM |
| 2 | Comcast Pod/amplifier | 3/30/2025 10:23 PM |

# Q6 Do you have any above-ground landscaping or other objects such as boulders, statues, or light poles within the right-of-way, approximately 15-feet from the street? If yes, please explain.

Answered: 49 Skipped: 0



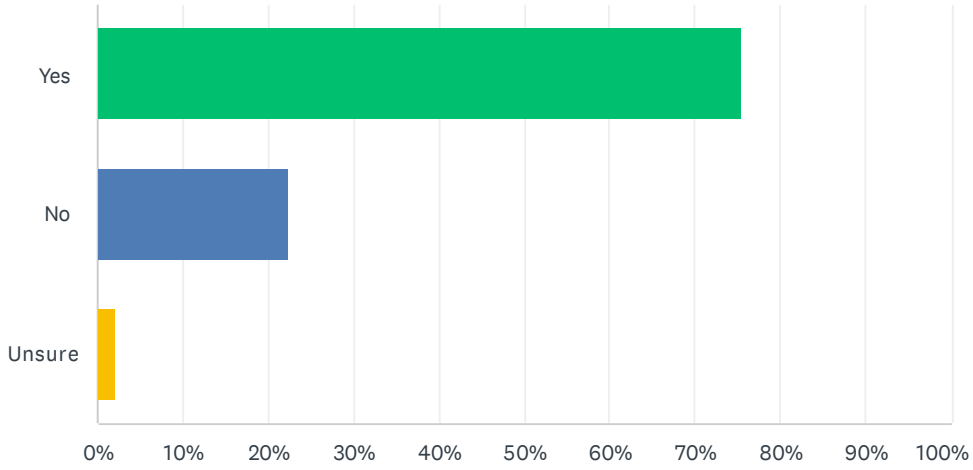

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| No | 51.02% | 25 |
| Yes | 48.98% | 24 |
| TOTAL | | 49 |

| # | YES | DATE |
|---|---|---|
| 1 | Garden | 4/24/2025 4:54 PM |
| 2 | Boulders | 4/21/2025 12:03 PM |
| 3 | Evergreen Tree | 4/21/2025 8:44 AM |
| 4 | Boulder, existing when we bought the house | 4/20/2025 1:41 PM |
| 5 | Garden bed | 4/20/2025 10:06 AM |
| 6 | Mailbox and bush | 4/19/2025 7:01 PM |
| 7 | boulder ringed gardens | 4/19/2025 3:23 PM |
| 8 | Trees and mailbox | 4/19/2025 9:52 AM |
| 9 | Trees, shrubs, flowers | 4/19/2025 8:37 AM |
| 10 | Possibly.distance close to that. Rock bed around cable/phone boxes | 4/18/2025 7:55 PM |
| 11 | Retaining Wall and Waterfall | 4/18/2025 5:56 PM |
| 12 | Large garden boulder | 4/18/2025 3:48 PM |
| 13 | Landscape bolder | 4/18/2025 2:55 PM |
| 14 | Landscaping | 4/15/2025 8:36 AM |
| 15 | Not sure. Planter area may be slightly closer | 4/12/2025 7:52 AM |
| 16 | Mail box | 4/9/2025 8:05 PM |

| | | |
|---|---|---|
| 17 | Cable box and small landscape area | 4/6/2025 11:25 AM |
| 18 | Trees | 4/3/2025 7:35 AM |
| 19 | arbor vitae and boulders | 3/30/2025 10:23 PM |
| 20 | Trees (large and well cared for!) | 3/30/2025 1:16 PM |
| 21 | Mail box | 3/27/2025 6:28 PM |
| 22 | Boulders in landscaping | 3/24/2025 11:37 AM |
| 23 | Landscaping | 3/23/2025 7:34 PM |
| 24 | boulders and garden stone wall | 3/22/2025 6:58 PM |

# Q7 Does your home have a sump pump? If your answer above is no, you may skip questions 8 & 9.

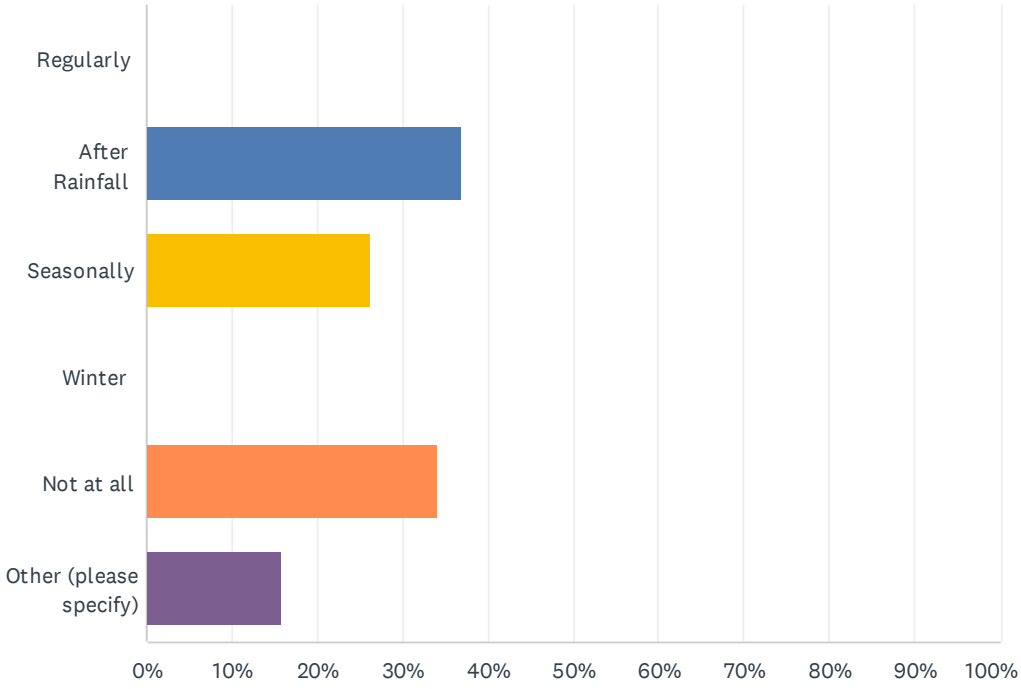
Answered: 49 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 75.51% | 37 |
| No | 22.45% | 11 |
| Unsure | 2.04% | 1 |
| TOTAL | | 49 |

# Q8 How frequently does your sump pump normally operate? (Check all that apply)

Answered: 38 Skipped: 11

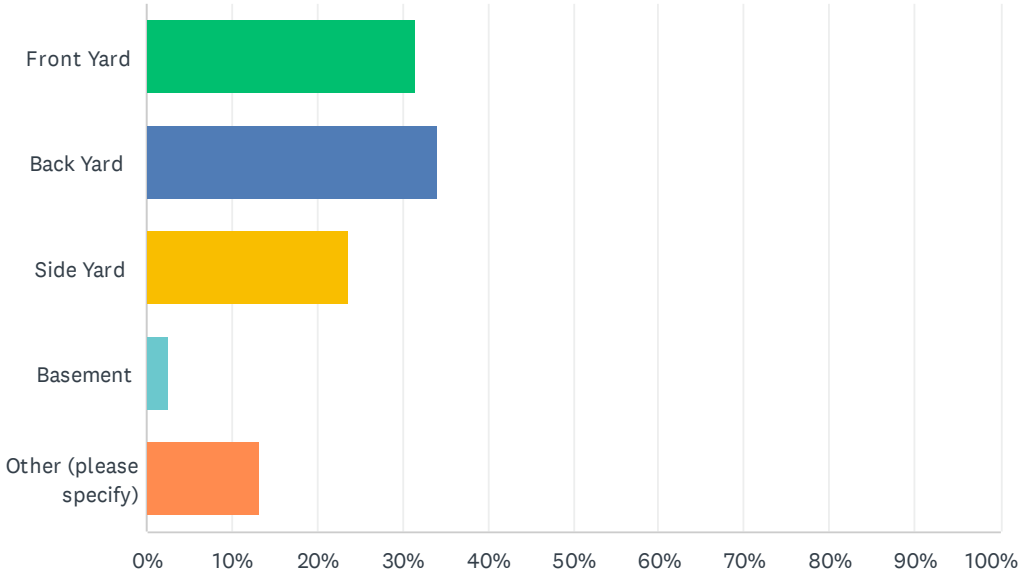



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Regularly | 0.00% | 0 |
| After Rainfall | 36.84% | 14 |
| Seasonally | 26.32% | 10 |
| Winter | 0.00% | 0 |
| Not at all | 34.21% | 13 |
| Other (please specify) | 15.79% | 6 |
| Total Respondents: 38 | | |

| # | OTHER (PLEASE SPECIFY) | DATE |
|---|---|---|
| 1 | Not sure | 4/22/2025 11:54 AM |
| 2 | Not sure | 4/19/2025 7:01 PM |
| 3 | Very rarely | 4/18/2025 3:31 PM |
| 4 | infrequently | 3/24/2025 9:30 PM |
| 5 | After heavy rain fall | 3/24/2025 11:37 AM |
| 6 | 1 or 2 x per year max | 3/23/2025 5:26 PM |

# Q9 Where does your sump pump current discharge? (Circle all that apply)

Answered: 38 Skipped: 11

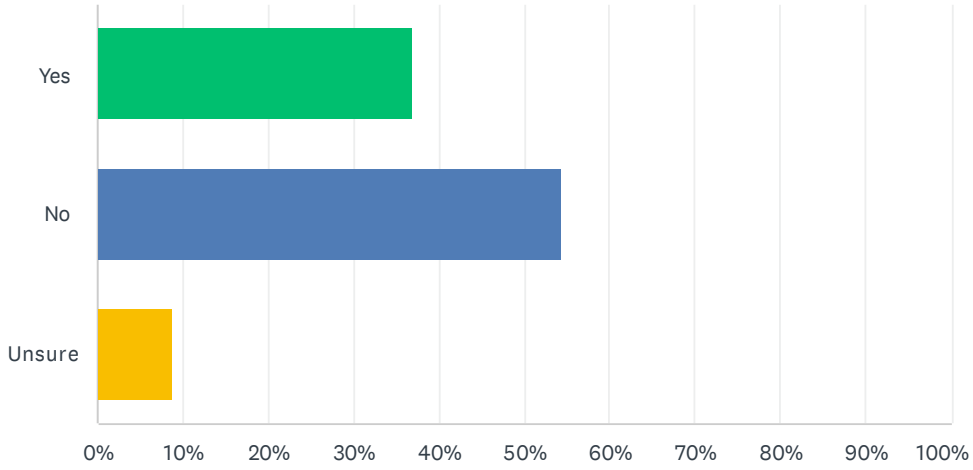



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Front Yard | 31.58% | 12 |
| Back Yard | 34.21% | 13 |
| Side Yard | 23.68% | 9 |
| Basement | 2.63% | 1 |
| Other (please specify) | 13.16% | 5 |
| Total Respondents: 38 | | |

| # | OTHER (PLEASE SPECIFY) | DATE |
|---|---|---|
| 1 | not sure | 4/21/2025 8:47 AM |
| 2 | Don't know | 4/19/2025 3:23 PM |
| 3 | Do not have sump pump | 4/18/2025 3:33 PM |
| 4 | Not sure | 4/9/2025 8:05 PM |
| 5 | No idea | 3/30/2025 1:16 PM |

# Q10 Do you have any exterior drain tiles or buried roof drains on your property?

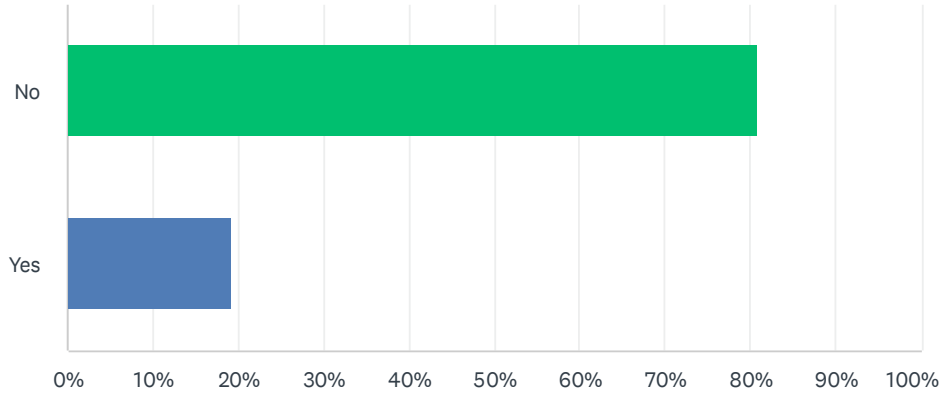
Answered: 46 Skipped: 3




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 36.96% | 17 |
| No | 54.35% | 25 |
| Unsure | 8.70% | 4 |
| TOTAL | | 46 |

# Q11 Have you experienced any issues with your sanitary sewer service? If yes, please explain.

Answered: 47 Skipped: 2

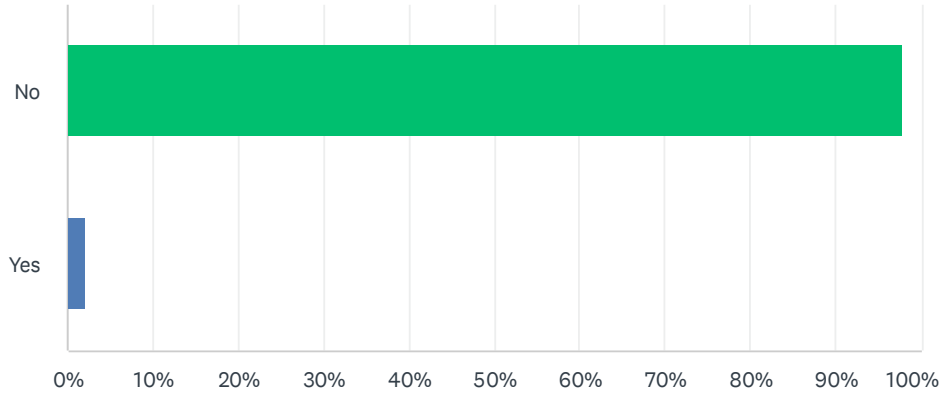



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| No | 80.85% | 38 |
| Yes | 19.15% | 9 |
| TOTAL | | 47 |

| # | YES | DATE |
|---|---|---|
| 1 | Tree root clog 3 years ago | 4/24/2025 5:01 PM |
| 2 | Needed to be cleaned out. | 4/23/2025 8:57 AM |
| 3 | Tree root blockage | 4/22/2025 11:57 AM |
| 4 | Had to replace main sewer line from house to street approximately 2010 | 4/19/2025 8:41 AM |
| 5 | The drop from our basement to the street sewer is too shallow and that means it’s very vulnerable to backing up | 4/18/2025 3:50 PM |
| 6 | Had one clog 2 years ago. | 4/12/2025 7:58 AM |
| 7 | Roots causing backups several times | 4/6/2025 11:28 AM |
| 8 | Not sure what this means but I know there are dips in the lines so they are services annually | 3/30/2025 1:24 PM |
| 9 | Sewer backup once | 3/22/2025 7:00 PM |

# Q12 Have you experienced any issues with your water service? If yes, please explain.

Answered: 46 Skipped: 3

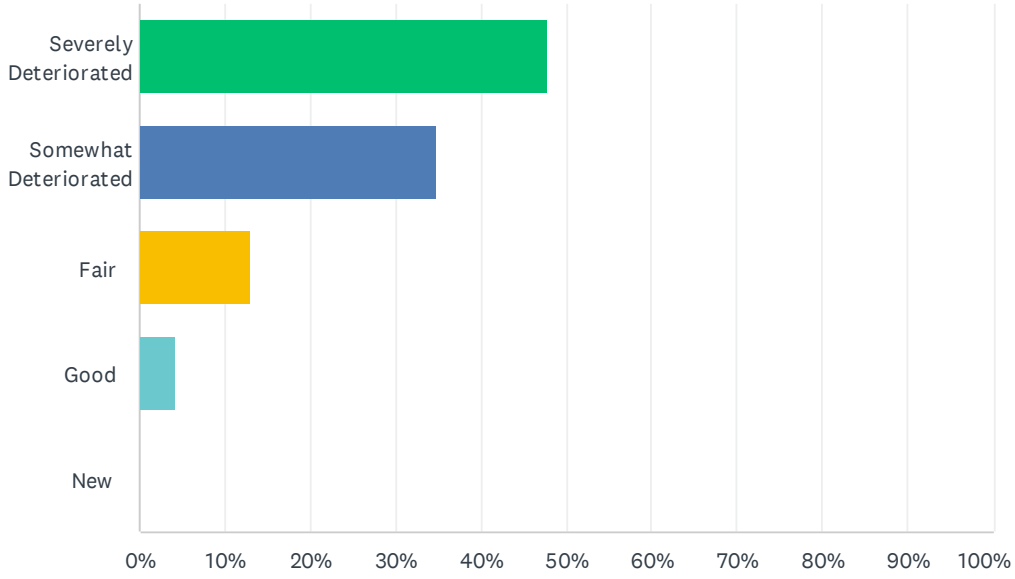



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| No | 97.83% | 45 |
| Yes | 2.17% | 1 |
| TOTAL | | 46 |

| # | YES | DATE |
|---|---|---|
| 1 | When water has been shut down, there are issues when it resumes. | 3/30/2025 1:24 PM |

# Q13 How would you classify the condition of the roadway pavement?

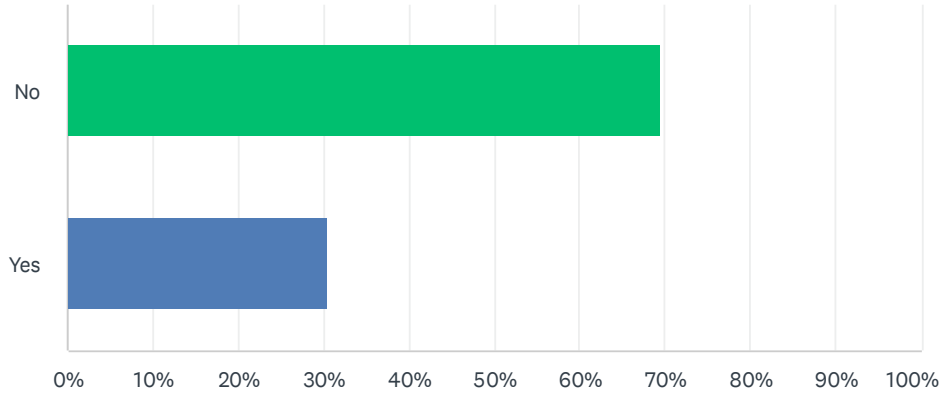
Answered: 46 Skipped: 3




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Severely Deteriorated | 47.83% | 22 |
| Somewhat Deteriorated | 34.78% | 16 |
| Fair | 13.04% | 6 |
| Good | 4.35% | 2 |
| New | 0.00% | 0 |
| TOTAL | | 46 |

# Q14 Does your property, or the roadway in front of your property, have drainage issues (ponding after significant rainfall, flooding, erosion along the boulevard, etc.)? If yes, please explain.

Answered: 46 Skipped: 3

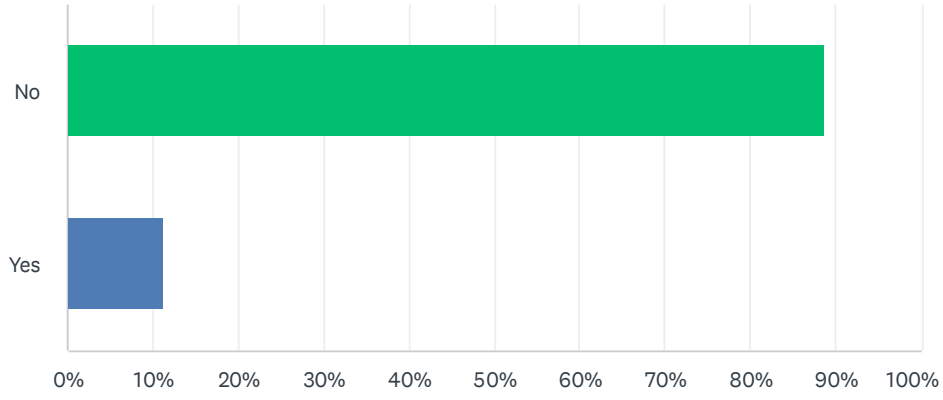



| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| No | 69.57% | 32 |
| Yes | 30.43% | 14 |
| TOTAL | | 46 |

| # | YES | DATE |
|---|---|---|
| 1 | Manhole has been repaired several times on the left side of the our driveway. | 4/22/2025 6:55 PM |
| 2 | A low spot in the curbing in front of my house collects and retains rainwater runoff. | 4/22/2025 9:15 AM |
| 3 | Yes pooling next door and at bottom by sewar cover | 4/22/2025 7:00 AM |
| 4 | Hump near driveway | 4/21/2025 7:38 PM |
| 5 | Some ponding and erosion on side yard. Front yard does not have enough slope towards street | 4/21/2025 12:06 PM |
| 6 | Erosion | 4/19/2025 7:03 PM |
| 7 | Pooling at end of driveway | 4/19/2025 2:40 PM |
| 8 | On pleasant ave side due to neighbors sewer issues and road tear up | 4/18/2025 7:59 PM |
| 9 | Ponding especially with winter warm/freeze. We get a large frozen puddle which is very dangerous | 4/18/2025 3:50 PM |
| 10 | Large pools of water form on street after heavy rain | 4/6/2025 11:28 AM |
| 11 | Back yard easement puddles after rainfall | 4/3/2025 7:43 AM |
| 12 | Rain water pools in front yard since the last street repair project | 3/26/2025 4:29 PM |
| 13 | Across the street from my house seems to collect water a bit more, as if the road isn't consistently graded | 3/22/2025 10:18 PM |
| 14 | ponding with rain | 3/22/2025 7:00 PM |

# Q15 Are there any issues with the sidewalks or trails in the project area? If yes, please explain.

Answered: 44 Skipped: 5




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| No | 88.64% | 39 |
| Yes | 11.36% | 5 |
| TOTAL | | 44 |

| # | YES | DATE |
|---|---|---|
| 1 | Very rough trails | 4/22/2025 11:57 AM |
| 2 | no sidewalks. trails in Cummings Park | 4/21/2025 8:48 AM |
| 3 | Runoff in heavy rains at the trail from Lexington to Cummings park needs to be addressed | 4/18/2025 3:50 PM |
| 4 | Missing street lights | 4/3/2025 7:43 AM |
| 5 | Unknown. I don’t use them. | 3/30/2025 1:24 PM |

# Q16 Please offer any additional information or general comments you would like considered as part of the project.

Answered: 28 Skipped: 21

| # | RESPONSES | DATE |
|---|---|---|
| 1 | Even though there's a culvert under the Cummings Park Trail, the trail regularly floods, leaving a mud slick that may be unsafe for some residents to navigate. | 4/24/2025 5:01 PM |
| 2 | The curb is too steep causing difficulty and car damage in the winter when we need to have some speed to get up our steep driveway. We had the curb lowered (with approval) when we redid the driveway. | 4/23/2025 5:52 PM |
| 3 | Everything seems fine here. | 4/23/2025 10:07 AM |
| 4 | The roads in the neighborhood are crumbling apart. If you fix them, PLEASE watch out for our sprinkler system - I will flag it for you. | 4/23/2025 9:27 AM |
| 5 | Amble Drive is in terrible condition. Driving on it is like skiing a slalom course. | 4/23/2025 8:57 AM |
| 6 | -Is the City of Arden Hills plan on sealing the new pavement, it appears that the old sealer is causing most of the trouble?Other city have stop this practice. - IS there a new way of detrimming the cost of this project with homeowners who live in cal de sacs? -Are home owners that live in a cal de sac going to get the same street treatments as the the entire neighborhood during the winter snow falls, in our experience there has been different treatment compared to the other streets? This may include salting and plowing. | 4/22/2025 6:55 PM |
| 7 | I would love to see coordination with a fiber internet provider, either Arvig or Lumen/Centurylink. | 4/22/2025 7:00 AM |
| 8 | I support the recommendations of the Karth Lake Improvement District (KLID) board to be included in the PMP Project, including a permanent lake pump house as well as automated lake level monitoring and pump control systems. | 4/21/2025 12:06 PM |
| 9 | Thanks much! | 4/19/2025 10:22 PM |
| 10 | Use good quality materials so that the roadway lasts longer and does not deteriorate again in a couple of years | 4/19/2025 7:03 PM |
| 11 | Driveway is brick paving stones. Will require attention. | 4/19/2025 8:41 AM |
| 12 | It would be nice if there was a way to have the properties water/sewer access from the street to our house inspected as part of this project. Many houses in the neighborhood have had to have work done and that has eaten up the road and made it very hard to drive on it through the years. It would be nice if we could get this taken care of while we are rebuilding the road instead of potentially ripping it up again after getting a nice road back in. | 4/18/2025 7:59 PM |
| 13 | Waterfall and Retaining Wall are within 15 ft of our rear property line. Originally they were more than 30 ft from the rear property line but there were two (2) instances of eminent domain for Lexington Ave improvements since we build the house in 1984.. | 4/18/2025 5:59 PM |
| 14 | If the improvement project aims to increase runoff into Karth Lake; the overflow pump may need to become automated, and the storm rainwater runoff should have natural filtration areas. | 4/18/2025 3:55 PM |
| 15 | Retaining wall on Karth lake needs to be replaced. The pump hose should be moved to go into the retaining wall to protect it from vandalism. The control panel also needs to be made more secure. | 4/18/2025 3:50 PM |
| 16 | Please address Karth Lake's function as part of surface water management including pumping infrastructure improvements (retaining wall, pumping automation, pumping strategy to reduce extreme erosion caused by extreme high and low water levels). | 4/12/2025 7:58 AM |
| 17 | Please consider and prospective utility and Telco projects (e.g. fiber optics) to be done at the same time as the road. I have a storm drain on my property and would like to install a rain | 4/9/2025 8:13 PM |

| | | |
|---|---|---|
| | garden to improve the water quality of Karth lake. It isn't currently possible due to the presence of utilities in the right-of-way. If utilities are to be disturbed/ updated I would like to coordinate that with the rain garden project. I also suggest that rain gardens are considered as part of the project in general. | |
| 18 | Want to keep sediment, salt and fertilizer out of the lake | 4/6/2025 11:28 AM |
| 19 | Our neighborhood has a lot of walkers (the neighborhood is ~ 1mi round) that walk at night or at dusk. We could definitely use street lights for safety reasons. Also for security reason: there has been a fair amount of suspicious activity and theft in the neighborhood and surrounding area. | 4/3/2025 7:43 AM |
| 20 | I estimate that the lake bottom level next to and 15 feet around the storm drain outlet near our property has risen over 3 feet since we moved here Nov. 1989 due to sand and gravel washing into the lake through the storm drain. | 3/30/2025 10:31 PM |
| 21 | There are areas that get much heavier traffic than others. Can this be addressed through customized paving? Some storm drains seem misplaced. Water doesn't flow uphill but the placement suggests it does. There has been talk of rain gardens- still a consideration? | 3/30/2025 1:24 PM |
| 22 | Road surface is rough, but that helps keep speeds low in the neighborhood | 3/27/2025 6:29 PM |
| 23 | Amble seems far worse shape than Karth Lake Dr- many potholes and deteriorating road | 3/27/2025 6:27 PM |
| 24 | Last time streets were redone in Karth Lake they severely deteriorated very quickly. It's ridiculous what we were charged in assessment given quality delivered. | 3/26/2025 4:29 PM |
| 25 | Our street is so badly deteriorated that it is difficult to drive on at all. It's really awful!! | 3/24/2025 11:52 AM |
| 26 | Need to understand access during construction as only one street outlet | 3/24/2025 11:39 AM |
| 27 | Why does it take so long to repair the street pavement? | 3/24/2025 9:22 AM |
| 28 | Please put in a rain garden in culdesac at end of karth lake dr | 3/23/2025 10:55 AM |

# Appendix F: Geotechnical Report & Sediment Sampling Report

# Geotechnical/Pavement Evaluation Report

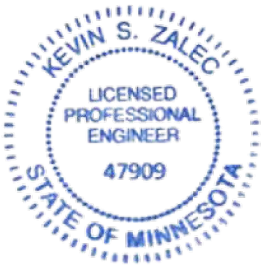
2026 PMP Street and Utility Improvements
Various Streets
Arden Hills, Minnesota

*Prepared for*

## City of Arden Hills

**Professional Certification:**
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Kevin S. Zalec




Kevin S. Zalec, PE
Senior Engineer
License Number: 47909
June 13, 2025

BRAUN INTERTEC
The Science You Build On.

Project B2502087

Braun Intertec Corporation

**Braun Intertec Corporation**
11001 Hampshire Avenue S
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

June 13, 2025 Project B2502087

David Swearingen, PE
City of Arden Hills
1245 West Highway 96
Arden Hills, MN 55112

Re: Geotechnical/Pavement Evaluation
2026 PMP Street and Utility Improvements
Various Streets
Arden Hills, Minnesota

Dear Mr. Swearingen:

We are pleased to present this Geotechnical/Pavement Evaluation Report for the 2026 Pavement Management project for the street and utility improvements in Arden Hills, Minnesota.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Zach Semlak at 651.788.5071 (zsemlak@braunintertec.com) or Kevin Zalec at 952.995.2223 (kzalec@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

Zachary T. Semlak, EIT
Staff Engineer

Kevin S. Zalec, PE
Senior Engineer

c: Mr. Lucas Miller, City of Arden Hills
Brad Fisher, PE, Bolton & Menk, Inc.

AA/EOE

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**Appendix**


Soil Boring Location Sketch
Log of Boring Sheets ST-1 through ST-19 (19 pages)
Descriptive Terminology of Soil
Photographic Log of Pavement Cores (11 pages)
Table – Summary Statistic of Bituminous and Aggregate Layer thicknesses
Ground Penetrating Radar Data (Graphical Plots) (8 pages)
MnPAVE-Flexible Results

# A. Introduction

## A.1. Project Description

This Geotechnical/Pavement Evaluation Report addresses the proposed design and rehabilitation of the Arden Hills 2026 pavement management project (PMP) in Arden Hills, Minnesota. The 2026 PMP project areas are depicted in Figure 1.

**Figure 1. Project Rehabilitation Areas**

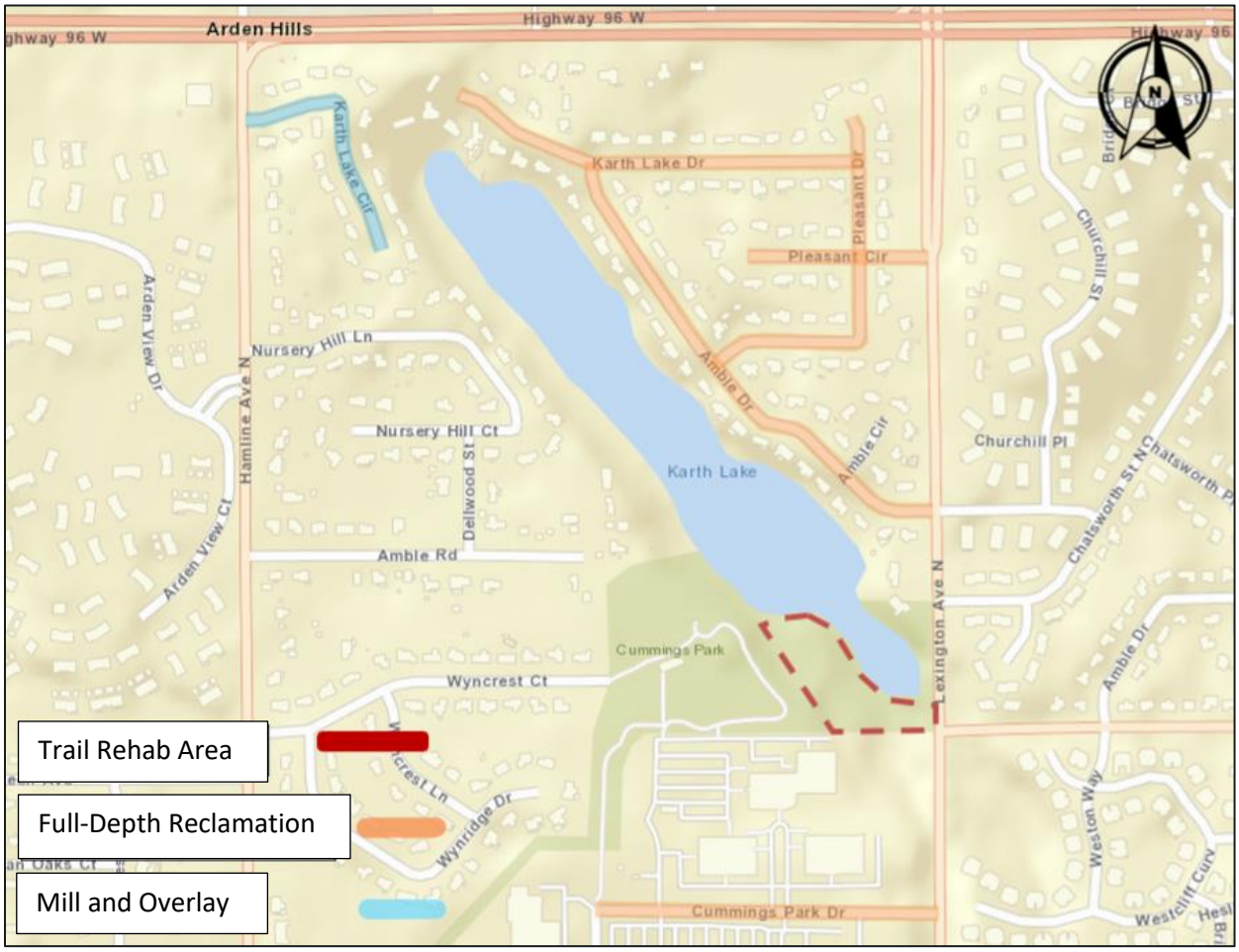



Figure annotated and extracted from Enterprise MnDOT Mapping Application (EMMA).

We understand that proposed rehabilitation is anticipated to include new bituminous pavements through milling and overlaying or through reclaiming existing bituminous and apparent aggregate base material, then overlaying new bituminous. We also understand that the trail on the south side of Karth Lake will be rehabilitated. Additional site work may include spot curb and gutter repairs as well as spot utility repairs where the City of Arden Hills (City) has deemed necessary.

Table 1 provides additional project specific details related to the 2026 PMP project.

**Table 1. Project Description for 2026 Street Rehabilitation**

| Project Component | Description | Source |
|---|---|---|
| Pavement type | Bituminous | City / Bolton & Menk, Inc. (BMI) |
| Pavement rehabilitation method | ▪ Mill and Overlay (M&O)<br>▪ Full-Depth Reclamation (FDR) | City / BMI |
| Pavement loads* | **Karth Lake Neighborhood:** Less than 150,000 Bituminous ESALs (BESALs) | Assumed |
| | **Cummings Park Drive:** Less than 250,000 BESALs | Assumed based on on-site observations at time of drilling and based on vehicle traffic being mainly Boston Scientific employees (passenger car vehicles driving through the road corridor). |
| Utilities | Spot utility repairs, up to 10 feet below grade | Assumed |
| Cummings Park Trail | FDR where bituminous and aggregate exist. Where aggregate exists only, tolerancing and paving over. | BMI |
| Grade changes | Street grades will be within 1 foot of existing. | Assumed |

*Equivalent 18,000-lb single axle loads based on 20-year design.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

## A.2. Site Conditions

Currently, the project site exists as a residential neighborhood and a business entrance (Cummings Park Drive). The area is bounded by County Road 96 West to the north, Hamline Avenue North to the west, Boston Scientific to the south and Lexington Avenue North to the east.

Current grades range from elevations of about 954.8 feet at Boring ST-14 to about 1007.4 feet at Boring ST-18. The project area generally contains hummocky topography, and regionally slopes downward from the northeast to the southwest near Karth Lake.

## A.3. Purpose

The purpose of our geotechnical/pavement evaluation was to characterize subsurface geologic conditions at selected exploration locations, evaluate their impact on the project, and provide geotechnical recommendations for the design and construction of street rehabilitation using an assumed R-value, associated utility improvements, and trail improvements.

## A.4. Background Information and Reference Documents

We reviewed the following information:

- Email request with map regarding proposed scope of work from Bolton & Menk, Inc., received on February 12, 2025.
- Geologic map titled M-178, Surficial Geology of the Twin Cities Metropolitan Area, Minnesota prepared by the Minnesota Geological Survey, dated 2007.
- Traffic data available via the Minnesota Department of Transportation (MnDOT) Traffic Mapping Application, http://www.dot.state.mn.us/traffic/data/tma.html.
- Enterprise MnDOT Mapping Application (EMMA), https://dotapp9.dot.state.mn.us/emma/.

## A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal for a Geotechnical/Pavement Evaluation (QTB210666) dated February 21, 2025 and authorized on March 10, 2025. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and coordinating the clearing of our exploration locations for underground utilities. We selected and staked the new exploration locations. We acquired the surface elevations and locations with GPS technology using the State of Minnesota's permanent GPS base station network. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings and pavement cores.

- Performing 19 standard penetration test (SPT) borings, denoted as ST-1 to ST-19, to nominal depths of 10 feet below existing grade.

- Performing 4 hand auger borings (HABs) through trail areas, denoted as T-1 to T-4, to nominal depths of 2 to 4 feet below existing grade.

- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.

- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation and the design of foundations, floor slabs, exterior slabs, utilities, stormwater improvements and pavements.

We performed this geotechnical evaluation concurrently with Sediment (Dredge) Sampling, which we submitted separately. The project team should review the Sediment Sampling report for work specific to Karth Lake.

# B. Results

## B.1. Geologic Overview

The general geologic profile of the project area represented in Figure 2 below generally consists of Moderate- and high-relief glacial till deposits, such as silty sands, and clays forming hummocky, irregular topography (map unit's 'Qnh' and 'Qnm').

**Figure 2. Surficial Geology Map of the Project Area**

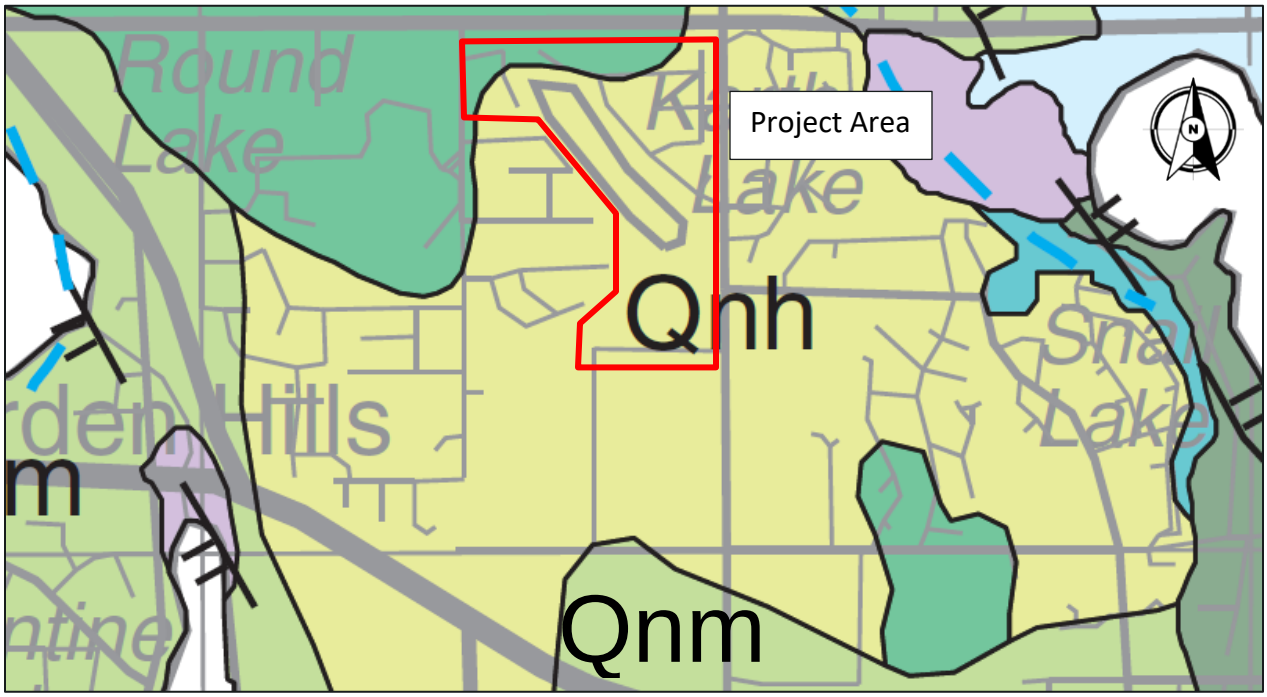



Figure extracted from Map M-178, Surficial Geology of the Twin Cities Metropolitan Area.

We based the geologic origins used in this report on the soil types, laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain.

## B.2. Ground Penetrating Radar (GPR)

GPR was used to approximate pavement layer thicknesses along the road sections for the 2026 pavement management project (PMP). The data was collected at a nominal 1-foot interval. Where “ground truth” data (pavement cores) were performed, the interpreted layers from the GPR scan were compared directly to the measured thicknesses from the cores to improve the overall accuracy of the GPR analysis.

The tables shown in the Appendix show summary statistics of the bituminous pavement layer thicknesses. The Graphical Results of the GPR can be found in the Appendix as well. We can provide complete results electronically at your request.

A second layer (probable aggregate base) was not always visible in the scans, i.e., it was difficult to identify as a distinct layer due to ambient interference with the GPR signal. A lack of a visible second layer in the

GPR scan does not imply an absence of one within the pavement section. Refer to our pavement core and hand auger boring results for approximate aggregate base depths in these locations.

## B.3. Pavement Core Results

We performed pavement coring and hand auger borings at 23 locations along the various roads, as shown in the sketch in the Appendix. HABs were also performed through the aggregate base layer and into the shallow subgrade in core locations.

The pavement cores and HABs were used to measure pavement layer thicknesses for the bituminous and aggregate base layers, to assess bituminous conditions, and determine the shallow subgrade soil type. The results are presented below.

We did not perform gradation analysis on the apparent aggregate base material encountered as part of the pavement section, in accordance with our scope of work. Therefore, we cannot conclusively determine if the encountered material satisfies a particular specification.

**Table 2. Summary of Pavement Section Thicknesses by Boring/Core Location**

| Street | Boring/Core Locations | Bituminous Thickness (in.) | Aggregate Base Thickness (in.) | Overall Pavement Thickness (in.) |
|---|---|---|---|---|
| Karth Lake Circle | ST-1 | 5 1/2 | 5 | 10 1/2 |
| | ST-2 | 3 3/4 | 4 | 7 3/4 |
| | ST-3 | 9 1/4 | 3 | 12 1/4 |
| Karth Lake Drive | ST-4 | 6 1/2 | 6 | 12 1/2 |
| | ST-5 | 5 | 8 | 13 |
| | ST-6 | 9 | 8 | 6 1/4 |
| Pleasant Drive | ST-7 | 8 1/2 | 5 | 13 1/2 |
| | ST-8 | 5 1/2 | 2 | 7 1/2 |
| | ST-9 | 4 3/4 | 14 | 18 3/4 |
| Pleasant Circle | ST-10 | 7 | 3 | 10 |
| | ST-11 | 8 | 4 | 12 |
| Amble Drive | ST-12 | 3 1/2 | 7 | 10 1/2 |
| | ST-13 | 3 3/4 | 12 | 15 ¾ |
| | ST-14 | 3 3/4 | 9 1/2 | 13 1/4 |
| | ST-15 | 6 1/2 | 1 | 7 1/2 |
| | ST-16 | 5 1/2 | 7 | 12 1/2 |

| Street | Boring/Core Locations | Bituminous Thickness (in.) | Aggregate Base Thickness (in.) | Overall Pavement Thickness (in.) |
|---|---|---|---|---|
| Cummings Park Drive | ST-17 | 5 1/4 | 13 | 18 1/4 |
| | ST-18 | 4 1/4 | 11 | 15 1/4 |
| | ST-19 | 4 1/4 | 8 | 12 1/4 |
| Karth Lake Trail* | T-1 | 1 3/4 | 2 | 3 3/4 |
| | T-2 | Not Encountered | 2 | 2 |
| | T-3 | 2 1/4 | 2 | 4 1/4 |
| | T-4 | 1 1/4 | 2 | 3 1/4 |

*Pavement cores performed in bituminous trail (Karth Lake Trail).

## B.4. Boring Results

Table 3 provides a summary of the soil boring results, in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheets in the Appendix include definitions of abbreviations used in Table 3.

**Table 3. Subsurface Profile Summary**

| Strata | Soil Type - ASTM Classification | Range of N-Values | Commentary and Details |
|---|---|---|---|
| Pavement section | --- | --- | ▪ Reference Table 2 above for pavement section thicknesses. |
| Fill | SP-SM, SM, SC, CL | Weight of Hammer (WOH) to 25 | ▪ Extended to depths of about 2 to 11 feet (boring termination depth) below existing grade.<br>▪ Highly variable, soils intermixed.<br>▪ Slightly organic layers encountered within Borings ST-1 and ST-14.<br>▪ Moisture condition generally moist. |
| Glacial deposits | SM, SC, CL, ML | 7 to 50 | ▪ Variable amounts of gravel; has the potential to contain cobbles and boulders.<br>▪ Generally consists of CL.<br>▪ SC encountered below the fill within Boring ST-2.<br>▪ ML encountered below the fill within Boring ST-6.<br>▪ SM encountered below the fill within Boring ST-8.<br>▪ Moisture condition generally moist. |

For simplicity in this report, we define fill to mean existing, uncontrolled or undocumented.

## B.5. Groundwater

We did not observe groundwater while performing our borings. Groundwater may take days or longer to reach equilibrium in the boreholes and we immediately backfilled the boreholes, in accordance with our scope of work. If the project team identifies a need for more accurate determination of groundwater depth, we can install piezometers. Project planning should anticipate seasonal and annual fluctuations of groundwater.

## B.6. Laboratory Test Results

We performed various laboratory tests on select soil samples to aid us in our evaluation. The Log of Boring sheets attached in the Appendix presents the results. Table 4 provides the range of results for the moisture contents, percent passing the #200 sieve, organic contents and Atterberg limits.

**Table 4. Laboratory Classification Test Results**

| Laboratory Test | Range of Results | Comments |
|---|---|---|
| Moisture content (MC) tests, %<br>(per ASTM D2216) | Cohesionless soils: 2 to 15<br>Cohesive soils: 11 to 26 | Coarse-grained soils were typically dry to near the soil's probable optimum moisture content.<br><br>Fine-grained soils were generally moist but anticipated to be at- to slightly-above the probable optimum moisture content. |
| Organic content (OC) tests, %<br>(per ASTM D2974) | 2 | Considered slightly organic as classified by MnDOT definitions. |
| Percent of particles passing the #200 Sieve, %<br>(per ASTM D1140) | 2 to 17 | USCS Classifications: SP, SP-SM, SM |
| Atterberg Limits (AL), %<br>(per ASTM D4318) | Liquid Limit (LL) – 22<br>Plastic Limit (PL) – 17<br>Plasticity Index (PI) – 5 | USCS Classification: CL-ML |

# C. Recommendations

## C.1. Design and Construction Discussion

The recommendations provided herein are based on the information provided to us at the time of this report. As the project progresses through final design or elements of the project are adjusted, we should revisit our recommendations.

References to the MnDOT Specification in this report are to Minnesota Department of Transportation (MnDOT) Standard Specification for Construction, 2025 edition.

### C.1.a. Rehabilitation Methods

Based on our understanding that the 2026 PMP will utilize either mill and overlay or full depth reclamation (FDR), Table 5 presents our recommended pavement rehabilitation method for each of the identified roads.

**Table 5. Proposed Rehabilitation Approach**

| Rehabilitation Method | Location |
|---|---|
| Mill-and-Overlay | ▪ Karth Lake Circle |
| Full-Depth Reclamation (FDR) | ▪ Karth Lake Drive<br>▪ Amble Drive<br>▪ Amble Circle<br>▪ Pleasant Drive<br>▪ Pleasant Circle<br>▪ Cummings Park Drive |

We understand that the recommended rehabilitation methods presented in Table 5 matches the planned rehabilitation methods the City was proposing.

### C.1.b. Karth Lake Park Trail

We understand that Karth Lake Park Trail is also being considered for FDR as part of this rehabilitation project. With the encountered thin trail pavement section, we anticipate it will likely be difficult to perform an FDR and recommend stripping the bituminous, adding aggregate base and repaving on this project.

Refer to Section C.5 for additional recommendations on Karth Lake Trail.

### C.1.c. Reuse of Pavement Materials

From a materials perspective, milling or reclamation of the bituminous pavement materials for reuse as recycled aggregate base or as a component to new pavements is acceptable assuming the produced products meet the applicable project specifications, and these practices are acceptable to the City. Prior to reuse, the project should implement thorough quality control practices, including frequent sieve analyses, asphalt contents and other tests, to achieve desirable characteristics for any reclaimed material processed on site.

### C.1.d. Reuse of On-Site Soils

Based on the completed laboratory testing program, the existing non-organic soils (both the naturally deposited soils and fill soils) on-site are generally considered suitable for reuse as engineered fill soil following moisture conditioning and compaction as outlined in this report. If encountered, organic fill soils are not considered suitable for reuse as engineered fill. Any materials to be used as engineered fill should be tested and approved by the engineer prior to placement.

### C.1.e. Groundwater

Water was not encountered in any of the borings completed for this project. Groundwater may fluctuate in response to both seasonal and annual rainfall events. Surface runoff can collect in open excavation if left open during wet weather. If encountered, the water should be removed from excavations during construction and prior to placement of any utility structures.

### C.1.f. Construction Disturbance

The existing soils encountered on-site, including clay-based soils, are highly susceptible to loss of strength when subjected to additional moisture or disturbance. The contractor should take precautions to limit the disturbance of these soils to the extent practical within the utility trench excavations. If disturbed, there is the potential that an additional subcut of these soils to depths of 2 to 3 feet may be necessary to re-establish a stable base for placement of engineered fill. In addition, a layer of stabilizing aggregate may be necessary to provide a stable working surface for construction.

## C.2. Site Grading and Subgrade Preparation

We understand that as part of the 2026 pavement management project, there may be spot utility repairs in areas where FDR is to occur. The following sections under Section C.2 provide general site grading and subgrade preparation recommendations.

### C.2.a. Utility Subgrade Stabilization

We anticipate the soils at typical invert elevations will be suitable for utility support. However, if construction encounters unfavorable conditions such as soft clay, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.

Where soft/loose or organic soils are encountered below utility inverts, we recommend subcutting a minimum of 1-foot and replacing with crushed rock to help provide a stable working platform.

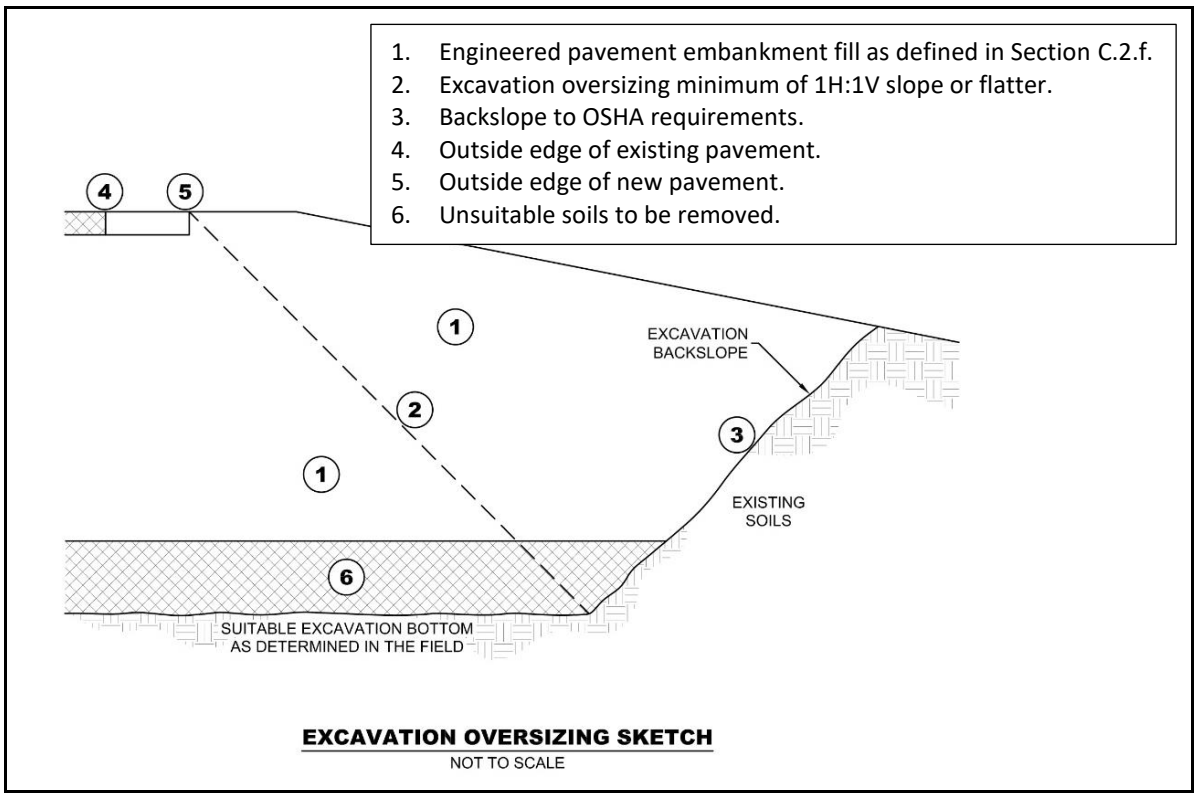
### C.2.b. Corrosion Potential

Based on our experience, the soils encountered by the borings are moderately corrosive to metallic conduits, but only marginally corrosive to concrete. We recommend specifying non-corrosive materials or providing corrosion protection, unless project planning chooses to perform additional tests to demonstrate the soils are not corrosive.

### C.2.c. Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or flatter. See Figure 3 for an illustration of excavation oversizing.

**Figure 3. Generalized Illustration of Oversizing**




### C.2.d. Excavated Slopes

Based on the borings, we anticipate most of the on-site soils in excavations will consist of fill sands and clays. These soils are typically considered Type C Soil under OSHA (Occupational Safety and Health Administration) guidelines. OSHA guidelines indicate unsupported excavations in Type C soils should have a gradient no steeper than 1 1/2H:1V. Slopes constructed in this manner may still exhibit surface sloughing.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches." This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

### C.2.e. Excavation Dewatering

We recommend removing groundwater that collects within excavations from rainfall events and/or surface runoff. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as clays. Where granular soils are encountered at invert elevations, the design team may want to consider additional means and methods for removing groundwater, as sumps and pumps have the potential to loosen the granular soils at excavated bottoms.

### C.2.f. Engineered Fill Materials and Compaction

Most on-site soils appear suitable for reuse as engineered fill within pavement subgrades and utility trenches, although some moisture conditioning may be required (drying or wetting of materials). If encountered, topsoil and soils with organic contents of greater than 5 percent by weight should not be reused as pavement subgrade or utility trench backfill anywhere on the project. Organic soils can be stockpiled for use as a component in topsoil dressing, side slopes or in other areas where loads are not supported. Any materials to be reused as engineered fill should be tested and approved by the engineer prior to reuse.

We recommend that subgrade fill materials and compaction are in accordance with the MnDOT specifications presented in Table 6.

**Table 6. Engineered Fill Materials and Compaction Specifications**

| Material | Material Specification | Compaction Specification |
|---|---|---|
| Embankment fill,<br>Utility trench backfill | Common Embankment<br>MnDOT 2106.2.B.1 | MnDOT 2106.3.G.1 |
| Pavement subbase | Select Granular Material<br>MnDOT 3149.2.B | MnDOT 2106.3.G.3 |
| Below landscaped surfaces, where subsidence is not a concern | Non-Structural Grading Material<br>MnDOT 2106.1.A.8 | MnDOT 2106.3.G.2 |

We recommend spreading engineered fill in loose lifts of approximately 8 to 12 inches thick for granular soils and for cohesive soils, we recommend spreading in loose lifts of approximately 6 to 8 inches thick.

We recommend performing moisture and density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

## C.3. Full-Depth Reclamation

We understand that the FDR is proposed for the areas presented in Table 5. For the proposed FDR on the residential streets, for reuse of pavement materials by reclamation, we recommend a 10-inch FDR for most of the project streets. Due to the thinner pavement section and clayey subgrade, we recommend the FDR depth be reduced to 8 inches on Karth Lake Circle, Amble Circle, and Pleasant Circle between Lexington Avenue and Pleasant Drive. To place the full aggregate base section in these areas, an additional removal of 2 inches of subgrade material may be needed. Based on the measurements from the borings and pavement cores, this generally will avoid subgrade soils. If there are areas where subgrade may be penetrated due to a thinner pavement section, we recommend reducing the mill depth to the top of subgrade and excavating to the design depth of the pavement section.

We recommend implementing through quality control practices, including frequent sieve analyses, to achieve a desirable gradation of the reclaimed material. The gradation requirements of MnDOT Specification 2215 (Reclamation) or Specification 3138 (Aggregate for Surface and Base Courses) can be used for the aggregate base; the latter specification's controls on gradation and asphalt content are stricter and will generally be more difficult to meet. We suggest the contractor assume some contingency for importing clean, crushed rock that can be blended with the reclaimed material to improve the uniformity of the resulting gradation prior to reuse as an aggregate base.

For the Karth Lake Trail, we understand the intent was to reclaim the trail and repave. Understanding the trail had limited pavement and aggregate base present, we recommend stripping the pavement adding additional aggregate to the existing apparent aggregate base and then placing new pavement for the trail. See section C.5 for recommendations with regards to the trail.

### C.3.a. Full-Depth Reclamation Preparation

We recommend the following steps for pavement reclamation preparation, understanding the new pavements will match existing grades.

1. Reclaim the pavement as recommended under Section C.3., stockpile and/or redistribute excess reclaim material as necessary to construct the new pavement sections.

2. Once the roadway section is cut to grade, have a geotechnical engineer or their representative observe the top of reclaim material (and/or subgrade if material below reclaim becomes exposed or wet) to evaluate if additional improvements are necessary.

### C.3.b. Full-Depth Reclamation Design Section

For the FDR process, the pavement should generally follow Table 7.

**Table 7. Proposed Bituminous Pavement Section**

| Material | Thickness (inches) | Material | Material Specification |
|---|---|---|---|
| Bituminous wear course | 1 1/2 | SPWEA340C | MnDOT 2360 |
| Bituminous wear course | 2 1/2 | SPWEB330C | MnDOT 2360 |
| Aggregate base | 6 | Reclaim* | MnDOT 2215 |
| Aggregate base | Varies | --- | Residual aggregate base |
| Approved subgrade | --- | --- | --- |

*Where reclaim is removed for spot utility repair, material specification will generally follow MnDOT 2211, class 5 material.

### C.3.c. Bituminous Pavement Materials and Compaction

We recommend that the bituminous wear and non-wear courses meet the requirements of Specifications 2360.

We recommend compacting the aggregate base to meet the requirements of MnDOT Specification 2211.3.D.2.c (Penetration Index Method for the dynamic cone penetrometer [DCP]). We recommend compacting bituminous pavements to at least 92 percent of their maximum theoretical (Rice) density.

### C.3.d. Performance and Maintenance

We based the above pavement designs on a 20-year performance life for bituminous. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

Many conditions affect the overall performance of pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. With regard to bituminous pavements in particular, it is common to have thermal cracking develop within the first few years of placement and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade.

### C.3.e. Miscellaneous Bituminous Recommendations

When placing new pavement next to in-place pavement, we recommend providing a full-depth sawcut to ensure a uniform joint.

We recommend tack coat between all bituminous layers and prior to placing any bituminous mixtures on existing pavement in accordance with MnDOT Specification 2357.

## C.4. Mill-and-Overlay

We recommend milling the pavements for Karth Lake Circle in accordance with MnDOT Specification 2232. The mill depth will vary based on conditions encountered but should be a minimum depth of 2 1/2 inches. Following the milling, place a 2 1/2-inch bituminous overlay meeting bituminous wear course mix SPWEA340B (MnDOT Material Specification 2360). Pavement depth can vary between the boring and core locations. The contractor may need to adjust the mill depth to account for unexpected conditions such as areas of thin pavement.

The surface condition prior to milling can indicate where deeper repairs to the milled surface may be necessary to improve the life of the overlay. This includes distresses such as severe longitudinal and transverse cracking, alligator/fatigue cracking of any severity, potholes, edge cracking, and similar failures. MnDOT defines these distresses in their surface rating procedure as follows:

- High-severity transverse cracking: Any crack running transverse to the centerline of the roadway with significant adjacent random cracking (12 inches or more apart), have large areas of spalling, missing material and/or potholes.

- High-severity longitudinal cracking: Any crack running parallel to the centerline of the roadway with significant adjacent random cracking (12 inches or more apart), large areas of spalling, missing material and/or potholes.

- Alligator cracking: A series of interconnected cracks forming many-sided, sharp-angled pieces, 6 inches or less in size, typically located in the wheel paths and under concentrated traffic loads.

We recommend an experienced engineer walk the milled surface to delineate areas for these repairs based on conditions exposed by the milling process. We recommend performing the full-depth mill to at least 1 foot beyond the edge of the visible distresses where present.

## C.5. Karth Lake Park Trail

We understand that Karth Lake Park Trail is not anticipated to touch the subgrade and will be limited to removal of existing bituminous pavement, placing additional aggregate base down and then repaving. The following subsections provide general recommendations for this work.

### C.5.a. Base Grade Proofroll

After preparing the aggregate base, we recommend proofrolling the aggregate base with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proofroll. Areas that fail the proofroll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proofroll, as determined by the geotechnical representative. If the aggregate base proofroll shows signs of distress, possible options could be to correct the subgrade which could include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, chemical stabilization and/or geotextiles. If subgrade corrections occur, we recommend performing a second proofroll after the aggregate base material is in place (where aggregate base was removed), and prior to placing bituminous pavement.

### C.5.b. Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar _ soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of _. Note the contractor may need to perform limited removal of unsuitable or less suitable soils to achieve this value. Table X provides recommended pavement sections, based on the soils support and traffic loads.

**Table 8. Proposed Bituminous Trail Pavement Section – Karth Lake Trail**

| Material | Thickness (inches) | Material | Material Specification |
|---|---|---|---|
| Bituminous wear course | 1 1/2 | SPWEA240C | MnDOT 2360 |
| Bituminous wear course | 2 | SPWEB230C | MnDOT 2360 |
| Aggregate base | 6* | Class 5 or 6 | MnDOT 2211 |
| Approved subgrade | --- | --- | --- |

*Could potentially incorporate residual apparent aggregate base on-site from existing section, depending on site observations.

For recommendations on bituminous pavement materials, compaction, performance and maintenance, and miscellaneous bituminous recommendations, please refer to sections C.3.c., C.3.d. and C.3.e, respectively.

# D. Procedures

## D.1. Ground Penetrating Radar

### D.1.a. Data Collection

GPR data was collected in May of 2025. GPR collection occurred at posted speed limits and data was recorded continuously along the pavement to a depth of up to 2 feet. Analysis of this data provides a continuous estimate of layer thickness for identifiable layers.

Scans of the pavement were collected according to GSSI, Inc. (manufacturer) SIR-30 processor settings at a specified interval of approximately one scan per lineal foot in the outer wheel path. A calibration file, required for data post-processing, was collected at the onset of testing. The RoadScan system from GSSI, Inc. allows for the entry of user marks to note events. This capability was used to mark and tie in core locations. Distance along the pavement is measured using a Distance Measuring Instrument (DMI).

### D.1.b. GPR Analysis

Data collected by the GPR unit was returned to our office and analyzed to estimate the pavement thickness. Pavement layer interpretation was accomplished using RADAN 7.0, a software package included with the GSSI RoadScan system. The software includes tools to aid in delineating pavement layer transitions and automatically calculates their depths from the pavement surface using the calibration file(s) collected prior to or following testing.

Where “ground-truth” data (cores and hand augers) were performed, the interpreted layers from the GPR scan were compared directly to the measured thicknesses from the borings to validate the accuracy of the GPR analysis.

## D.2. Pavement Coring and Hand Auger Borings

We performed pavement cores and hand auger borings in April of 2025. Exploration locations were selected based on GPR results. The coring was performed with a 6-inch diameter diamond-toothed core barrel fitted on a mechanically operated rotary drill. From the top of the apparent aggregate base layer, we extended a manually operated hand auger through the base layer and into the subgrade layer. Upon completion of the pavement cores and hand augers, we then performed our penetration test borings.

The cores were measured to obtain approximate bituminous thicknesses, and their material conditions were noted based on visual observation. A sample of underlying base material was obtained at each of the exploration locations and was sent to our laboratory for review by a geotechnical engineer.

## D.3. Penetration Test Borings

We drilled the penetration test borings with a GeoProbe-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples continuously to a depth of 6 feet below existing grade, then at 2 1/2-foot intervals in general accordance to ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

## D.4. Exploration Logs

### D.4.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

### D.4.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

## D.5. Material Classification and Testing

### D.5.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

### D.5.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM procedures.

## D.6. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes or allowed them to remain open for an extended period of observation, as noted on the boring logs.

# E. Qualifications

## E.1. Variations in Subsurface Conditions

### E.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

### E.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

## E.2. Continuity of Professional Responsibility

### E.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

### E.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

## E.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

## E.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

# Appendix




**DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING**

200' 0 400'

SCALE: 1"= 400'

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BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

**Drawing Information**

| | |
|---|---|
| Project No: | B2502087 |
| Drawing No: | B2502087 |
| Drawn By: | JAG |
| Date Drawn: | 3/25/25 |
| Checked By: | ZTS |
| Last Modified: | 4/22/25 |

**Project Information**

City of Areden Hills
2026 PMP Street and Utility Improvements

Bounded by Highway 96, Lexington Avenue N., Cummings Park Drive and Hamline Avenue

Arden Hills, Minnesota

# Soil Boring Location Sketch

BRAUN INTERTEC
The Science You Build On.

# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-1**
LOCATION: Estimated
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204792 EASTING: 558427
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 965.0 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 964.1 | | PAVEMENT, 5 1/2 inches of bituminous over 5 inches of apparent aggregate base | | | | | |
| 0.9 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, brown, moist | | 2-4 (4) 12" | | | |
| | | | | 3-8-6-9 (14) 19" | | 17 | |
| | | | 5 | 3-5-7-10 (12) 20" | | | |
| 958.0 | | | | | | | |
| 7.0 | | FILL: LEAN CLAY (CL), trace Gravel, trace roots, slightly organic, bluish gray to brown, moist | | 2-5-7 (12) 14" | | 21 | OC=2% |
| | | | 10 | 3-4-8 (12) 17" | | | |
| 954.0 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
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| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-2**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204660.4 EASTING: 558700.9
START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 967.0 ft
DRILLER: M. Barber
LOGGED BY: Z. Semlak
RIG: GP-1
METHOD: 3 1/4" HSA
SURFACING: Bituminous
WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 966.4 | | PAVEMENT, 3 3/4 inches of bituminous over 4 inches of apparent aggregate base | | | | | |
| 0.6 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, brown, moist | AU | | | 11 | |
| | | *Light brown to reddish brown at 2 feet* | | 2-2-3-5 (5) 18" | | | |
| 963.0 | | | | | | | |
| 4.0 | | CLAYEY SAND (SC), trace Gravel, brown, moist, stiff to very stiff (GLACIAL TILL) | | 2-7-8-10 (15) 24" | | 15 | LL=30, PL=16, PI=14 |
| | | | 5 | 5-9-14 (23) 16" | | | |
| | | | 10 | 6-8-13 (21) 18" | | | |
| 956.0 | | | | | | | |
| 11.0 | | END OF BORING | | | | | Water not observed while drilling. |
| | | Boring then backfilled with auger cuttings | | | | | |
| | | | 15 | | | | |
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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-3**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204314.2 EASTING: 558858.4
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 968.7 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 967.7 | | PAVEMENT, 9 1/4 inches of bituminous over 3 inches of apparent aggregate base | | | | | |
| 1.0 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, brown to dark brown, moist<br>*Reddish brown to brown at 2 feet* | | 1-3<br>(3)<br>10" | | 13 | |
| | | | | 1-3-5-7<br>(8)<br>15" | | | |
| 5 | | | | 4-5-6-7<br>(11)<br>10" | | 13 | |
| | | | | 1-2-4<br>(6)<br>13" | | | |
| 10 | | | | 1-2-3<br>(5)<br>9" | | | |
| 957.7 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| 15 | | | | | | | |
| 20 | | | | | | | |
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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-4**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204899.6 EASTING: 559146.8
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 957.6 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 956.6 | | PAVEMENT, 6 1/2 inches of bituminous over 6 inches of apparent aggregate base | | 4-7 (7) 12" | | | |
| 1.0 | | FILL: CLAYEY SAND (SC), trace Gravel, with Silty Sand seams, brown, moist | | | | | |
| 955.6 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, with SANDY LEAN CLAY layers, brown, moist | | 6-5-7-7 (12) 15" | | 7 | |
| 2.0 | | *SILTY SAND layers at 4 feet* | 5 | 7-8-9-9 (17) 14" | | | |
| 951.6 | | FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, with Sandy Lean Clay seams, brown, moist | | 9-7-9 (16) 12" | | 7 | |
| 6.0 | | *Sandy Lean Clay seams from 6 to 9 1/2 feet* | 10 | 7-8-9 (17) 14" | | | |
| 946.6 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-5**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204648.4 EASTING: 559669.9
START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 963.7 ft
DRILLER: M. Barber
LOGGED BY: Z. Semlak
RIG: GP-1
METHOD: 3 1/4" HSA
SURFACING: Bituminous
WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 962.1 | | PAVEMENT, 11 inches of bituminous over 8 inches of apparent aggregate base | | 2-2 (2) 12" | | 4 | |
| 1.6 | | FILL: SILTY SAND (SM), fine-grained, trace Gravel, dark brown, moist | | 0-0-1-2 (1) 10" | | | |
| 961.7 | | FILL: SANDY LEAN CLAY (CL), brown, moist | | 0-1-4-3 (5) 12" | | 18 | |
| 2.0 | | SANDY LEAN CLAY (CL), brown, moist, medium to very stiff (GLACIAL TILL) | | 1-2-4 (6) 11" | | | |
| 959.7 | | | | 2-6-10 (16) 14" | | | |
| 4.0 | | | | | | | |
| 952.7 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-6**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204647.8 EASTING: 560226.8
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 946.8 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 945.4 | | PAVEMENT, 9 inches of bituminous over 8 inches of apparent aggregate base | | 6-9 (9) 12" | | 4 | |
| 1.4 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with Gravel, brown, moist | | 3-4-8-10 (12) 16" | | | |
| | | | 5 | 5-5-6-7 (11) 18" | | | |
| 939.8 | | | | | | | |
| 7.0 | | FILL: POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, brown, moist | | 6-6-8 (14) 14" | | 1 | P200=3% |
| 936.8 | | | | | | | |
| 10.0 | | SANDY LEAN CLAY (CL), brown, moist, very stiff (GLACIAL TILL) | 10 | 10-13-16 (29) 12" | | 17 | LL=21, PL=15, PI=6 |
| 935.8 | | | | | | | Water not observed while drilling. |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | |
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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-7**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204735.4 EASTING: 560671.3
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 946.4 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 945.4 | | PAVEMENT, 8 1/2 inches of bituminous over 5 inches of apparent aggregate base | | | | | |
| 1.0 | | FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, dark brown, moist | | 3-5 (5) 12" | | | |
| 944.4 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, brown, moist | | 13-14-11-9 (25) 18" | | 6 | P200=5% |
| 2.0 | | FILL: SILTY SAND (SM), fine to medium-grained, brown, moist | | 4-7-6-8 (13) 18" | | 5 | |
| 942.4 | | | | 7-8-6 (14) 4" | | | |
| 4.0 | | SANDY LEAN CLAY (CL), brown, moist, medium (GLACIAL TILL) | | 2-3-4 (7) 16" | | | |
| 936.9 | | | | | | | |
| 9.5 | | END OF BORING | | | | | Water not observed while drilling. |
| 935.4 | | Boring then backfilled with auger cuttings | | | | | |
| 11.0 | | | | | | | |

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See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-8**
LOCATION: Estimated
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204130 EASTING: 560693
START DATE: 04/01/25 END DATE: 04/01/25
DRILLER: M. Barber LOGGED BY: Z. Semlak
SURFACE ELEVATION: 950.7 ft RIG: GP-1 METHOD: 3 1/4" HSA
SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 950.1 | | PAVEMENT, 5 1/2 inches of bituminous over 2 inches of apparent aggregate base | | AU | | | |
| 0.6 | | FILL: SILTY SAND (SM), fine-grained, with Clay seams, brown, moist | | 2-4-11-16 (15) 20" | | 5 | |
| 948.7 | | SILTY SAND (SM), fine to medium-grained, trace Gravel, reddish brown, moist, medium dense to dense (GLACIAL TILL) | | 14-15-32-25 (47) 24" | | 5 | P200=24% |
| 2.0 | | | 5 | | | | |
| | | | | 36-20-30 (50) 16" | | | |
| | | | 10 | 13-10-15 (25) 18" | | | |
| 939.7 | | | | | | | |
| 11.0 | | END OF BORING<br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-9**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 203960.5 EASTING: 560277.7
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 956.5 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 954.9 | | PAVEMENT, 4 3/4 inches of bituminous over 14 inches of apparent aggregate base | | 7-9 (9) 12" | | 8 | |
| 1.6 954.5 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, moist | | 2-3-4-5 (7) 14" | | | |
| 2.0 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, brown, moist<br>*Bluish gray to brown and slightly organic seams at 4 feet* | 5 | 1-3-5-7 (8) 14" | | 15 | |
| 949.5 7.0 | | FILL: LEAN CLAY (CL), slightly organic, with Silty Sand seams, dark brown to gray, moist | | 2-7-8 (15) 4" | | | |
| 947.0 9.5 | | FILL: LEAN CLAY (CL), trace Gravel, gray to bluish gray, moist, iron oxide staining | 10 | 1-2-3 (5) 8" | | | |
| 945.5 11.0 | | END OF BORING<br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-10**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204293.1 EASTING: 560825.3
START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 952.8 ft
DRILLER: M. Barber LOGGED BY: Z. Semlak
RIG: GP-1 METHOD: 3 1/4" HSA
SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 952.0 | | PAVEMENT, 7 inches of bituminous over 3 inches of apparent aggregate base | | | | | |
| 0.8 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, brown to dark brown, moist | | 4-6<br>(6)<br>10"<br>2-3-5-8<br>(8)<br>14" | | 14 | |
| 948.8 | | | | | | | |
| 4.0 | | SILTY SAND (SM), fine-grained, trace Gravel, with Clayey Sand seams, brown to reddish brown, moist, dense to very dense (GLACIAL TILL) | 5 | 12-22-23-50/<br>5"<br>(45)<br>9"<br>43-29-34<br>(63)<br>15" | | | |
| 943.4 | | | | | | | |
| 9.5 | | SANDY LEAN CLAY (CL), trace Gravel, brown to reddish brown, dry, hard (GLACIAL TILL) | 10 | 46-34-31<br>(65)<br>16" | | | |
| 941.8 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-11**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204294.4 EASTING: 560305.6
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/01/25 END DATE: 04/01/25
SURFACE ELEVATION: 953.1 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear/Rain

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 952.1 | | PAVEMENT, 8 inches of bituminous over 4 inches of apparent aggregate base | | | | | |
| 1.0 | | FILL: CLAYEY SAND (SC), trace Gravel, reddish brown, moist | | 14-9 (9) 10" | | 9 | |
| | | | | 6-8-9-14/6" (17) 19" | | 9 | |
| | | | 5 | 13-14-13-11 (27) 18" | | 10 | P200=45% |
| | | | | 1-2-3 (5) 14" | | | |
| | | *Silty Sand seams at 9 1/2 feet* | 10 | 1-1-3 (4) 11" | | | |
| 942.1 | | | | | | | |
| 11.0 | | END OF BORING | | | | | Water not observed while drilling. |
| | | Boring then backfilled with auger cuttings | | | | | |
| | | | 15 | | | | |
| | | | 20 | | | | |
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# LOG OF BORING

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-12**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 204376.1 EASTING: 559774.4
START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 961.2 ft
DRILLER: M. Barber LOGGED BY: Z. Semlak
RIG: GP-1 METHOD: 3 1/4" HSA
SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 960.4 | | PAVEMENT, 3 1/2 inches of bituminous over 7 inches of apparent aggregate base | | | | | |
| 0.9 | | FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, with Clayey Sand seams, dark brown, moist | | 8-7 (7) 12" | | 11 | |
| 959.2 | | FILL: LEAN CLAY (CL), trace Gravel, reddish brown, moist | | 2-3-5-6 (8) 18" | | | |
| 2.0 | | LEAN CLAY (CL), with Sand, trace Gravel, reddish brown, moist, stiff (GLACIAL TILL) | | 4-5-8-10 (13) 18" | | 17 | |
| 957.2 | | | | 3-5-7 (12) 18" | | | |
| 4.0 | | | | 4-6-8 (14) 18" | | | |
| 950.2 | | END OF BORING | | | | | Water not observed while drilling. |
| 11.0 | | Boring then backfilled with auger cuttings | | | | | |

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**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-13**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 203954.9 EASTING: 560059.7
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 957.0 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 955.7 | | PAVEMENT, 3 3/4 inches of bituminous over 12 inches of apparent aggregate base | | 4-4 (4) 12" | | 14 | |
| 1.3 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown, moist | | 2-3-7-9 (10) 24" | | 11 | P200=47% |
| 955.0 2.0 | | FILL: CLAYEY SAND (SC), trace Gravel, slightly organic, with Silty Sand seams, dark brown, moist | | 4-7-11-16 (18) 24" | | | |
| 952.0 5.0 | | LEAN CLAY (CL), with Sand, trace Gravel, reddish brown, moist to dry, very stiff (GLACIAL TILL) | 5 | 4-13-17 (30) 18" | | 18 | |
| | | | 10 | 5-10-14 (24) 18" | | | |
| 946.0 11.0 | | END OF BORING<br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-14**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 203637.6 EASTING: 560427.2
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 954.8 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 953.8 | | PAVEMENT, 3 3/4 inches of bituminous over 9 1/2 inches of apparent aggregate base | | | | | |
| 1.0 | | FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist to wet | | 5-4 (4) 12" | | | |
| 952.8 | | FILL: LEAN CLAY (CL), trace Gravel, slightly organic, bluish gray to gray, moist | | 1-2-3-4 (5) 10" | | 18 | |
| 2.0 | | *Slightly organic from 4 to 6 feet* | | | | | |
| | | *Brown with mottled gray at 4 feet* | 5 | 1-1-2-4 (3) 14" | | 24 | OC=2% |
| 947.8 | | | | | | | |
| 7.0 | | SANDY LEAN CLAY (CL), trace Gravel, light brown, moist, stiff to very stiff (GLACIAL TILL) | | 2-6-8 (14) 18" | | | |
| | | *Reddish brown at 10 feet* | 10 | 3-8-13 (21) 18" | | | |
| 943.8 | | | | | | | |
| 11.0 | | END OF BORING | | | | | Water not observed while drilling. |
| | | Boring then backfilled with auger cuttings | | | | | |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-15**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 203634.6 EASTING: 560741.0
DRILLER: M. Barber LOGGED BY: Z. Semlak START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 957.4 ft RIG: GP-1 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 956.8 | | PAVEMENT, 6 1/2 inches of bituminous over 1 inches of apparent aggregate base | | | | | |
| 0.6 | | FILL: SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist | | 2-2 (2) 12" | | 16 | |
| | | | | 0-0-0-0 WOH/ 13" | | | |
| 952.4 | | | | | | | |
| 5.0 | | SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium to very stiff (GLACIAL TILL) | 5 | 1-1-5-8 (6) 24" | | 16 | |
| | | | | 3-6-8 (14) 18" | | | |
| | | | 10 | 4-9-13 (22) 18" | | | |
| 946.4 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-16**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 203337.0 EASTING: 560784.2
START DATE: 04/02/25 END DATE: 04/02/25
SURFACE ELEVATION: 957.0 ft
RIG: GP-1
METHOD: 3 1/4" HSA
SURFACING: Bituminous
WEATHER: Clear
DRILLER: M. Barber
LOGGED BY: Z. Semlak

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 956.0 | | PAVEMENT, 5 1/2 inches of bituminous over 7 inches of apparent aggregate base | | AU | | | |
| 1.0 | | FILL: SILTY SAND (SM), fine to coarse-grained, with Clayey Sand seams, dark brown, moist | | 1-2-3-5 (5) 16" | | 10 | |
| 955.0 2.0 | | FILL: SANDY LEAN CLAY (CL), with POORLY GRADED SAND WITH SILT layers, gray to brown, moist | | 4-7-9-11 (16) 19" | | | |
| 953.0 4.0 | | LEAN CLAY (CL), with Sand, trace Gravel, reddish brown, moist, very stiff (GLACIAL TILL) | 5 | | | | |
| | | | | 3-6-11 (17) 18" | | 16 | |
| | | | 10 | 5-9-13 (22) 18" | | | |
| 946.0 11.0 | | END OF BORING<br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-17**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 201795.7 EASTING: 559657.6
DRILLER: J. Vloo LOGGED BY: Z. Semlak START DATE: 04/03/25 END DATE: 04/03/25
SURFACE ELEVATION: 1002.1 ft RIG: 7519 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 1000.6 | | PAVEMENT, 5 1/4 inches of bituminous over 13 inches of apparent aggregate base | | 8-11 (11) 12" | | | |
| 1.5 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with Silt lenses, brown, moist | | 10-8-6-7 (14) 14" | | 10 | |
| 998.1 | | | | | | | |
| 4.0 | | SANDY LEAN CLAY (CL), trace Gravel, brown, moist, stiff (GLACIAL TILL) | | 8-7-6 (13) 16" | | | |
| | | | 5 | 6-5-6 (11) 16" | | 16 | |
| | | | 10 | 4-5-7 (12) 16" | | | |
| 991.1 | | | | | | | |
| 11.0 | | END OF BORING<br><br>Boring then backfilled with auger cuttings | | | | | Water not observed while drilling. |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-18**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 201788.2 EASTING: 560271.1
DRILLER: J. Vloo LOGGED BY: Z. Semlak START DATE: 04/03/25 END DATE: 04/03/25
SURFACE ELEVATION: 1007.4 ft RIG: 7519 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 1006.1 | | PAVEMENT, 4 1/4 inches of bituminous over 11 inches of apparent aggregate base | | | | | |
| 1.3 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, brown, moist | | 4-3 (3) 12" | | 11 | |
| 1005.4 | | SANDY LEAN CLAY (CL), trace Gravel, brown to reddish brown, moist, medium to very stiff (GLACIAL TILL) | | 3-2-2-5 (4) 14" | | | |
| 2.0 | | | | 5-6-8-8 (14) 14" | | 15 | |
| | | | | 5-7-10 (17) 16" | | | |
| | | *Reddish brown at 9 1/2 feet* | | 10-7-10 (17) 14" | | | |
| 996.4 | | | | | | | |
| 11.0 | | END OF BORING | | | | | Water not observed while drilling. |
| | | Boring then backfilled with auger cuttings | | | | | |

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# LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

**Project Number B2502087**
**Geotechnical Evaluation**
**City of Arden Hills 2026 Improvements**
**Hamline Avenue and Amble Road**
**Arden Hills, Minnesota**

BORING: **ST-19**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Ramsey (US Feet)
NORTHING: 201810.6 EASTING: 560737.5
DRILLER: J. Vloo LOGGED BY: Z. Semlak START DATE: 04/03/25 END DATE: 04/03/25
SURFACE ELEVATION: 1000.5 ft RIG: 7519 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Clear

| Elev./ Depth ft | Water Level | Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) | Sample | Blows (N-Value) Recovery | $q_p$ tsf | MC % | Tests or Remarks |
|---|---|---|---|---|---|---|---|
| 999.5 | | PAVEMENT, 4 1/4 inches of bituminous over 8 inches of apparent aggregate base | | | | | |
| 1.0 | | FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, brown, dry | | 7-7 (7) 12" | | 4 | P200=6% |
| | | *Clay lenses at 3 feet* | | 8-9-8-10 (17) 16" | | | |
| 996.5 | | | | | | | |
| 4.0 | | SANDY LEAN CLAY (CL), brown, moist, stiff to very stiff (GLACIAL TILL) | | 11-9-8-6 (17) 14" | | 19 | |
| | | | 5 | 7-6-7 (13) 14" | | | |
| | | | 10 | 6-10-9 (19) 16" | | | |
| 989.5 | | | | | | | |
| 11.0 | | END OF BORING | | | | | Water not observed while drilling. |
| | | Boring then backfilled with auger cuttings | | | | | |
| | | | 15 | | | | |
| | | | 20 | | | | |
| | | | 25 | | | | |
| | | | 30 | | | | |

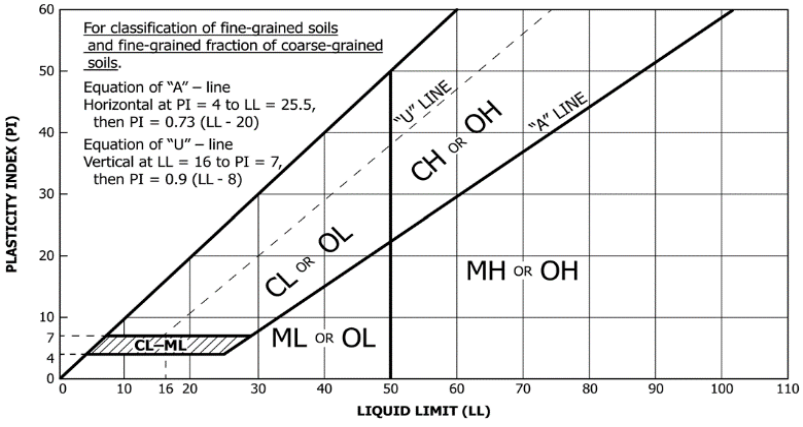
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# Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

| Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A] | | | | Soil Classification | |
|---|---|---|---|---|---|
| | | | | Group Symbol | Group Name[B] |
| Coarse-grained Soils (more than 50% retained on No. 200 sieve) | Gravels (More than 50% of coarse fraction retained on No. 4 sieve) | Clean Gravels (Less than 5% fines[C]) | $C_u \geq 4$ and $1 \leq C_c \leq 3$[D] | GW | Well-graded gravel[E] |
| | | | $C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D] | GP | Poorly graded gravel[E] |
| | | Gravels with Fines (More than 12% fines[C]) | Fines classify as ML or MH | GM | Silty gravel[E F G] |
| | | | Fines Classify as CL or CH | GC | Clayey gravel[E F G] |
| | Sands (50% or more coarse fraction passes No. 4 sieve) | Clean Sands (Less than 5% fines[H]) | $C_u \geq 6$ and $1 \leq C_c \leq 3$[D] | SW | Well-graded sand[I] |
| | | | $C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D] | SP | Poorly graded sand[I] |
| | | Sands with Fines (More than 12% fines[H]) | Fines classify as ML or MH | SM | Silty sand[F G I] |
| | | | Fines classify as CL or CH | SC | Clayey sand[F G I] |
| Fine-grained Soils (50% or more passes the No. 200 sieve) | Silts and Clays (Liquid limit less than 50) | Inorganic | PI > 7 and plots on or above "A" line[J] | CL | Lean clay[K L M] |
| | | | PI < 4 or plots below "A" line[J] | ML | Silt[K L M] |
| | | Organic | Liquid Limit – oven dried / Liquid Limit – not dried < 0.75 | OL | Organic clay[K L M N] / Organic silt[K L M O] |
| | Silts and Clays (Liquid limit 50 or more) | Inorganic | PI plots on or above "A" line | CH | Fat clay[K L M] |
| | | | PI plots below "A" line | MH | Elastic silt[K L M] |
| | | Organic | Liquid Limit – oven dried / Liquid Limit – not dried < 0.75 | OH | Organic clay[K L M P] / Organic silt[K L M Q] |
| Highly Organic Soils | | Primarily organic matter, dark in color, and organic odor | | PT | Peat |

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.




### Laboratory Tests

| | | | |
|---|---|---|---|
| **DD** | Dry density, pcf | **$q_p$** | Pocket penetrometer strength, tsf |
| **WD** | Wet density, pcf | **$q_U$** | Unconfined compression test, tsf |
| **P200** | % Passing #200 sieve | **LL** | Liquid limit |
| **MC** | Moisture content, % | **PL** | Plastic limit |
| **OC** | Organic content, % | **PI** | Plasticity index |

### Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

### Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

### Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

### Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

| Consistency of Cohesive Soils | Blows Per Foot | Approximate Unconfined Compressive Strength |
|---|---|---|
| Very soft | 0 to 1 BPF | < 0.25 tsf |
| Soft | 2 to 4 BPF | 0.25 to 0.5 tsf |
| Medium | 5 to 8 BPF | 0.5 to 1 tsf |
| Stiff | 9 to 15 BPF | 1 to 2 tsf |
| Very Stiff | 16 to 30 BPF | 2 to 4 tsf |
| Hard | over 30 BPF | > 4 tsf |

### Moisture Content:

**Dry:** Absence of moisture, dusty, dry to the touch.
**Moist:** Damp but no visible water.
**Wet:** Visible free water, usually soil is below water table.

### Drilling Notes:

**Blows/N-value:** Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

**Partial Penetration:** If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

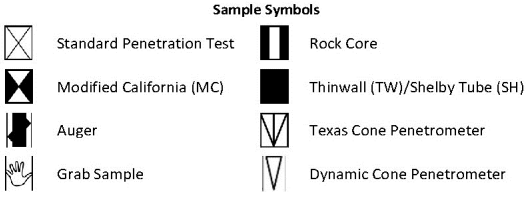
**Recovery:** Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

**WOH:** Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

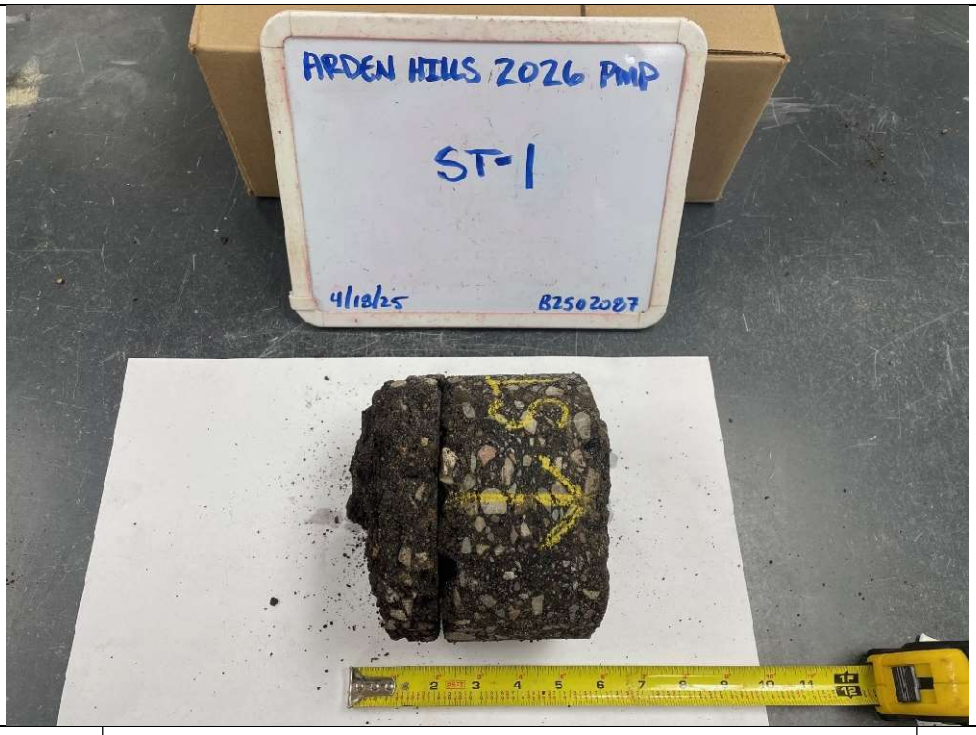
**WOR:** Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

**Water Level:** Indicates the water level measured by the drillers either while drilling ( ▽ ), at the end of drilling ( ▼ ), or at some time after drilling ( ▼ ).

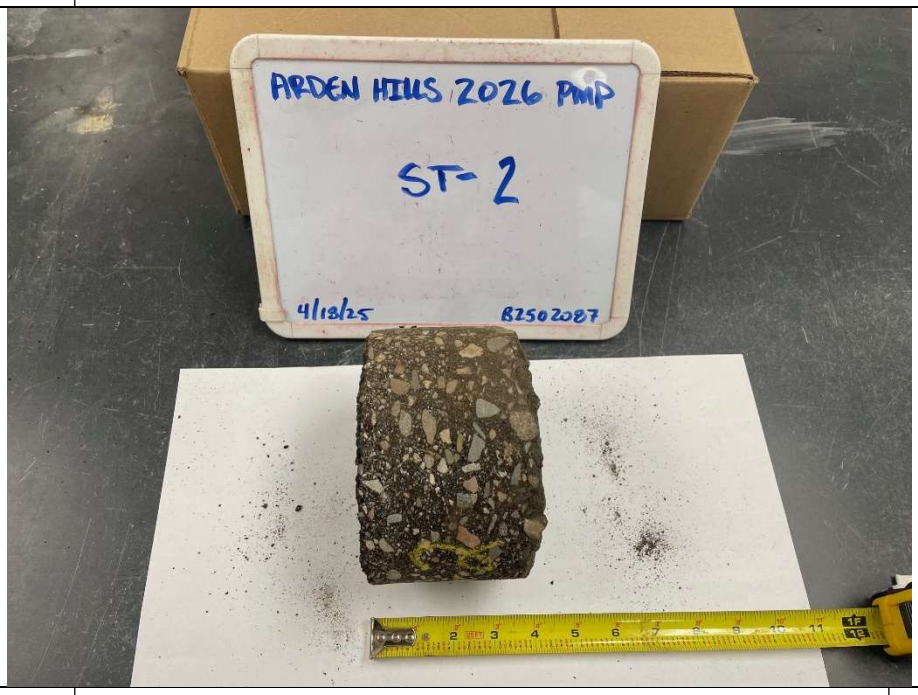
### Sample Symbols



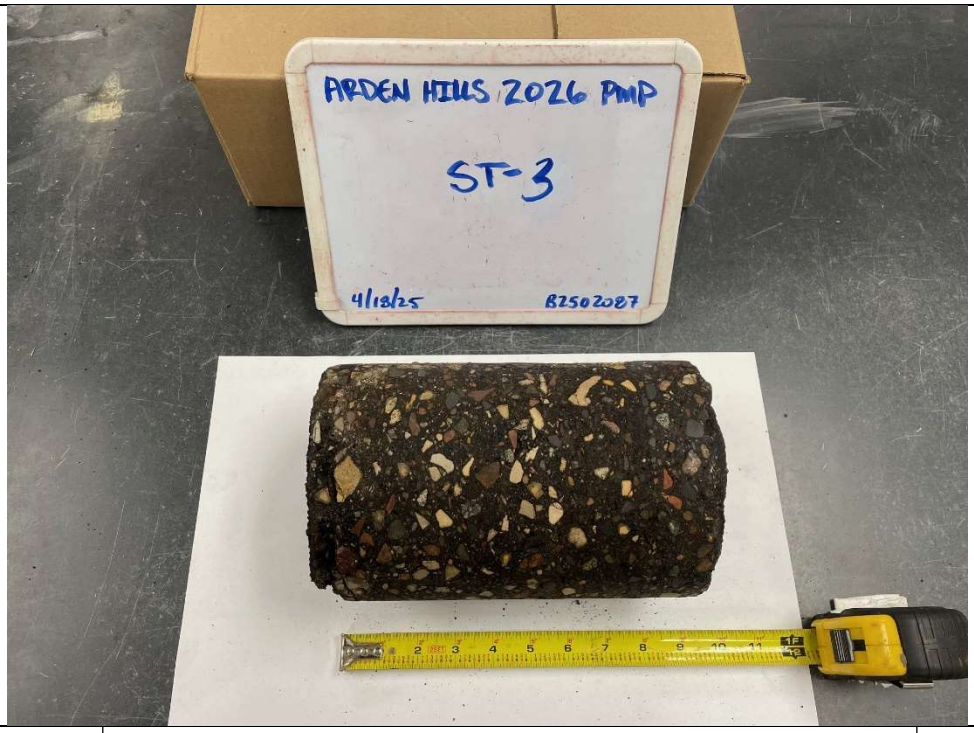

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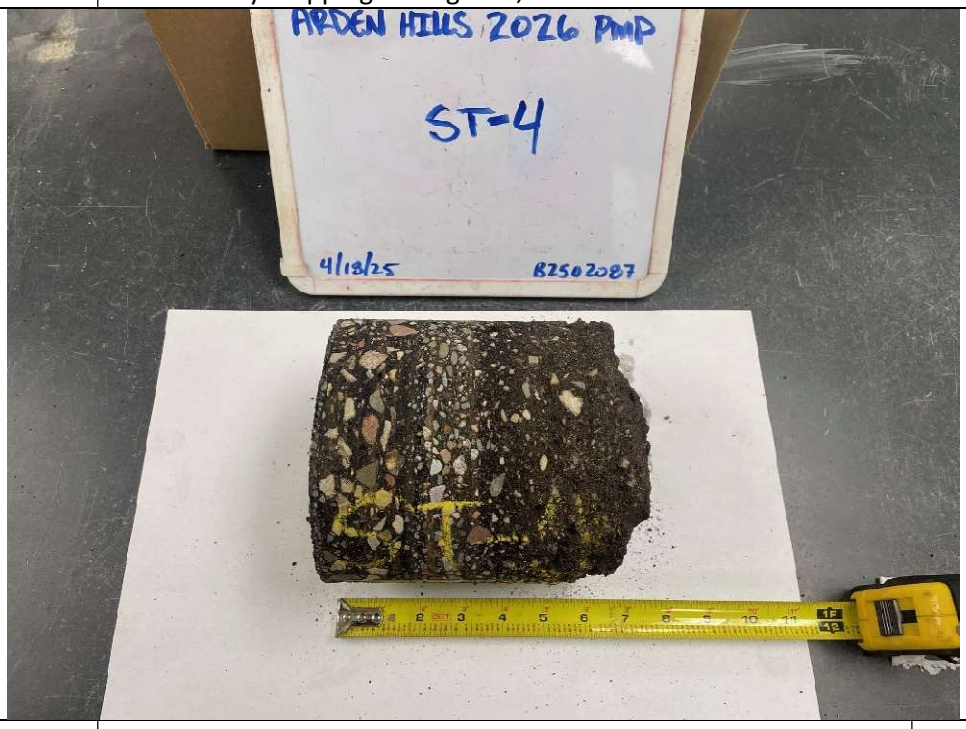

| | | | | |
|---|---|---|---|---|
| Core #: | ST-1 | | | Project: B2502087 |
| Pavement thickness | 5 1/2 inches | Agg base thickness: | 5 inches | BRAUN INTERTEC |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Upper 2” high deterioration; Debonded at 2”; Low severity stripping in bottom 3 1/2 inches. | | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-2 | | | Project: B2502087 |
| Pavement thickness | 3 3/4 inches | Agg base thickness: | 4 inches | BRAUN INTERTEC |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Good condition. Surface has chip seal. | | | |



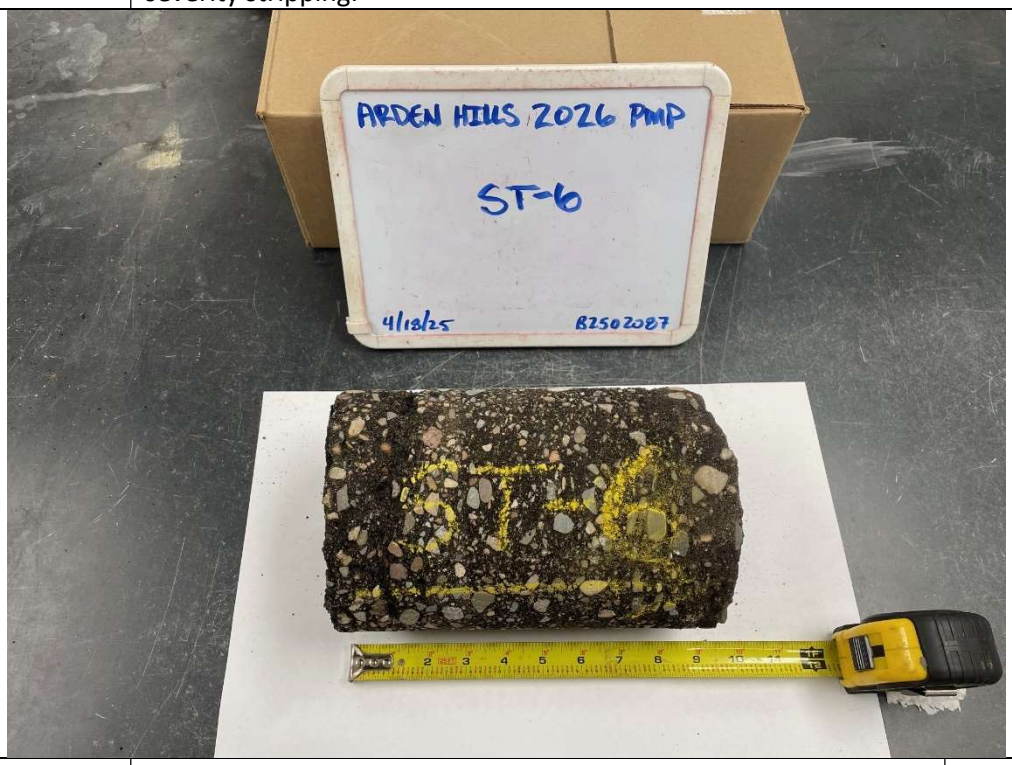

| | | | | |
|---|---|---|---|---|
| Core #: | ST-3 | | | Project: B2502087 |
| Pavement thickness | 9 1/4 inches | Agg base thickness: | 3 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Low severity stripping throughout; Surface distress. | | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-4 | | | Project: B2502087 |
| Pavement thickness | 6-1/2 inches | Agg base thickness: | 6 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | September 16, 2024 | | | |
| Notes: | Low to high severity stripping throughout. | | | |




| | | | |
|---|---|---|---|
| Core #: | ST-5 | | Project: B2502087 |
| Pavement thickness | 11 inches | Agg base thickness: | 8 inches |
| Project Name: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | **Pavement core crumbled at the bottom. Hole measured to 11”. Upper 4 1/4", low severity stripping. | | |




| | | | |
|---|---|---|---|
| Core #: | ST-6 | | Project: B2502087 |
| Pavement thickness | 9 inches | Agg base thickness: | 8 inches |
| Location: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Moderate severity throughout; Deterioration about 1 1/2 inches. | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-7 | | | Project: B2502087 |
| Pavement thickness | 8 1/2 inches | Agg base thickness: | 5 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Upper 4 1/2 inches, good condition; Bottom 4 inches, low to moderate severity stripping. | | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-8 | | | Project: B2502087 |
| Pavement thickness | 5 1/2 inches | Agg base thickness: | 2 inches | |
| Location: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Debonded at 2 1/4 inches; Upper 2 1/4 inches high deterioration; Bottom 3 1/4 inches, low severity stripping. | | | |



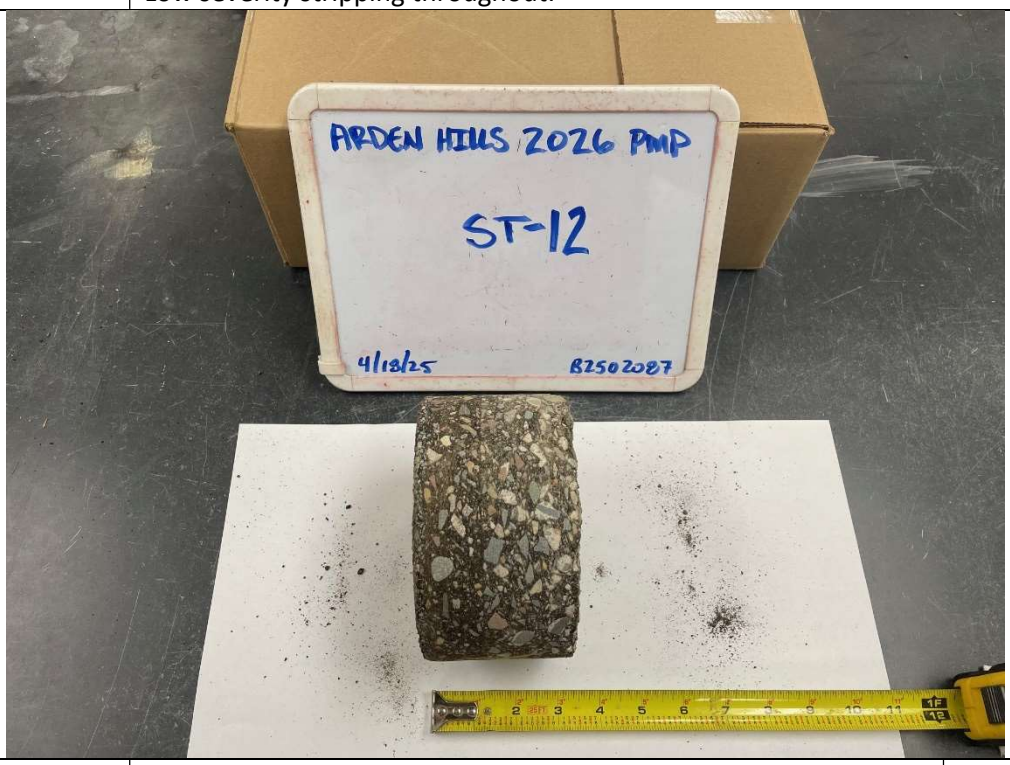

| | | | | |
|---|---|---|---|---|
| Core #: | ST-9 | | | Project: B2502087 |
| Pavement thickness | 4 3/4 inches | Agg base thickness: | 14 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Surface distress; Good core condition; | | | |



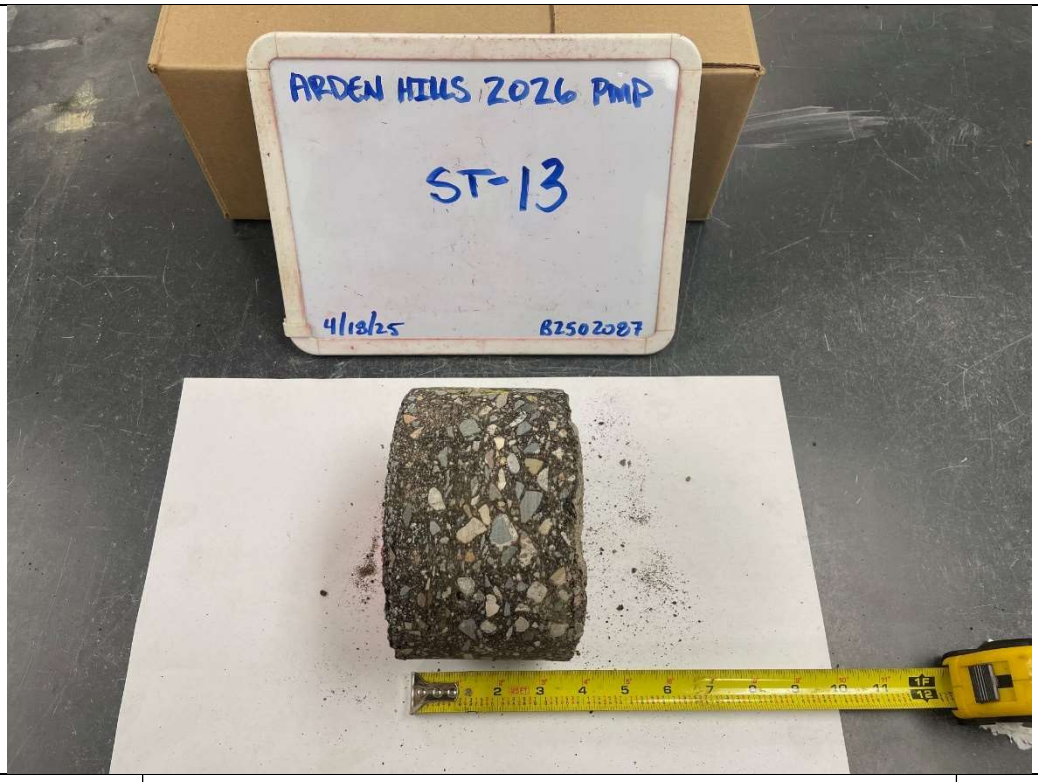

| | | | | |
|---|---|---|---|---|
| Core #: | ST-10 | | | Project: B2502087 |
| Pavement thickness | 7 inches | Agg base thickness: | 3 inches | |
| Location: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Good condition. | | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-11 | | | Project: B2502087 |
| Pavement thickness | 8 inches | Agg base thickness: | 4 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Low severity stripping throughout. | | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-12 | | | Project: B2502087 |
| Pavement thickness | 3 1/2 inches | Agg base thickness: | 7 inches | |
| Location: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Good condition. | | | |




| | | | |
|---|---|---|---|
| Core #: | ST-13 | | Project: B2502087 |
| Pavement thickness | 3 3/4 inches | Agg base thickness: | 12 inches |
| Project Name: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |



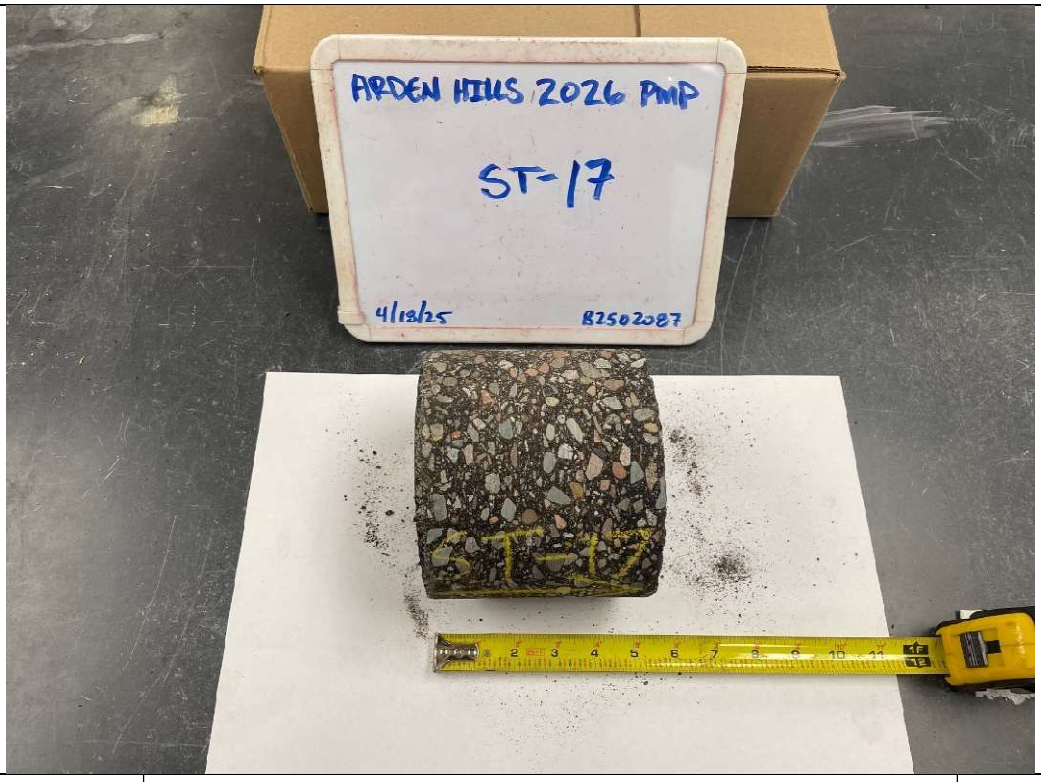

| | | | |
|---|---|---|---|
| Core #: | ST-14 | | Project: B2502087 |
| Pavement thickness | 3 3/4 inches | Agg base thickness: | 9 inches |
| Location: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |




| | | | | |
|---|---|---|---|---|
| Core #: | ST-15 | | | Project: B2502087 |
| Pavement thickness | 6 1/2 inches | Agg base thickness: | 1 inches | |
| Project Name: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Upper 3 1/2 inches, good condition; Surface deterioration; Debonded at 3 1/2 inches; Bottom 3 inches, high deterioration. | | | |



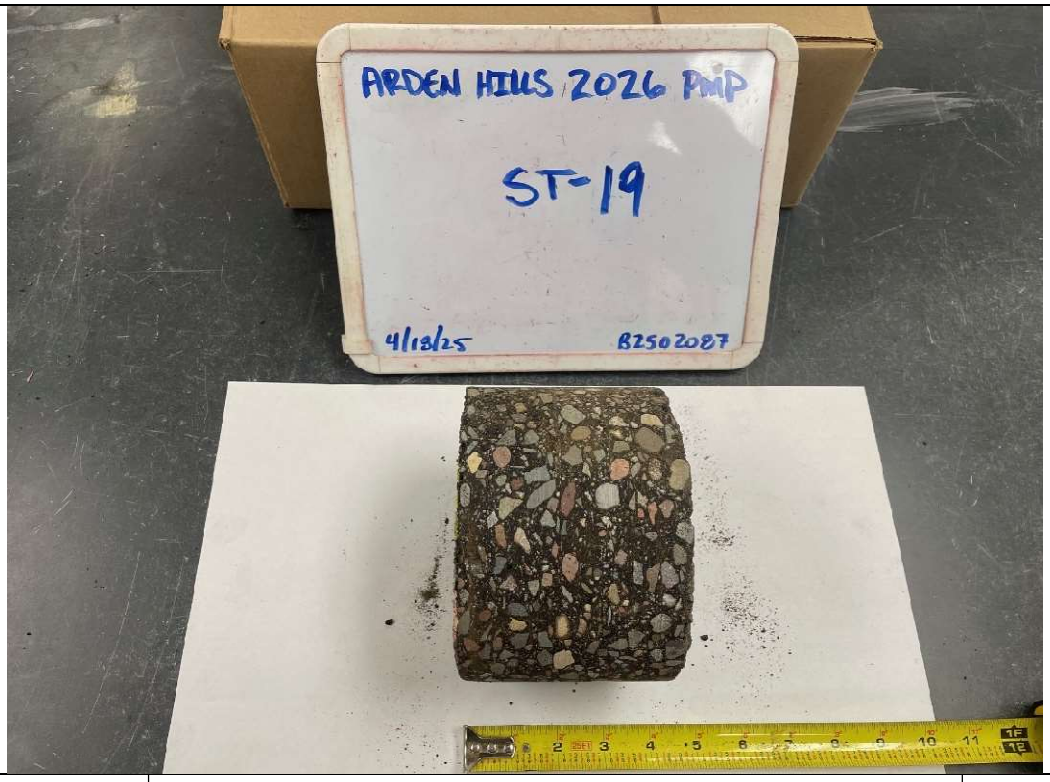

| | | | | |
|---|---|---|---|---|
| Core #: | ST-16 | | | Project: B2502087 |
| Pavement thickness | 5 1/2 inches | Agg base thickness: | 7 inches | |
| Location: | Arden Hills 2026 PMP | | | |
| Date: | April 1, 2025 | | | |
| Notes: | Upper 3 inches, high deterioration; Bottom 2 1/2 inches, low severity stripping. | | | |



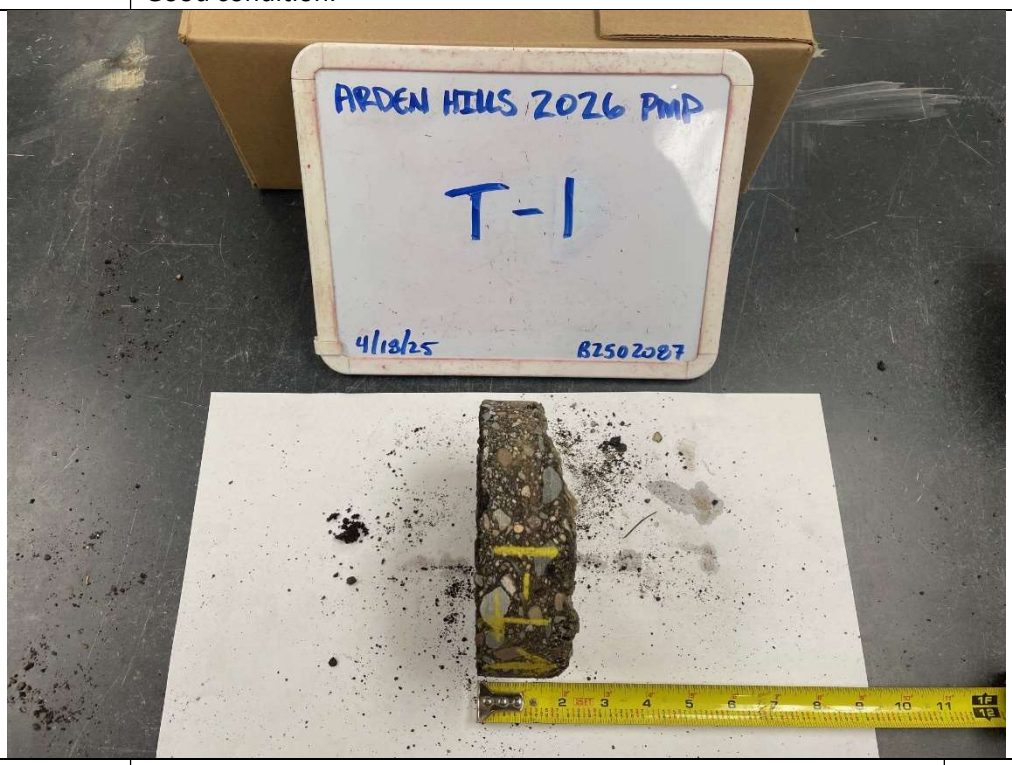

| | | | |
|---|---|---|---|
| Core #: | ST-17 | | Project: B2502087 |
| Pavement thickness | 5 1/4 inches | Agg base thickness: | 7 inches |
| Project Name: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |



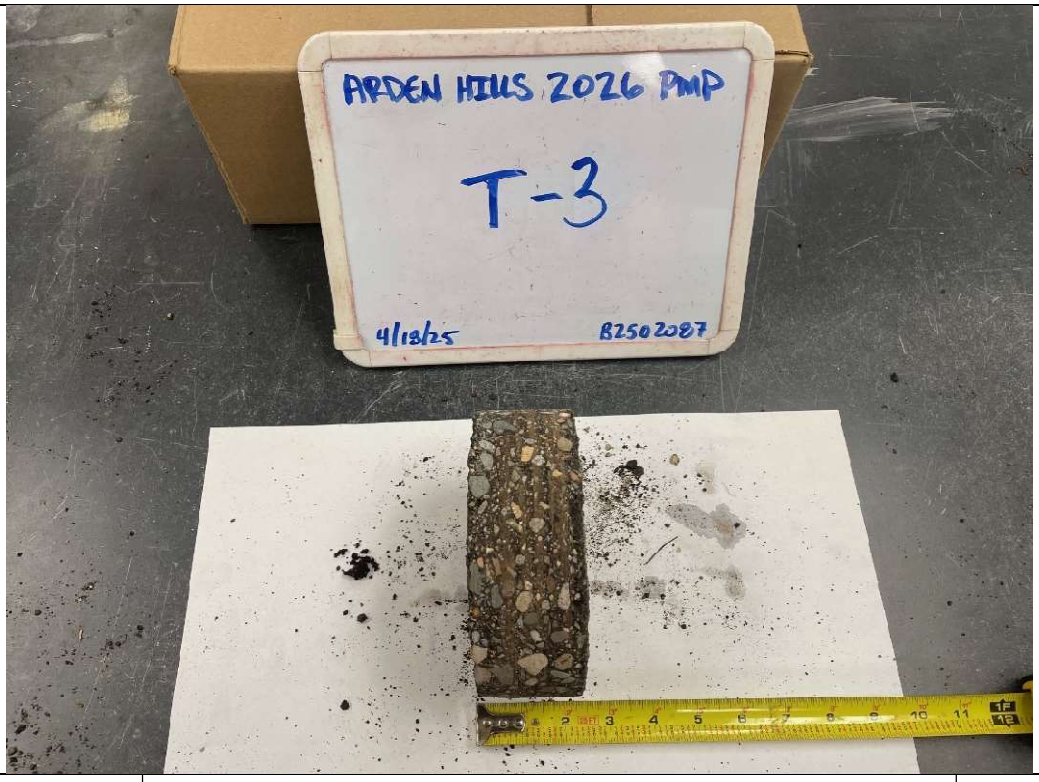

| | | | |
|---|---|---|---|
| Core #: | ST-18 | | Project: B2502087 |
| Pavement thickness | 4 1/4 inches | Agg base thickness: | 11 inches |
| Location: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |




| | | | |
|---|---|---|---|
| Core #: | ST-19 | | Project: B2502087 |
| Pavement thickness | 4 1/4 inches | Agg base thickness: | 8 inches |
| Project Name: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |




| | | | |
|---|---|---|---|
| Core #: | T-1 | | Project: B2502087 |
| Pavement thickness | 1 3/4 inches | Agg base thickness: | 2 inches |
| Location: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |




| | | | |
|---|---|---|---|
| Core #: | T-3 | | Project: B2502087 |
| Pavement thickness | 2 1/4 inches | Agg base thickness: | 2 inches |
| Project Name: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Good condition. | | |




| | | | |
|---|---|---|---|
| Core #: | T-4 | | Project: B2502087 |
| Pavement thickness | 1 1/4 inches | Agg base thickness: | 2 inches |
| Location: | Arden Hills 2026 PMP | | |
| Date: | April 1, 2025 | | |
| Notes: | Low severity stripping. | | |

## Bituminous GPR Results - Arden Hills 2026 PMP

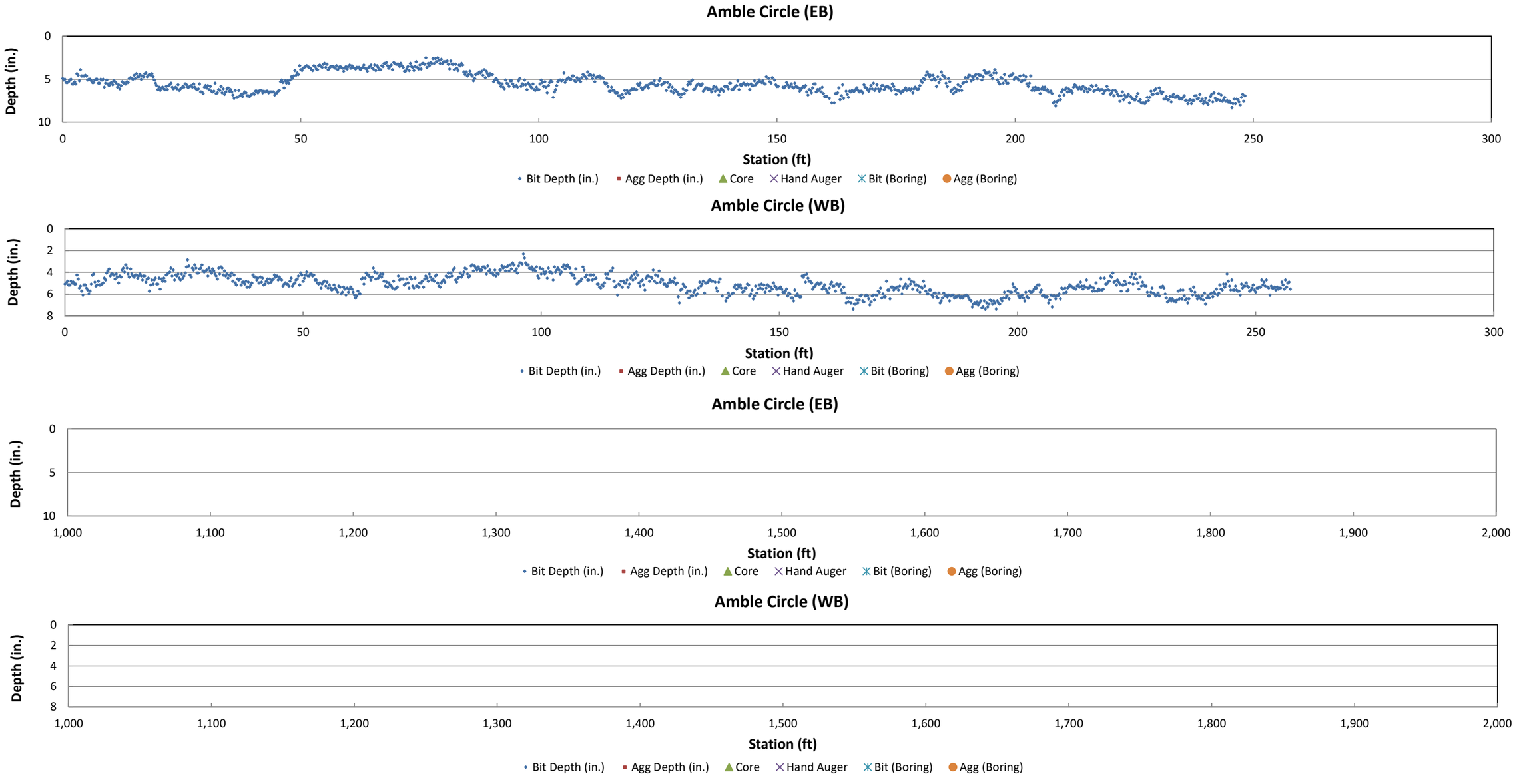
| Segment | Bituminous (inches) | | | | |
|---|---|---|---|---|---|
| | Average | Standard Deviation | Minimum* | Maximum | 10th Percentile |
| Amble Circle (EB) | 5.5 | 2.5 | 8.3 | 3.7 | 1.2 |
| Amble Circle (WB) | 5.1 | 2.3 | 7.4 | 3.9 | 0.9 |
| Amble Drive (EB) | 4.7 | 0.7 | 1.3 | 7.8 | 3.8 |
| Amble Drive (WB) | 4.9 | 0.7 | 2.9 | 7.8 | 4.1 |
| Cummings Park Dr (WB) | 5.8 | 0.8 | 2.2 | 8.9 | 5.0 |
| Cummings Park Dr (EB) | 5.8 | 0.6 | 3.4 | 8.3 | 5.1 |
| Karth Lake Circle (EB/SB) | 6.4 | 1.1 | 1.7 | 9.3 | 5.1 |
| Karth Lake Circle (NB/WB) | 7.3 | 2.7 | 3.3 | 14.3 | 4.9 |
| Karth Lake Drive (EB) | 7.6 | 2.0 | 2.8 | 12.4 | 4.5 |
| Karth Lake Drive (WB) | --- | --- | --- | --- | --- |
| Pleasant Circle (WB) | 9.4 | 0.8 | 6.9 | 12.4 | 8.4 |
| Pleasant Circle (EB) | 7.3 | 1.3 | 4.0 | 11.1 | 5.5 |
| Pleasant Drive (EB) | 5.5 | 0.4 | 4.0 | 7.3 | 5.0 |
| Pleasant Drive (WB) | 5.4 | 0.4 | 3.8 | 7.5 | 4.9 |
| Pleasant Drive (NB) | 7.0 | 1.8 | 4.0 | 12.4 | 5.2 |
| Pleasant Drive (SB) | 7.3 | 1.9 | 4.1 | 12.4 | 5.2 |

# GPR Results: Amble Circle - Amble Drive to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Amble Circle** |
| **From** | **Amble Drive** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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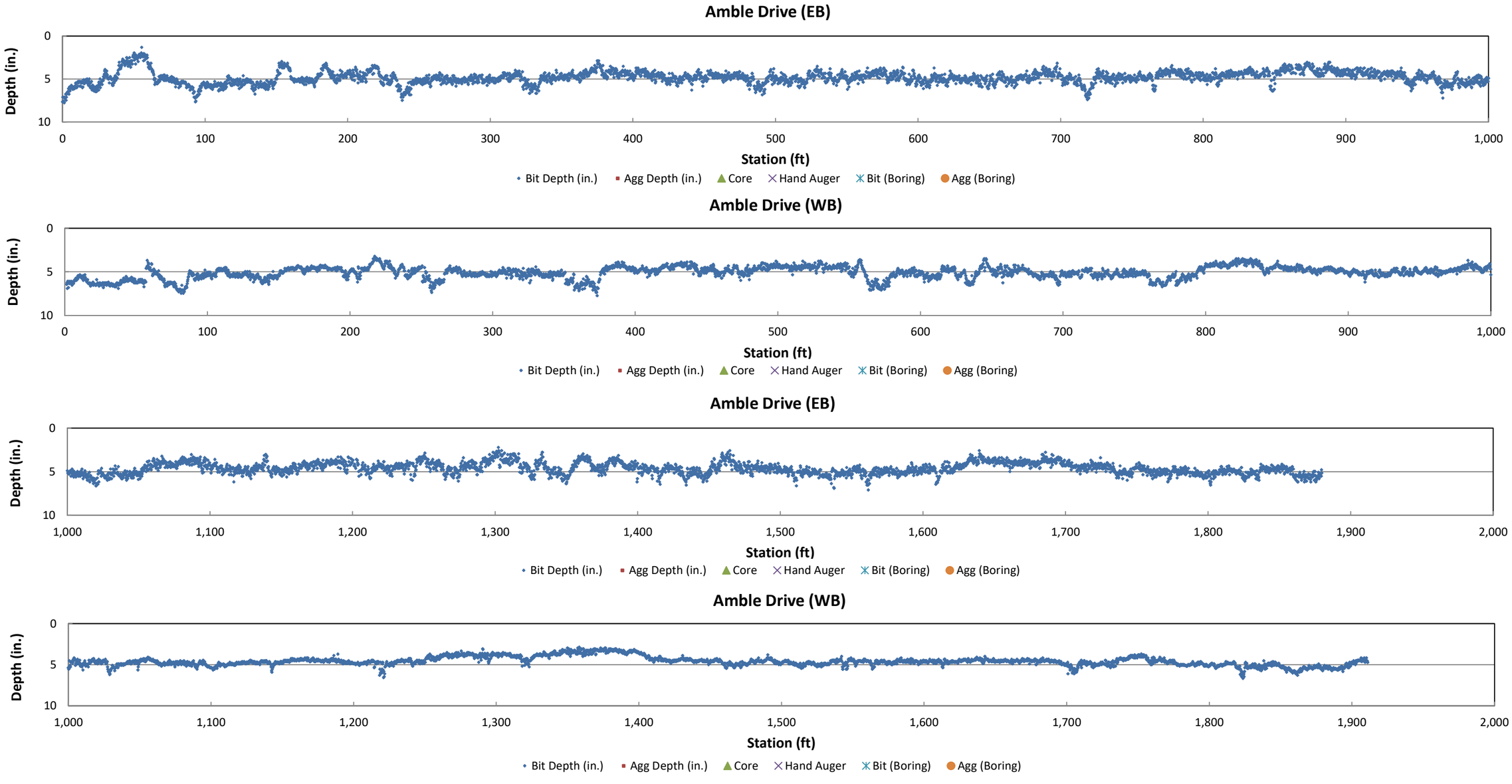


# GPR Results: Amble Drive - Karth Lake Drive to Lexington Avenue North

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Amble Drive** |
| **From** | **Karth Lake Drive** |
| **To** | **Lexington Avenue North** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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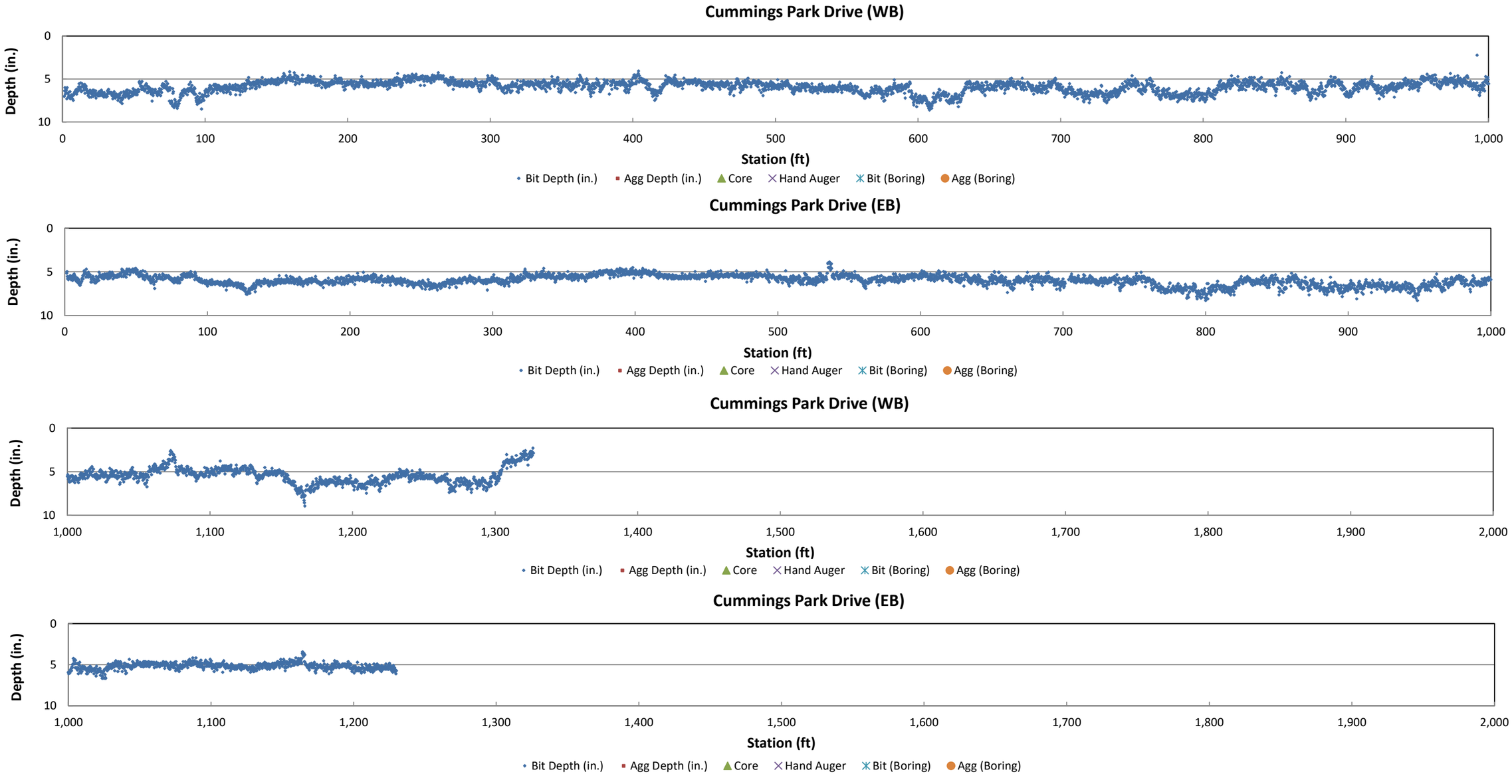


# GPR Results: Cummings Park Drive - Lexington Avenue North to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Cummings Park Drive** |
| **From** | **Lexington Avenue North** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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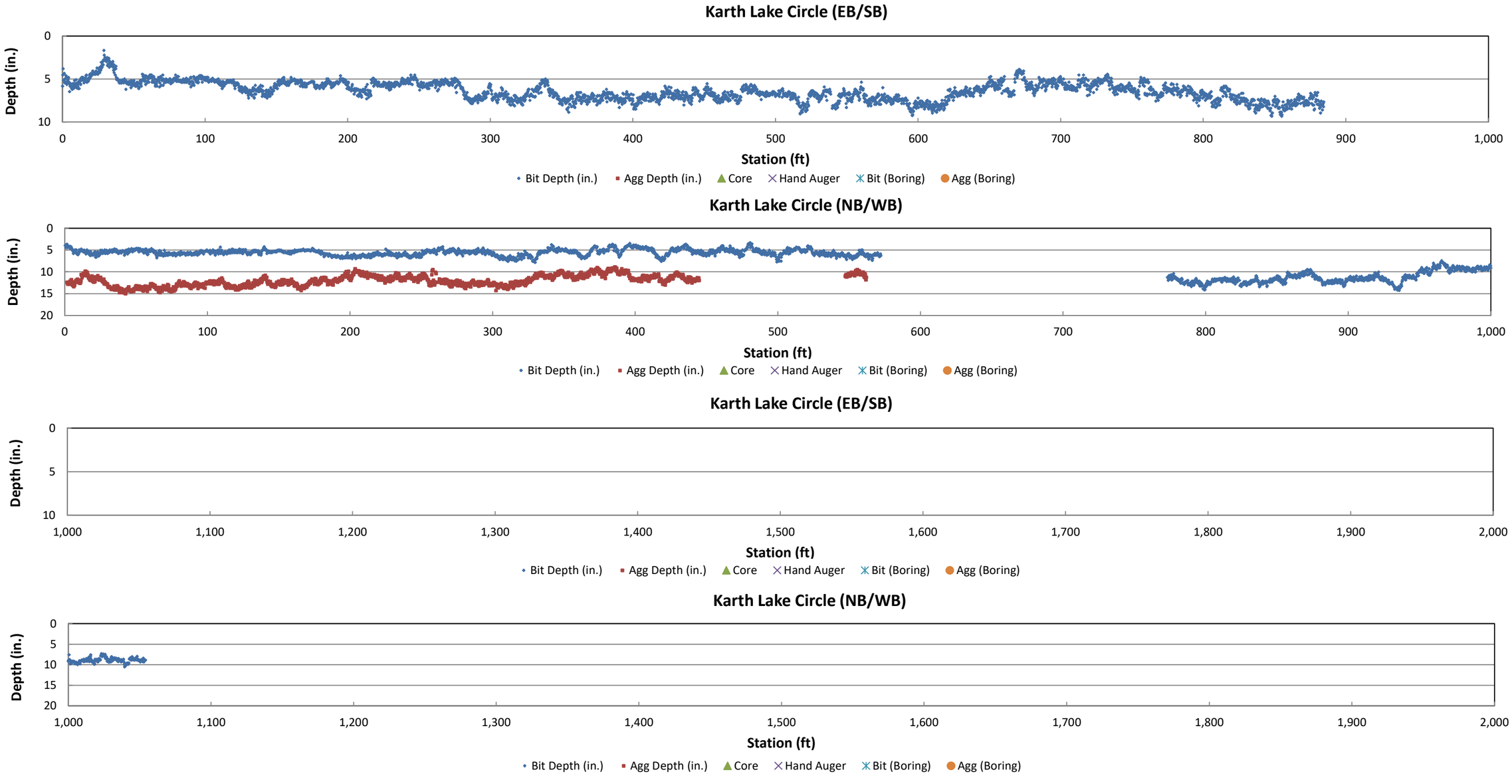


# GPR Results: Karth Lake Circle - Hamline Ave N to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2007164** |
| **Roadway** | **Karth Lake Circle** |
| **From** | **Hamline Ave N** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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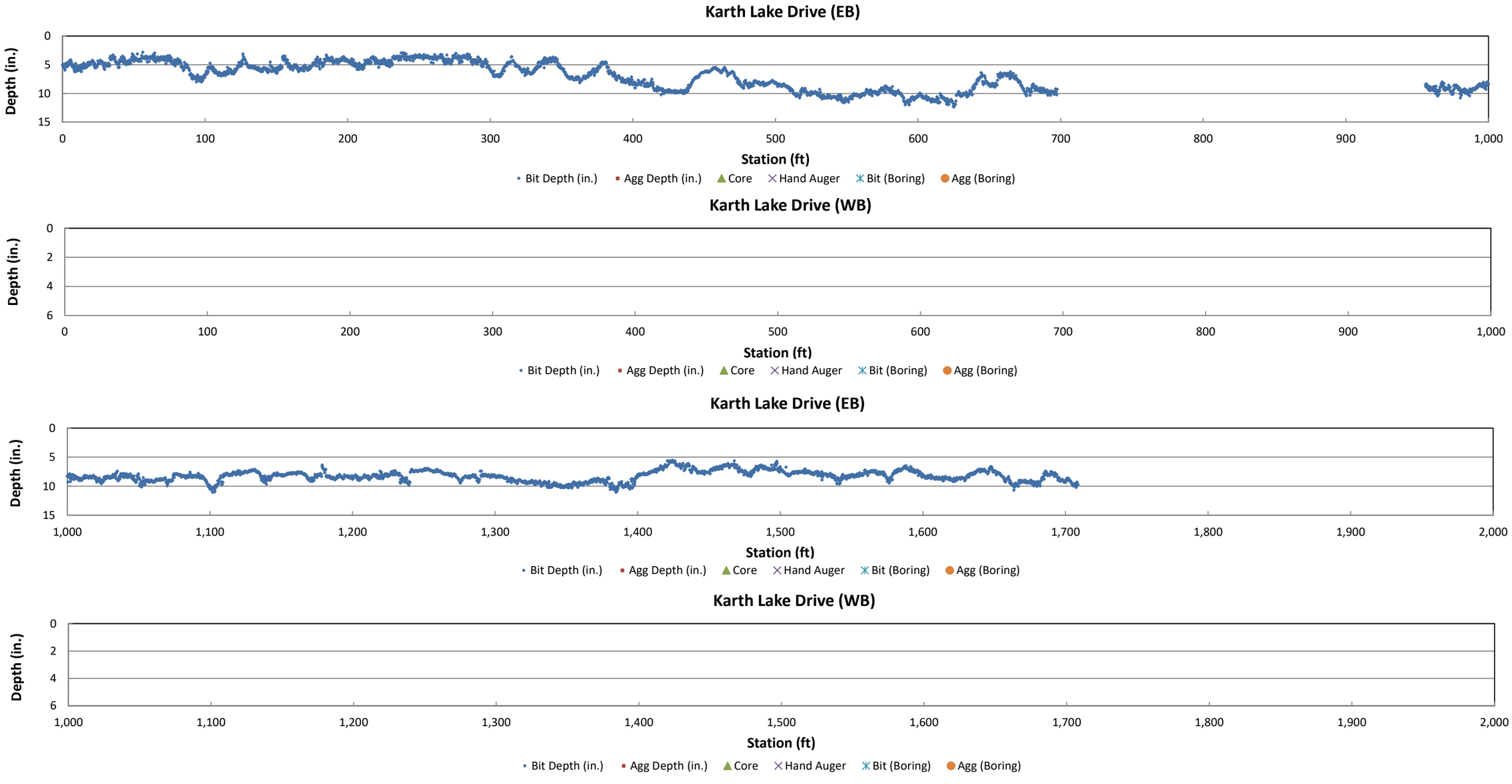


# GPR Results: Karth Lake Drive - Cul-de-sac to Pleasant Drive

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Karth Lake Drive** |
| **From** | **Cul-de-sac** |
| **To** | **Pleasant Drive** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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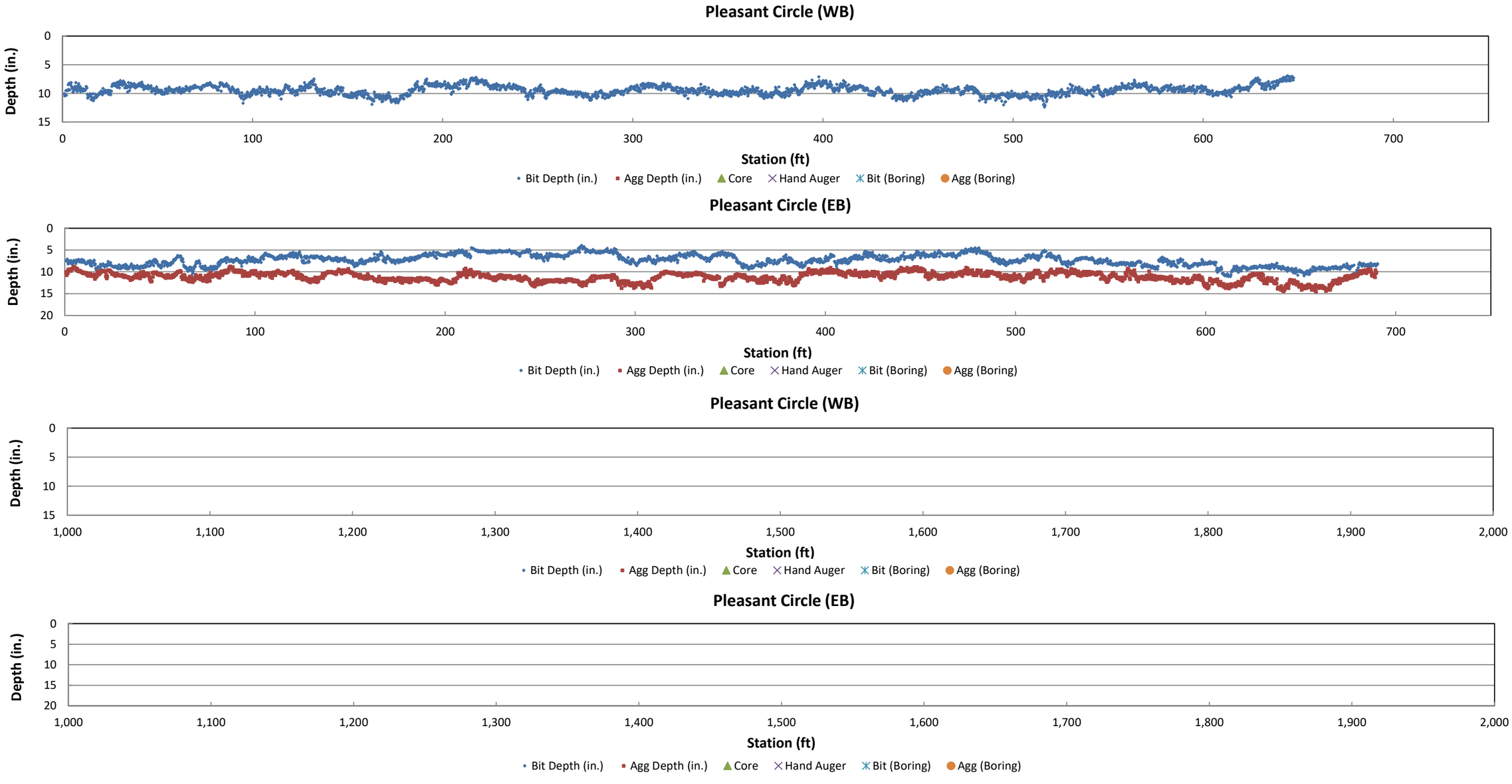


# GPR Results: Pleasant Circle - Lexington Avenue North to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Pleasant Circle** |
| **From** | **Lexington Avenue North** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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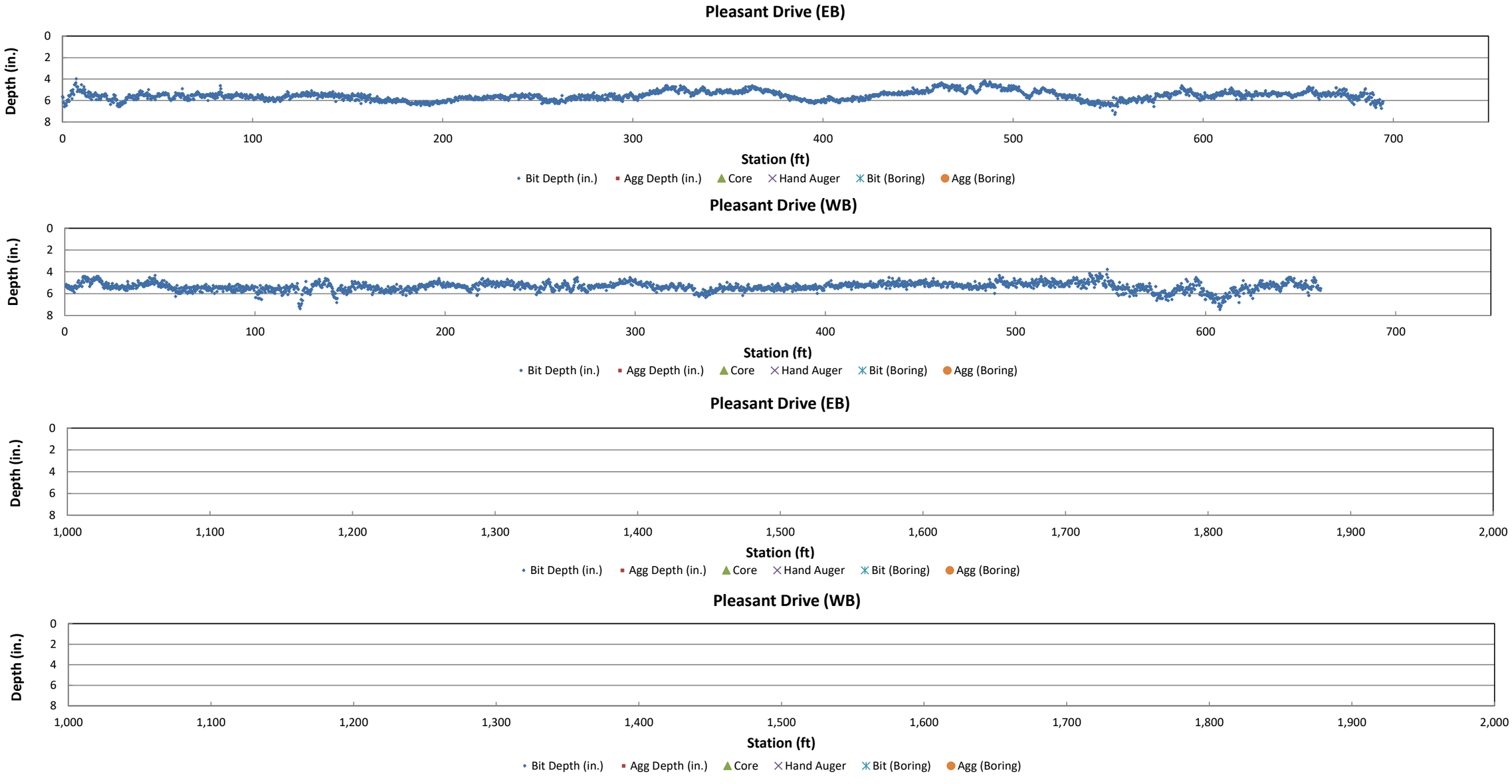


# GPR Results: Pleasant Drive - Amble Drive to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Pleasant Drive** |
| **From** | **Amble Drive** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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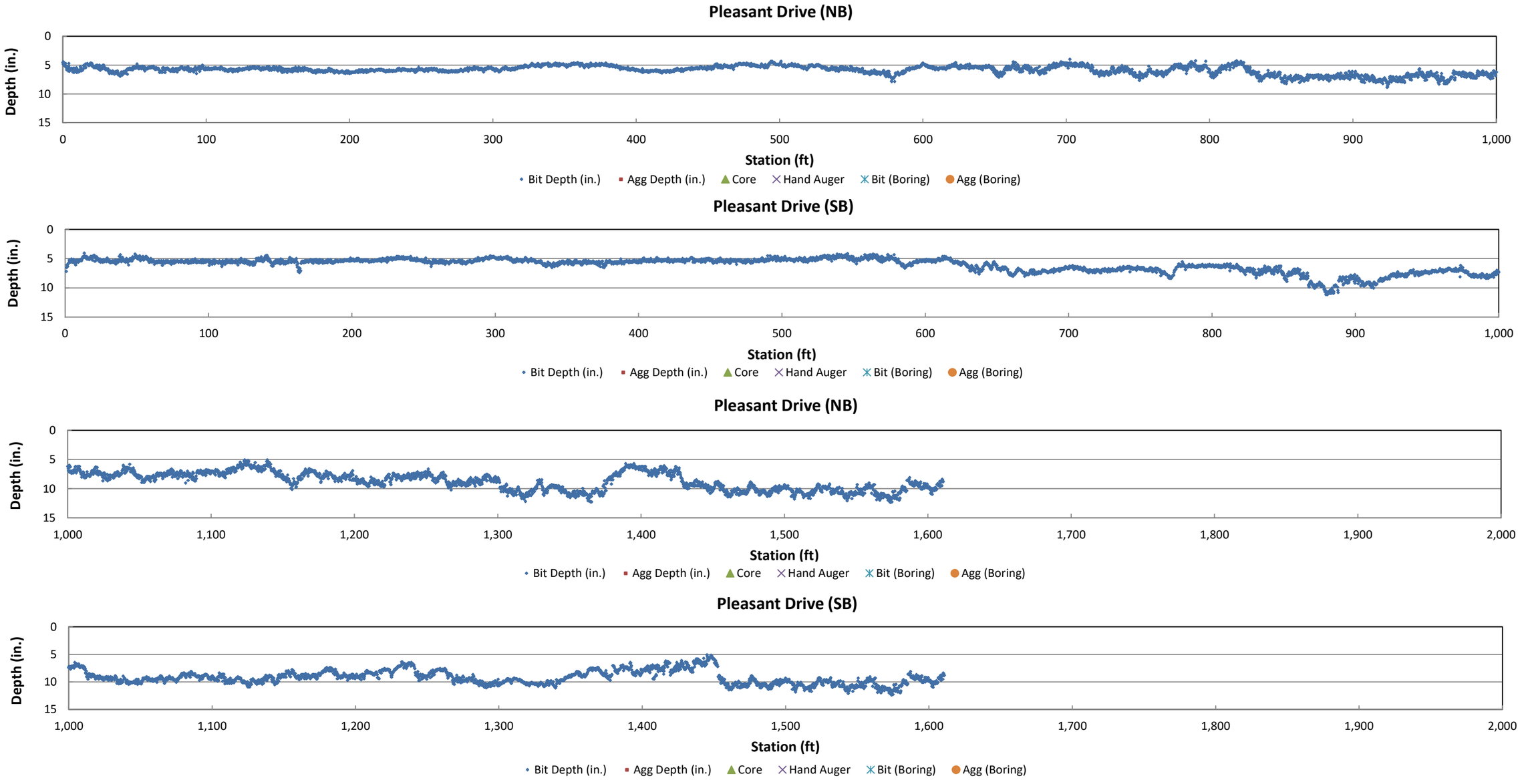


# GPR Results: Pleasant Drive - Pleasant Drive (E-W bound) to Cul-de-sac

| | |
|---|---|
| **Location** | **City of Arden Hills** |
| **Project No.** | **B2502087** |
| **Roadway** | **Pleasant Drive** |
| **From** | **Pleasant Drive (E-W bound)** |
| **To** | **Cul-de-sac** |

Notes: stations increase in direction indicated; data for second direction is reversed. See attached report for complete results and core interpretation

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DEPARTMENT OF TRANSPORTATION

Created 6/5/2025 1:22 PM

## MnPAVE 7.103 Design Summary — Hot-Mix Asphalt

**MnPAVE File:** MnPAVE B2502087.mp7

**20 Year Reliability:** 98.9% (85% recommended) 5,000 cycles

## Project Information

**District:** Metro **County:** Ramsey **City:** Arden Hills

**Project No.:** B2502087 **Route:** 2026 PMP Streets **Ref. Post:** --- to ---

**Letting Date:** 5/30/2025

**Designer:** Bolton & Menk, Inc. **Soils Engineer:** Braun Intertec

## Climate Information

**Seasons:** 5 **Location:** 45° 3.76' Latitude, 93° 5.07' Longitude

## Structural Information

| Layer | Type | Subtype | Thickness, in. |
|---|---|---|---|
| 1a | Hot-Mix Asphalt | C - PG58H-34, 5% Pb, Size B | 1.50 |
| 1b | | C - PG58H-34, 5% Pb, Size B | 2.50 |
| 2 | Aggregate Base | FDR | 6.00 |
| 3 | Engineered Soil | CL R12 | 12.00 |
| 4 | Undisturbed Soil | Clay Loam | |

## Traffic Information

**Forecast #:**

**Speed:** 30 mph **Growth Rate:** 1% **Design Flexible ESALs:** 250,000

## Notes

Disclaimer: The Minnesota Department of Transportation makes no guarantee or warranty, either express or implied, with respect to the reuse of the data provided herewith, regardless of its format or means of its transmission. The user accepts the data "as is", and assumes all risks associated with its use. By accepting of this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Department of Transportation assumes no responsibility, actual or consequential, for damage that results from any user's reliance on this data.

# Sediment (Dredge) Sampling

2026 PMP Street and Utility Improvements
Karth Lake
Arden Hills, Minnesota

*Prepared for*

## City of Arden Hills

BRAUN INTERTEC
The Science You Build On.

Project B2502087
May 15, 2025

Braun Intertec Corporation

**Braun Intertec Corporation**
11001 Hampshire Avenue S
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

May 15, 2025 Project B2502087

Mr. David Swearingen, PE
City of Arden Hills
1245 W Hwy 96
Arden Hills, MN 55112

Re: Sediment Sampling
2026 PMP Street and Utility Improvements - Karth Lake
Arden Hills, Minnesota

Dear Mr. Swearingen:

As authorized, Braun Intertec Corporation completed sediment sampling activities at the above-mentioned Karth Lake in Arden Hills, Minnesota (the Site). The objective of the work was to characterize the in-place sediment (future dredge material) for potential disposal purposes.

## Sediment Sampling Procedures

The Site is located within Karth Lake. As such, our scope was based on the Minnesota Pollution Control Agency's (MPCA) current best management practice for "Managing Dredged Materials," dated August 2024 (MPCA, 2024).

We collected five analytical samples from the proposed dredge areas, which are downstream of stormwater outfalls into the lake. The samples were collected by driving a core into the underlying sediment using direct push sampling equipment.

During sampling activities, sediment sample textures were evaluated by visual methods as the samples were collected and noted in the field notes. Coring tools were cleaned prior to and between sampling runs by washing the equipment with a brush and potable water containing Alconox® and rinsing the equipment with deionized water.

The samples were transferred to clean laboratory-supplied containers, preserved in accordance with Braun Intertec Standard Operating Procedures (SOPs) and transported to Pace Analytical Services laboratory for analysis. Chain of Custody was initiated at the time of sampling and maintained throughout the process.

The sample locations are depicted on Figure 1.

## Sample Analytical Parameters

Five samples were analyzed for the baseline sediment parameters pursuant to MPCA guidelines. The parameters were as follows:

- Metals – arsenic, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel, selenium, and zinc by SW-846 EPA 6020/7471B.
- Total phosphorus using method EPA 365.1.
- Nitrate & nitrite using EPA 353.2.
- Ammonia nitrogen using EPA 350.1.
- Total Kjeldahl nitrogen using EPA 351.2.
- Polychlorinated biphenyls (PCBs) using method SW-846 8082A.
- Total organic carbon using SW-846-9060.
- Extended List, Polycyclic Aromatic Hydrocarbons (PAHs) using EPA 8270E SIM.

## Results

### Sediment Profile

Sediments observed during the completion of the borings consisted primarily of a dark brown to black silty sand. Organic/decay odors were noted in the material collected from the O-2 through O-5 borings.

### Sediment Chemistry

The results of laboratory analysis are summarized in Table 1. The laboratory analytical reports are also enclosed.

***PAHs***

- PAHs were detected at or above the reporting limit within each sample analyzed. Non-carcinogenic PAHs were not reported at concentrations greater than Tier 1 SRVs. The benzo(a)pyrene (BaP) equivalent for the samples varied. Calculated concentrations ranged from below the Tier 1 and 2 Soil Reference Values (SRVs) within O-1, to between the Tier 1 and 2 SRVs within O-2, O-4, and O-5, to above the Tier 2 SRV within O-3.

***PCBs***

- PCBs were not detected at or above the laboratory reporting limit in the samples analyzed, thus total reported PCBs for each analyzed sample were below the Tier 1 and 2 SRVs.

***Metals***

- Cadmium, hexavalent chromium, selenium and mercury were not detected at or above the reporting limit (RL) within the sample analyzed.

- Arsenic, total chromium, copper, lead, nickel and zinc were detected at concentrations above the laboratory reporting limit within the sample analyzed. However, the concentrations were less than the Tier 1 and Tier 2 SRVs established for each compound.

***Other***

Ammonia, total Kjeldahl nitrogen, nitrate + nitrite, total phosphorous, and total organic carbon were detected at various concentrations in the samples. Management criteria have not been established for these compounds. We understand that the MPCA requirement to include these compounds is geared toward end-use of the dredged sediments and the results should be provided to disposal facilities or receiving parties for their use. Additional consultation with the MPCA regarding land application criteria and approvals may be required.

Please refer to Table 1 for a detailed summary of the analytical results.

## Quality Assurance/Quality Control

A data quality assessment of field procedures and laboratory reports was performed to determine the effect of any deviations on data quality and used to support project objectives. All applicable Braun Intertec SOPs were followed as prescribed unless otherwise noted in this report. Notable findings are provided in more detail below and incorporated, where necessary, into this report.

Soil samples were placed in clean, laboratory-supplied containers, preserved, labeled, and transported to Eurofins laboratory in Cedar Falls, Iowa and Pace laboratory in Minneapolis, Minnesota under refrigerated conditions using chain-of-custody procedures. Eurofins subcontracted hexavalent chromium to Eurofins laboratory in Pittsburgh, Pennsylvania and total organic carbon (TOC) analysis to Eurofins laboratory in Arvada, Colorado. Chain-of-custody forms were reviewed at sample check-in and determined to be in general agreement with the contents of the sample coolers. Analyses were performed using EPA or other recognized standard procedures, and samples were analyzed within the EPA recommended holding times.

Laboratory reporting limits were compared against Dredge Management Level 1 limits which utilize MPCA Residential/Recreational SRVs for soil samples. Detection limits for the compounds analyzed during the investigation met their respective regulatory standards.

The recoveries and/or relative percent differences (RPD) of benzo(g,h,i)perylene, fluoranthene, phenanthrene, and pyrene were outside of method acceptance criteria in the matrix spike/duplicate (MS/D) samples for parent sample O-1. These analytes are considered estimated in O-1, but their regulatory limits are several orders of magnitude greater than the results.

The recoveries and/or RPDs of numerous cPAHs were outside of method acceptance criteria in the MS/D samples for parent sample O-1. The recoveries of the affected analytes are within the expanded lower acceptance limits according to the National Functional Guidelines and are acceptable for use in this investigation. Detections of the affected analytes are considered estimated, and non-detected analytes have estimated quantitation limits.

The RPDs of chromium, nickel, and zinc were above method acceptance criteria in the duplicate of sample O-4. These results are considered estimated, but they are below the regulatory limits.

The recoveries of nitrite and nitrate-nitrite as N were below method acceptance criteria in the MS/D samples for parent sample O-1. These analytes were not detected in O-1, and the quantitation limits are considered estimated; however, regulatory limits have not been established for these analytes.

In summary, data quality control items identified during the quality review were evaluated and all data collected are acceptable for use in this investigation for the intended purpose of identifying sediment impacts within the area of concern.

## Recommendations

Based on the analytical results from our sampling, sediments at the Site fall into each of the dredge management levels established by MPCA.

Level 1 Dredged Material is suitable for beneficial use on properties with a residential or recreational use category. Sediment at **O-1** is at or below the Tier 1 SRVs, and as such, meets the Level 1 characteristic.

Level 2 Dredged Material is suitable for beneficial use on properties with an industrial use category. Sediment at **O-2, O-4, and O-5** is at or below the Tier 2 SRVs, and as such, meets the Level 2 characteristic.

Level 3 Dredged Material is not suitable for use or reuse. Sediment at O-3 is above the Tier 2 SRVs, and as such, meets the Level 3 characteristic.

Per MPCA 2024 guidance, "if subsets of Management Levels exist within the project, dredged material may be:

- "managed separately by levels, i.e. each subset of dredged material is managed at the relevant Management Level;
- managed at the most restrictive Management Level, if separation and management by subset is not feasible or desired; or,
- managed at the most restrictive Management Level if subsets from a given project or multiple project, such as at a use/reuse staging area, are co-mingled prior to disposal." [breaks and bullets added for readability]

## General

Our scope of our work was determined by our understanding of the rules and guidance of the MPCA as they apply to needs of the City of Arden Hills. Therefore, the scope of work is not represented to conform explicitly to current MPCA written guidance.

We appreciate the opportunity to provide our professional services on this project and look forward to working with you in the future. Please contact Edward Pencak at 612.500.3752 or Brian Hoese at 612.940.3270 if you have questions about the report or require additional information.

Sincerely,

BRAUN INTERTEC CORPORATION

Edward S. Pencak, PG
Project Scientist

Brian J. Hoese, PE
Director, Principal Engineer

Attachments:
Table 1: Summary of Sediment Testing Results
Figure 1: Sample Location Sketch
Laboratory Analytical Reports

# Summary of Sediment Testing Results

BRAUN
INTERTEC

**Table 1**
**Summary of Sediment Testing Results**
**2026 PMP Arden Hills - Karth Lake**
**Project B2502087**

**Project Name:** 2026 PMP
**Sample Dates:** 4/24/2025

| | | | Sample Location | | | | |
|---|---|---|---|---|---|---|---|
| | DML 1 | DML 2 | O-1 | O-2 | O-3 | O-4 | O-5 |
| Parameters | mg/kg | mg/kg | 4/24/2025 | 4/24/2025 | 4/24/2025 | 4/24/2025 | 4/24/2025 |
| **Other (mg/kg)** | | | | | | | |
| Ammonia | NE | NE | <56.8 | <64.6 | <75.2 | <66.3 | <71.4 |
| Total Kjeldahl Nitrogen | NE | NE | **285** | **672** | **1,390** | **483** | **937** |
| Nitrate+Nitrite | NE | NE | **3.87** | <1.35 | <1.52 | <1.28 | <1.47 |
| Total Phosphorous | NE | NE | **202** | **219** | **351** | **111** | **431** |
| Total Organic Carbon | NE | NE | **8,900** | **16,200** | **44,100** | **13,000** | **24,500** |
| Total PCBs | 0.82 | 10 | <0.122 | <0.161 | <0.246 | <0.123 | <0.187 |
| **Metals (mg/kg)** | **Optional Methods SW-846; 6010 or 6020** | | | | | | |
| Arsenic | 9 | 9 | **1.75** | **1.85** | **1.76** | <1.27 | **1.96** |
| Cadmium | 1.6 | 23 | <0.496 | <0.552 | <0.699 | <0.635 | <0.646 |
| Chromium, Total (Trivalent) | 23,000 | 100,000 | **11.4** | **14.1** | **9.9** | **13.4** | **12.5** |
| Chromium, Hexavalent | 2.3 | 62 | <0.492 | <0.569 | <0.638 | <0.554 | <0.597 |
| Copper | 120 | 33,000 | **8.92** | **15** | **14** | **16** | **23.4** |
| Lead | 200 | 460 | **7.54** | **9.71** | **6.19** | **3.62** | **5.86** |
| Mercury | 2.7 | 3.1 | <0.0239 | <0.0233 | <0.0263 | <0.0257 | <0.0237 |
| Nickel | 170 | 170 | **12** | **12.2** | **7.74** | **15.2** | **17.3** |
| Selenium | 78 | 1,200 | <1.49 | <1.66 | <2.10 | <1.90 | <1.94 |
| Zinc | 4,700 | 70,000 | **24.5** | **53** | **41.4** | **38.5** | **47.3** |
| **Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)** | | | | | | | |
| Acenapthene | 460 | 6,800 | **0.0201** | **0.935** | **1.05** | **0.103** | **1.17** |
| Acenapthylene | na | na | **0.0131** | **0.392** | **0.15** | **0.0325** | **0.217** |
| Anthracene | 2,800 | 42,000 | **0.0684** | **3.58** | **3.57** | **0.183** | **2.42** |
| Benzo(g,h,i)perlyene | na | na | **0.237** | **7.5** | **10.7** | **0.955** | **7.999** |
| Fluoranthene | 210 | 2,700 | **0.872** | **33** | **43** | **3.23** | **32.8** |
| Fluorene | 390 | 5,800 | **0.0375** | **2.11** | **1.73** | **0.147** | **1.85** |
| 2-Methylnapthalene | NE | NE | <0.0228 | **0.0809** | **0.0378** | <0.0266 | **0.0897** |
| Naphthalene | 81 | 280 | <0.0163 | **0.234** | **0.0664** | <0.0189 | **0.111** |
| Phenanthrene | NE | NE | **0.453** | **19.8** | **22.2** | **1.82** | **20** |
| Pyrene | 220 | 3,200 | **0.734** | **26.5** | **35.5** | **2.68** | **26.6** |
| **Carcinogenic PAHs & BaP Equiv. (mg/kg)** | **Potency Equiv. Factor (PEF)** | | Site Conc. ** | BaP Equiv. | Site Conc. | BaP Equiv. | Site Conc. | BaP Equiv. | Site Conc. | BaP Equiv. | Site Conc. | BaP Equiv. |
| Benz[a]anthracene | 0.10 | | **0.0863** | **0.009** | **5.36** | **0.536** | **11.6** | **1.160** | **0.657** | **0.066** | **7.69** | **0.769** |
| Benzo[a]pyrene | 1.00 | | **0.100** | **0.100** | **5.77** | **5.770** | **12.9** | **12.900** | **0.981** | **0.981** | **8.22** | **8.220** |
| Benzo(b, j & k)fluoranthenes | 0.10 | | **0.211** | **0.021** | **18.7** | **1.870** | **25.6** | **2.560** | **2.31** | **0.231** | **22.6** | **2.260** |
| Chrysene | 0.01 | | **0.124** | **0.001** | **7.14** | **0.071** | **16.0** | **0.160** | **0.934** | **0.009** | **10.4** | **0.104** |
| Dibenz[a,h]acridine | 0.10 | | 0.0084 | **0.001** | **0.26** | **0.026** | **0.55** | **0.055** | **0.0402** | **0.004** | **0.306** | **0.031** |
| Dibenz[a,h]anthracene | 0.56 | | **0.0155** | **0.009** | **0.817** | **0.458** | **1.82** | **1.019** | **0.119** | **0.067** | **0.954** | **0.534** |
| Dibenzo[a,e]pyrene | 1.00 | | **0.0184** | **0.018** | **0.703** | **0.703** | **1.53** | **1.530** | **0.106** | **0.106** | **0.845** | **0.845** |
| Dibenzo[a,h]pyrene | 10.00 | | **0.0094** | **0.094** | **0.316** | **3.160** | **0.690** | **6.900** | **0.0489** | **0.489** | **0.345** | **3.450** |
| Dibenzo[a,i]pyrene | 10.00 | | 0.0082 | **0.082** | **0.080** | **0.800** | **0.183** | **1.830** | **0.0119** | **0.119** | **0.0854** | **0.854** |
| Dibenzo[a,l]pyrene | 10.00 | | 0.0054 | **0.054** | **0.0502** | **0.502** | **0.0951** | **0.951** | 0.0062 | **0.062** | **0.0515** | **0.515** |
| 7H-Dibenzo[c,g]carbazole | 1.00 | | 0.0077 | **0.008** | **0.0932** | **0.093** | **0.208** | **0.208** | **0.0142** | **0.014** | **0.113** | **0.113** |
| 7,12 Dimethylbenz-anthracene | 34.00 | | 0.0071 | **0.241** | 0.0190 | **0.646** | 0.0207 | **0.704** | **0.0257** | **0.874** | 0.0234 | **0.796** |
| Indeno[1,2,3,-c,d]pyrene | 0.10 | | **0.0754** | **0.008** | **3.81** | **0.381** | **9.62** | **0.962** | **0.550** | **0.055** | **4.22** | **0.422** |
| 3-Methylcholanthrene | 3.00 | | 0.0053 | **0.016** | **0.102** | **0.306** | **0.311** | **0.933** | 0.0061 | **0.018** | **0.142** | **0.426** |
| 5-Methylchrysene | 1.00 | | 0.0066 | **0.007** | 0.0178 | **0.018** | **0.0193** | **0.019** | 0.0077 | **0.008** | 0.0219 | **0.022** |
| **(BaP) Equivalent*** ** | 2 mg/kg | 23 mg/kg | | **0.67** | | **15.34** | | **31.89** | | **3.10** | | **19.36** |

Dredge Management Level 1= results less than SRV 1 (suitable for residential landuse)

DredgeManagement Level 2= results less than SRV 2 (suitable for industrial landuse)

Dredge Management Level 3- exceeds SRV2 (must be treated or disposed in a landfill with MPCA approved industrial waste management plan)

** - Recoveries of numerous cPAHs were outside of method acceptance criteria in quality control samples run on parent sample O-1. The O-1 detections are considered estimated, and non-detected cPAHs are considered to have estimated quantitation limits.

***BaP Equivalent - this sheet is set up to multiply the sample concentration for each parameter by the Potency Equivalency Factor (PEF) and sum them to determine the BaP Equivalent for each sample allowing comparison to the Mgmt. Level

mg/kg = milligrams per kilogram, equivalent to parts per million.

§ Benzo-b, Benzo -j and Benzo-k fluoranthene are reported as Benzofluoranthenes (Total)

# Sample Location Sketch

BRAUN
INTERTEC




F:\2025\B2502087\CAD\B2502087.dwg,Overall,3/26/2025 7:12:13 AM

**DENOTES APPROXIMATE LOCATION OF SEDIMENT SAMPLE**

200' 0 400'

SCALE: 1"= 400'

BRAUN INTERTEC
The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

| | |
|---|---|
| Project No: | B2502087 |
| Drawing No: | B2502087 |
| Drawn By: | JAG |
| Date Drawn: | 3/25/25 |
| Checked By: | ZTS |
| Last Modified: | 3/26/25 |

Project Information

City of Arden Hills
2026 PMP Street and Utility Improvements

Bounded by Highway 96, Lexington Avenue N., Cummings Park Drive and Hamline Avenue

Arden Hills, Minnesota

# Sample Location Sketch

Figure 1

# Laboratory Analytical Reports

BRAUN INTERTEC

**Pace Analytical Services, LLC**
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

May 05, 2025

Edward Pencak
Braun Intertec
11001 Hampshire Ave S
Bloomington, MN 55438

RE: Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

Dear Edward Pencak:

Enclosed are the analytical results for sample(s) received by the laboratory on April 24, 2025. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sydni Harrison
sydni.harrison@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Eric Crouser, Braun Intertec



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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

## CERTIFICATIONS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Pace Analytical Services, LLC - Minneapolis MN**
1700 Elm Street SE, Minneapolis, MN 55414
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
DoD Certification via A2LA #: 2926.01
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
GMP+ Certification #: GMP050884
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
ISO/IEC 17025 Certification via A2LA #: 2926.01
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification via A2LA #: 2926.01
USDA Permit #: P330-19-00208



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Minneapolis, MN 55414
(612)607-1700

## SAMPLE SUMMARY

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **10732220001** | **O-1** | Solid | 04/24/25 11:45 | 04/24/25 16:40 |
| **10732220002** | **O-2** | Solid | 04/24/25 11:00 | 04/24/25 16:40 |
| **10732220003** | **O-3** | Solid | 04/24/25 10:30 | 04/24/25 16:40 |
| **10732220004** | **O-4** | Solid | 04/24/25 10:05 | 04/24/25 16:40 |
| **10732220005** | **O-5** | Solid | 04/24/25 09:20 | 04/24/25 16:40 |



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## SAMPLE ANALYTE COUNT

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **10732220001** | **O-1** | ASTM D2974 | MER | 1 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 12 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 17 | PASI-M |
| **10732220002** | **O-2** | ASTM D2974 | MER | 1 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 12 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 17 | PASI-M |
| **10732220003** | **O-3** | ASTM D2974 | MER | 1 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 12 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 17 | PASI-M |
| **10732220004** | **O-4** | ASTM D2974 | MER | 1 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 12 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 17 | PASI-M |
| **10732220005** | **O-5** | ASTM D2974 | MER | 1 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 12 | PASI-M |
| | | EPA 8270E by SIM | GY1 | 17 | PASI-M |

PASI-M = Pace Analytical Services - Minneapolis



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(612)607-1700

# PROJECT NARRATIVE

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Method:** **EPA 8270E by SIM**
**Description:** 8270E MSSV PAH by SIM
**Client:** Braun Intertec Corporation
**Date:** May 05, 2025

**General Information:**
5 samples were analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**
The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**
The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**
All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**
All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**
All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**
All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**
All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 1003652

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10732220001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 5234085)
  - Benzo(g,h,i)perylene
  - Fluoranthene
  - Phenanthrene
  - Pyrene
- MSD (Lab ID: 5234086)
  - Benzo(g,h,i)perylene
  - Fluoranthene
  - Phenanthrene

## REPORT OF LABORATORY ANALYSIS

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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

# PROJECT NARRATIVE

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Method:** **EPA 8270E by SIM**
**Description:** 8270E MSSV PAH by SIM
**Client:** Braun Intertec Corporation
**Date:** May 05, 2025

QC Batch: 1003652

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10732220001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Pyrene

R1: RPD value was outside control limits.

- MSD (Lab ID: 5234086)
  - Fluoranthene
  - Pyrene

**Additional Comments:**

Analyte Comments:

QC Batch: 1003652

D4: Sample was diluted due to the presence of high levels of target analytes.

- O-2 (Lab ID: 10732220002)
  - 2-Fluorobiphenyl (S)
- O-3 (Lab ID: 10732220003)
  - 2-Fluorobiphenyl (S)
- O-4 (Lab ID: 10732220004)
  - 2-Fluorobiphenyl (S)
- O-5 (Lab ID: 10732220005)
  - 2-Fluorobiphenyl (S)



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# PROJECT NARRATIVE

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Method:** **EPA 8270E by SIM**
**Description:** 8270E MSSV CPAH by SIM
**Client:** Braun Intertec Corporation
**Date:** May 05, 2025

**General Information:**
5 samples were analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**
The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**
The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**
All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**
All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**
All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**
All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**
All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 1003848

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10732220001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 5234991)
  - Dibenzo(a,h)pyrene
  - Dibenzo(a,i)pyrene
  - Dibenzo(a,l)pyrene
- MSD (Lab ID: 5234992)
  - Dibenzo(a,l)pyrene

R1: RPD value was outside control limits.

- MSD (Lab ID: 5234992)
  - Benzo(a)anthracene

## REPORT OF LABORATORY ANALYSIS

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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

# PROJECT NARRATIVE

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Method:** **EPA 8270E by SIM**
**Description:** 8270E MSSV CPAH by SIM
**Client:** Braun Intertec Corporation
**Date:** May 05, 2025

QC Batch: 1003848

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10732220001

R1: RPD value was outside control limits.

- Benzo(a)pyrene
- Chrysene
- Indeno(1,2,3-cd)pyrene

**Additional Comments:**

Analyte Comments:

QC Batch: 1003848

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- BLANK (Lab ID: 5234989)
  - Benzofluoranthenes (Total)
- LCS (Lab ID: 5234990)
  - Benzofluoranthenes (Total)
- MS (Lab ID: 5234991)
  - Benzofluoranthenes (Total)
- MSD (Lab ID: 5234992)
  - Benzofluoranthenes (Total)
- O-1 (Lab ID: 10732220001)
  - Benzofluoranthenes (Total)
- O-2 (Lab ID: 10732220002)
  - Benzofluoranthenes (Total)
- O-3 (Lab ID: 10732220003)
  - Benzofluoranthenes (Total)
- O-4 (Lab ID: 10732220004)
  - Benzofluoranthenes (Total)
- O-5 (Lab ID: 10732220005)
  - Benzofluoranthenes (Total)

This data package has been reviewed for quality and completeness and is approved for release.



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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

## ANALYTICAL RESULTS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Sample: O-1** **Lab ID: 10732220001** Collected: 04/24/25 11:45 Received: 04/24/25 16:40 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **Dry Weight / %M by ASTM D2974** | Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis | | | | | | | | |
| Percent Moisture | **19.2** | % | 0.10 | 0.10 | 1 | | 04/28/25 09:24 | | N2 |
| **8270E MSSV PAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis | | | | | | | | |
| Acenaphthene | **20.1J** | ug/kg | 61.2 | 6.4 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 83-32-9 | |
| Acenaphthylene | **13.1J** | ug/kg | 61.2 | 6.1 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 208-96-8 | |
| Anthracene | **68.4** | ug/kg | 61.2 | 10.8 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 120-12-7 | |
| Benzo(g,h,i)perylene | **237** | ug/kg | 61.2 | 23.5 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 191-24-2 | M1 |
| Fluoranthene | **872** | ug/kg | 61.2 | 16.3 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 206-44-0 | M1,R1 |
| Fluorene | **37.5J** | ug/kg | 61.2 | 8.6 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 86-73-7 | |
| 2-Methylnaphthalene | **<22.8** | ug/kg | 61.2 | 22.8 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 91-57-6 | |
| Naphthalene | **<16.3** | ug/kg | 61.2 | 16.3 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 91-20-3 | |
| Phenanthrene | **453** | ug/kg | 61.2 | 15.3 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 85-01-8 | M1 |
| Pyrene | **734** | ug/kg | 61.2 | 18.2 | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 129-00-0 | M1,R1 |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 69 | %. | 39-125 | | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 79 | %. | 41-125 | | 5 | 04/28/25 14:44 | 04/29/25 08:53 | 1718-51-0 | |
| **8270E MSSV CPAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis | | | | | | | | |
| Benzo(a)anthracene | **86.3** | ug/kg | 24.5 | 8.9 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 56-55-3 | R1 |
| Benzo(a)pyrene | **100** | ug/kg | 24.5 | 9.3 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 50-32-8 | R1 |
| Benzofluoranthenes (Total) | **211** | ug/kg | 73.6 | 23.8 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | | N2 |
| Chrysene | **124** | ug/kg | 24.5 | 7.2 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 218-01-9 | R1 |
| Dibenz(a,h)acridine | **<8.4** | ug/kg | 24.5 | 8.4 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 226-36-8 | |
| Dibenz(a,h)anthracene | **15.5J** | ug/kg | 24.5 | 8.5 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 53-70-3 | |
| Dibenzo(a,e)pyrene | **18.4J** | ug/kg | 24.5 | 6.9 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 192-65-4 | |
| Dibenzo(a,h)pyrene | **9.4J** | ug/kg | 24.5 | 6.8 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 189-64-0 | M1 |
| Dibenzo(a,i)pyrene | **<8.2** | ug/kg | 24.5 | 8.2 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 189-55-9 | M1 |
| Dibenzo(a,l)pyrene | **<5.4** | ug/kg | 24.5 | 5.4 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 191-30-0 | M1 |
| 7H-Dibenzo(c,g)carbazole | **<7.7** | ug/kg | 24.5 | 7.7 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 194-59-2 | |
| 7,12-Dimethylbenz(a)anthracene | **<7.1** | ug/kg | 24.5 | 7.1 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 57-97-6 | |
| Indeno(1,2,3-cd)pyrene | **75.4** | ug/kg | 24.5 | 8.2 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 193-39-5 | R1 |
| 3-Methylcholanthrene | **<5.3** | ug/kg | 24.5 | 5.3 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 56-49-5 | |
| 5-Methylchrysene | **<6.6** | ug/kg | 24.5 | 6.6 | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 3697-24-3 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 70 | %. | 45-125 | | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 78 | %. | 53-125 | | 2 | 04/29/25 13:52 | 04/30/25 02:44 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Sample: O-2** **Lab ID: 10732220002** Collected: 04/24/25 11:00 Received: 04/24/25 16:40 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **Dry Weight / %M by ASTM D2974** | Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis | | | | | | | | |
| Percent Moisture | **25.0** | % | 0.10 | 0.10 | 1 | | 04/28/25 09:26 | | N2 |
| **8270E MSSV PAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis | | | | | | | | |
| Acenaphthene | **935** | ug/kg | 64.5 | 6.8 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 83-32-9 | |
| Acenaphthylene | **392** | ug/kg | 64.5 | 6.4 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 208-96-8 | |
| Anthracene | **3580** | ug/kg | 64.5 | 11.4 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 120-12-7 | |
| Benzo(g,h,i)perylene | **7500** | ug/kg | 645 | 248 | 50 | 04/28/25 14:44 | 04/29/25 17:59 | 191-24-2 | |
| Fluoranthene | **33000** | ug/kg | 645 | 172 | 50 | 04/28/25 14:44 | 04/29/25 17:59 | 206-44-0 | |
| Fluorene | **2110** | ug/kg | 64.5 | 9.1 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 86-73-7 | |
| 2-Methylnaphthalene | **80.9** | ug/kg | 64.5 | 24.1 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 91-57-6 | |
| Naphthalene | **234** | ug/kg | 64.5 | 17.2 | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 91-20-3 | |
| Phenanthrene | **19800** | ug/kg | 645 | 161 | 50 | 04/28/25 14:44 | 04/29/25 17:59 | 85-01-8 | |
| Pyrene | **26500** | ug/kg | 645 | 192 | 50 | 04/28/25 14:44 | 04/29/25 17:59 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 69 | %. | 39-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 321-60-8 | D4 |
| p-Terphenyl-d14 (S) | 83 | %. | 41-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:01 | 1718-51-0 | |
| **8270E MSSV CPAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis | | | | | | | | |
| Benzo(a)anthracene | **5360** | ug/kg | 329 | 119 | 25 | 04/29/25 13:52 | 05/02/25 15:59 | 56-55-3 | |
| Benzo(a)pyrene | **5770** | ug/kg | 329 | 125 | 25 | 04/29/25 13:52 | 05/02/25 15:59 | 50-32-8 | |
| Benzofluoranthenes (Total) | **18700** | ug/kg | 198 | 63.9 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | | N2 |
| Chrysene | **7140** | ug/kg | 329 | 96.5 | 25 | 04/29/25 13:52 | 05/02/25 15:59 | 218-01-9 | |
| Dibenz(a,h)acridine | **260** | ug/kg | 65.9 | 22.5 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 226-36-8 | |
| Dibenz(a,h)anthracene | **817** | ug/kg | 65.9 | 22.9 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 53-70-3 | |
| Dibenzo(a,e)pyrene | **703** | ug/kg | 65.9 | 18.6 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 192-65-4 | |
| Dibenzo(a,h)pyrene | **316** | ug/kg | 65.9 | 18.1 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 189-64-0 | |
| Dibenzo(a,i)pyrene | **80.0** | ug/kg | 65.9 | 22.0 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 189-55-9 | |
| Dibenzo(a,l)pyrene | **50.2J** | ug/kg | 65.9 | 14.4 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 191-30-0 | |
| 7H-Dibenzo(c,g)carbazole | **93.2** | ug/kg | 65.9 | 20.6 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 194-59-2 | |
| 7,12-Dimethylbenz(a)anthracene | **<19.0** | ug/kg | 65.9 | 19.0 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 57-97-6 | |
| Indeno(1,2,3-cd)pyrene | **3810** | ug/kg | 65.9 | 22.0 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 193-39-5 | |
| 3-Methylcholanthrene | **102** | ug/kg | 65.9 | 14.1 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 56-49-5 | |
| 5-Methylchrysene | **<17.8** | ug/kg | 65.9 | 17.8 | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 3697-24-3 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 68 | %. | 45-125 | | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 79 | %. | 53-125 | | 5 | 04/29/25 13:52 | 04/30/25 04:46 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Sample: O-3** **Lab ID: 10732220003** Collected: 04/24/25 10:30 Received: 04/24/25 16:40 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **Dry Weight / %M by ASTM D2974** | Analytical Method: ASTM D2974<br>Pace Analytical Services - Minneapolis | | | | | | | | |
| Percent Moisture | **31.1** | % | 0.10 | 0.10 | 1 | | 04/28/25 09:30 | | N2 |
| **8270E MSSV PAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546<br>Pace Analytical Services - Minneapolis | | | | | | | | |
| Acenaphthene | **1050** | ug/kg | 71.6 | 7.5 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 83-32-9 | |
| Acenaphthylene | **150** | ug/kg | 71.6 | 7.2 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 208-96-8 | |
| Anthracene | **3570** | ug/kg | 71.6 | 12.7 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 120-12-7 | |
| Benzo(g,h,i)perylene | **10700** | ug/kg | 716 | 275 | 50 | 04/28/25 14:44 | 04/29/25 18:21 | 191-24-2 | |
| Fluoranthene | **43000** | ug/kg | 716 | 190 | 50 | 04/28/25 14:44 | 04/29/25 18:21 | 206-44-0 | |
| Fluorene | **1730** | ug/kg | 71.6 | 10.1 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 86-73-7 | |
| 2-Methylnaphthalene | **37.8J** | ug/kg | 71.6 | 26.7 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 91-57-6 | |
| Naphthalene | **66.4J** | ug/kg | 71.6 | 19.0 | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 91-20-3 | |
| Phenanthrene | **22200** | ug/kg | 716 | 179 | 50 | 04/28/25 14:44 | 04/29/25 18:21 | 85-01-8 | |
| Pyrene | **35500** | ug/kg | 716 | 213 | 50 | 04/28/25 14:44 | 04/29/25 18:21 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 65 | %. | 39-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 321-60-8 | D4 |
| p-Terphenyl-d14 (S) | 83 | %. | 41-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:24 | 1718-51-0 | |
| **8270E MSSV CPAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546<br>Pace Analytical Services - Minneapolis | | | | | | | | |
| Benzo(a)anthracene | **11600** | ug/kg | 357 | 129 | 25 | 04/29/25 13:52 | 05/02/25 16:30 | 56-55-3 | |
| Benzo(a)pyrene | **12900** | ug/kg | 357 | 135 | 25 | 04/29/25 13:52 | 05/02/25 16:30 | 50-32-8 | |
| Benzofluoranthenes (Total) | **25600** | ug/kg | 1070 | 347 | 25 | 04/29/25 13:52 | 05/02/25 16:30 | | N2 |
| Chrysene | **16000** | ug/kg | 357 | 105 | 25 | 04/29/25 13:52 | 05/02/25 16:30 | 218-01-9 | |
| Dibenz(a,h)acridine | **551** | ug/kg | 71.5 | 24.4 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 226-36-8 | |
| Dibenz(a,h)anthracene | **1820** | ug/kg | 71.5 | 24.8 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 53-70-3 | |
| Dibenzo(a,e)pyrene | **1530** | ug/kg | 71.5 | 20.2 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 192-65-4 | |
| Dibenzo(a,h)pyrene | **690** | ug/kg | 71.5 | 19.7 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 189-64-0 | |
| Dibenzo(a,i)pyrene | **183** | ug/kg | 71.5 | 23.9 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 189-55-9 | |
| Dibenzo(a,l)pyrene | **95.1** | ug/kg | 71.5 | 15.6 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 191-30-0 | |
| 7H-Dibenzo(c,g)carbazole | **208** | ug/kg | 71.5 | 22.3 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 194-59-2 | |
| 7,12-Dimethylbenz(a)anthracene | **<20.7** | ug/kg | 71.5 | 20.7 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 57-97-6 | |
| Indeno(1,2,3-cd)pyrene | **9620** | ug/kg | 357 | 119 | 25 | 04/29/25 13:52 | 05/02/25 16:30 | 193-39-5 | |
| 3-Methylcholanthrene | **311** | ug/kg | 71.5 | 15.3 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 56-49-5 | |
| 5-Methylchrysene | **<19.3** | ug/kg | 71.5 | 19.3 | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 3697-24-3 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 68 | %. | 45-125 | | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 82 | %. | 53-125 | | 5 | 04/29/25 13:52 | 04/30/25 05:17 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Sample: O-4** **Lab ID: 10732220004** Collected: 04/24/25 10:05 Received: 04/24/25 16:40 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **Dry Weight / %M by ASTM D2974** | Analytical Method: ASTM D2974 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Percent Moisture | **30.1** | % | 0.10 | 0.10 | 1 | | 04/28/25 09:32 | | N2 |
| **8270E MSSV PAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Acenaphthene | **103** | ug/kg | 71.2 | 7.5 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 83-32-9 | |
| Acenaphthylene | **32.5J** | ug/kg | 71.2 | 7.1 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 208-96-8 | |
| Anthracene | **183** | ug/kg | 71.2 | 12.6 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 120-12-7 | |
| Benzo(g,h,i)perylene | **955** | ug/kg | 71.2 | 27.4 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 191-24-2 | |
| Fluoranthene | **3230** | ug/kg | 71.2 | 18.9 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 206-44-0 | |
| Fluorene | **147** | ug/kg | 71.2 | 10.0 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 86-73-7 | |
| 2-Methylnaphthalene | **<26.6** | ug/kg | 71.2 | 26.6 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 91-57-6 | |
| Naphthalene | **<18.9** | ug/kg | 71.2 | 18.9 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 91-20-3 | |
| Phenanthrene | **1820** | ug/kg | 71.2 | 17.8 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 85-01-8 | |
| Pyrene | **2680** | ug/kg | 71.2 | 21.2 | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 66 | %. | 39-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 321-60-8 | D4 |
| p-Terphenyl-d14 (S) | 66 | %. | 41-125 | | 5 | 04/28/25 14:44 | 04/29/25 10:46 | 1718-51-0 | |
| **8270E MSSV CPAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Benzo(a)anthracene | **657** | ug/kg | 28.6 | 10.3 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 56-55-3 | |
| Benzo(a)pyrene | **981** | ug/kg | 28.6 | 10.8 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 50-32-8 | |
| Benzofluoranthenes (Total) | **2310** | ug/kg | 85.7 | 27.7 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | | N2 |
| Chrysene | **934** | ug/kg | 28.6 | 8.4 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 218-01-9 | |
| Dibenz(a,h)acridine | **40.2** | ug/kg | 28.6 | 9.7 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 226-36-8 | |
| Dibenz(a,h)anthracene | **119** | ug/kg | 28.6 | 9.9 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 53-70-3 | |
| Dibenzo(a,e)pyrene | **106** | ug/kg | 28.6 | 8.1 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 192-65-4 | |
| Dibenzo(a,h)pyrene | **48.9** | ug/kg | 28.6 | 7.9 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 189-64-0 | |
| Dibenzo(a,i)pyrene | **11.9J** | ug/kg | 28.6 | 9.5 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 189-55-9 | |
| Dibenzo(a,l)pyrene | **<6.2** | ug/kg | 28.6 | 6.2 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 191-30-0 | |
| 7H-Dibenzo(c,g)carbazole | **14.2J** | ug/kg | 28.6 | 8.9 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 194-59-2 | |
| 7,12-Dimethylbenz(a)anthracene | **25.7J** | ug/kg | 28.6 | 8.3 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 57-97-6 | |
| Indeno(1,2,3-cd)pyrene | **550** | ug/kg | 28.6 | 9.5 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 193-39-5 | |
| 3-Methylcholanthrene | **<6.1** | ug/kg | 28.6 | 6.1 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 56-49-5 | |
| 5-Methylchrysene | **<7.7** | ug/kg | 28.6 | 7.7 | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 3697-24-3 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 73 | %. | 45-125 | | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 79 | %. | 53-125 | | 2 | 04/29/25 13:52 | 04/30/25 04:16 | 1718-51-0 | |

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## ANALYTICAL RESULTS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

**Sample: O-5** **Lab ID: 10732220005** Collected: 04/24/25 09:20 Received: 04/24/25 16:40 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **Dry Weight / %M by ASTM D2974** | Analytical Method: ASTM D2974 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Percent Moisture | **39.3** | % | 0.10 | 0.10 | 1 | | 04/28/25 09:34 | | N2 |
| **8270E MSSV PAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Acenaphthene | **1170** | ug/kg | 80.6 | 8.5 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 83-32-9 | |
| Acenaphthylene | **217** | ug/kg | 80.6 | 8.1 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 208-96-8 | |
| Anthracene | **2420** | ug/kg | 80.6 | 14.3 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 120-12-7 | |
| Benzo(g,h,i)perylene | **7990** | ug/kg | 80.6 | 31.0 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 191-24-2 | |
| Fluoranthene | **32800** | ug/kg | 806 | 215 | 50 | 04/28/25 14:44 | 04/29/25 19:07 | 206-44-0 | |
| Fluorene | **1850** | ug/kg | 80.6 | 11.4 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 86-73-7 | |
| 2-Methylnaphthalene | **89.7** | ug/kg | 80.6 | 30.1 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 91-57-6 | |
| Naphthalene | **111** | ug/kg | 80.6 | 21.5 | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 91-20-3 | |
| Phenanthrene | **20000** | ug/kg | 806 | 202 | 50 | 04/28/25 14:44 | 04/29/25 19:07 | 85-01-8 | |
| Pyrene | **26600** | ug/kg | 806 | 240 | 50 | 04/28/25 14:44 | 04/29/25 19:07 | 129-00-0 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 69 | %. | 39-125 | | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 321-60-8 | D4 |
| p-Terphenyl-d14 (S) | 82 | %. | 41-125 | | 5 | 04/28/25 14:44 | 04/29/25 11:09 | 1718-51-0 | |
| **8270E MSSV CPAH by SIM** | Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 | | | | | | | | |
| | Pace Analytical Services - Minneapolis | | | | | | | | |
| Benzo(a)anthracene | **7690** | ug/kg | 405 | 146 | 25 | 04/29/25 13:52 | 05/02/25 17:01 | 56-55-3 | |
| Benzo(a)pyrene | **8220** | ug/kg | 405 | 154 | 25 | 04/29/25 13:52 | 05/02/25 17:01 | 50-32-8 | |
| Benzofluoranthenes (Total) | **22600** | ug/kg | 243 | 78.6 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | | N2 |
| Chrysene | **10400** | ug/kg | 405 | 119 | 25 | 04/29/25 13:52 | 05/02/25 17:01 | 218-01-9 | |
| Dibenz(a,h)acridine | **306** | ug/kg | 81.0 | 27.6 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 226-36-8 | |
| Dibenz(a,h)anthracene | **954** | ug/kg | 81.0 | 28.1 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 53-70-3 | |
| Dibenzo(a,e)pyrene | **845** | ug/kg | 81.0 | 22.9 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 192-65-4 | |
| Dibenzo(a,h)pyrene | **345** | ug/kg | 81.0 | 22.3 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 189-64-0 | |
| Dibenzo(a,i)pyrene | **85.4** | ug/kg | 81.0 | 27.1 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 189-55-9 | |
| Dibenzo(a,l)pyrene | **51.5J** | ug/kg | 81.0 | 17.7 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 191-30-0 | |
| 7H-Dibenzo(c,g)carbazole | **113** | ug/kg | 81.0 | 25.3 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 194-59-2 | |
| 7,12-Dimethylbenz(a)anthracene | **<23.4** | ug/kg | 81.0 | 23.4 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 57-97-6 | |
| Indeno(1,2,3-cd)pyrene | **4220** | ug/kg | 81.0 | 27.1 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 193-39-5 | |
| 3-Methylcholanthrene | **142** | ug/kg | 81.0 | 17.3 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 56-49-5 | |
| 5-Methylchrysene | **<21.9** | ug/kg | 81.0 | 21.9 | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 3697-24-3 | |
| ***Surrogates*** | | | | | | | | | |
| 2-Fluorobiphenyl (S) | 68 | %. | 45-125 | | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 321-60-8 | ED |
| p-Terphenyl-d14 (S) | 80 | %. | 53-125 | | 5 | 04/29/25 13:52 | 04/30/25 05:47 | 1718-51-0 | |

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(612)607-1700

# QUALITY CONTROL DATA

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

QC Batch: 1003512
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10732220001, 10732220002, 10732220003, 10732220004, 10732220005

SAMPLE DUPLICATE: 5233694

| Parameter | Units | 10731833001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 3.2 | 3.2 | 2 | 30 | N2 |

SAMPLE DUPLICATE: 5233695

| Parameter | Units | 10732360001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 6.3 | 6.0 | 4 | 30 | N2 |

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# QUALITY CONTROL DATA

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

QC Batch: 1003652
QC Batch Method: EPA 3546
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10732220001, 10732220002, 10732220003, 10732220004, 10732220005

METHOD BLANK: 5234083 Matrix: Solid
Associated Lab Samples: 10732220001, 10732220002, 10732220003, 10732220004, 10732220005

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ug/kg | <3.7 | 10.0 | 3.7 | 04/29/25 02:27 | |
| Acenaphthene | ug/kg | <1.0 | 10.0 | 1.0 | 04/29/25 02:27 | |
| Acenaphthylene | ug/kg | <1.0 | 10.0 | 1.0 | 04/29/25 02:27 | |
| Anthracene | ug/kg | <1.8 | 10.0 | 1.8 | 04/29/25 02:27 | |
| Benzo(g,h,i)perylene | ug/kg | <3.8 | 10.0 | 3.8 | 04/29/25 02:27 | |
| Fluoranthene | ug/kg | <2.7 | 10.0 | 2.7 | 04/29/25 02:27 | |
| Fluorene | ug/kg | <1.4 | 10.0 | 1.4 | 04/29/25 02:27 | |
| Naphthalene | ug/kg | <2.7 | 10.0 | 2.7 | 04/29/25 02:27 | |
| Phenanthrene | ug/kg | <2.5 | 10.0 | 2.5 | 04/29/25 02:27 | |
| Pyrene | ug/kg | <3.0 | 10.0 | 3.0 | 04/29/25 02:27 | |
| 2-Fluorobiphenyl (S) | %. | 72 | 39-125 | | 04/29/25 02:27 | |
| p-Terphenyl-d14 (S) | %. | 91 | 41-125 | | 04/29/25 02:27 | |

LABORATORY CONTROL SAMPLE: 5234084

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ug/kg | 100 | 70.6 | 71 | 45-125 | |
| Acenaphthene | ug/kg | 100 | 68.6 | 69 | 54-125 | |
| Acenaphthylene | ug/kg | 100 | 69.8 | 70 | 53-125 | |
| Anthracene | ug/kg | 100 | 73.7 | 74 | 61-125 | |
| Benzo(g,h,i)perylene | ug/kg | 100 | 90.3 | 90 | 60-125 | |
| Fluoranthene | ug/kg | 100 | 72.0 | 72 | 64-125 | |
| Fluorene | ug/kg | 100 | 69.2 | 69 | 56-125 | |
| Naphthalene | ug/kg | 100 | 64.6 | 65 | 51-125 | |
| Phenanthrene | ug/kg | 100 | 67.2 | 67 | 61-125 | |
| Pyrene | ug/kg | 100 | 86.5 | 86 | 62-125 | |
| 2-Fluorobiphenyl (S) | %. | | | 71 | 39-125 | |
| p-Terphenyl-d14 (S) | %. | | | 91 | 41-125 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 5234085 5234086

| Parameter | Units | 10732220001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ug/kg | <22.8 | 122 | 122 | 87.7 | 77.2 | 72 | 63 | 30-150 | 13 | 30 | |
| Acenaphthene | ug/kg | 20.1J | 122 | 122 | 96.5 | 95.5 | 63 | 62 | 31-125 | 1 | 30 | |
| Acenaphthylene | ug/kg | 13.1J | 122 | 122 | 97.4 | 88.8 | 69 | 62 | 38-125 | 9 | 30 | |
| Anthracene | ug/kg | 68.4 | 122 | 122 | 111 | 122 | 35 | 44 | 30-150 | 9 | 30 | |

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## QUALITY CONTROL DATA

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 5234085 5234086

| Parameter | Units | 10732220001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(g,h,i)perylene | ug/kg | 237 | 122 | 122 | 153 | 185 | -69 | -42 | 30-150 | 19 | 30 | M1 |
| Fluoranthene | ug/kg | 872 | 122 | 122 | 249 | 402 | -511 | -384 | 30-150 | 47 | 30 | M1,R1 |
| Fluorene | ug/kg | 37.5J | 122 | 122 | 110 | 100 | 59 | 51 | 30-150 | 9 | 30 | |
| Naphthalene | ug/kg | <16.3 | 122 | 122 | 69.0 | 68.1 | 57 | 56 | 30-150 | 1 | 30 | |
| Phenanthrene | ug/kg | 453 | 122 | 122 | 170 | 212 | -232 | -197 | 30-150 | 22 | 30 | M1 |
| Pyrene | ug/kg | 734 | 122 | 122 | 220 | 359 | -421 | -307 | 30-150 | 48 | 30 | M1,R1 |
| 2-Fluorobiphenyl (S) | %. | | | | | | 72 | 67 | 39-125 | | | ED |
| p-Terphenyl-d14 (S) | %. | | | | | | 80 | 72 | 41-125 | | | |

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# QUALITY CONTROL DATA

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

QC Batch: 1003848
QC Batch Method: EPA 3546
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E CPAH Solid
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10732220001, 10732220002, 10732220003, 10732220004, 10732220005

METHOD BLANK: 5234989 Matrix: Solid
Associated Lab Samples: 10732220001, 10732220002, 10732220003, 10732220004, 10732220005

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| 3-Methylcholanthrene | ug/kg | <2.1 | 10.0 | 2.1 | 04/30/25 01:12 | |
| 5-Methylchrysene | ug/kg | <2.7 | 10.0 | 2.7 | 04/30/25 01:12 | |
| 7,12-Dimethylbenz(a)anthracene | ug/kg | <2.9 | 10.0 | 2.9 | 04/30/25 01:12 | |
| 7H-Dibenzo(c,g)carbazole | ug/kg | <3.1 | 10.0 | 3.1 | 04/30/25 01:12 | |
| Benzo(a)anthracene | ug/kg | <3.6 | 10.0 | 3.6 | 04/30/25 01:12 | |
| Benzo(a)pyrene | ug/kg | <3.8 | 10.0 | 3.8 | 04/30/25 01:12 | |
| Benzofluoranthenes (Total) | ug/kg | <9.7 | 30.0 | 9.7 | 04/30/25 01:12 | N2 |
| Chrysene | ug/kg | <2.9 | 10.0 | 2.9 | 04/30/25 01:12 | |
| Dibenz(a,h)acridine | ug/kg | <3.4 | 10.0 | 3.4 | 04/30/25 01:12 | |
| Dibenz(a,h)anthracene | ug/kg | <3.5 | 10.0 | 3.5 | 04/30/25 01:12 | |
| Dibenzo(a,e)pyrene | ug/kg | <2.8 | 10.0 | 2.8 | 04/30/25 01:12 | |
| Dibenzo(a,h)pyrene | ug/kg | <2.8 | 10.0 | 2.8 | 04/30/25 01:12 | |
| Dibenzo(a,i)pyrene | ug/kg | <3.3 | 10.0 | 3.3 | 04/30/25 01:12 | |
| Dibenzo(a,l)pyrene | ug/kg | <2.2 | 10.0 | 2.2 | 04/30/25 01:12 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | <3.3 | 10.0 | 3.3 | 04/30/25 01:12 | |
| 2-Fluorobiphenyl (S) | %. | 71 | 45-125 | | 04/30/25 01:12 | |
| p-Terphenyl-d14 (S) | %. | 81 | 53-125 | | 04/30/25 01:12 | |

LABORATORY CONTROL SAMPLE: 5234990

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| 3-Methylcholanthrene | ug/kg | 300 | 265 | 88 | 53-125 | |
| 5-Methylchrysene | ug/kg | 300 | 258 | 86 | 61-125 | |
| 7,12-Dimethylbenz(a)anthracene | ug/kg | 300 | 267 | 89 | 44-125 | |
| 7H-Dibenzo(c,g)carbazole | ug/kg | 300 | 254 | 85 | 56-125 | |
| Benzo(a)anthracene | ug/kg | 300 | 262 | 87 | 52-125 | |
| Benzo(a)pyrene | ug/kg | 300 | 261 | 87 | 53-125 | |
| Benzofluoranthenes (Total) | ug/kg | 900 | 804 | 89 | 56-125 | N2 |
| Chrysene | ug/kg | 300 | 255 | 85 | 57-125 | |
| Dibenz(a,h)acridine | ug/kg | 300 | 271 | 90 | 59-125 | |
| Dibenz(a,h)anthracene | ug/kg | 300 | 265 | 88 | 53-125 | |
| Dibenzo(a,e)pyrene | ug/kg | 300 | 245 | 82 | 54-125 | |
| Dibenzo(a,h)pyrene | ug/kg | 300 | 252 | 84 | 56-125 | |
| Dibenzo(a,i)pyrene | ug/kg | 300 | 258 | 86 | 53-125 | |
| Dibenzo(a,l)pyrene | ug/kg | 300 | 239 | 80 | 47-125 | |
| Indeno(1,2,3-cd)pyrene | ug/kg | 300 | 262 | 87 | 53-125 | |
| 2-Fluorobiphenyl (S) | %. | | | 72 | 45-125 | |
| p-Terphenyl-d14 (S) | %. | | | 85 | 53-125 | |

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## QUALITY CONTROL DATA

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 5234991 5234992

| Parameter | Units | 10732220001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-Methylcholanthrene | ug/kg | <5.3 | 366 | 367 | 285 | 324 | 78 | 88 | 30-125 | 13 | 30 | |
| 5-Methylchrysene | ug/kg | <6.6 | 366 | 367 | 280 | 325 | 77 | 88 | 33-125 | 15 | 30 | |
| 7,12-Dimethylbenz(a)anthracene | ug/kg | <7.1 | 366 | 367 | 284 | 269 | 76 | 72 | 30-125 | 6 | 30 | |
| 7H-Dibenzo(c,g)carbazole | ug/kg | <7.7 | 366 | 367 | 178 | 183 | 48 | 49 | 30-125 | 3 | 30 | |
| Benzo(a)anthracene | ug/kg | 86.3 | 366 | 367 | 356 | 493 | 74 | 111 | 30-150 | 32 | 30 | R1 |
| Benzo(a)pyrene | ug/kg | 100 | 366 | 367 | 361 | 502 | 71 | 110 | 30-150 | 33 | 30 | R1 |
| Benzofluoranthenes (Total) | ug/kg | 211 | 1100 | 1100 | 1040 | 1310 | 76 | 100 | 30-150 | 23 | 30 | N2 |
| Chrysene | ug/kg | 124 | 366 | 367 | 355 | 503 | 63 | 103 | 30-150 | 34 | 30 | R1 |
| Dibenz(a,h)acridine | ug/kg | <8.4 | 366 | 367 | 260 | 284 | 69 | 76 | 32-125 | 9 | 30 | |
| Dibenz(a,h)anthracene | ug/kg | 15.5J | 366 | 367 | 237 | 281 | 61 | 72 | 30-125 | 17 | 30 | |
| Dibenzo(a,e)pyrene | ug/kg | 18.4J | 366 | 367 | 152 | 177 | 37 | 43 | 30-137 | 15 | 30 | |
| Dibenzo(a,h)pyrene | ug/kg | 9.4J | 366 | 367 | 113 | 144 | 28 | 37 | 30-148 | 24 | 30 | M1 |
| Dibenzo(a,i)pyrene | ug/kg | <8.2 | 366 | 367 | 97.5 | 120 | 26 | 32 | 30-137 | 20 | 30 | M1 |
| Dibenzo(a,l)pyrene | ug/kg | <5.4 | 366 | 367 | 90.3 | 102 | 25 | 28 | 30-127 | 12 | 30 | M1 |
| Indeno(1,2,3-cd)pyrene | ug/kg | 75.4 | 366 | 367 | 272 | 393 | 54 | 86 | 30-150 | 36 | 30 | R1 |
| 2-Fluorobiphenyl (S) | %. | | | | | | 69 | 67 | 45-125 | | | ED |
| p-Terphenyl-d14 (S) | %. | | | | | | 77 | 74 | 53-125 | | | |

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# QUALIFIERS

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

## DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## ANALYTE QUALIFIERS

| | |
|---|---|
| D4 | Sample was diluted due to the presence of high levels of target analytes. |
| ED | Due to the extract's physical characteristics, the analysis was performed at dilution. |
| M1 | Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery. |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request. |
| R1 | RPD value was outside control limits. |



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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B2502087 2026 PMP Inprovements
Pace Project No.: 10732220

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **10732220001** | **O-1** | ASTM D2974 | 1003512 | | |
| **10732220002** | **O-2** | ASTM D2974 | 1003512 | | |
| **10732220003** | **O-3** | ASTM D2974 | 1003512 | | |
| **10732220004** | **O-4** | ASTM D2974 | 1003512 | | |
| **10732220005** | **O-5** | ASTM D2974 | 1003512 | | |
| **10732220001** | **O-1** | EPA 3546 | 1003652 | EPA 8270E by SIM | 1003865 |
| **10732220002** | **O-2** | EPA 3546 | 1003652 | EPA 8270E by SIM | 1003865 |
| **10732220003** | **O-3** | EPA 3546 | 1003652 | EPA 8270E by SIM | 1003865 |
| **10732220004** | **O-4** | EPA 3546 | 1003652 | EPA 8270E by SIM | 1003865 |
| **10732220005** | **O-5** | EPA 3546 | 1003652 | EPA 8270E by SIM | 1003865 |
| **10732220001** | **O-1** | EPA 3546 | 1003848 | EPA 8270E by SIM | 1004259 |
| **10732220002** | **O-2** | EPA 3546 | 1003848 | EPA 8270E by SIM | 1004259 |
| **10732220003** | **O-3** | EPA 3546 | 1003848 | EPA 8270E by SIM | 1004259 |
| **10732220004** | **O-4** | EPA 3546 | 1003848 | EPA 8270E by SIM | 1004259 |
| **10732220005** | **O-5** | EPA 3546 | 1003848 | EPA 8270E by SIM | 1004259 |



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Pace® Location Requested (City/State):

# CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

**WO# : 10732220**

10732220

| | |
|---|---|
| Company Name: Brown Interted | Contact/Report To: Edward Pencak |
| Street Address: 1100 1 Hampshire Ave S Minneapolis, MN 55438 | Phone #: |
| | E-Mail: EPencak@brownintertec.com |
| | Cc E-Mail: |
| Customer Project #: B2502087 | Invoice to: Same |
| Project Name: 2026 PMP Improvements | Invoice E-mail: |
| Site Collection Info/Facility ID (as applicable): | Purchase Order # (if applicable): |
| | Quote #: |
| Time Zone Collected: [ ] AK [ ] PT [ ] MT [X] CT [ ] ET | County / State origin of sample(s): MN |
| Data Deliverables: [ ] Level II [ ] Level III [ ] Level IV [ ] EQUIS [ ] Other | Regulatory Program (DW, RCRA, etc.) as applicable: Reportable [ ] Yes [ ] No |
| | Rush (Pre-approval required): [ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day Other Date Results Requested: Standard TAT |
| | DW PWSID # or WW Permit # as applicable: Field Filtered (if applicable): [ ] Yes [ ] No Analysis: |

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Surface Water (SW), Sediment (SED), Sludge (SL), Caulk (CK), Leachate (LL), Biosolid (BS), Other (OT)

| Customer Sample ID | Matrix * | Comp / Grab | Composite Start Date | Composite Start Time | Collected or Composite End Date | Collected or Composite End Time | # Cont. | Residual Chlorine Result | Residual Chlorine Units | 8270E SIM* | MPCA Stormwater List (Report to MDL, See attached list) | Moisture | Sample Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-1 | SS | C | 4/24/25 | 1140 | 4/24/25 | 1145 | 2 | | | X | | X | 001 |
| O-2 | | | 4/24/25 | 1055 | 4/24/25 | 1100 | 2 | | | X | | X | 002 |
| O-3 | | | 4/24/25 | 1025 | 4/24/25 | 1030 | 2 | | | X | | X | 003 |
| O-4 | | | 4/24/25 | 1000 | 4/24/25 | 1005 | 2 | | | X | | X | 004 |
| O-5 | | | 4/24/25 | 0915 | 4/24/25 | 0920 | 2 | | | X | | X | 005 |

Specify Container Size **

Identify Container Preservative Type***

Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) 90mL, (10) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only: Proj. Mgr: | AcctNum / Client ID: | Table #: | Profile / Template: 44149 | Prelog / Bottle Ord. ID:

Preservation non-conformance identified for sample.

Additional Instructions from Pace® :

Collected By: Derek Cole
Printed Name
Signature

Customer Remarks / Special Conditions / Possible Hazards:

| # Coolers: | Thermometer ID: | Correction Factor (°C): | Obs. Temp. (°C): | Corrected Temp. (°C): | [ ] On Ice |
|---|---|---|---|---|---|
| 1 | T9 | | | 1.6 | Y |

| Relinquished by/Company: (Signature) | Date/Time: | Received by/Company: (Signature) | Date/Time: | Tracking Number: |
|---|---|---|---|---|
| Brown | 4/24/25 1330 | Pace | 4/24/25 1330 | |
| Relinquished by/Company: (Signature) | Date/Time: | Received by/Company: (Signature) | Date/Time: | Delivered by: [ ] In- Person [ ] Courier |
| Pace | 4/24/25 1500 | Pace | 4/24/25 1505 | [ ] FedEx [ ] UPS [ ] Other |
| Relinquished by/Company: (Signature) | Date/Time: | Received by/Company: (Signature) | Date/Time: | |
| Pace | 4/24/25 1640 | Pace | 4/24/25 1640 | |
| Relinquished by/Company: (Signature) | Date/Time: | Received by/Company: (Signature) | Date/Time: | Page: of |

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

ENV-FRM-CORQ-0019_v02_110123 ©

# ENV-FRM-MIN4-0150 v19_Sample Condition Upon Receipt

**Person Examining & Date:** ZE 4/25/25 **PROJECT #:** **WO#: 10732220**

PM: SH5 Due Date: 05/06/25

CLIENT: Braun-BLM

**Client Name:** BROWN INTERTEL

**Custody Seal Present:** ☐ YES ☑ NO **Seals Intact:** ☐ YES ☑ NO

**Tracking Number:** ☐ See Exceptions form ENV-FRM-MIN4-0142.

**Courier:** ☐ Client ☐ Commercial ☐ FedEx ☑ Pace Courier/Field ☐ SpeeDee ☐ UPS ☐ USPS

**Packing Material:** ☑ Bubble Bags ☑ Bubble Wrap ☐ None ☐ Other: _____ **Biological Tissue Frozen:** ☐ YES ☑ NO

**Thermometer:** ☐ T1 (0461) ☐ T2 (0431) ☐ T3 (0459) ☐ T4 (0402) ☐ T5 (0187) ☐ T6 (0396) ☐ T7 (0377) ☐ T8 (0775) ☑ T9 (0428) ☐ 01339252 (0710)

**Type of Ice:** ☐ Blue ☐ Dry ☑ Wet ☐ Melted ☐ None

**Temp Blank:** ☑ YES ☐ NO

***NOTE:** Temp should be ≤ 6°C, but above freezing.*

**Read Temp w/Temp Blank:** 1.6 °C

**Correction Factor:** TRUE

**Corrected Temp w/Temp Blank:** 1.6 °C

**Did Samples Originate in West Virginia:** ☐ YES ☑ NO (list temps on exception)

**Were All Container Temps Taken:** ☐ YES ☐ NO ☑ N/A

**Average Corrected Temp (No Temp Blank Only):** _____

☐ See Exceptions form ENV-FRM-MIN4-0142. ☐ 1 Container

**USDA Regulated Soil:** ☐ N/A – Water Sample/Other (describe): _____

**Did Samples originate from one of the following states (check maps):** ☐ YES ☑ NO

**Circle State:** AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, VA

**Are samples from a foreign source** (international, including Hawaii and Puerto Rico): ☐ YES ☑ NO

***NOTE: If YES to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.***

| **LOCATION (check one):** ☐ DULUTH ☑ MINNEAPOLIS ☐ VIRGINIA | YES | NO | N/A | COMMENT(S) |
|---|---|---|---|---|
| Chain of Custody Present and Filled Out? **(i.e.; Analysis/ID/Date/Time)** | ☑ | ☐ | | 1. |
| Chain of Custody Relinquished? | ☑ | ☐ | | 2. |
| Sampler Name and/or Signature on COC? | ☑ | ☐ | ☐ | 3. |
| Samples Arrived within Hold Time? If Fecal: ☐ <8 hrs ☐ >8 hr but <24 hr ☐ >24 hr | ☑ | ☐ | | 4. |
| **Short Hold Time Analysis (<72 hr)?** | ☐ | ☑ | | 5. ☐ BOD / cBOD ☐ Fecal coliform ☐ Hex Chrom ☐ HPC ☐ Nitrate ☐ Nitrite ☐ Ortho Phos ☐ Total coliform/*E. coli* ☐ Turbidity ☐ Other: |
| **Rush Turn Around Time Requested?** | ☐ | ☑ | | 6. ☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 5 Day Due Date: |
| Sufficient Sample Volume? **(If NO, list approximate volume in section 7.)** | ☑ | ☐ | | 7. |
| Correct Containers Used? – Pace Containers Used? | ☑ ☑ | ☐ ☐ | ☐ | 8. |
| Containers Intact? | ☑ | ☐ | | 9. |
| Field Filtered Volume Received for Dissolved Tests? | ☐ | ☐ | ☑ | 10. Is sediment visible in the dissolved container: ☐ YES ☐ NO |
| ID/Date/Time Match? **(If NO, fill out section 11.)** Matrix: ☐ Oil ☑ Soil ☐ Water ☐ Other | ☑ | ☐ | ☐ | 11. ☐ See Exceptions form ENV-FRM-MIN4-0142 |
| All containers needing acid/base preservation have been checked? | ☐ | ☐ | ☑ | 12. |

**Sample #:**

☐ HNO3 _____ ☐ H2SO4 _____ ☐ NaOH _____ ☐ Zinc Acetate _____

**pH Paper Lot #:**

☐ Residual Chlorine _____ ☐ 0-6 Roll _____ ☐ 0-6 Strip _____ ☐ 0-14 Strip _____

**Positive for Residual Chlorine (NaOH containers only):** ☐ YES ☐ NO

| | | | | |
|---|---|---|---|---|
| Preserved containers in compliance with EPA recommendations? (HNO3, H2SO4, < 2 pH, NaOH > 9 Sulfide, NaOH > 10 Cyanide) | ☐ | ☐ | ☑ | ☐ See Exceptions form ENV-FRM-MIN4-0142 |
| **EXCECTIONS (water only):** VOA, Coliform, TOC/DOC, Oil & Grease, Phenols, DRO/8015, Dioxins, and PFAS | ☐ | ☐ | ☑ | |
| Extra labels present on soil VOA or WIDRO containers? **(soil only)** | ☐ | ☐ | ☑ | 13. |
| Headspace in Methyl Mercury Container? | ☐ | ☐ | ☑ | 14. |
| Headspace in VOA Vials (greater than 6mm)? | ☐ | ☐ | ☑ | ☐ See Exceptions form ENV-FRM-MIN4-0140 |
| Trip Blanks Present? | ☐ | ☐ | ☑ | 15. |
| Trip Blank Custody Seals Present? | ☐ | ☐ | ☑ | Pace Trip Blank Lot # (if purchased): |

**CLIENT NOTIFICATION / RESOLUTION:** **Labeled By:** ZE **Line:** 2

**Person Contacted & Date/Time:** _____ **PM Review & Date:** Sylvia Hunter 4/25/25

***NOTE:** When there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEQ Certification Office.*

**Table A-1. List of PAHs to be analyzed in stormwater pond sediments**

| |
|---|
| ***Noncarcinogenic PAHs*** |
| Acenaphthene |
| Acenaphthylene |
| Anthracene |
| Benzo[g,h,i]perylene |
| Fluoranthene |
| Fluorene |
| 2-Methylnaphthalene |
| Naphthalene |
| Phenanthrene |
| Pyrene |
| ***Carcinogenic PAHs*** |
| Benzo[a]anthracene |
| Benzo[b]fluoranthene |
| Benzo[j]fluoranthene |
| Benzo[k]fluoranthene |
| Benzo[a]pyrene |
| Chrysene |
| Dibenz[a,h]acridine |
| Dibenz[a,h]anthracene |
| 7H-Dibenzo[c,g]carbazole |
| Dibenzo[a,e]pyrene |
| Dibenzo[a,h]pyrene |
| Dibenzo[a,i]pyrene |
| Dibenzo[a,l]pyrene |
| 7,12-Dimethylbenz[a]anthracene |
| Indeno[1,2,3-cd]pyrene |
| 3-Methylcholanthrene |
| 5-Methylchrysene |

**Note: A combination of benzo[b]fluoranthene, benzo[j]fluoranthene, and/or benzo[k]fluoranthene frequently coelute together when sediments are analyzed**

eurofins | Environment Testing

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Edward Pencak
Braun Intertec Corporation
11001 Hampshire Avenue South
Bloomington, Minnesota 55438

Generated 5/13/2025 1:03:50 PM Revision 2

## JOB DESCRIPTION

2026 PMP Improvements
B2502087

## JOB NUMBER

310-305029-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.



myEOL

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

## Authorization



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Revision 2

Authorized for release by
Zach Bindert, Senior Project Manager
Zach.Bindert@et.eurofinsus.com
(319)595-2016

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**Job Narrative**
**310-305029-1**

REVISION

The report being provided is a revision of the original report sent on 5/5/2025. The report (revision 2) is being revised due to This report was revised 5/13/2025. Added Total PCB to Target list..

Report revision history
Revision 1 - 5/12/2025 - Reason - This report was revised 5/12/2025. Client requesting PCB reported to method detection limit..

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

**Receipt**
The samples were received on 4/25/2025 2:17 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.4°C.

**PCBs**
Method 8082A: Due to the matrix, the initial volume(s) used for the following samples deviated from the standard procedure: O-1 (310-305029-1), O-2 (310-305029-2), O-3 (310-305029-3), O-4 (310-305029-4) and O-5 (310-305029-5). The reporting limits (RLs) have been adjusted proportionately.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**Metals**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**General Chemistry**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Sample Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 310-305029-1 | O-1 | Solid | 04/24/25 00:00 | 04/25/25 14:17 |
| 310-305029-2 | O-2 | Solid | 04/24/25 00:00 | 04/25/25 14:17 |
| 310-305029-3 | O-3 | Solid | 04/24/25 00:00 | 04/25/25 14:17 |
| 310-305029-4 | O-4 | Solid | 04/24/25 00:00 | 04/25/25 14:17 |
| 310-305029-5 | O-5 | Solid | 04/24/25 00:00 | 04/25/25 14:17 |

# Detection Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Client Sample ID: O-1 — Lab Sample ID: 310-305029-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.75 | | 0.992 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Chromium | 11.4 | | 1.49 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Copper | 8.92 | | 1.49 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Lead | 7.54 | | 2.48 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Nickel | 12.0 | | 1.49 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Zinc | 24.5 | | 4.96 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Total Kjeldahl Nitrogen | 285 | | 216 | | mg/Kg | 1 | ☼ | 351.2 | Total/NA |
| Total Phosphorus as P | 202 | | 11.3 | | mg/Kg | 1 | ☼ | 365.1 | Total/NA |
| Total Organic Carbon | 8900 | | 8000 | | mg/Kg | 2 | | 9060A | Total/NA |
| Nitrate as N | 3.87 | | 1.18 | | mg/Kg | 1 | | 353.2 | Soluble |
| Nitrate Nitrite as N | 3.87 | F1 | 1.18 | | mg/Kg | 1 | ☼ | 353.2 | Soluble |

## Client Sample ID: O-2 — Lab Sample ID: 310-305029-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.85 | | 1.10 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Chromium | 14.1 | | 1.66 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Copper | 15.0 | | 1.66 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Lead | 9.71 | | 2.76 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Nickel | 12.2 | | 1.66 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Zinc | 53.0 | | 5.52 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Total Kjeldahl Nitrogen | 672 | | 323 | | mg/Kg | 1 | ☼ | 351.2 | Total/NA |
| Total Phosphorus as P | 219 | | 13.6 | | mg/Kg | 1 | ☼ | 365.1 | Total/NA |
| Total Organic Carbon | 16200 | | 8000 | | mg/Kg | 2 | | 9060A | Total/NA |

## Client Sample ID: O-3 — Lab Sample ID: 310-305029-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.76 | | 1.40 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Chromium | 9.90 | | 2.10 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Copper | 14.0 | | 2.10 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Lead | 6.19 | | 3.50 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Nickel | 7.74 | | 2.10 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Zinc | 41.4 | | 6.99 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Total Kjeldahl Nitrogen | 1390 | | 311 | | mg/Kg | 1 | ☼ | 351.2 | Total/NA |
| Total Phosphorus as P | 351 | | 14.7 | | mg/Kg | 1 | ☼ | 365.1 | Total/NA |
| Total Organic Carbon | 44100 | | 20000 | | mg/Kg | 5 | | 9060A | Total/NA |

## Client Sample ID: O-4 — Lab Sample ID: 310-305029-4

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Chromium | 13.4 | | 1.90 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Copper | 16.0 | | 1.90 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Lead | 3.62 | | 3.17 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Nickel | 15.2 | | 1.90 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Zinc | 38.5 | | 6.35 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Total Kjeldahl Nitrogen | 483 | | 302 | | mg/Kg | 1 | ☼ | 351.2 | Total/NA |
| Total Phosphorus as P | 111 | | 13.2 | | mg/Kg | 1 | ☼ | 365.1 | Total/NA |
| Total Organic Carbon | 13000 | | 4000 | | mg/Kg | 1 | | 9060A | Total/NA |

This Detection Summary does not include radiochemical test results.

# Detection Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Client Sample ID: O-5

## Lab Sample ID: 310-305029-5

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.96 | | 1.29 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Chromium | 12.5 | | 1.94 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Copper | 23.4 | | 1.94 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Lead | 5.86 | | 3.23 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Nickel | 17.3 | | 1.94 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Zinc | 47.3 | | 6.46 | | mg/Kg | 5 | ☼ | 6020B | Total/NA |
| Total Kjeldahl Nitrogen | 937 | | 338 | | mg/Kg | 1 | ☼ | 351.2 | Total/NA |
| Total Phosphorus as P | 431 | | 14.7 | | mg/Kg | 1 | ☼ | 365.1 | Total/NA |
| Total Organic Carbon | 24500 | | 20000 | | mg/Kg | 5 | | 9060A | Total/NA |

This Detection Summary does not include radiochemical test results.

## Client Sample ID: O-1

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-1

**Matrix: Solid**

### Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.0906 | | 0.142 | 0.0906 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1221 | <0.0906 | | 0.142 | 0.0906 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1232 | <0.0906 | | 0.142 | 0.0906 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1242 | <0.0906 | | 0.142 | 0.0906 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1248 | <0.122 | | 0.142 | 0.122 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1254 | <0.122 | | 0.142 | 0.122 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1260 | <0.122 | | 0.142 | 0.122 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| PCB-1268 | <0.122 | | 0.142 | 0.122 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |
| Polychlorinated biphenyls, Total | <0.122 | | 0.142 | 0.122 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:05 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *69* | | *15 - 150* | *05/01/25 08:14* | *05/01/25 17:05* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *79* | | *24 - 150* | *05/01/25 08:14* | *05/01/25 17:05* | *1* |

### Method: SW846 6020B - Metals (ICP/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **1.75** | | 0.992 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| Cadmium | <0.496 | | 0.496 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| **Chromium** | **11.4** | | 1.49 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| **Copper** | **8.92** | | 1.49 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| **Lead** | **7.54** | | 2.48 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| **Nickel** | **12.0** | | 1.49 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| Selenium | <1.49 | | 1.49 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |
| **Zinc** | **24.5** | | 4.96 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:13 | 5 |

### Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0239 | | 0.0239 | | mg/Kg | ☼ | 05/01/25 11:57 | 05/01/25 15:56 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N (EPA 350.1) | <56.8 | | 56.8 | | mg/Kg | ☼ | 04/28/25 14:22 | 04/28/25 20:06 | 1 |
| **Total Kjeldahl Nitrogen (EPA 351.2** | **285** | | 216 | | mg/Kg | ☼ | 04/30/25 05:39 | 04/30/25 22:39 | 1 |
| **Total Phosphorus as P (EPA 365.1)** | **202** | | 11.3 | | mg/Kg | ☼ | 04/29/25 13:30 | 04/29/25 19:14 | 1 |
| **Total Organic Carbon (SW846 9060A)** | **8900** | | 8000 | | mg/Kg | | | 04/30/25 14:34 | 2 |
| Cr (VI) (SW846 EPA 7196A) | <0.492 | | 0.492 | | mg/Kg | ☼ | 04/29/25 17:11 | 05/03/25 13:10 | 1 |

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture (EPA Moisture)** | **17.8** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |
| **Percent Solids (EPA Moisture)** | **82.2** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Nitrate as N (EPA 353.2)** | **3.87** | | 1.18 | | mg/Kg | | | 05/01/25 12:34 | 1 |
| **Nitrate Nitrite as N (EPA 353.2)** | **3.87** | **F1** | 1.18 | | mg/Kg | ☼ | | 05/01/25 12:16 | 1 |
| Nitrite as N (EPA 353.2) | <1.18 | F1 | 1.18 | | mg/Kg | ☼ | | 05/01/25 12:34 | 1 |

## Client Sample ID: O-2

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-2

**Matrix: Solid**

### Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.120 | | 0.187 | 0.120 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1221 | <0.120 | | 0.187 | 0.120 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1232 | <0.120 | | 0.187 | 0.120 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1242 | <0.120 | | 0.187 | 0.120 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1248 | <0.161 | | 0.187 | 0.161 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1254 | <0.161 | | 0.187 | 0.161 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1260 | <0.161 | | 0.187 | 0.161 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| PCB-1268 | <0.161 | | 0.187 | 0.161 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |
| Polychlorinated biphenyls, Total | <0.161 | | 0.187 | 0.161 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:18 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *78* | | *15 - 150* | *05/01/25 08:14* | *05/01/25 17:18* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *73* | | *24 - 150* | *05/01/25 08:14* | *05/01/25 17:18* | *1* |

### Method: SW846 6020B - Metals (ICP/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **1.85** | | 1.10 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| Cadmium | <0.552 | | 0.552 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| **Chromium** | **14.1** | | 1.66 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| **Copper** | **15.0** | | 1.66 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| **Lead** | **9.71** | | 2.76 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| **Nickel** | **12.2** | | 1.66 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| Selenium | <1.66 | | 1.66 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |
| **Zinc** | **53.0** | | 5.52 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:15 | 5 |

### Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0233 | | 0.0233 | | mg/Kg | ☼ | 05/02/25 10:13 | 05/02/25 12:26 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N (EPA 350.1) | <64.6 | | 64.6 | | mg/Kg | ☼ | 04/28/25 14:22 | 04/28/25 20:08 | 1 |
| **Total Kjeldahl Nitrogen (EPA 351.2** | **672** | | 323 | | mg/Kg | ☼ | 04/30/25 05:39 | 04/30/25 22:40 | 1 |
| **Total Phosphorus as P (EPA 365.1)** | **219** | | 13.6 | | mg/Kg | ☼ | 04/29/25 13:30 | 04/29/25 19:14 | 1 |
| **Total Organic Carbon (SW846 9060A)** | **16200** | | 8000 | | mg/Kg | | | 04/30/25 14:16 | 2 |
| Cr (VI) (SW846 EPA 7196A) | <0.569 | | 0.569 | | mg/Kg | ☼ | 04/29/25 17:11 | 05/03/25 13:11 | 1 |

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture (EPA Moisture)** | **29.1** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |
| **Percent Solids (EPA Moisture)** | **70.9** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N (EPA 353.2) | <1.35 | | 1.35 | | mg/Kg | | | 05/01/25 12:36 | 1 |
| Nitrate Nitrite as N (EPA 353.2) | <1.35 | | 1.35 | | mg/Kg | ☼ | | 05/01/25 12:22 | 1 |
| Nitrite as N (EPA 353.2) | <1.35 | | 1.35 | | mg/Kg | ☼ | | 05/01/25 12:36 | 1 |

## Client Sample ID: O-3

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-3

**Matrix: Solid**

### Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.183 | | 0.286 | 0.183 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1221 | <0.183 | | 0.286 | 0.183 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1232 | <0.183 | | 0.286 | 0.183 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1242 | <0.183 | | 0.286 | 0.183 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1248 | <0.246 | | 0.286 | 0.246 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1254 | <0.246 | | 0.286 | 0.246 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1260 | <0.246 | | 0.286 | 0.246 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| PCB-1268 | <0.246 | | 0.286 | 0.246 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |
| Polychlorinated biphenyls, Total | <0.246 | | 0.286 | 0.246 | mg/Kg | ☼ | 05/01/25 08:14 | 05/01/25 17:31 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *54* | | *15 - 150* | *05/01/25 08:14* | *05/01/25 17:31* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *56* | | *24 - 150* | *05/01/25 08:14* | *05/01/25 17:31* | *1* |

### Method: SW846 6020B - Metals (ICP/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **1.76** | | 1.40 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| Cadmium | <0.699 | | 0.699 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| **Chromium** | **9.90** | | 2.10 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| **Copper** | **14.0** | | 2.10 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| **Lead** | **6.19** | | 3.50 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| **Nickel** | **7.74** | | 2.10 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| Selenium | <2.10 | | 2.10 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |
| **Zinc** | **41.4** | | 6.99 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:18 | 5 |

### Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0263 | | 0.0263 | | mg/Kg | ☼ | 05/02/25 10:13 | 05/02/25 12:28 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N (EPA 350.1) | <75.2 | | 75.2 | | mg/Kg | ☼ | 04/28/25 14:22 | 04/28/25 20:08 | 1 |
| **Total Kjeldahl Nitrogen (EPA 351.2** | **1390** | | 311 | | mg/Kg | ☼ | 04/30/25 05:39 | 04/30/25 22:40 | 1 |
| **Total Phosphorus as P (EPA 365.1)** | **351** | | 14.7 | | mg/Kg | ☼ | 04/29/25 13:30 | 04/29/25 19:14 | 1 |
| **Total Organic Carbon (SW846 9060A)** | **44100** | | 20000 | | mg/Kg | | | 04/30/25 15:15 | 5 |
| Cr (VI) (SW846 EPA 7196A) | <0.638 | | 0.638 | | mg/Kg | ☼ | 04/29/25 17:11 | 05/03/25 13:26 | 1 |

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture (EPA Moisture)** | **36.5** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |
| **Percent Solids (EPA Moisture)** | **63.5** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N (EPA 353.2) | <1.52 | | 1.52 | | mg/Kg | | | 05/01/25 12:37 | 1 |
| Nitrate Nitrite as N (EPA 353.2) | <1.52 | | 1.52 | | mg/Kg | ☼ | | 05/01/25 12:24 | 1 |
| Nitrite as N (EPA 353.2) | <1.52 | | 1.52 | | mg/Kg | ☼ | | 05/01/25 12:37 | 1 |

## Client Sample ID: O-4

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-4

**Matrix: Solid**

### Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.0913 | | 0.143 | 0.0913 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1221 | <0.0913 | | 0.143 | 0.0913 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1232 | <0.0913 | | 0.143 | 0.0913 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1242 | <0.0913 | | 0.143 | 0.0913 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1248 | <0.123 | | 0.143 | 0.123 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1254 | <0.123 | | 0.143 | 0.123 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1260 | <0.123 | | 0.143 | 0.123 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| PCB-1268 | <0.123 | | 0.143 | 0.123 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |
| Polychlorinated biphenyls, Total | <0.123 | | 0.143 | 0.123 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:12 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *66* | | *15 - 150* | *05/01/25 08:14* | *05/02/25 21:12* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *70* | | *24 - 150* | *05/01/25 08:14* | *05/02/25 21:12* | *1* |

### Method: SW846 6020B - Metals (ICP/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <1.27 | | 1.27 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| Cadmium | <0.635 | | 0.635 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| **Chromium** | **13.4** | | 1.90 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| **Copper** | **16.0** | | 1.90 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| **Lead** | **3.62** | | 3.17 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| **Nickel** | **15.2** | | 1.90 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| Selenium | <1.90 | | 1.90 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |
| **Zinc** | **38.5** | | 6.35 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:20 | 5 |

### Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0257 | | 0.0257 | | mg/Kg | ☼ | 05/02/25 10:13 | 05/02/25 12:35 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N (EPA 350.1) | <66.3 | | 66.3 | | mg/Kg | ☼ | 04/28/25 14:22 | 04/28/25 20:10 | 1 |
| **Total Kjeldahl Nitrogen (EPA 351.2** | **483** | | 302 | | mg/Kg | ☼ | 04/30/25 05:39 | 04/30/25 22:40 | 1 |
| **Total Phosphorus as P (EPA 365.1)** | **111** | | 13.2 | | mg/Kg | ☼ | 04/29/25 13:30 | 04/29/25 19:15 | 1 |
| **Total Organic Carbon (SW846 9060A)** | **13000** | | 4000 | | mg/Kg | | | 04/30/25 15:28 | 1 |
| Cr (VI) (SW846 EPA 7196A) | <0.554 | | 0.554 | | mg/Kg | ☼ | 04/29/25 17:11 | 05/03/25 13:27 | 1 |

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture (EPA Moisture)** | **28.1** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |
| **Percent Solids (EPA Moisture)** | **71.9** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N (EPA 353.2) | <1.28 | | 1.28 | | mg/Kg | | | 05/01/25 12:37 | 1 |
| Nitrate Nitrite as N (EPA 353.2) | <1.28 | | 1.28 | | mg/Kg | ☼ | | 05/01/25 12:26 | 1 |
| Nitrite as N (EPA 353.2) | <1.28 | | 1.28 | | mg/Kg | ☼ | | 05/01/25 12:37 | 1 |

## Client Sample ID: O-5

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-5

**Matrix: Solid**

### Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.139 | | 0.218 | 0.139 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1221 | <0.139 | | 0.218 | 0.139 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1232 | <0.139 | | 0.218 | 0.139 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1242 | <0.139 | | 0.218 | 0.139 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1248 | <0.187 | | 0.218 | 0.187 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1254 | <0.187 | | 0.218 | 0.187 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1260 | <0.187 | | 0.218 | 0.187 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| PCB-1268 | <0.187 | | 0.218 | 0.187 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |
| Polychlorinated biphenyls, Total | <0.187 | | 0.218 | 0.187 | mg/Kg | ☼ | 05/01/25 08:14 | 05/02/25 21:25 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *56* | | *15 - 150* | *05/01/25 08:14* | *05/02/25 21:25* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *56* | | *24 - 150* | *05/01/25 08:14* | *05/02/25 21:25* | *1* |

### Method: SW846 6020B - Metals (ICP/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **1.96** | | 1.29 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| Cadmium | <0.646 | | 0.646 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| **Chromium** | **12.5** | | 1.94 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| **Copper** | **23.4** | | 1.94 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| **Lead** | **5.86** | | 3.23 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| **Nickel** | **17.3** | | 1.94 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| Selenium | <1.94 | | 1.94 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |
| **Zinc** | **47.3** | | 6.46 | | mg/Kg | ☼ | 05/01/25 09:30 | 05/01/25 17:25 | 5 |

### Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0237 | | 0.0237 | | mg/Kg | ☼ | 05/02/25 10:13 | 05/02/25 12:37 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N (EPA 350.1) | <71.4 | | 71.4 | | mg/Kg | ☼ | 04/28/25 14:22 | 04/28/25 20:10 | 1 |
| **Total Kjeldahl Nitrogen (EPA 351.2** | **937** | | 338 | | mg/Kg | ☼ | 04/30/25 05:39 | 04/30/25 22:41 | 1 |
| **Total Phosphorus as P (EPA 365.1)** | **431** | | 14.7 | | mg/Kg | ☼ | 04/29/25 13:30 | 04/29/25 19:15 | 1 |
| **Total Organic Carbon (SW846 9060A)** | **24500** | | 20000 | | mg/Kg | | | 04/30/25 15:40 | 5 |
| Cr (VI) (SW846 EPA 7196A) | <0.597 | | 0.597 | | mg/Kg | ☼ | 04/29/25 17:11 | 05/03/25 13:28 | 1 |

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture (EPA Moisture)** | **32.2** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |
| **Percent Solids (EPA Moisture)** | **67.8** | | 0.1 | | % | | | 04/29/25 09:55 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate as N (EPA 353.2) | <1.47 | | 1.47 | | mg/Kg | | | 05/01/25 12:37 | 1 |
| Nitrate Nitrite as N (EPA 353.2) | <1.47 | | 1.47 | | mg/Kg | ☼ | | 05/01/25 12:27 | 1 |
| Nitrite as N (EPA 353.2) | <1.47 | | 1.47 | | mg/Kg | ☼ | | 05/01/25 12:37 | 1 |

# Definitions/Glossary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| F3 | Duplicate RPD exceeds the control limit |

### General Chemistry

| Qualifier | Qualifier Description |
|---|---|
| F1 | MS and/or MSD recovery exceeds control limits. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

## Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|---|---|
| ☼ | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CFU | Colony Forming Unit |
| CNF | Contains No Free Liquid |
| DER | Duplicate Error Ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MCL | EPA recommended "Maximum Contaminant Level" |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| MPN | Most Probable Number |
| MQL | Method Quantitation Limit |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| NEG | Negative / Absent |
| POS | Positive / Present |
| PQL | Practical Quantitation Limit |
| PRES | Presumptive |
| QC | Quality Control |
| RER | Relative Error Ratio (Radiochemistry) |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |
| TNTC | Too Numerous To Count |

# Surrogate Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

**Matrix: Solid** **Prep Type: Total/NA**

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DCB2 | TCX2 | | | | | | | | |
| Lab Sample ID | Client Sample ID | (15-150) | (24-150) | | | | | | | | |
| 310-305026-B-1-F MS | Matrix Spike | 94 | 99 | | | | | | | | |
| 310-305026-B-1-G MSD | Matrix Spike Duplicate | 104 | 114 | | | | | | | | |
| 310-305029-1 | O-1 | 69 | 79 | | | | | | | | |
| 310-305029-2 | O-2 | 78 | 73 | | | | | | | | |
| 310-305029-3 | O-3 | 54 | 56 | | | | | | | | |
| LCS 310-453316/2-A | Lab Control Sample | 84 | 95 | | | | | | | | |
| MB 310-453316/1-A | Method Blank | 91 | 99 | | | | | | | | |

**Surrogate Legend**

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene (Surr)

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

**Matrix: Solid** **Prep Type: Total/NA**

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DCB1 | TCX1 | | | | | | | | |
| Lab Sample ID | Client Sample ID | (15-150) | (24-150) | | | | | | | | |
| 310-305029-4 | O-4 | 66 | 70 | | | | | | | | |
| 310-305029-5 | O-5 | 56 | 56 | | | | | | | | |

**Surrogate Legend**

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene (Surr)

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

### Lab Sample ID: MB 310-453316/1-A
**Matrix: Solid**
**Analysis Batch: 453319**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453316**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.0302 | | 0.0471 | 0.0302 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1221 | <0.0302 | | 0.0471 | 0.0302 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1232 | <0.0302 | | 0.0471 | 0.0302 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1242 | <0.0302 | | 0.0471 | 0.0302 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1248 | <0.0405 | | 0.0471 | 0.0405 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1254 | <0.0405 | | 0.0471 | 0.0405 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1260 | <0.0405 | | 0.0471 | 0.0405 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |
| PCB-1268 | <0.0405 | | 0.0471 | 0.0405 | mg/Kg | | 05/01/25 08:14 | 05/01/25 15:07 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *91* | | *15 - 150* | *05/01/25 08:14* | *05/01/25 15:07* | *1* |
| *Tetrachloro-m-xylene (Surr)* | *99* | | *24 - 150* | *05/01/25 08:14* | *05/01/25 15:07* | *1* |

### Lab Sample ID: LCS 310-453316/2-A
**Matrix: Solid**
**Analysis Batch: 453319**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453316**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| PCB-1016 | 0.317 | 0.2665 | | mg/Kg | | 84 | 40 - 139 |
| PCB-1260 | 0.317 | 0.2632 | | mg/Kg | | 83 | 39 - 142 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *84* | | *15 - 150* |
| *Tetrachloro-m-xylene (Surr)* | *95* | | *24 - 150* |

### Lab Sample ID: 310-305026-B-1-F MS
**Matrix: Solid**
**Analysis Batch: 453319**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 453316**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.0325 | | 0.328 | 0.3887 | | mg/Kg | ☼ | 118 | 27 - 150 |
| PCB-1260 | <0.0436 | | 0.328 | 0.3839 | | mg/Kg | ☼ | 117 | 17 - 150 |

| *Surrogate* | *MS %Recovery* | *MS Qualifier* | *Limits* |
|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *94* | | *15 - 150* |
| *Tetrachloro-m-xylene (Surr)* | *99* | | *24 - 150* |

### Lab Sample ID: 310-305026-B-1-G MSD
**Matrix: Solid**
**Analysis Batch: 453319**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453316**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | <0.0325 | | 0.332 | 0.3713 | | mg/Kg | ☼ | 112 | 27 - 150 | 5 | 40 |
| PCB-1260 | <0.0436 | | 0.332 | 0.3909 | | mg/Kg | ☼ | 118 | 17 - 150 | 2 | 40 |

| *Surrogate* | *MSD %Recovery* | *MSD Qualifier* | *Limits* |
|---|---|---|---|
| *DCB Decachlorobiphenyl (Surr)* | *104* | | *15 - 150* |

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

**Lab Sample ID: 310-305026-B-1-G MSD**
**Matrix: Solid**
**Analysis Batch: 453319**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453316**

| Surrogate | MSD %Recovery | MSD Qualifier | Limits |
|---|---|---|---|
| *Tetrachloro-m-xylene (Surr)* | *114* | | *24 - 150* |

## Method: 6020B - Metals (ICP/MS)

**Lab Sample ID: MB 310-453039/1-A ^5**
**Matrix: Solid**
**Analysis Batch: 453470**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453039**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.881 | | 0.881 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Cadmium | <0.441 | | 0.441 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Chromium | <1.32 | | 1.32 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Copper | <1.32 | | 1.32 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Lead | <2.20 | | 2.20 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Nickel | <1.32 | | 1.32 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Selenium | <1.32 | | 1.32 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |
| Zinc | <4.41 | | 4.41 | | mg/Kg | | 05/01/25 09:30 | 05/01/25 16:32 | 5 |

**Lab Sample ID: LCS 310-453039/2-A ^20**
**Matrix: Solid**
**Analysis Batch: 453470**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453039**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Arsenic | 157 | 152.9 | | mg/Kg | | 98 | 80 - 120 |
| Cadmium | 78.4 | 70.96 | | mg/Kg | | 91 | 80 - 120 |
| Chromium | 78.4 | 71.10 | | mg/Kg | | 91 | 80 - 120 |
| Copper | 157 | 143.7 | | mg/Kg | | 92 | 80 - 120 |
| Lead | 157 | 141.2 | | mg/Kg | | 90 | 80 - 120 |
| Nickel | 157 | 142.5 | | mg/Kg | | 91 | 80 - 120 |
| Selenium | 313 | 280.7 | | mg/Kg | | 90 | 80 - 120 |
| Zinc | 157 | 130.3 | | mg/Kg | | 83 | 80 - 120 |

**Lab Sample ID: 310-304791-B-2-D MS ^20**
**Matrix: Solid**
**Analysis Batch: 453470**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 453039**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <1.11 | | 193 | 235.5 | | mg/Kg | ☼ | 122 | 75 - 125 |
| Cadmium | <0.557 | | 96.5 | 110.9 | | mg/Kg | ☼ | 115 | 75 - 125 |
| Chromium | 4.66 | | 96.5 | 114.1 | | mg/Kg | ☼ | 113 | 75 - 125 |
| Copper | 2.75 | | 193 | 225.0 | | mg/Kg | ☼ | 115 | 75 - 125 |
| Lead | <2.79 | | 193 | 224.7 | | mg/Kg | ☼ | 115 | 75 - 125 |
| Nickel | 3.77 | | 193 | 224.4 | | mg/Kg | ☼ | 114 | 75 - 125 |
| Selenium | <1.67 | | 386 | 433.8 | | mg/Kg | ☼ | 112 | 75 - 125 |
| Zinc | 7.13 | | 193 | 207.0 | | mg/Kg | ☼ | 104 | 75 - 125 |

## Method: 6020B - Metals (ICP/MS) (Continued)

**Lab Sample ID: 310-304791-B-2-E MSD ^20**
**Matrix: Solid**
**Analysis Batch: 453470**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453039**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <1.11 | | 222 | 264.3 | | mg/Kg | ☼ | 119 | 75 - 125 | 12 | 20 |
| Cadmium | <0.557 | | 111 | 123.2 | | mg/Kg | ☼ | 111 | 75 - 125 | 11 | 20 |
| Chromium | 4.66 | | 111 | 128.6 | | mg/Kg | ☼ | 112 | 75 - 125 | 12 | 20 |
| Copper | 2.75 | | 222 | 252.4 | | mg/Kg | ☼ | 112 | 75 - 125 | 11 | 20 |
| Lead | <2.79 | | 222 | 250.0 | | mg/Kg | ☼ | 112 | 75 - 125 | 11 | 20 |
| Nickel | 3.77 | | 222 | 253.1 | | mg/Kg | ☼ | 112 | 75 - 125 | 12 | 20 |
| Selenium | <1.67 | | 444 | 485.8 | | mg/Kg | ☼ | 109 | 75 - 125 | 11 | 20 |
| Zinc | 7.13 | | 222 | 232.3 | | mg/Kg | ☼ | 101 | 75 - 125 | 11 | 20 |

**Lab Sample ID: 310-305029-4 DU**
**Matrix: Solid**
**Analysis Batch: 453470**

**Client Sample ID: O-4**
**Prep Type: Total/NA**
**Prep Batch: 453039**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Arsenic | <1.27 | | <1.19 | | mg/Kg | ☼ | NC | 20 |
| Cadmium | <0.635 | | <0.595 | | mg/Kg | ☼ | NC | 20 |
| Chromium | 13.4 | | 8.936 | F3 | mg/Kg | ☼ | 40 | 20 |
| Copper | 16.0 | | 13.45 | | mg/Kg | ☼ | 17 | 20 |
| Lead | 3.62 | | 3.315 | | mg/Kg | ☼ | 9 | 20 |
| Nickel | 15.2 | | 11.21 | F3 | mg/Kg | ☼ | 30 | 20 |
| Selenium | <1.90 | | <1.78 | | mg/Kg | ☼ | NC | 20 |
| Zinc | 38.5 | | 24.57 | F3 | mg/Kg | ☼ | 44 | 20 |

## Method: 7471B - Mercury (CVAA)

**Lab Sample ID: MB 310-453030/1-A**
**Matrix: Solid**
**Analysis Batch: 453446**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453030**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0186 | | 0.0186 | | mg/Kg | | 05/01/25 11:57 | 05/01/25 14:54 | 1 |

**Lab Sample ID: LCS 310-453030/2-A**
**Matrix: Solid**
**Analysis Batch: 453446**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453030**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Mercury | 0.148 | 0.1257 | | mg/Kg | | 85 | 80 - 120 |

**Lab Sample ID: 310-305025-E-1-B MS**
**Matrix: Solid**
**Analysis Batch: 453446**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 453030**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0203 | | 0.158 | 0.1534 | | mg/Kg | ☼ | 97 | 80 - 120 |

## Method: 7471B - Mercury (CVAA) (Continued)

**Lab Sample ID: 310-305025-E-1-C MSD**
**Matrix: Solid**
**Analysis Batch: 453446**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453030**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0203 | | 0.155 | 0.1406 | | mg/Kg | ☼ | 91 | 80 - 120 | 9 | 20 |

**Lab Sample ID: MB 310-453031/1-A**
**Matrix: Solid**
**Analysis Batch: 453563**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453031**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0170 | | 0.0170 | | mg/Kg | | 05/02/25 10:13 | 05/02/25 12:14 | 1 |

**Lab Sample ID: LCS 310-453031/2-A**
**Matrix: Solid**
**Analysis Batch: 453563**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453031**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Mercury | 0.134 | 0.1295 | | mg/Kg | | 96 | 80 - 120 |

**Lab Sample ID: 310-304993-B-1-B MS**
**Matrix: Solid**
**Analysis Batch: 453563**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 453031**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0179 | | 0.151 | 0.1353 | | mg/Kg | ☼ | 90 | 80 - 120 |

**Lab Sample ID: 310-304993-B-1-C MSD**
**Matrix: Solid**
**Analysis Batch: 453563**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453031**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | <0.0179 | | 0.146 | 0.1315 | | mg/Kg | ☼ | 90 | 80 - 120 | 3 | 20 |

## Method: 350.1 - Nitrogen, Ammonia

**Lab Sample ID: MB 310-452929/1-A**
**Matrix: Solid**
**Analysis Batch: 452953**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 452929**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N | <48.0 | | 48.0 | | mg/Kg | | 04/28/25 14:13 | 04/28/25 19:58 | 1 |

**Lab Sample ID: LCS 310-452929/2-A**
**Matrix: Solid**
**Analysis Batch: 452953**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 452929**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Ammonia as N | 383 | 361.7 | | mg/Kg | | 94 | 90 - 110 |

## Method: 351.2 - Nitrogen, Total Kjeldahl

**Lab Sample ID: MB 310-453133/1-A**
**Matrix: Solid**
**Analysis Batch: 453285**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453133**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen | <155 | | 155 | | mg/Kg | | 04/30/25 05:39 | 04/30/25 22:36 | 1 |

**Lab Sample ID: LCS 310-453133/2-A**
**Matrix: Solid**
**Analysis Batch: 453285**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453133**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen | 600 | 642.6 | | mg/Kg | | 107 | 90 - 110 |

**Lab Sample ID: 310-304970-A-2-J MS**
**Matrix: Solid**
**Analysis Batch: 453285**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 453133**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen | 64400 | F1 | 21300 | 88040 | F1 | mg/Kg | ☼ | 111 | 90 - 110 |

**Lab Sample ID: 310-304970-A-2-K MSD**
**Matrix: Solid**
**Analysis Batch: 453285**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 453133**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen | 64400 | F1 | 20200 | 88820 | F1 | mg/Kg | ☼ | 121 | 90 - 110 | 1 | 36 |

## Method: 353.2 - Nitrogen, Nitrite

**Lab Sample ID: MB 310-453333/1-A**
**Matrix: Solid**
**Analysis Batch: 453398**

**Client Sample ID: Method Blank**
**Prep Type: Soluble**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrite as N | <0.992 | | 0.992 | | mg/Kg | | | 05/01/25 12:33 | 1 |

**Lab Sample ID: LCS 310-453333/2-A**
**Matrix: Solid**
**Analysis Batch: 453398**

**Client Sample ID: Lab Control Sample**
**Prep Type: Soluble**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Nitrite as N | 9.92 | 9.253 | | mg/Kg | | 93 | 90 - 110 |

**Lab Sample ID: 310-305029-1 MS**
**Matrix: Solid**
**Analysis Batch: 453398**

**Client Sample ID: O-1**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Nitrite as N | <1.18 | F1 | 11.8 | 8.225 | F1 | mg/Kg | ☼ | 70 | 90 - 110 |

## Method: 353.2 - Nitrogen, Nitrite (Continued)

**Lab Sample ID: 310-305029-1 MSD**
**Matrix: Solid**
**Analysis Batch: 453398**

**Client Sample ID: O-1**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrite as N | <1.18 | F1 | 11.8 | 7.696 | | mg/Kg | ☼ | | | | |

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

**Lab Sample ID: MB 310-453333/1-A**
**Matrix: Solid**
**Analysis Batch: 453357**

**Client Sample ID: Method Blank**
**Prep Type: Soluble**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate Nitrite as N | <0.992 | | 0.992 | | mg/Kg | | | 05/01/25 12:13 | 1 |

**Lab Sample ID: LCS 310-453333/2-A**
**Matrix: Solid**
**Analysis Batch: 453357**

**Client Sample ID: Lab Control Sample**
**Prep Type: Soluble**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Nitrate Nitrite as N | 20.5 | 20.08 | | mg/Kg | | 98 | 90 - 110 |

**Lab Sample ID: 310-305029-1 MS**
**Matrix: Solid**
**Analysis Batch: 453357**

**Client Sample ID: O-1**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate Nitrite as N | 3.87 | F1 | 11.8 | 13.46 | F1 | mg/Kg | ☼ | 81 | 90 - 110 |

**Lab Sample ID: 310-305029-1 MSD**
**Matrix: Solid**
**Analysis Batch: 453357**

**Client Sample ID: O-1**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate Nitrite as N | 3.87 | F1 | 11.8 | 13.11 | F1 | mg/Kg | ☼ | 78 | 90 - 110 | 3 | 20 |

## Method: 365.1 - Phosphorus, Total

**Lab Sample ID: MB 310-453084/1-A**
**Matrix: Solid**
**Analysis Batch: 453128**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 453084**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus as P | <9.69 | | 9.69 | | mg/Kg | | 04/29/25 13:30 | 04/29/25 19:11 | 1 |

**Lab Sample ID: LCS 310-453084/2-A**
**Matrix: Solid**
**Analysis Batch: 453128**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 453084**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Total Phosphorus as P | 96.9 | 100.1 | | mg/Kg | | 103 | 90 - 110 |

## Method: 9060A - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 280-693986/4**
**Matrix: Solid**
**Analysis Batch: 693986**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | <4000 | | 4000 | | mg/Kg | | | 04/30/25 10:29 | 1 |

**Lab Sample ID: LCS 280-693986/3**
**Matrix: Solid**
**Analysis Batch: 693986**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 3250 | 3894 | J | mg/Kg | | 120 | 41 - 120 |

**Lab Sample ID: 310-305029-1 MS**
**Matrix: Solid**
**Analysis Batch: 693986**

**Client Sample ID: O-1**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 8900 | | 47800 | 34720 | | mg/Kg | | 54 | 41 - 120 |

**Lab Sample ID: 310-305029-1 MSD**
**Matrix: Solid**
**Analysis Batch: 693986**

**Client Sample ID: O-1**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 8900 | | 47900 | 32760 | | mg/Kg | | 50 | 41 - 120 | 6 | 20 |

## Method: EPA 7196A - Chromium, Hexavalent

**Lab Sample ID: MB 180-494917/1-A**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cr (VI) | <0.400 | | 0.400 | | mg/Kg | | 04/29/25 17:11 | 05/03/25 12:31 | 1 |

**Lab Sample ID: LCSI 180-494917/3-A**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | Spike Added | LCSI Result | LCSI Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Cr (VI) | 708 | 806.9 | | mg/Kg | | 114 | 80 - 120 |

**Lab Sample ID: LCSS 180-494917/2-A**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | Spike Added | LCSS Result | LCSS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Cr (VI) | 20.0 | 23.36 | | mg/Kg | | 117 | 80 - 120 |

## Method: EPA 7196A - Chromium, Hexavalent (Continued)

**Lab Sample ID: 180-189340-M-1-C MSS**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSS Result | MSS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Cr (VI) | <0.622 | F1 | 30.2 | <0.605 | F1 | mg/Kg | ☼ | -0.4 | 75 - 125 |

**Lab Sample ID: 180-189340-M-1-D MSI**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Matrix Spike**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSI Result | MSI Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Cr (VI) | <0.622 | F1 | 1060 | 571.5 | F1 | mg/Kg | ☼ | 54 | 75 - 125 |

**Lab Sample ID: 180-189340-M-1-B DU**
**Matrix: Solid**
**Analysis Batch: 495080**

**Client Sample ID: Duplicate**
**Prep Type: Total/NA**
**Prep Batch: 494917**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Cr (VI) | <0.622 | F1 | <0.619 | | mg/Kg | ☼ | NC | 20 |

## Method: Moisture - Percent Moisture

**Lab Sample ID: 310-305028-B-7 DU**
**Matrix: Solid**
**Analysis Batch: 453008**

**Client Sample ID: Duplicate**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Percent Moisture | 22.2 | | 23.3 | | % | | 5 | 40 |
| Percent Solids | 77.8 | | 76.7 | | % | | 1 | 16 |

## GC Semi VOA

### Prep Batch: 453316

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 3546 | |
| 310-305029-2 | O-2 | Total/NA | Solid | 3546 | |
| 310-305029-3 | O-3 | Total/NA | Solid | 3546 | |
| 310-305029-4 | O-4 | Total/NA | Solid | 3546 | |
| 310-305029-5 | O-5 | Total/NA | Solid | 3546 | |
| MB 310-453316/1-A | Method Blank | Total/NA | Solid | 3546 | |
| LCS 310-453316/2-A | Lab Control Sample | Total/NA | Solid | 3546 | |
| 310-305026-B-1-F MS | Matrix Spike | Total/NA | Solid | 3546 | |
| 310-305026-B-1-G MSD | Matrix Spike Duplicate | Total/NA | Solid | 3546 | |

### Analysis Batch: 453319

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 8082A | 453316 |
| 310-305029-2 | O-2 | Total/NA | Solid | 8082A | 453316 |
| 310-305029-3 | O-3 | Total/NA | Solid | 8082A | 453316 |
| MB 310-453316/1-A | Method Blank | Total/NA | Solid | 8082A | 453316 |
| LCS 310-453316/2-A | Lab Control Sample | Total/NA | Solid | 8082A | 453316 |
| 310-305026-B-1-F MS | Matrix Spike | Total/NA | Solid | 8082A | 453316 |
| 310-305026-B-1-G MSD | Matrix Spike Duplicate | Total/NA | Solid | 8082A | 453316 |

### Analysis Batch: 453565

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-4 | O-4 | Total/NA | Solid | 8082A | 453316 |
| 310-305029-5 | O-5 | Total/NA | Solid | 8082A | 453316 |

## Metals

### Prep Batch: 453030

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 7471B | |
| MB 310-453030/1-A | Method Blank | Total/NA | Solid | 7471B | |
| LCS 310-453030/2-A | Lab Control Sample | Total/NA | Solid | 7471B | |
| 310-305025-E-1-B MS | Matrix Spike | Total/NA | Solid | 7471B | |
| 310-305025-E-1-C MSD | Matrix Spike Duplicate | Total/NA | Solid | 7471B | |

### Prep Batch: 453031

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-2 | O-2 | Total/NA | Solid | 7471B | |
| 310-305029-3 | O-3 | Total/NA | Solid | 7471B | |
| 310-305029-4 | O-4 | Total/NA | Solid | 7471B | |
| 310-305029-5 | O-5 | Total/NA | Solid | 7471B | |
| MB 310-453031/1-A | Method Blank | Total/NA | Solid | 7471B | |
| LCS 310-453031/2-A | Lab Control Sample | Total/NA | Solid | 7471B | |
| 310-304993-B-1-B MS | Matrix Spike | Total/NA | Solid | 7471B | |
| 310-304993-B-1-C MSD | Matrix Spike Duplicate | Total/NA | Solid | 7471B | |

### Prep Batch: 453039

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 3050B | |
| 310-305029-2 | O-2 | Total/NA | Solid | 3050B | |
| 310-305029-3 | O-3 | Total/NA | Solid | 3050B | |

## Metals (Continued)

### Prep Batch: 453039 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-4 | O-4 | Total/NA | Solid | 3050B | |
| 310-305029-5 | O-5 | Total/NA | Solid | 3050B | |
| MB 310-453039/1-A ^5 | Method Blank | Total/NA | Solid | 3050B | |
| LCS 310-453039/2-A ^20 | Lab Control Sample | Total/NA | Solid | 3050B | |
| 310-304791-B-2-D MS ^20 | Matrix Spike | Total/NA | Solid | 3050B | |
| 310-304791-B-2-E MSD ^20 | Matrix Spike Duplicate | Total/NA | Solid | 3050B | |
| 310-305029-4 DU | O-4 | Total/NA | Solid | 3050B | |

### Analysis Batch: 453446

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 7471B | 453030 |
| MB 310-453030/1-A | Method Blank | Total/NA | Solid | 7471B | 453030 |
| LCS 310-453030/2-A | Lab Control Sample | Total/NA | Solid | 7471B | 453030 |
| 310-305025-E-1-B MS | Matrix Spike | Total/NA | Solid | 7471B | 453030 |
| 310-305025-E-1-C MSD | Matrix Spike Duplicate | Total/NA | Solid | 7471B | 453030 |

### Analysis Batch: 453470

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 6020B | 453039 |
| 310-305029-2 | O-2 | Total/NA | Solid | 6020B | 453039 |
| 310-305029-3 | O-3 | Total/NA | Solid | 6020B | 453039 |
| 310-305029-4 | O-4 | Total/NA | Solid | 6020B | 453039 |
| 310-305029-5 | O-5 | Total/NA | Solid | 6020B | 453039 |
| MB 310-453039/1-A ^5 | Method Blank | Total/NA | Solid | 6020B | 453039 |
| LCS 310-453039/2-A ^20 | Lab Control Sample | Total/NA | Solid | 6020B | 453039 |
| 310-304791-B-2-D MS ^20 | Matrix Spike | Total/NA | Solid | 6020B | 453039 |
| 310-304791-B-2-E MSD ^20 | Matrix Spike Duplicate | Total/NA | Solid | 6020B | 453039 |
| 310-305029-4 DU | O-4 | Total/NA | Solid | 6020B | 453039 |

### Analysis Batch: 453563

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-2 | O-2 | Total/NA | Solid | 7471B | 453031 |
| 310-305029-3 | O-3 | Total/NA | Solid | 7471B | 453031 |
| 310-305029-4 | O-4 | Total/NA | Solid | 7471B | 453031 |
| 310-305029-5 | O-5 | Total/NA | Solid | 7471B | 453031 |
| MB 310-453031/1-A | Method Blank | Total/NA | Solid | 7471B | 453031 |
| LCS 310-453031/2-A | Lab Control Sample | Total/NA | Solid | 7471B | 453031 |
| 310-304993-B-1-B MS | Matrix Spike | Total/NA | Solid | 7471B | 453031 |
| 310-304993-B-1-C MSD | Matrix Spike Duplicate | Total/NA | Solid | 7471B | 453031 |

## General Chemistry

### Prep Batch: 452929

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 350.1 | |
| 310-305029-2 | O-2 | Total/NA | Solid | 350.1 | |
| 310-305029-3 | O-3 | Total/NA | Solid | 350.1 | |
| 310-305029-4 | O-4 | Total/NA | Solid | 350.1 | |
| 310-305029-5 | O-5 | Total/NA | Solid | 350.1 | |
| MB 310-452929/1-A | Method Blank | Total/NA | Solid | 350.1 | |
| LCS 310-452929/2-A | Lab Control Sample | Total/NA | Solid | 350.1 | |

## General Chemistry

### Analysis Batch: 452953

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 350.1 | 452929 |
| 310-305029-2 | O-2 | Total/NA | Solid | 350.1 | 452929 |
| 310-305029-3 | O-3 | Total/NA | Solid | 350.1 | 452929 |
| 310-305029-4 | O-4 | Total/NA | Solid | 350.1 | 452929 |
| 310-305029-5 | O-5 | Total/NA | Solid | 350.1 | 452929 |
| MB 310-452929/1-A | Method Blank | Total/NA | Solid | 350.1 | 452929 |
| LCS 310-452929/2-A | Lab Control Sample | Total/NA | Solid | 350.1 | 452929 |

### Analysis Batch: 453008

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | Moisture | |
| 310-305029-2 | O-2 | Total/NA | Solid | Moisture | |
| 310-305029-3 | O-3 | Total/NA | Solid | Moisture | |
| 310-305029-4 | O-4 | Total/NA | Solid | Moisture | |
| 310-305029-5 | O-5 | Total/NA | Solid | Moisture | |
| 310-305028-B-7 DU | Duplicate | Total/NA | Solid | Moisture | |

### Prep Batch: 453084

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 365.1 | |
| 310-305029-2 | O-2 | Total/NA | Solid | 365.1 | |
| 310-305029-3 | O-3 | Total/NA | Solid | 365.1 | |
| 310-305029-4 | O-4 | Total/NA | Solid | 365.1 | |
| 310-305029-5 | O-5 | Total/NA | Solid | 365.1 | |
| MB 310-453084/1-A | Method Blank | Total/NA | Solid | 365.1 | |
| LCS 310-453084/2-A | Lab Control Sample | Total/NA | Solid | 365.1 | |

### Analysis Batch: 453128

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 365.1 | 453084 |
| 310-305029-2 | O-2 | Total/NA | Solid | 365.1 | 453084 |
| 310-305029-3 | O-3 | Total/NA | Solid | 365.1 | 453084 |
| 310-305029-4 | O-4 | Total/NA | Solid | 365.1 | 453084 |
| 310-305029-5 | O-5 | Total/NA | Solid | 365.1 | 453084 |
| MB 310-453084/1-A | Method Blank | Total/NA | Solid | 365.1 | 453084 |
| LCS 310-453084/2-A | Lab Control Sample | Total/NA | Solid | 365.1 | 453084 |

### Prep Batch: 453133

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 351.2 | |
| 310-305029-2 | O-2 | Total/NA | Solid | 351.2 | |
| 310-305029-3 | O-3 | Total/NA | Solid | 351.2 | |
| 310-305029-4 | O-4 | Total/NA | Solid | 351.2 | |
| 310-305029-5 | O-5 | Total/NA | Solid | 351.2 | |
| MB 310-453133/1-A | Method Blank | Total/NA | Solid | 351.2 | |
| LCS 310-453133/2-A | Lab Control Sample | Total/NA | Solid | 351.2 | |
| 310-304970-A-2-J MS | Matrix Spike | Total/NA | Solid | 351.2 | |
| 310-304970-A-2-K MSD | Matrix Spike Duplicate | Total/NA | Solid | 351.2 | |

## General Chemistry

### Analysis Batch: 453285

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 351.2 | 453133 |
| 310-305029-2 | O-2 | Total/NA | Solid | 351.2 | 453133 |
| 310-305029-3 | O-3 | Total/NA | Solid | 351.2 | 453133 |
| 310-305029-4 | O-4 | Total/NA | Solid | 351.2 | 453133 |
| 310-305029-5 | O-5 | Total/NA | Solid | 351.2 | 453133 |
| MB 310-453133/1-A | Method Blank | Total/NA | Solid | 351.2 | 453133 |
| LCS 310-453133/2-A | Lab Control Sample | Total/NA | Solid | 351.2 | 453133 |
| 310-304970-A-2-J MS | Matrix Spike | Total/NA | Solid | 351.2 | 453133 |
| 310-304970-A-2-K MSD | Matrix Spike Duplicate | Total/NA | Solid | 351.2 | 453133 |

### Leach Batch: 453333

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Soluble | Solid | DI Leach | |
| 310-305029-2 | O-2 | Soluble | Solid | DI Leach | |
| 310-305029-3 | O-3 | Soluble | Solid | DI Leach | |
| 310-305029-4 | O-4 | Soluble | Solid | DI Leach | |
| 310-305029-5 | O-5 | Soluble | Solid | DI Leach | |
| MB 310-453333/1-A | Method Blank | Soluble | Solid | DI Leach | |
| LCS 310-453333/2-A | Lab Control Sample | Soluble | Solid | DI Leach | |
| 310-305029-1 MS | O-1 | Soluble | Solid | DI Leach | |
| 310-305029-1 MSD | O-1 | Soluble | Solid | DI Leach | |

### Analysis Batch: 453357

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-2 | O-2 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-3 | O-3 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-4 | O-4 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-5 | O-5 | Soluble | Solid | 353.2 | 453333 |
| MB 310-453333/1-A | Method Blank | Soluble | Solid | 353.2 | 453333 |
| LCS 310-453333/2-A | Lab Control Sample | Soluble | Solid | 353.2 | 453333 |
| 310-305029-1 MS | O-1 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-1 MSD | O-1 | Soluble | Solid | 353.2 | 453333 |

### Analysis Batch: 453398

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-2 | O-2 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-3 | O-3 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-4 | O-4 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-5 | O-5 | Soluble | Solid | 353.2 | 453333 |
| MB 310-453333/1-A | Method Blank | Soluble | Solid | 353.2 | 453333 |
| LCS 310-453333/2-A | Lab Control Sample | Soluble | Solid | 353.2 | 453333 |
| 310-305029-1 MS | O-1 | Soluble | Solid | 353.2 | 453333 |
| 310-305029-1 MSD | O-1 | Soluble | Solid | 353.2 | 453333 |

### Analysis Batch: 453761

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Soluble | Solid | 353.2 | |
| 310-305029-2 | O-2 | Soluble | Solid | 353.2 | |
| 310-305029-3 | O-3 | Soluble | Solid | 353.2 | |

## General Chemistry (Continued)

### Analysis Batch: 453761 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-4 | O-4 | Soluble | Solid | 353.2 | |
| 310-305029-5 | O-5 | Soluble | Solid | 353.2 | |

### Prep Batch: 494917

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 3060A | |
| 310-305029-2 | O-2 | Total/NA | Solid | 3060A | |
| 310-305029-3 | O-3 | Total/NA | Solid | 3060A | |
| 310-305029-4 | O-4 | Total/NA | Solid | 3060A | |
| 310-305029-5 | O-5 | Total/NA | Solid | 3060A | |
| MB 180-494917/1-A | Method Blank | Total/NA | Solid | 3060A | |
| LCSI 180-494917/3-A | Lab Control Sample | Total/NA | Solid | 3060A | |
| LCSS 180-494917/2-A | Lab Control Sample | Total/NA | Solid | 3060A | |
| 180-189340-M-1-C MSS | Matrix Spike | Total/NA | Solid | 3060A | |
| 180-189340-M-1-D MSI | Matrix Spike | Total/NA | Solid | 3060A | |
| 180-189340-M-1-B DU | Duplicate | Total/NA | Solid | 3060A | |

### Analysis Batch: 495080

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | EPA 7196A | 494917 |
| 310-305029-2 | O-2 | Total/NA | Solid | EPA 7196A | 494917 |
| 310-305029-3 | O-3 | Total/NA | Solid | EPA 7196A | 494917 |
| 310-305029-4 | O-4 | Total/NA | Solid | EPA 7196A | 494917 |
| 310-305029-5 | O-5 | Total/NA | Solid | EPA 7196A | 494917 |
| MB 180-494917/1-A | Method Blank | Total/NA | Solid | EPA 7196A | 494917 |
| LCSI 180-494917/3-A | Lab Control Sample | Total/NA | Solid | EPA 7196A | 494917 |
| LCSS 180-494917/2-A | Lab Control Sample | Total/NA | Solid | EPA 7196A | 494917 |
| 180-189340-M-1-C MSS | Matrix Spike | Total/NA | Solid | EPA 7196A | 494917 |
| 180-189340-M-1-D MSI | Matrix Spike | Total/NA | Solid | EPA 7196A | 494917 |
| 180-189340-M-1-B DU | Duplicate | Total/NA | Solid | EPA 7196A | 494917 |

### Analysis Batch: 693986

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-305029-1 | O-1 | Total/NA | Solid | 9060A | |
| 310-305029-2 | O-2 | Total/NA | Solid | 9060A | |
| 310-305029-3 | O-3 | Total/NA | Solid | 9060A | |
| 310-305029-4 | O-4 | Total/NA | Solid | 9060A | |
| 310-305029-5 | O-5 | Total/NA | Solid | 9060A | |
| MB 280-693986/4 | Method Blank | Total/NA | Solid | 9060A | |
| LCS 280-693986/3 | Lab Control Sample | Total/NA | Solid | 9060A | |
| 310-305029-1 MS | O-1 | Total/NA | Solid | 9060A | |
| 310-305029-1 MSD | O-1 | Total/NA | Solid | 9060A | |

# Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Client Sample ID: O-1

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-1

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3546 | | | 453316 | BDJ4 | EET CF | 05/01/25 08:14 |
| Total/NA | Analysis | 8082A | | 1 | 453319 | BW2O | EET CF | 05/01/25 17:05 |
| Total/NA | Prep | 3050B | | | 453039 | QTZ5 | EET CF | 05/01/25 09:30 |
| Total/NA | Analysis | 6020B | | 5 | 453470 | NFT2 | EET CF | 05/01/25 17:13 |
| Total/NA | Prep | 7471B | | | 453030 | F5MW | EET CF | 05/01/25 11:57 |
| Total/NA | Analysis | 7471B | | 1 | 453446 | F5MW | EET CF | 05/01/25 15:56 |
| Total/NA | Prep | 350.1 | | | 452929 | RLT9 | EET CF | 04/28/25 14:22 |
| Total/NA | Analysis | 350.1 | | 1 | 452953 | ZJX4 | EET CF | 04/28/25 20:06 |
| Total/NA | Prep | 351.2 | | | 453133 | W9YR | EET CF | 04/30/25 05:39 |
| Total/NA | Analysis | 351.2 | | 1 | 453285 | ZJX4 | EET CF | 04/30/25 22:39 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453398 | WZC8 | EET CF | 05/01/25 12:34 |
| Soluble | Analysis | 353.2 | | 1 | 453761 | HE7K | EET CF | 05/01/25 12:34 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453357 | WZC8 | EET CF | 05/01/25 12:16 |
| Total/NA | Prep | 365.1 | | | 453084 | T5AC | EET CF | 04/29/25 13:30 |
| Total/NA | Analysis | 365.1 | | 1 | 453128 | ZJX4 | EET CF | 04/29/25 19:14 |
| Total/NA | Analysis | 9060A | | 2 | 693986 | GMW | EET DEN | 04/30/25 14:34 |
| Total/NA | Prep | 3060A | | | 494917 | ELS | EET PIT | 04/29/25 17:11 |
| Total/NA | Analysis | EPA 7196A | | 1 | 495080 | ELS | EET PIT | 05/03/25 13:10 |
| Total/NA | Analysis | Moisture | | 1 | 453008 | W9YR | EET CF | 04/29/25 09:55 |

## Client Sample ID: O-2

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-2

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3546 | | | 453316 | BDJ4 | EET CF | 05/01/25 08:14 |
| Total/NA | Analysis | 8082A | | 1 | 453319 | BW2O | EET CF | 05/01/25 17:18 |
| Total/NA | Prep | 3050B | | | 453039 | QTZ5 | EET CF | 05/01/25 09:30 |
| Total/NA | Analysis | 6020B | | 5 | 453470 | NFT2 | EET CF | 05/01/25 17:15 |
| Total/NA | Prep | 7471B | | | 453031 | F5MW | EET CF | 05/02/25 10:13 |
| Total/NA | Analysis | 7471B | | 1 | 453563 | F5MW | EET CF | 05/02/25 12:26 |
| Total/NA | Prep | 350.1 | | | 452929 | RLT9 | EET CF | 04/28/25 14:22 |
| Total/NA | Analysis | 350.1 | | 1 | 452953 | ZJX4 | EET CF | 04/28/25 20:08 |
| Total/NA | Prep | 351.2 | | | 453133 | W9YR | EET CF | 04/30/25 05:39 |
| Total/NA | Analysis | 351.2 | | 1 | 453285 | ZJX4 | EET CF | 04/30/25 22:40 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453398 | WZC8 | EET CF | 05/01/25 12:36 |
| Soluble | Analysis | 353.2 | | 1 | 453761 | HE7K | EET CF | 05/01/25 12:36 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453357 | WZC8 | EET CF | 05/01/25 12:22 |
| Total/NA | Prep | 365.1 | | | 453084 | T5AC | EET CF | 04/29/25 13:30 |
| Total/NA | Analysis | 365.1 | | 1 | 453128 | ZJX4 | EET CF | 04/29/25 19:14 |

# Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Client Sample ID: O-2
**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-2
**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | 9060A | | 2 | 693986 | GMW | EET DEN | 04/30/25 14:16 |
| Total/NA | Prep | 3060A | | | 494917 | ELS | EET PIT | 04/29/25 17:11 |
| Total/NA | Analysis | EPA 7196A | | 1 | 495080 | ELS | EET PIT | 05/03/25 13:11 |
| Total/NA | Analysis | Moisture | | 1 | 453008 | W9YR | EET CF | 04/29/25 09:55 |

## Client Sample ID: O-3
**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-3
**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3546 | | | 453316 | BDJ4 | EET CF | 05/01/25 08:14 |
| Total/NA | Analysis | 8082A | | 1 | 453319 | BW2O | EET CF | 05/01/25 17:31 |
| Total/NA | Prep | 3050B | | | 453039 | QTZ5 | EET CF | 05/01/25 09:30 |
| Total/NA | Analysis | 6020B | | 5 | 453470 | NFT2 | EET CF | 05/01/25 17:18 |
| Total/NA | Prep | 7471B | | | 453031 | F5MW | EET CF | 05/02/25 10:13 |
| Total/NA | Analysis | 7471B | | 1 | 453563 | F5MW | EET CF | 05/02/25 12:28 |
| Total/NA | Prep | 350.1 | | | 452929 | RLT9 | EET CF | 04/28/25 14:22 |
| Total/NA | Analysis | 350.1 | | 1 | 452953 | ZJX4 | EET CF | 04/28/25 20:08 |
| Total/NA | Prep | 351.2 | | | 453133 | W9YR | EET CF | 04/30/25 05:39 |
| Total/NA | Analysis | 351.2 | | 1 | 453285 | ZJX4 | EET CF | 04/30/25 22:40 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453398 | WZC8 | EET CF | 05/01/25 12:37 |
| Soluble | Analysis | 353.2 | | 1 | 453761 | HE7K | EET CF | 05/01/25 12:37 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453357 | WZC8 | EET CF | 05/01/25 12:24 |
| Total/NA | Prep | 365.1 | | | 453084 | T5AC | EET CF | 04/29/25 13:30 |
| Total/NA | Analysis | 365.1 | | 1 | 453128 | ZJX4 | EET CF | 04/29/25 19:14 |
| Total/NA | Analysis | 9060A | | 5 | 693986 | GMW | EET DEN | 04/30/25 15:15 |
| Total/NA | Prep | 3060A | | | 494917 | ELS | EET PIT | 04/29/25 17:11 |
| Total/NA | Analysis | EPA 7196A | | 1 | 495080 | ELS | EET PIT | 05/03/25 13:26 |
| Total/NA | Analysis | Moisture | | 1 | 453008 | W9YR | EET CF | 04/29/25 09:55 |

## Client Sample ID: O-4
**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-4
**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3546 | | | 453316 | BDJ4 | EET CF | 05/01/25 08:14 |
| Total/NA | Analysis | 8082A | | 1 | 453565 | BW2O | EET CF | 05/02/25 21:12 |
| Total/NA | Prep | 3050B | | | 453039 | QTZ5 | EET CF | 05/01/25 09:30 |
| Total/NA | Analysis | 6020B | | 5 | 453470 | NFT2 | EET CF | 05/01/25 17:20 |
| Total/NA | Prep | 7471B | | | 453031 | F5MW | EET CF | 05/02/25 10:13 |
| Total/NA | Analysis | 7471B | | 1 | 453563 | F5MW | EET CF | 05/02/25 12:35 |

# Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Client Sample ID: O-4

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-4

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 350.1 | | | 452929 | RLT9 | EET CF | 04/28/25 14:22 |
| Total/NA | Analysis | 350.1 | | 1 | 452953 | ZJX4 | EET CF | 04/28/25 20:10 |
| Total/NA | Prep | 351.2 | | | 453133 | W9YR | EET CF | 04/30/25 05:39 |
| Total/NA | Analysis | 351.2 | | 1 | 453285 | ZJX4 | EET CF | 04/30/25 22:40 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453398 | WZC8 | EET CF | 05/01/25 12:37 |
| Soluble | Analysis | 353.2 | | 1 | 453761 | HE7K | EET CF | 05/01/25 12:37 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453357 | WZC8 | EET CF | 05/01/25 12:26 |
| Total/NA | Prep | 365.1 | | | 453084 | T5AC | EET CF | 04/29/25 13:30 |
| Total/NA | Analysis | 365.1 | | 1 | 453128 | ZJX4 | EET CF | 04/29/25 19:15 |
| Total/NA | Analysis | 9060A | | 1 | 693986 | GMW | EET DEN | 04/30/25 15:28 |
| Total/NA | Prep | 3060A | | | 494917 | ELS | EET PIT | 04/29/25 17:11 |
| Total/NA | Analysis | EPA 7196A | | 1 | 495080 | ELS | EET PIT | 05/03/25 13:27 |
| Total/NA | Analysis | Moisture | | 1 | 453008 | W9YR | EET CF | 04/29/25 09:55 |

## Client Sample ID: O-5

**Date Collected: 04/24/25 00:00**
**Date Received: 04/25/25 14:17**

## Lab Sample ID: 310-305029-5

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3546 | | | 453316 | BDJ4 | EET CF | 05/01/25 08:14 |
| Total/NA | Analysis | 8082A | | 1 | 453565 | BW2O | EET CF | 05/02/25 21:25 |
| Total/NA | Prep | 3050B | | | 453039 | QTZ5 | EET CF | 05/01/25 09:30 |
| Total/NA | Analysis | 6020B | | 5 | 453470 | NFT2 | EET CF | 05/01/25 17:25 |
| Total/NA | Prep | 7471B | | | 453031 | F5MW | EET CF | 05/02/25 10:13 |
| Total/NA | Analysis | 7471B | | 1 | 453563 | F5MW | EET CF | 05/02/25 12:37 |
| Total/NA | Prep | 350.1 | | | 452929 | RLT9 | EET CF | 04/28/25 14:22 |
| Total/NA | Analysis | 350.1 | | 1 | 452953 | ZJX4 | EET CF | 04/28/25 20:10 |
| Total/NA | Prep | 351.2 | | | 453133 | W9YR | EET CF | 04/30/25 05:39 |
| Total/NA | Analysis | 351.2 | | 1 | 453285 | ZJX4 | EET CF | 04/30/25 22:41 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453398 | WZC8 | EET CF | 05/01/25 12:37 |
| Soluble | Analysis | 353.2 | | 1 | 453761 | HE7K | EET CF | 05/01/25 12:37 |
| Soluble | Leach | DI Leach | | | 453333 | WZC8 | EET CF | 05/01/25 09:43 |
| Soluble | Analysis | 353.2 | | 1 | 453357 | WZC8 | EET CF | 05/01/25 12:27 |
| Total/NA | Prep | 365.1 | | | 453084 | T5AC | EET CF | 04/29/25 13:30 |
| Total/NA | Analysis | 365.1 | | 1 | 453128 | ZJX4 | EET CF | 04/29/25 19:15 |
| Total/NA | Analysis | 9060A | | 5 | 693986 | GMW | EET DEN | 04/30/25 15:40 |
| Total/NA | Prep | 3060A | | | 494917 | ELS | EET PIT | 04/29/25 17:11 |
| Total/NA | Analysis | EPA 7196A | | 1 | 495080 | ELS | EET PIT | 05/03/25 13:28 |
| Total/NA | Analysis | Moisture | | 1 | 453008 | W9YR | EET CF | 04/29/25 09:55 |

# Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

**Laboratory References:**

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

EET PIT = Eurofins Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

# Accreditation/Certification Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Minnesota | NELAP | 019-999-319 | 12-31-25 |

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

| Analysis Method | Prep Method | Matrix | Analyte |
|---|---|---|---|
| 7471B | 7471B | Solid | Mercury |
| 8082A | 3546 | Solid | Polychlorinated biphenyls, Total |
| Moisture | | Solid | Percent Moisture |
| Moisture | | Solid | Percent Solids |

## Laboratory: Eurofins Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| A2LA | Dept. of Defense ELAP | 2907.01 | 10-31-26 |
| A2LA | ISO/IEC 17025 | 2907.01 | 10-31-26 |
| Alabama | State Program | 40730 | 09-30-12 * |
| Alaska (UST) | State | 18-001 | 11-30-25 |
| Arizona | State | AZ0713 | 12-20-25 |
| Arkansas DEQ | State | 88-00687 | 04-02-26 |
| California | State | 2513 | 01-08-26 |
| Colorado | Petroleum Storage Tank Program | 2907.01 (A2LA) | 10-31-26 |
| Colorado | State | CO00026 | 06-30-25 |
| Connecticut | State | PH-0686 | 09-30-26 |
| Florida | NELAP | E87667 | 06-30-25 |
| Georgia | State | 4025 | 01-08-26 |
| Illinois | NELAP | 200017 | 05-31-26 |
| Iowa | State | 370 | 12-01-26 |
| Kansas | NELAP | E-10166 | 04-30-25 |
| Kentucky (WW) | State | KY98047 | 12-31-25 |
| Louisiana | NELAP | 30785 | 06-30-14 * |
| Louisiana (All) | NELAP | 30785 | 06-30-25 |
| Minnesota | NELAP | 1788752 | 12-31-25 |
| Nevada | State | CO00026 | 07-31-25 |
| New Hampshire | NELAP | 2053 | 04-28-26 |
| New Jersey | NELAP | 230001 | 06-30-25 |
| New York | NELAP | 11964 | 04-01-26 |
| North Dakota | State | R-034 | 01-08-25 * |
| Oklahoma | NELAP | 8614 | 08-31-25 |
| Oregon | NELAP | 4025 | 01-08-26 |
| Pennsylvania | NELAP | 68-00664 | 07-31-25 |
| South Carolina | State | 72002001 | 01-18-25 * |
| Texas | NELAP | TX104704183-08-TX | 09-30-09 * |
| Texas | NELAP | T104704183 | 09-30-25 |
| US Fish & Wildlife | US Federal Programs | 058448 | 07-31-25 |
| USDA | US Federal Programs | P330-20-00065 | 12-19-25 |
| Utah | NELAP | QUAN5 | 06-30-13 * |
| Utah | NELAP | CO00026 | 07-31-25 |
| Virginia | NELAP | 460232 | 06-14-25 |
| Washington | State | C583 | 08-03-25 |
| West Virginia DEP | State | 354 | 11-30-25 |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

## Laboratory: Eurofins Denver (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Wisconsin | State | 999615430 | 08-31-25 |
| Wyoming (UST) | A2LA | 2907.01 | 10-31-26 |

## Laboratory: Eurofins Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Arkansas DEQ | State | 88-00690 | 06-28-25 |
| California | State | 2891 | 04-30-24 * |
| Connecticut | State | PH-0820 | 09-30-26 |
| Florida | NELAP | E871008 | 06-30-25 |
| Georgia | State | PA 02-00416 | 04-30-25 * |
| Illinois | NELAP | 200005 | 05-06-25 |
| Kansas | NELAP | E-10350 | 05-06-25 |
| Kentucky (UST) | State | 162013 | 04-30-26 |
| Kentucky (WW) | State | KY98043 | 12-31-25 |
| Louisiana | NELAP | 04041 | 06-30-22 * |
| Louisiana (All) | NELAP | 04041 | 05-06-25 |
| Maine | State | PA00164 | 03-06-26 |
| Minnesota | NELAP | 042-999-482 | 12-31-25 |
| New Hampshire | NELAP | 2030 | 05-06-25 |
| New Jersey | NELAP | PA005 | 05-06-25 |
| New York | NELAP | 11182 | 05-06-25 |
| North Carolina (WW/SW) | State | 434 | 12-31-25 |
| North Dakota | State | R-227 | 04-30-24 * |
| Oregon | NELAP | PA-2151 | 02-06-26 |
| Pennsylvania | NELAP | 02-00416 | 05-06-25 |
| Rhode Island | State | LAO00375 | 12-30-25 |
| South Carolina | State | 89014 | 04-30-25 * |
| Texas | NELAP | T104704528 | 05-06-25 |
| USDA | US Federal Programs | P330-16-00211 | 04-11-26 |
| Utah | NELAP | PA001462024-14 | 05-31-25 |
| Virginia | NELAP | 460189 | 09-14-25 |
| West Virginia DEP | State | 142 | 01-31-26 |
| Wisconsin | State | 998027800 | 08-31-25 |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Method Summary

Client: Braun Intertec Corporation
Project/Site: 2026 PMP Improvements

Job ID: 310-305029-1
SDG: B2502087

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 8082A | Polychlorinated Biphenyls (PCBs) by Gas Chromatography | SW846 | EET CF |
| 6020B | Metals (ICP/MS) | SW846 | EET CF |
| 7471B | Mercury (CVAA) | SW846 | EET CF |
| 350.1 | Nitrogen, Ammonia | EPA | EET CF |
| 351.2 | Nitrogen, Total Kjeldahl | EPA | EET CF |
| 353.2 | Nitrogen, Nitrate (Calculation) | EPA | EET CF |
| 353.2 | Nitrogen, Nitrate-Nitrite | EPA | EET CF |
| 353.2 | Nitrogen, Nitrite | EPA | EET CF |
| 365.1 | Phosphorus, Total | EPA | EET CF |
| 9060A | Organic Carbon, Total (TOC) | SW846 | EET DEN |
| EPA 7196A | Chromium, Hexavalent | SW846 | EET PIT |
| Moisture | Percent Moisture | EPA | EET CF |
| 3050B | Preparation, Metals | SW846 | EET CF |
| 3060A | Alkaline Digestion (Chromium, Hexavalent) | SW846 | EET PIT |
| 350.1 | Distillation, Ammonia | EPA | EET CF |
| 351.2 | Nitrogen, Total Kjeldahl | EPA | EET CF |
| 3546 | Microwave Extraction | SW846 | EET CF |
| 365.1 | Sample Digestion for Total Phosphorus | MCAWW | EET CF |
| 7471B | Preparation, Mercury | SW846 | EET CF |
| DI Leach | Deionized Water Leaching Procedure | ASTM | EET CF |

**Protocol References:**

ASTM = ASTM International
EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401
EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
EET PIT = Eurofins Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

eurofins | Environment Testing America

310-305029 Chain of Custody

# Cooler/Sample Receipt and Temperature Log Form

**Client Information**

Client: Braun

City/State: CITY Maple STATE MN | Project.

**Receipt Information**

Date/Time Received: DATE 4/25/25 TIME 1417 | Received By. KB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

**Condition of Cooler/Containers**

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☒ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

**Temperature Record**

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: 2 | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.4 | Corrected Temp (°C): 0.4

• **Sample Container Temperature**

| | CONTAINER 1 | CONTAINER 2 |
|---|---|---|
| Container(s) used: | | |
| Uncorrected Temp (°C): | | |
| Corrected Temp (°C): | | |

**Exceptions Noted**

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding. If no, proceed with login

**Additional Comments**

Address _____

Eurofins Minneapolis SC 213

# Chain of Custody Record

648329

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TAL-8210

| Client Contact | Project Manager: Edward Pengok | Site Contact: | Date: | COC No |
|---|---|---|---|---|
| Company Name: Brown Enterprise | Tel/Email: epengok@brownenterprise.com | Lab Contact: | Carrier: | 1 of 1 COCs |
| Address: 11001 Hampshire Ave S | Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS | | | Sampler: Derek Cole |
| City/State/Zip: Minneapolis / MN / 55438 | TAT if different from Below: ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day | | | For Lab Use Only: Walk-in Client: / Lab Sampling: |
| Phone: | | | | Job / SDG No: |
| Fax: | | | | |
| Project Name: 2026 PMP Improvements | | | | |
| Site: B2502087 | | | | |
| P O #: | | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y/N) | Perform MS / MSD (Y/N) | TOC using SW-846-9060 | Metals by 6010/7471B | PCBs by 8082A | TKN by 351.2 | Ammonia by 350.1 | Nitrate/Nitrite by 353.2 | Phosphorus by 365.1 | Sample Specific Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-1 | 4/24/25 | | C | soil | 4 | | | X | X | X | X | X | X | X | |
| O-2 | ↓ | | ↓ | ↓ | ↓ | | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | |
| O-3 | | | | | | | | | | | | | | | |
| O-4 | | | | | | | | | | | | | | | |
| O-5 | | | | | | | | | | | | | | | |

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

**Special Instructions/QC Requirements & Comments.**

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ Therm ID No _____

| Relinquished by | Company | Date/Time | Received by | Company | Date/Time |
|---|---|---|---|---|---|
| Derek Cole | Brown | 4/24/25/1246 | | | 4/24/25 1246 |
| Relinquished by: | Company: | Date/Time: 4/24/25 1700 | Received by: | Company: | Date/Time |
| Relinquished by: | Company | Date/Time | Received in Laboratory by: | Company: | Date/Time: 4/25/25 1417 |

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3/13/2025 (Rev. 2)

**Eurofins Cedar Falls**
3019 Venture Way
Cedar Falls, IA 50613
Phone: 319-277-2401 Fax: 319-277-2425

# Chain of Custody Record

eurofins | Environment Testing

| Client Information (Sub Contract Lab) | Sampler: N/A | Lab PM: Bindert, Zach T | Carrier Tracking No(s): N/A | COC No: 310-82498.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: N/A | E-Mail: Zach.Bindert@et.eurofinsus.com | State of Origin: Minnesota | Page: Page 1 of 1 |
| Company: Eurofins Environment Testing Northeast L | | Accreditations Required (See note): NELAP - Minnesota | | Job #: 310-305029-1 |
| Address: 301 Alpha Drive, RIDC Park, | Due Date Requested: 5/6/2025 | | | |
| City: Pittsburgh | TAT Requested (days): N/A | | | |
| State, Zip: PA, 15238 | | | | |
| Phone: 412-963-7058(Tel) 412-963-2468(Fax) | PO #: N/A | | | |
| Email: N/A | WO #: N/A | | | |
| Project Name: 2026 PMP Improvements | Project #: 31017020 | | | |
| Site: N/A | SSOW#: N/A | | | |

**Analysis Requested**

**Preservation Codes:** -

**Other:** N/A

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=Comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 7196A/3060A | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| O-1 (310-305029-1) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-2 (310-305029-2) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-3 (310-305029-3) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-4 (310-305029-4) | 4/24/25 | Central | G | Solid | | | X | | |
| O-5 (310-305029-5) | 4/24/25 | Central | G | Solid | | | X | | |

310-305029 Chain of Custody

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

| *Possible Hazard Identification* | *Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)* |
|---|---|
| *Unconfirmed* | ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months* |
| Deliverable Requested: I, II, III, IV, Other (specify) — Primary Deliverable Rank: 2 | Special Instructions/QC Requirements. |

| Empty Kit Relinquished by | Date | Time | Method of Shipment: |
|---|---|---|---|
| | | | |

| | Relinquished by | Date/Time | Company | Received by | Date/Time | Company |
|---|---|---|---|---|---|---|
| 1 | [signature] | 4/29/25 1310 | | [signature] | 4/30/25 930 | GPITT ME |
| 2 | Relinquished by | Date/Time | Company | Received by | Date/Time | Company |
| 3 | Relinquished by | Date/Time | Company | Received by | Date/Time | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No | Cooler Temperature(s) °C and Other Remarks |
|---|---|---|
| | | |

Ver: 10/10/2024



5/13/2025 (Rev. 2)

**Eurofins Cedar Falls**
3019 Venture Way
Cedar Falls, IA 50613
Phone: 319-277-2401 Fax: 319-277-2425

# Chain of Custody Record

eurofins | Environment Testing

| Client Information (Sub Contract Lab) | Sampler: N/A | Lab PM: Bindert, Zach T | Carrier Tracking No(s): N/A | COC No: 310-82457.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: N/A | E-Mail: Zach.Bindert@et.eurofinsus.com | State of Origin: Minnesota | Page: Page 1 of 1 |
| Company: TestAmerica Laboratories, Inc. | | Accreditations Required (See note): NELAP - Minnesota | | Job #: 310-305029-1 |
| Address: 4955 Yarrow Street, , | Due Date Requested: 5/6/2025 | | | |
| City: Arvada | TAT Requested (days): N/A | | | |
| State, Zip: CO, 80002 | | | | |
| Phone: 303-736-0100(Tel) 303-431-7171(Fax) | PO #: N/A | | | |
| Email: N/A | WO #: N/A | | | |
| Project Name: 2026 PMP Improvements | Project #: 31017020 | | | |
| Site: N/A | SSOW#: N/A | | | |

**Analysis Requested**

**Preservation Codes:** -

**Other:** N/A

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 9060A/ Solids - TOC | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| O-1 (310-305029-1) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-2 (310-305029-2) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-3 (310-305029-3) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-4 (310-305029-4) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| O-5 (310-305029-5) | 4/24/25 | Central | G | Solid | | | X | 1 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

***Possible Hazard Identification***
*Unconfirmed*

***Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)***
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: | Date/Time: 4/25/25 1445 | Company | Received by: | Date/Time: 04-24-25 0917 | Company EETDEN |
|---|---|---|---|---|---|
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 0.4, CF: +.3, IR: 1010 |
|---|---|---|

Ver: 10/10/2024

# Login Sample Receipt Checklist

Client: Braun Intertec Corporation

Job Number: 310-305029-1
SDG Number: B2502087

**Login Number: 305029**
**List Number: 1**
**Creator: Homolar, Dana J**

**List Source: Eurofins Cedar Falls**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | N/A | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |

# Login Sample Receipt Checklist

Client: Braun Intertec Corporation

Job Number: 310-305029-1
SDG Number: B2502087

**Login Number: 305029**
**List Number: 2**
**Creator: Little, Matthew L**

**List Source: Eurofins Denver**
**List Creation: 04/29/25 01:33 PM**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | True | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | N/A | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | N/A | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |

# Login Sample Receipt Checklist

Client: Braun Intertec Corporation

Job Number: 310-305029-1
SDG Number: B2502087

**Login Number: 305029**
**List Number: 3**
**Creator: Ryan, Shannon G**

**List Source: Eurofins Pittsburgh**
**List Creation: 05/01/25 03:59 PM**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |