



ENGINEERING REPORT

2026 STREET REHABILITATION PROJECT

November 25, 2025

Prepared for:

City of Lakeville

20195 Holyoke Avenue

Lakeville, MN 55044

CITY PROJECT NO. 26-02

WSB PROJECT NO. 031257-000



November 25, 2025

Honorable Mayor and City Council
City of Lakeville
20195 Holyoke Avenue
Lakeville, MN 55044

Re: 2026 Street Rehabilitation Project
City Project No. 26-02
WSB Project No. 031257-000

Dear Mayor and City Council:

Transmitted herewith for your review is an Engineering Report which addresses improvements associated with the 2026 Street Rehabilitation Project. This Engineering Report describes the necessary improvements and associated costs for this street improvement project.

I am available at your convenience to discuss this report. Please do not hesitate to contact me at 612.523.7374 if you have any questions regarding this report.

Sincerely,

WSB

A handwritten signature in black ink, appearing to read "Jeff Oliver", written over a light grey rectangular background.

Jeff Oliver, PE
Senior Project Manager

Attachments



Table of Contents

Letter of Introduction

Table of Contents

Certification

Executive Summary 1

Introduction 3

 Authorization 3

 Scope 3

 Data Available 3

Existing Conditions 4

 Surface 4

 Public Utilities 8

 Public Sanitary Sewer 8

 Public Water Main 8

 Public Storm Sewer 9

 Stormwater Basins 10

Proposed Improvements 10

 Surface 10

 Public Utilities 11

 Public Sanitary Sewer 11

 Public Water Main 11

 Storm Sewer 11

 Stormwater Basins 12

 Public Street Sign Replacement 12

 Mailbox Replacement 12

 Permits/Approvals 13

 Construction Access/Staging 13

Financing 14

 Opinion of Probable Cost 14

 Funding 14

Project Schedule 16

Feasibility and Recommendation 16



Appendix A

Figures

Appendix B

Opinion of Probable Cost

Appendix C

Draft Geotechnical Report, Braun Intertec



Certification Sheet

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.

Rachel Scheu, PE

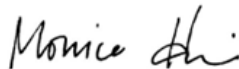


Date: November 25, 2025

Lic. No. 63257

Quality Control Review Completed By:

Monica Heil, PE



Date: November 25, 2025

Lic. No. 47497



Executive Summary

The 2026 Street Rehabilitation Project, City Project No. 26-02, was initiated based on the City's Pavement Management Program and will require milling and overlaying. The streets proposed for improvements have deteriorated to a point where milling and paving rehabilitation work is needed. Streets proposed for improvements in 2026 include roadways within the following subdivisions totaling approximately 5.25 miles:

Dakota Heights 2nd, 3rd, and 7th Addition, Oak Hills Additions, Oak Hills Estates, and Raven Lake 2nd Addition.

- Jasmine Avenue (175th Street West to Jaguar Path)
- Jaguar Path (175th Street West to Upper 178th Street West)
- 176th Street West
- Jaguar Court
- Jalisco Way
- Jalisco Court
- Upper 178th Street West
- Jamaica Circle
- Jasper Court
- Javelin Court
- Jasmin Court
- Ingrid Court
- Jacquard Path
- Jaguar Circle
- 178th Street West (Jaguar Path to Ipava Avenue)
- Ixonia Avenue (180th Street West to 175th Street West)
- 177th Circle West
- 176th Circle West
- Iten Court North
- Iten Court South
- 180th Street West (Ixonia Avenue to Italy Path)
- Isle Avenue (Italy Path to 178th Street West)
- Irons Court
- 176th Court (to Ipava Avenue)



- Isleton Avenue (178th Street West to 175th Street West)
- Isleton Court
- Italy Path (180th Street West/Italy Avenue to 175th Street West)
- Italy Court
- Italy Avenue

The project location map for Milled and Overlaid Streets is included in **Figure 1** of **Appendix A** of this report.

The 2026 Street Rehabilitation Project includes roadway mill and overlay based on pavement ratings, current roadway conditions, and utility needs in the area, as well as the overall Capital Improvement Plan budget. Surface improvements recommended for all streets within the project include milling of the existing bituminous pavement, including full depth milling where necessary based on the geotechnical report, subgrade correction as necessary, replacement of structurally deficient or improperly draining concrete curb and gutter, sidewalks, Americans with Disabilities Act (ADA) compliant pedestrian ramp installation, and new pavement installation.

Replacing portions of the City's deteriorating utility infrastructure in conjunction with the proposed street improvements provides an opportunity to minimize the replacement costs and traffic disruptions associated with the work. Proposed utility improvements include the following:

- Installation of corrosion protection for the existing watermain throughout a majority of the project area.
- Replacement of hydrants and installing new auxiliary gate valves throughout the majority of the Dakota Heights project area.
- Repair or replacement of structurally deficient storm sewer manholes and installation of stormwater quality best management practices (BMPs).
- Installation of additional storm sewer drainage structures and storm sewer, including drain tile in areas with poorly draining soils (drain tile services to individual properties will be evaluated in final design).
- Replacement of all structurally deficient storm sewer and sanitary sewer manhole castings, concrete adjusting rings, and installing inflow and infiltration protection (I&I protection) per current City Standards.

The total estimated project cost for the City of Lakeville's 2026 Street Rehabilitation Project is \$5,793,885 which includes a 8% contingency and 25% indirect costs for legal, engineering, administrative, and financing costs. The project is proposed to be funded through various City funding sources.



Introduction

Authorization

On July 21, 2025, the Lakeville City Council authorized the preparation of an engineering report for the 2026 Street Rehabilitation Project. This project is included in the City's 2025-2029 Capital Improvement Plan (CIP) and is designated as City Project No. 26-02.

Scope

This report investigates the feasibility of proposed street and utility improvements identified by the City Pavement Management Program (PMP) and CIP for 2026. Streets proposed within the 2026 Street Rehabilitation Project were initially considered because of existing pavement conditions. The average Overall Condition Index (OCI) value for streets within the 2026 Street Rehabilitation Project area is 54.7 using an OCI scale of 0 to 100 (with zero representing a completely failed street section and 100 representing a new street section free of deficiencies). Streets with OCI values less than 40 are considered to be in failing condition. Streets with OCI values of 40 – 60 are considered to be in weakened condition and will deteriorate more quickly based on a typical pavement performance curve.

Improvements outlined within this report include street rehabilitation in the form of milling and pavement overlays, partial replacement of concrete curb and gutter and concrete sidewalk, installing ADA compliant pedestrian ramps, installation of corrosion protection on select watermain facilities and water hydrant replacement and repairs, sanitary sewer repairs, and storm sewer improvements.

Data Available

Information and materials used in the preparation of this report include the following:

- City of Lakeville Record Plans
- City of Lakeville Sanitary Sewer, Watermain, and Storm Sewer inspection documentation
- City of Lakeville Water and Natural Resources Management Plan, Barr Engineering, dated January 2019
- Dakota County Topography Maps
- Topographic Survey
- Field Observations of the Area and Discussions with City Staff
- Draft Geotechnical Evaluation Report, Braun Intertec, dated October 16, 2025



Existing Conditions

Surface

Streets within the proposed improvement area are aging and display varying severities of wear and distress, including alligator, transverse, and longitudinal cracking. All streets within the project area are urbanized, with existing concrete curb and gutter, either full height or surmountable. The curb and gutter condition is fair overall, with isolated instances of cracking, heaving, and settlements that may contribute to localized draining issues.

Majority of the Streets within the 2026 Street Rehabilitation Project Area are designated as local residential, while Jaguar Path, 178th St West, and Ixonia Avenue are designated minor collector.

The project area contains landscaping, trees, irrigation systems, and numerous other private improvements beyond the edge of the roadway and within City right-of-way.

The photos below illustrate some of the varying levels of pavement distress:

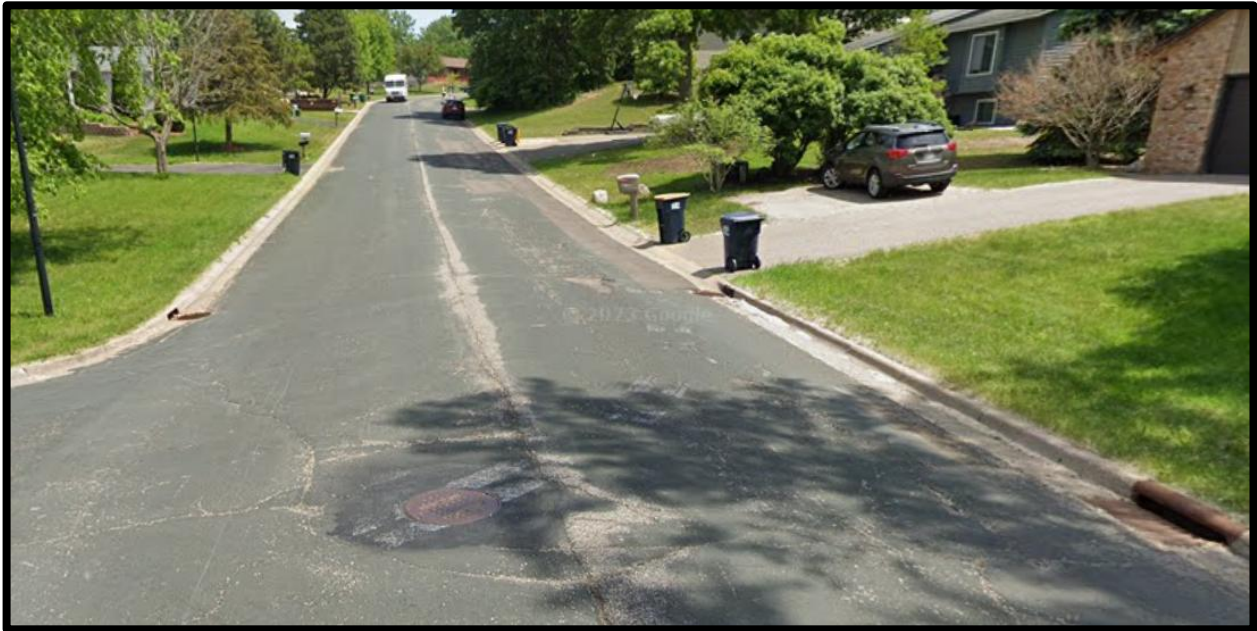


Photo 1. Jaguar Path looking northeast from Upper 178th Street West intersection.

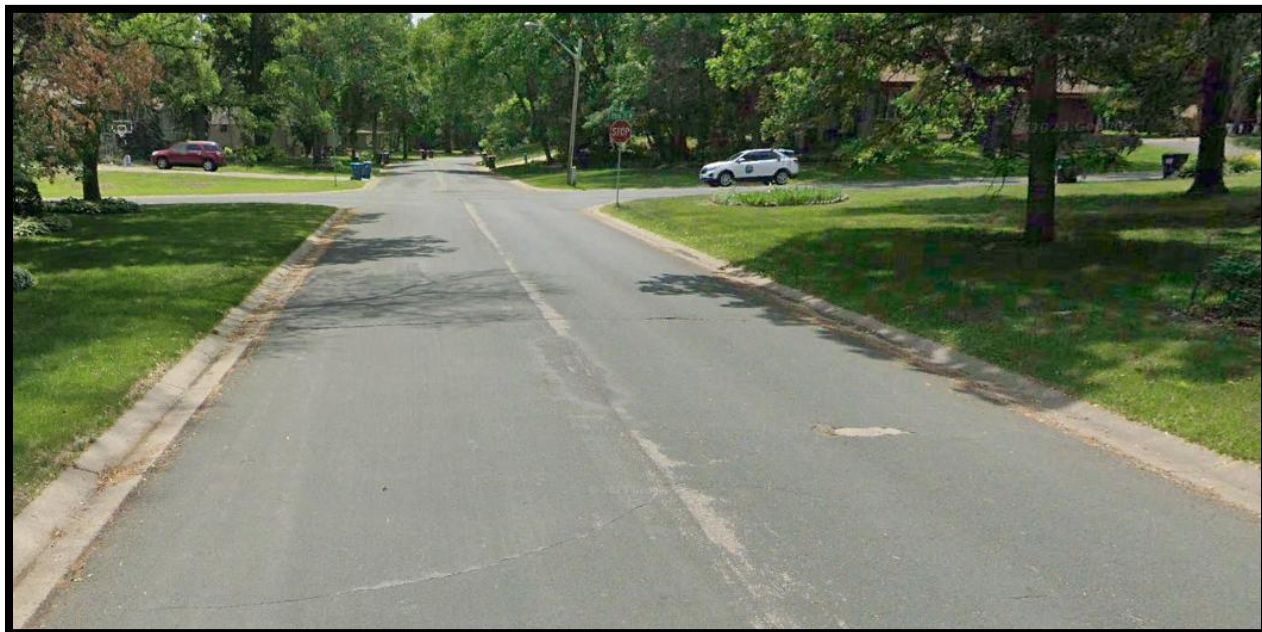


Photo 2. Ixonia Avenue looking south toward 178th



Photo 3. 178th Street West looking east toward Ipava Avenue.

Concrete sidewalks and bituminous trails exist throughout the project area along connection points with Ipava Avenue and 175th Street West. The installation of new sidewalks and/or trails in these areas was looked at but not feasible given the existing vegetation, right of way, and overall scope of the project.

The concrete sidewalks and bituminous trails are generally in good condition; however, many of the existing pedestrian ramps do not meet the current ADA design



standards, and there are isolated instances where concrete sidewalk panels have heaved, settled, or are otherwise structurally deficient.

Soil borings and corings for streets within the 2026 project area were collected in August of 2025. Ground penetrating radar (GPR) was employed in both directions on each street to collect interpretations on pavement layer thickness between boring and coring locations. The draft geotechnical report is included in **Appendix C**, and the draft boring and coring logs were used to determine the feasibility of a mill and overlay. The final geotechnical report will be available with final design. The quantities included in the Opinion of Probable Cost, **Appendix B**, are based on the draft geotechnical report. **Table 1** Below provides a summary of existing street conditions within the 2026 Street Rehabilitation Project.

Table 1 – 2026 Street Rehabilitation Project							
Summary of Existing Street Conditions							
Street Name	Right-of-Way (feet)	Street Width (feet)	Curb Type	Sub-base (aggregate) (inches)	Avg. Bituminous Section (inches)	OCI	Approx. Year of Most Recent Construction
175 th Street West	60	28	Standard Surmountable	8.8	4.5	58	2007
Jaguar Path	60	28	Standard Surmountable	13.4	4.0	51	2007
176 th Street West	60	28	Standard Surmountable	10.8	5.1	53	2007
Jaguar Court	60	28	Standard Surmountable	19.0	4.8	53	2007
Jalisco Way	60	28	Standard Surmountable	19.0	3.3	53	2007
Jalisco Court	60	28	Standard Surmountable	19	4.3	53	2007
Upper 178 th Street	60	28	Standard Surmountable	15.4	3.9	52	2007
Jamaica Circle	60	28	Standard Surmountable	16.0	4.3	58	2007
Jasper Court	60	28	Standard Surmountable	23.0	5.0	52	2007
Javelin Court	60	30	Standard Surmountable	20.0	3.5	55	2007
Jasmine Court	60	28	Standard Surmountable	23.0	3.5	53	2007
Ingrid Court	60	28	Standard Surmountable	20.0	4.8	60	2007



Summary of Existing Street Conditions (Cont.)

Street Name	Right-of-Way (feet)	Street Width (feet)	Curb Type	Sub-base (aggregate) (inches)	Avg. Bituminous Section (inches)	OCI	Approx. Year of Most Recent Construction
Jacquard Path	60	28	Standard Surmountable	13.5	3.9	53	2007
Jaguar Circle	60	28	Standard Surmountable	14.0	4.0	48	2007
178 th Street West	60	28	Standard Surmountable	14.0	5.1	55	2007
Ixonia Avenue	60	28	Standard Surmountable	13.0	4.6	56	2007
177 th Circle West	60	28	Standard Surmountable	12.3	3.8	53	2007
176 th Circle West	60	28	Standard Surmountable	10.5	2.8	53	2007
Iten Court North	60	28	Standard Surmountable	16.0	6.0	53	2007
Iten Court South	60	28	Standard Surmountable	16.0	5.1	53	2007
180 th Street West	60	28	Standard Surmountable	18.0	4.9	60	2007
Isle Avenue	60	28	Standard Surmountable	12.0	4.8	53	2007
Irons Court	60	28	Standard Surmountable	10.0	4.5	60	2007
176 th Court	50	28	Standard Surmountable	19.0	4.1	62	2007
Isleton Avenue	60	28	Standard Surmountable	11.3	4.8	55	2007
Isleton Court	60	28	Standard Surmountable	16.0	4.3	60	2007
Italy Path	60	28	Standard Surmountable	12.7	3.8	55	2007
Italy Court	60	28	Standard Surmountable	8.5	3.8	53	2007
Italy Avenue	60	28	Standard Surmountable	13	3.8	53	2007

1. Information transcribed from coring data in Geotechnical Evaluation Report, Braun Intertec Corporation, dated October 16, 2025. Ground Penetrating Radar (GPR) interpolations are contained within the report.



Public Utilities

Public Sanitary Sewer

Majority of existing sanitary sewer located within the 2026 Street Rehabilitation Project Area consists of 8-inch or 10-inch polyvinylchloride pipe (PVC). 8-inch vitrified clay pipe (VCP) is partially utilized throughout the Dakota Heights neighborhood. The VCP pipe was all structurally lined in 2020.

Public Water Main

All of the existing watermain located in the 2026 Street Rehabilitation Project Area is ductile iron pipe (DIP). The diameter of watermain pipes varies throughout the project area. Below is a list of watermain pipe size by street:

6-inch Watermain

- 176th Street West
- Jaguar Court
- Jalisco Way
- Jalisco Court
- Upper 178th Street
- Jamaica Circle
- Jasper Court
- Javelin Court
- Jasmin Court
- Ingrid Court
- Jaguar Circle
- Ixonia Avenue
- 177th Circle West
- 176th Circle West
- Iten Court North
- Isle Avenue
- Irons Court
- Isleton Avenue
- Isleton Court
- Italy Court
- Italy Avenue



8-inch Watermain

- 180th Street West
- 176th Court
- Italy Path

16-inch Watermain

- Jasmin Avenue

20-inch Watermain

- 178th Street West

24-inch Watermain

- Jaguar Path

30-inch Watermain

- Jacquard Path

During city inspections of the existing watermain system, it was discovered that a majority of the hydrants in the Dakota Heights neighborhood area do not have auxiliary valves on the leads.

City maintenance records indicate a sporadic and limited watermain break history throughout the 2026 Street Rehabilitation Project area that have required typical maintenance efforts.

Public Storm Sewer

City record drawing information indicates that public storm sewer facilities exist within the 2026 Street Rehabilitation Project Area. All areas within the project area are urban section with curb and gutter and storm sewer.

Storm sewer that is routed West of Jaguar Path discharges to the Black Dog Watershed Management Organization (BDWMO). Regulations are kept at the local level, and the BDWMO does not administer a permit program.

Storm sewer that is routed East of Jaguar Path discharges to the Vermillion River Watershed and is subject to review by the Vermillion River Watershed Joint Powers Organization (VRWJPO).

Most of the storm sewer facilities within the 2026 Street Rehabilitation Project are constructed of reinforced concrete pipe (RCP) and appear to provide the necessary collection and conveyance capacity for the 10-year, 24-hour design storm event. These pipes are called out as “Good in Rational Calculation” in the storm sewer capacity figures.

Some segments of storm sewer don’t meet capacity requirements, but are still able to convey the 10-year, 24-hour design storm event. This is because the depth of water in the upstream structure (headwater) remains below the rim



elevation, and off of the street. These pipes are called out as “Allowable Headwater Pressure Flow” in the storm sewer capacity figures.

If storm sewer doesn’t meet capacity requirements, and the headwater exceeds the rim elevation, then that pipe is called out as “Consider Replacement” in the storm sewer capacity figures.

The storm sewer capacity figures can be found in **Appendix A**.

All storm sewer structures have been inspected by City Public Works staff and repair recommendations have been incorporated into the Opinion of Probable Cost.

Stormwater Basins

Two stormwater basins are located in the 2026 Street Rehabilitation Project. Both basins are located in VRWJPO and are subject to review.

The stormwater basin located west of Italy Path and south of Italy Court has a large sediment delta located at the south 27” inlet. The 27” storm sewer inlet pipe and apron have deteriorated.

Sediment deltas were identified in the basin located south of Jaguar Circle and east of Jacquard Path at the north inlet and the northwest inlet.

Proposed Improvements

Surface

Surface improvements recommended with the 2026 Street Rehabilitation Project Area are intended to extend the life of the existing roadway systems, improve isolated drainage issues, and improve the ride quality of roadways.

Surface improvements include the variable depth pavement milling. Milling is the process by which the existing wear course of the road is ground off and hauled off site and a new pavement layer is installed over the exposed underlying pavement layer. Street grades are typically not changed with a mill and overlay, however, the roadway crown will be restored where necessary. A significant portion of the existing curb and gutter within the project is in structurally adequate condition, so only partial curb and gutter replacement is proposed as a part of the project.

The local residential and minor collector streets within the project area will be milled and overlaid in accordance with the recommendations provided in the geotechnical report. **Appendix A** illustrates the proposed residential and minor collector roadway sections, which in general, consist of a new pavement layer of varying thickness over the existing bituminous road section. Certain areas have been identified by the Geotechnical Report as potentially needing a full depth mill and overlay or edge mill and overlay to remove the poor-quality pavement near the edges. These areas are limited to 176th Circle and Ixonia Avenue.

The Kenrick Avenue and Junelle Path Areas have been removed from the 26-02 Project area due to adjacent private lots adjacent being developed in the near



future. Anticipating this construction, the City has requested to delay these areas until the future development is complete.

As part of the Street Rehabilitation Project, all City owned and maintained pedestrian curb ramps with the project area that do not meet current ADA accessibility design standards will be reconstructed. Additionally, spot replacement of structurally deficient concrete sidewalk is proposed.

Per the City's request, WSB is proposing to install a turnaround driveway on the south side of Jacquard Path, to allow maintenance vehicles and snow plows an area to turnaround prior to the gated Dakota Heights Water Tower.

Public Utilities

Public Sanitary Sewer

The City's Public Works Department has televised the sanitary sewer system. The sanitary sewer video inspection revealed that the existing sewer pipe is in relatively good condition and will not require full replacement.

Sanitary sewer manholes within the project that are identified as needing new adjustment rings and/or castings will be repaired as a part of this project. Some existing structures have been identified as not having enough adjustment rings and will require reconfiguration. Additionally, all sanitary sewer manholes within the street reconstruction area will receive external chimney seals as a part of the project to reduce the potential for I&I issues and reduce the frequency of maintenance requests.

Public Water Main

It is proposed that in conjunction with the street improvements, the service life of the existing watermain systems be extended by replacing all bolts at select existing hydrants and watermain valves with stainless steel bolts, which are more resistant to the corrosive nature of the underlying soils. In addition to rebolting existing valves and hydrants, the majority of the hydrants in the Dakota Heights neighborhood will be removed and replaced in order to install an auxiliary valve where it previously did not exist.

The City's maintenance records show dispersed and limited watermain breaks and maintenance issues and therefore no watermain replacement is proposed with the 2026 Street Rehabilitation Project.

Storm Sewer

Rehabilitation of the streets provides a timely opportunity to improve drainage conditions and increase the longevity of the streets within the project area by repairing existing and installing additional storm sewer facilities. City staff completed an inspection of the storm sewer system in the fall of 2025 and provided recommendations for repairs and replacement including castings, adjustment rings, and structure replacement, as well as replacement of failing or deteriorating RCP. Structures identified as needing rehabilitation will undergo necessary interior concrete/grout invert and doghouse replacement.



Those structures identified as having existing sumps, but are not the last accessible structure in the street, will have their sumps filled with grout.

Sections of storm sewer that have been identified in **Appendix A** as not meeting capacity requirements are proposed to be upsized. Upsizing the pipe increases the capacity and keeps the depth of water in the upstream structure below the rim elevation, and off of the street.

Additional catch basins are also proposed at the locations identified in the capacity figures in order to increase the inlet capacity and reduce localized flooding. Costs for this work are included in the Opinion of Probable Cost. Any new storm sewer that is upsized, or structures replaced due to upsizing of pipes, or if the structure needs to be upsized itself, shall be funded by the stormwater infrastructure fund.

Existing inlets and outlets of storm sewer runs within the project area that were identified as needing improvements such as repair, replacement, tree removal, and/or delta excavation will be improved with the project.

Stormwater Basins

The stormwater basin located west of Italy Path and south of Italy Court was identified for maintenance. The project is proposing to remove the large sediment delta at the south 27" inlet. This removal increases the residence time of stormwater in the basin and increases pollutant removals for the basin. The last stick of pipe and pipe apron are proposed to be replaced.

The basin located south of Jaguar Circle and east of Jacquard Path was identified for maintenance to improve conveyance to the basin. Excavation is proposed to remove the sediment deltas at the north and northwest inlets. A riprap lined channel is proposed downstream of both inlets to convey stormwater to the basins.

Public Street Sign Replacement

Existing street signs within the project will not need to be replaced unless it is due to utility work, in which case they will be salvaged and reinstalled

Mailbox Replacement

It is the City's intent to salvage and reinstall all existing mailboxes and mailbox supports that may be impacted with construction. In the event the condition of the existing mailbox support warrants replacement prior to reinstallation, the City is proposing to salvage the existing mailbox and install a new mailbox support that will meet both City Standards and United States Postal Service (USPS) requirements.



Permits/Approvals

An National Pollutant Discharge Elimination System (NPDES) permit for construction activity will be required if more than one acre will be disturbed by construction activities within the project, which will be determined in final design of the project.

A Dakota County Work in Right-of-Way user registration will be required for the contractor for any county roads (i.e. CR 9, CSAH 23 etc.) that may be used as a haul route for the project. Work in Right-of-Way permits will be also required for construction within Dakota County Right-of-Way.

Construction Access/Staging

The contractor will be responsible for providing access to all properties throughout the project. Adequately signed detours will be identified to direct traffic around the construction zones and notify users of the increased truck and construction activity.

Construction will be phased such that construction truck traffic will not need to access newly reconstructed streets to complete the project. Detailed construction phasing plans will be developed with final design of the project.



Financing

Opinion of Probable Cost

A detailed opinion of probable cost for the project area can be found in the Appendix B of this report. The opinion of cost incorporates estimated 2026 construction costs and includes a 8% contingency factor. Indirect costs are projected at 25% of the construction cost and include engineering, legal, financing, and administrative costs.

Table 2 below provides a summary of the opinion of probable cost for the 2026 Street Rehabilitation Project:

Table 2 – 2026 Street Rehabilitation Project	
Opinion of Probable Cost Summary	
Schedule	Amount
Street Improvements	\$3,485,064
Storm Sewer Improvements	\$880,530
Watermain Improvements	\$1,110,622
Sanitary Sewer Improvements	\$210,364
Stormwater Basin Improvements	\$107,305
TOTAL	\$5,793,885

Funding

Financing for the street, storm sewer, watermain, and sanitary sewer improvements within the 2026 Street Rehabilitation Project will come from City CIP Funds, Stormwater Infrastructure Fund, Water Operating Fund, Sanitary Sewer Operating Fund, and Environmental Resources Fund.

Table 3 below provides a funding summary for the 2026 Street Rehabilitation Project.

Table 3 – 2026 Street Rehabilitation Project		
Funding Summary		
Funding Source	Project Amount	Estimated Funding Available
City CIP Funds – Street/Storm	\$2,769,343	\$3,580,000
City Water Operating Fund	\$1,247,329	\$470,000
City Sanitary Sewer Operating Fund	\$210,364	\$250,000
City Stormwater Infrastructure Fund	\$1,459,544	\$105,000
Environmental Resources Fund	\$107,305	\$100,000
TOTAL	\$5,793,885	\$4,505,000



The 2026 Street Rehabilitation Project, City Project No. 26-02 total cost is \$5,793,885.



Project Schedule

The proposed schedule for the 2026 Street Rehabilitation Project is as follows:

Task Description	Completion Date
Deliver Engineering Report to City	November 25, 2025
City Council Approves Plans and Specifications	January 20, 2026
Open Bids	February 18, 2026
Award Contract	March 2, 2026
Neighborhood Meeting	Late March 2026
Begin Construction	April/May 2026
Substantial Completion	October 2026
Final Completion	November 2026

*Schedule assumes any necessary private utility work is completed prior to the start of construction.

Feasibility and Recommendation

The 2026 Street Rehabilitation Project includes roadway milling and overlaying, watermain improvements, sanitary sewer improvements, storm sewer improvements, pedestrian ramp installation, sidewalk improvements, and partial repair and replacement of structurally deficient concrete sidewalk and concrete curb and gutter.

The total estimated cost for the 2026 Street Rehabilitation Project including roadway, storm sewer, sanitary sewer, and watermain improvements is \$5,793,885. Proposed funding for the project is provided through City Funds. Construction costs are based on anticipated construction costs for 2026.

This project is feasible, necessary, cost-effective from an engineering standpoint. The project feasibility is subject to financial review by the City. Based on information contained in this report, it is recommended to proceed with the improvements as outlined in this report.



Appendix A

Figure 1 – Project Locations Map

Figure 2 – Typical Section

Figure 3 – Storm Sewer Concept Maps

REVISIONS

NO.	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, AND CONTRACT DOCUMENTS WERE 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.

DATE: XX-XX-XXXX LIC. NO. 23110
 JEFF OUBER

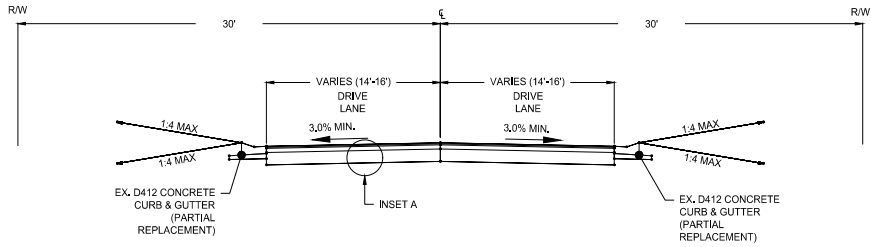
TYPICAL SECTIONS

2026 STREET REHABILITATION PROJECT
 CITY OF LAKEVILLE

CLIENT PROJECT NO.
 CP 26-02

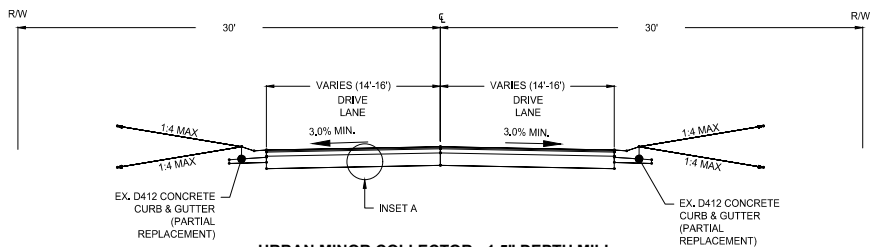
WSB PROJECT NO.
 031257-000

SHEET
 6 OF ##



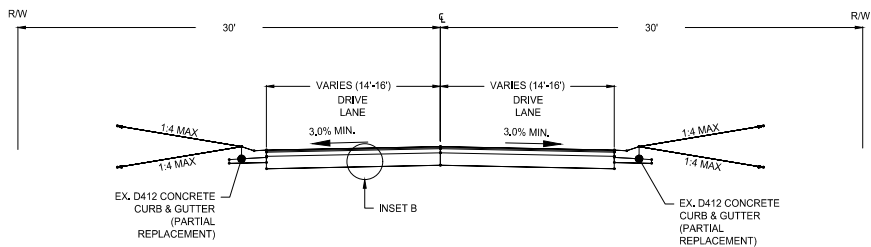
URBAN RESIDENTIAL - 1.5" DEPTH MILL

JASMINE AVENUE, JAGUAR PATH, 176TH STREET W, JAGUAR COURT, JALISCO PATH, JALISCO COURT, JAWHICA COURT, JASPER COURT, JAVELIN COURT, JASMINE COURT, INGRID COURT, JACQUARD PATH, JALISCO WAY, ITALY AVENUE, JAGUAR CIRCLE, IXONIA AVENUE, 177TH CIRCLE W, ITEN COURT N, ITEN COURT S, 180TH STREET W, ISLE AVENUE, IRONS COURT, 176TH COURT W, ISLETON AVENUE, ISLETON COURT, ITALY PATH, ITALY COURT (N.T.S.)



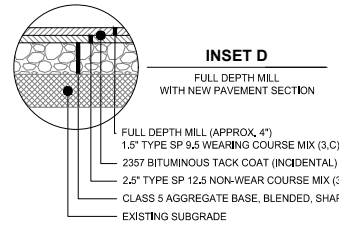
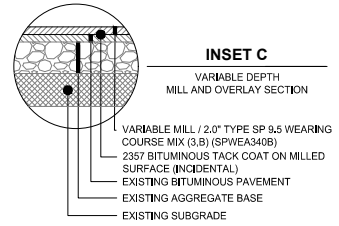
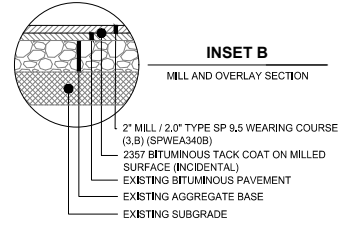
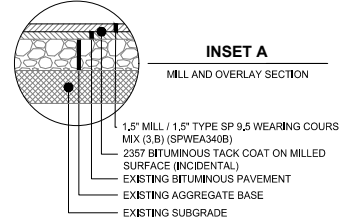
URBAN MINOR COLLECTOR - 1.5" DEPTH MILL

JAGUAR PATH
 178TH STREET W
 (N.T.S.)



URBAN RESIDENTIAL - 2" DEPTH MILL

UPPER 178TH STREET W
 (N.T.S.)



THE ENGINEER MAY ALSO REQUEST VARIABLE DEPTH MILLING FOR AREAS NOT IDENTIFIED IN THE PLANS.

THE ENGINEER MAY ALSO REQUEST VARIABLE DEPTH MILLING FOR AREAS NOT IDENTIFIED IN THE PLANS.

REVISIONS

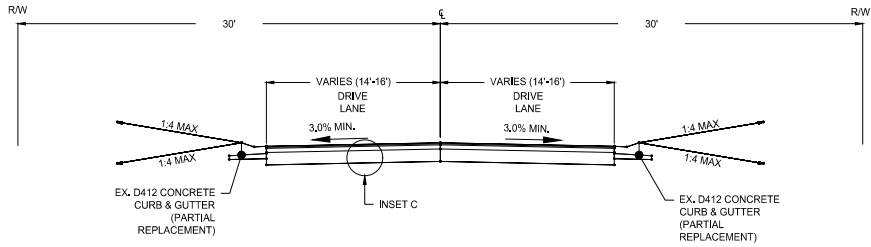
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DATE: XX-XX-XXXX LIC. NO. 23110
JEFF OUBER

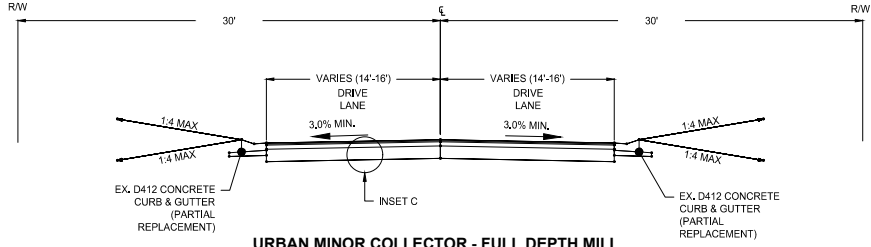
TYPICAL SECTIONS

2026 STREET REHABILITATION PROJECT
CITY OF LAKEVILLE



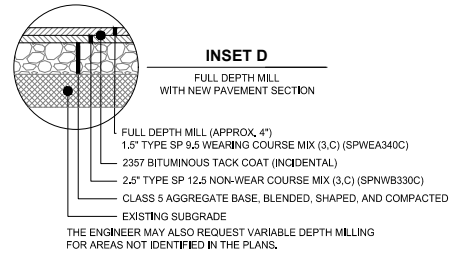
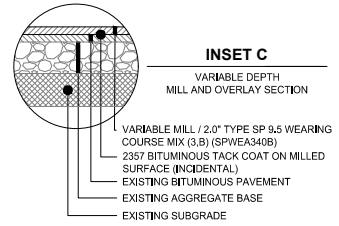
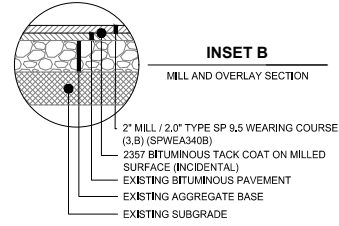
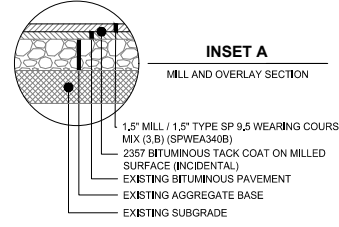
URBAN RESIDENTIAL - FULL DEPTH MILL

176TH CIRCLE W
(N.T.S.)



URBAN MINOR COLLECTOR - FULL DEPTH MILL

IXONIA AVENUE
(N.T.S.)



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— State Aid Roadway

Storm Structures

- ▲ Existing FES
- Proposed CB
- Proposed CBMH

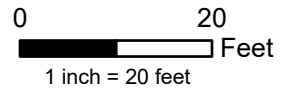
Storm Sewer

- Existing Pipe
- Proposed Pipe



Page 1 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN

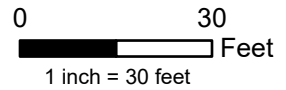


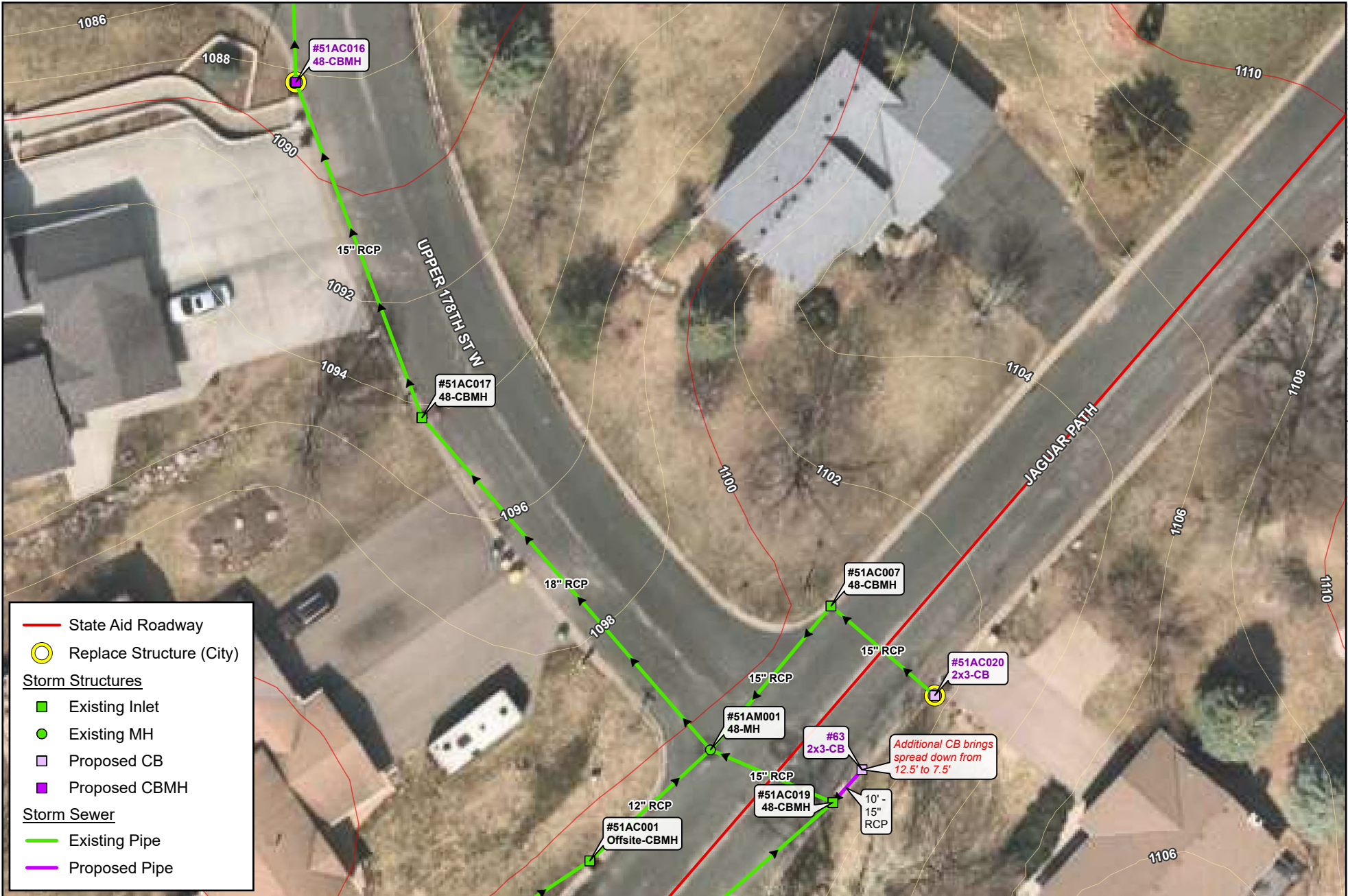


	Replace Structure (City)
Storm Structures	
	Existing Inlet
	Proposed CB
	Proposed CBMH
Storm Sewer	
	Existing Pipe



Page 2 - Storm Sewer Concept Maps
 26-02 Street Rehabilitation Project
 City of Lakeville, MN





Legend

- State Aid Roadway
- Replace Structure (City)

Storm Structures

- Existing Inlet
- Existing MH
- Proposed CB
- Proposed CBMH

Storm Sewer

- Existing Pipe
- Proposed Pipe

Page 4 - Storm Sewer Concept Maps

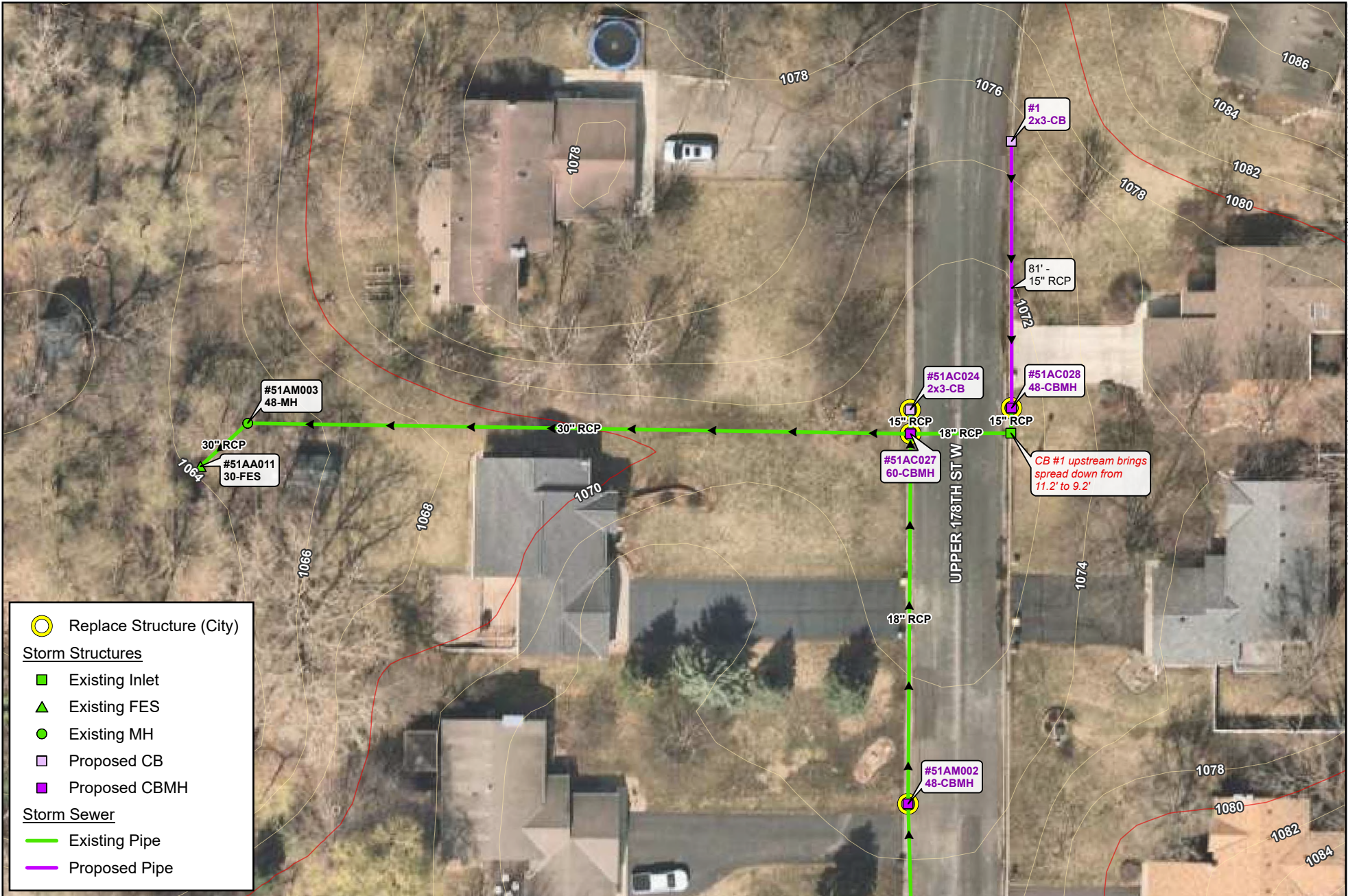
26-02 Street Rehabilitation Project
City of Lakeville, MN

N

0 30 Feet

1 inch = 30 feet



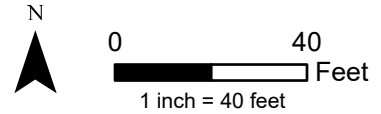


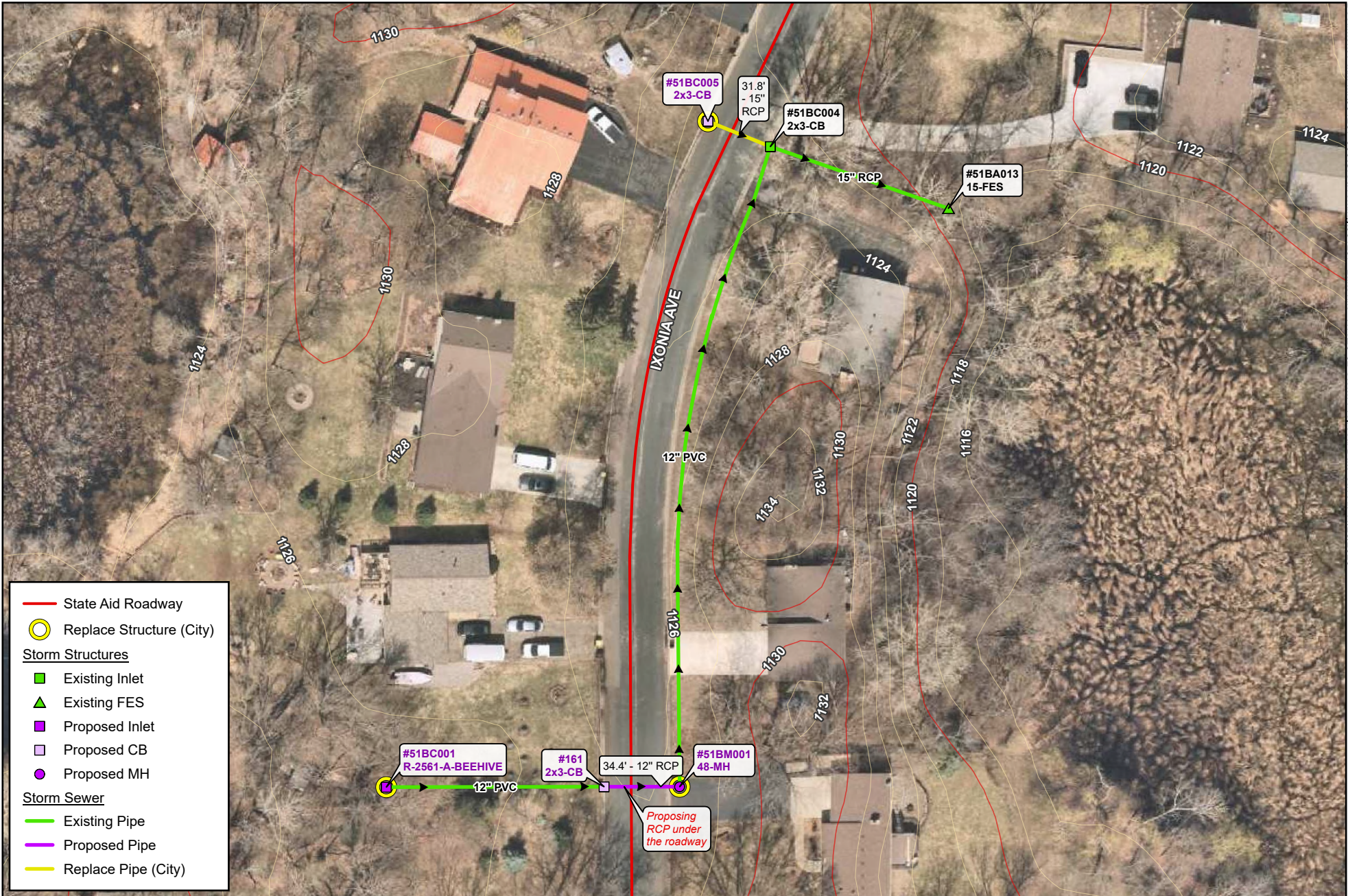
Legend

- Replace Structure (City)
- Storm Structures**
 - Existing Inlet
 - ▲ Existing FES
 - Existing MH
 - Proposed CB
 - Proposed CBMH
- Storm Sewer**
 - Existing Pipe
 - Proposed Pipe



Page 5 - Storm Sewer Concept Maps
 26-02 Street Rehabilitation Project
 City of Lakeville, MN





State Aid Roadway
 State Aid Roadway

Replace Structure (City)
 Replace Structure (City)

Storm Structures

- Existing Inlet
- Existing FES
- Proposed Inlet
- Proposed CB
- Proposed MH

Storm Sewer

- Existing Pipe
- Proposed Pipe
- Replace Pipe (City)

Page 7 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN

N

0 60
 Feet

1 inch = 60 feet





Replace Structure (City)

Storm Structures

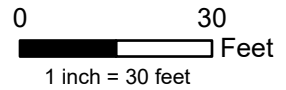
- Existing Inlet
- ▲ Existing FES
- Proposed CB
- Proposed CBMH

Storm Sewer

- Existing Pipe



Page 8 - Storm Sewer Concept Maps
 26-02 Street Rehabilitation Project
 City of Lakeville, MN





— State Aid Roadway

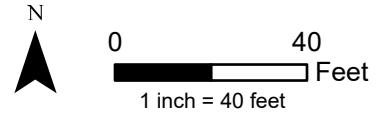
Storm Structures

- Existing Inlet
- Existing MH
- Proposed CB
- Proposed CBMH

Storm Sewer

- Existing Pipe
- Proposed Pipe

Page 9 - Storm Sewer Concept Maps
 26-02 Street Rehabilitation Project
 City of Lakeville, MN





— State Aid Roadway

Storm Structures

- Existing Inlet
- ▲ Existing FES
- Proposed CB

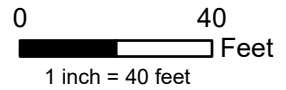
Storm Sewer

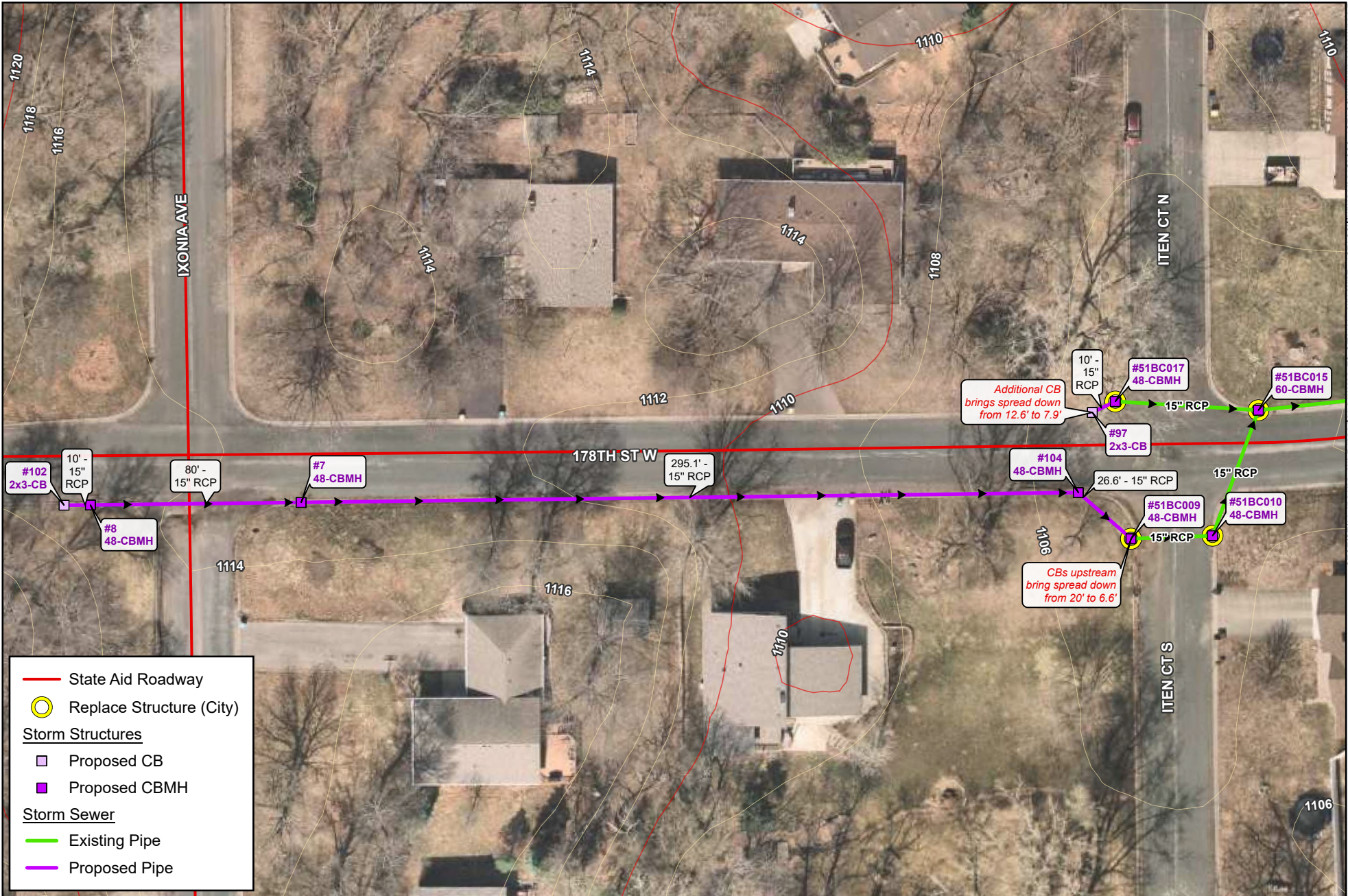
- Existing Pipe
- Proposed Pipe



Page 10 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN



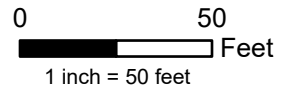


	State Aid Roadway
	Replace Structure (City)
Storm Structures	
	Proposed CB
	Proposed CBMH
Storm Sewer	
	Existing Pipe
	Proposed Pipe



Page 11 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN



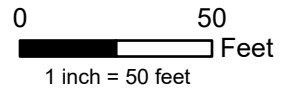


- State Aid Roadway
- Replace Structure (City)
- Storm Structures**
- Existing Inlet
- Existing MH
- Proposed CB
- Proposed CBMH
- Proposed FES
- Storm Sewer**
- Existing Pipe
- Proposed Pipe
- Replace Pipe (City)



Page 12 - Storm Sewer Concept Maps

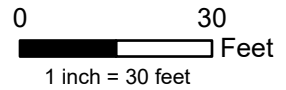
26-02 Street Rehabilitation Project
City of Lakeville, MN





Page 13 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN





— State Aid Roadway

○ Replace Structure (City)

Storm Structures

- Existing Inlet
- Proposed CB
- Proposed CBMH

Storm Sewer

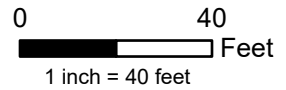
- Existing Pipe
- Proposed Pipe

Additional CB brings spread down from 13' to 5.8'



Page 14 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN





— State Aid Roadway

Storm Structures

- Existing Inlet
- Proposed CBMH

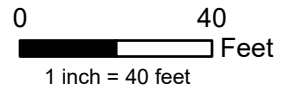
Storm Sewer

- Existing Pipe
- Proposed Pipe
- - - Offsite Pipe



Page 15 - Storm Sewer Concept Maps

26-02 Street Rehabilitation Project
City of Lakeville, MN





Appendix B

Opinion of Probable Cost

OPINION OF PROBABLE COST

WSB Project: 2026 Street Rehabilitation Project
 Project Location: City of Lakeville
 City Project No.: 26-02
 WSB Project No: 031257-000

Design By: EKM
 Checked By: RJS

Date: 11/25/2025

ITEM NO.	MNDOT SPECIFICATION NO.	DESCRIPTION	UNIT	ESTIMATED TOTAL QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL COST
A. Street Improvements						
1	2021.501	MOBILIZATION	LS	1	\$ 122,929.95	\$ 122,929.95
2	2101.502	CLEARING	EACH	10	\$ 500.00	\$ 5,000.00
3	2101.502	GRUBBING	EACH	10	\$ 400.00	\$ 4,000.00
4	2104.502	SALVAGE MAIL BOX SUPPORT	EACH	42	\$ 150.00	\$ 6,300.00
5	2104.502	SALVAGE SIGN	EACH	10	\$ 70.00	\$ 700.00
6	2104.503	REMOVE CURB & GUTTER	LF	17044	\$ 8.00	\$ 136,352.00
7	2104.503	SAWING BIT PAVEMENT (FULL DEPTH)	LF	3784	\$ 2.00	\$ 7,568.00
8	2104.503	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	1840	\$ 4.00	\$ 7,360.00
9	2104.504	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	S Y	2434	\$ 12.00	\$ 29,208.00
10	2104.504	REMOVE BITUMINOUS PAVEMENT	S Y	14	\$ 14.00	\$ 196.00
11	2104.504	REMOVE CONCRETE DRIVEWAY PAVEMENT	S Y	1651	\$ 18.00	\$ 29,718.00
12	2104.504	REMOVE CONCRETE PAVEMENT	S Y	30	\$ 20.00	\$ 600.00
13	2104.518	REMOVE CONCRETE WALK	S F	575	\$ 2.50	\$ 1,437.50
14	2104.601	SALVAGE AND REINSTALL LANDSCAPE STRUCTURES	LS	1	\$ 10,000.00	\$ 10,000.00
15	2104.618	SALVAGE BRICK PAVERS	S F	511	\$ 20.00	\$ 10,220.00
16	2106.507	EXCAVATION - COMMON	C Y	46	\$ 40.00	\$ 1,840.00
17	2106.507	EXCAVATION - SUBGRADE	C Y	1484	\$ 40.00	\$ 59,360.00
18	2106.507	STABILIZING AGGREGATE (CV)	C Y	1484	\$ 38.00	\$ 56,392.00
19	2106.609	STABILIZING AGGREGATE	TON	429	\$ 30.00	\$ 12,870.00
20	2106.619	MINOR GRADING	RDST	2	\$ 1,500.00	\$ 3,000.00
21	2112.519	SUBGRADE PREPARATION	RDST	246	\$ 55.00	\$ 13,530.00
22	2123.610	STREET SWEEPER (WITH PICKUP BROOM)	HOUR	100	\$ 170.00	\$ 17,000.00
23	2130.523	WATER	MGAL	446	\$ 45.00	\$ 20,070.00
24	2211.507	AGGREGATE BASE (CV) CLASS 5	C Y	28	\$ 35.00	\$ 980.00
25	2231.609	BITUMINOUS PATCH SPECIAL	TON	739	\$ 155.00	\$ 114,545.00
26	2232.604	MILL BITUMINOUS SURFACE (1.5")	S Y	75009	\$ 3.00	\$ 225,027.00
27	2232.604	MILL BITUMINOUS SURFACE (2")	S Y	7308	\$ 1.75	\$ 12,789.00
28	2232.604	MILL BITUMINOUS SURFACE (FULL DEPTH)	S Y	10686	\$ 1.75	\$ 18,700.50
29	2360.504	TYPE SP 9.5 WEAR CRS MIX(2,B)3.0" THICK	S Y	2566	\$ 30.00	\$ 76,980.00
30	2360.509	TYPE SP 9.5 WEARING COURSE MIX (3:B)	TON	7525	\$ 80.00	\$ 602,000.00
31	2360.509	TYPE SP 9.5 WEARING COURSE MIX (3:C)	TON	949	\$ 85.00	\$ 80,665.00
32	2360.509	TYPE SP 12.5 NON WEAR COURSE MIX (3:C)	TON	1582	\$ 88.00	\$ 139,216.00
33	2504.602	IRRIGATION SYSTEM REPAIR	EACH	30	\$ 215.00	\$ 6,450.00
34	2504.618	INSTALL BRICK PAVERS	S F	511	\$ 30.00	\$ 15,330.00
35	2521.518	5" CONCRETE WALK	S F	391	\$ 10.00	\$ 3,910.00
36	2521.518	6" CONCRETE WALK	S F	381	\$ 15.00	\$ 5,715.00
37	2531.503	CONCRETE CURB & GUTTER DESIGN D412	LF	3409	\$ 28.00	\$ 95,452.00
38	2531.503	CONCRETE CURB & GUTTER DESIGN D412 (SLIP FORM)	LF	13635	\$ 20.00	\$ 272,700.00
39	2531.504	7" CONCRETE DRIVEWAY PAVEMENT	S Y	1572	\$ 81.00	\$ 127,332.00
40	2531.504	7" CONCRETE DRIVEWAY PAVEMENT SPECIAL	S Y	31	\$ 175.00	\$ 5,425.00
41	2531.601	ADA COMPLIANCE SUPERVISOR	LS	1	\$ 1,000.00	\$ 1,000.00
42	2531.618	TRUNCATED DOMES	S F	80	\$ 60.00	\$ 4,800.00
43	2540.602	MAIL BOX	EACH	42	\$ 50.00	\$ 2,100.00
44	2540.602	MAIL BOX SUPPORT	EACH	42	\$ 80.00	\$ 3,360.00
45	2540.602	TEMPORARY MAIL BOX	EACH	417	\$ 85.00	\$ 35,445.00
46	2557.602	REPAIR DOG FENCE	EACH	15	\$ 150.00	\$ 2,250.00
47	2563.601	TRAFFIC CONTROL	LS	1	\$ 10,000.00	\$ 10,000.00
48	2573.501	STABILIZED CONSTRUCTION EXIT	LS	1	\$ 2,500.00	\$ 2,500.00
49	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	LF	30	\$ 5.00	\$ 150.00
50	2575.504	ROLLED EROSION PREVENTION CATEGORY 25	S Y	7157	\$ 4.00	\$ 28,628.00
51	2575.523	WATER	MGAL	107	\$ 50.00	\$ 5,350.00
52	2575.604	PERMANENT TURF ESTABLISHMENT	S Y	5248	\$ 15.00	\$ 78,720.00
53	2575.604	TEMPORARY STABILIZATION	S Y	4771	\$ 10.00	\$ 47,710.00
54	2582.518	CROSSWALK PAINT	SF	216	\$ 3.00	\$ 648.00
CONSTRUCTION TOTAL						\$ 2,581,528.95
CONTINGENCY TOTAL (8%)						\$ 206,522.32
SUBTOTAL						\$ 2,788,051.27
INDIRECT COST TOTAL (25%)						\$ 697,012.82
TOTAL						\$ 3,485,064.08
B. Storm Sewer Improvements						
55	2021.501	MOBILIZATION	LS	1	\$ 31,059.25	\$ 31,059.25
56	2101.502	CLEARING	EACH	2	\$ 500.00	\$ 1,000.00
57	2101.502	GRUBBING	EACH	2	\$ 400.00	\$ 800.00
58	2104.502	REMOVE CASTING	EACH	29	\$ 200.00	\$ 5,800.00
59	2104.502	REMOVE DRAINAGE STRUCTURE	EACH	32	\$ 580.00	\$ 18,560.00
60	2104.503	REMOVE SEWER PIPE (STORM)	LF	1017	\$ 20.00	\$ 20,340.00
61	2501.502	12" RC PIPE APRON	EACH	1	\$ 1,700.00	\$ 1,700.00
62	2501.502	18" RC PIPE APRON	EACH	1	\$ 2,100.00	\$ 2,100.00
63	2501.502	27" RC PIPE APRON	EACH	1	\$ 3,500.00	\$ 3,500.00
64	2503.503	12" RC PIPE SEWER CLASS V	LF	163	\$ 65.00	\$ 10,595.00
65	2503.503	15" RC PIPE SEWER CLASS V	LF	1833	\$ 75.00	\$ 137,475.00

OPINION OF PROBABLE COST

WSB Project: 2026 Street Rehabilitation Project
 Project Location: City of Lakeville
 City Project No.: 26-02
 WSB Project No: 031257-000

Design By: EKM
 Checked By: RJS

Date: 11/25/2025

ITEM NO.	MNDOT SPECIFICATION NO.	DESCRIPTION	UNIT	ESTIMATED TOTAL QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL COST
66	2503.503	18" RC PIPE SEWER CLASS III	LF	80	\$ 85.00	\$ 6,800.00
67	2503.503	24" RC PIPE SEWER CLASS III	LF	70	\$ 105.00	\$ 7,350.00
68	2503.503	27" RC PIPE SEWER CLASS III	LF	20	\$ 155.00	\$ 3,100.00
69	2503.503	30" RC PIPE SEWER CLASS III	LF	10	\$ 215.00	\$ 2,150.00
70	2503.602	CONNECT TO EXISTING STORM SEWER	EACH	1	\$ 35.00	\$ 35.00
71	2503.603	CLEAN PIPE DRAIN	LF	460	\$ 35.00	\$ 16,100.00
72	2503.603	CLEAN PIPE SEWER	LF	1444	\$ 45.00	\$ 64,980.00
73	2503.603	TELEWISE STORM SEWER	LF	455	\$ 20.00	\$ 9,100.00
74	2506.502	ADJUST FRAME & RING CASTING	EACH	19	\$ 350.00	\$ 6,650.00
75	2506.502	CASTING ASSEMBLY	EACH	61	\$ 950.00	\$ 57,950.00
76	2506.503	CONST DRAINAGE STRUCTURE DES 48-4020	LF	115	\$ 925.00	\$ 106,375.00
77	2506.503	CONST DRAINAGE STRUCTURE DES 60-4020	LF	35	\$ 1,125.00	\$ 39,375.00
78	2506.503	CONST DRAINAGE STRUCTURE DES 72-4020	LF	5	\$ 1,350.00	\$ 6,750.00
79	2506.503	CONST DRAINAGE STRUCTURE DES 84-4020	LF	6	\$ 1,500.00	\$ 9,000.00
80	2506.602	6" TOP SLAB FOR 48-4020 STRUCTURE	EACH	1	\$ 2,000.00	\$ 2,000.00
81	2506.602	CHIMNEY SEAL	EACH	3	\$ 200.00	\$ 600.00
82	2506.602	CONNECT INTO EXISTING DRAINAGE STRUCTURE	EACH	5	\$ 2,000.00	\$ 10,000.00
83	2506.602	CONST DRAINAGE STRUCTURE DESIGN SPEC (2'X3')	EACH	11	\$ 2,500.00	\$ 27,500.00
84	2506.602	FILL STRUCTURE SUMP	EACH	5	\$ 500.00	\$ 2,500.00
85	2506.602	GROUT CATCH BASIN OR MANHOLE	EACH	65	\$ 400.00	\$ 26,000.00
86	2573.502	STORM DRAIN INLET PROTECTION	EACH	100	\$ 150.00	\$ 15,000.00
CONSTRUCTION TOTAL						\$ 652,244.25
CONTINGENCY TOTAL (8%)						\$ 52,179.54
SUBTOTAL						\$ 704,423.79
INDIRECT COST TOTAL (25%)						\$ 176,105.95
TOTAL						\$ 880,529.74
C. Sanitary Sewer Improvements						
87	2021.501	MOBILIZATION	LS	1	\$ 7,420.25	\$ 7,420.25
88	2104.502	REMOVE CASTING	EACH	1	\$ 225.00	\$ 225.00
89	2506.502	ADJUST FRAME & RING CASTING	EACH	137	\$ 800.00	\$ 109,600.00
90	2506.502	CASTING ASSEMBLY	EACH	1	\$ 1,200.00	\$ 1,200.00
91	2506.503	RECONSTRUCT DRAINAGE STRUCTURE	LF	12	\$ 1,000.00	\$ 12,000.00
92	2506.602	CHIMNEY SEAL	EACH	141	\$ 180.00	\$ 25,380.00
CONSTRUCTION TOTAL						\$ 155,825.25
CONTINGENCY TOTAL (8%)						\$ 12,466.02
SUBTOTAL						\$ 168,291.27
INDIRECT COST TOTAL (25%)						\$ 42,072.82
TOTAL						\$ 210,364.09
D. Watermain Improvements						
93	2021.501	MOBILIZATION	LS	1	\$ 37,439.00	\$ 37,439.00
94	2104.502	REMOVE HYDRANT	EACH	53	\$ 600.00	\$ 31,800.00
95	2104.503	REMOVE WATERMAIN	LF	424	\$ 11.00	\$ 4,664.00
96	2106.610	EXPLORATORY EXCAVATION	HOURL	20	\$ 500.00	\$ 10,000.00
97	2451.507	GRANULAR BEDDING	CY	40	\$ 100.00	\$ 4,000.00
98	2504.602	ADJUST VALVE BOX	EACH	12	\$ 200.00	\$ 2,400.00
99	2504.602	6" GATE VALVE & BOX	EACH	53	\$ 2,000.00	\$ 106,000.00
100	2504.602	BOLT & VALVE BOX REPLACEMENT - HYDRANT & VALVE	EACH	4	\$ 5,000.00	\$ 20,000.00
101	2504.602	BOLT & VALVE BOX REPLACEMENT - VALVE	EACH	39	\$ 4,000.00	\$ 156,000.00
102	2504.602	HYDRANT	EACH	53	\$ 7,200.00	\$ 381,600.00
103	2504.602	INSTALL HYDRANT LEAD RESTRAINT	EACH	53	\$ 600.00	\$ 31,800.00
104	2504.602	METER BOX COVER	EACH	1	\$ 180.00	\$ 180.00
105	2504.602	VALVE BOX SECTION	EACH	24	\$ 650.00	\$ 15,600.00
106	2504.603	6" WATERMAIN DUCTILE IRON CL 52	LF	424	\$ 50.00	\$ 21,200.00
CONSTRUCTION TOTAL						\$ 822,683.00
CONTINGENCY TOTAL (8%)						\$ 65,814.64
SUBTOTAL						\$ 888,497.64
INDIRECT COST TOTAL (25%)						\$ 222,124.41
TOTAL						\$ 1,110,622.05
E. Stormwater Basin Improvements						
107	2021.501	MOBILIZATION	LS	1	\$ 10,000.00	\$ 10,000.00
108	2051.601	MAINTENANCE AND RESTORATION OF HAUL ROADS	LS	1	\$ 10,000.00	\$ 10,000.00
109	2101.505	CLEARING	ACRE	0.3	\$ 6,000.00	\$ 1,800.00
110	2101.505	GRUBBING	ACRE	0.3	\$ 6,000.00	\$ 1,800.00
111	2104.502	REMOVE PIPE APRON	EACH	1	\$ 400.00	\$ 400.00
112	2104.503	REMOVE SEWER PIPE (STORM)	LF	8	\$ 25.00	\$ 200.00
113	2104.601	SALVAGE AND REINSTALL LANDSCAPE STRUCTURES	LS	1	\$ 3,000.00	\$ 3,000.00
114	2106.602	DEWATERING	LS	1	\$ 5,000.00	\$ 5,000.00
115	2106.607	EXCAVATION - CHANNEL AND POND (LV) (SPECIAL 1)	CY	420	\$ 35.00	\$ 14,700.00
116	2106.609	EXCAVATION - CHANNEL AND POND (LV) (SPECIAL 2)	TON	26	\$ 75.00	\$ 1,950.00
117	2501.502	27" RC PIPE APRON	EACH	1	\$ 7,000.00	\$ 7,000.00
118	2501.602	CLEAN INLET STRUCTURE	EACH	4	\$ 1,000.00	\$ 4,000.00
119	2503.503	27" RC PIPE SEWER DES 3006 CL III	LF	8	\$ 250.00	\$ 2,000.00
120	2511.504	GEOTEXTILE FILTER TYPE 4	SY	72	\$ 5.00	\$ 360.00

OPINION OF PROBABLE COST

WSB Project: 2026 Street Rehabilitation Project
 Project Location: City of Lakeville
 City Project No.: 26-02
 WSB Project No: 031257-000

Design By: EKM
 Checked By: RJS

Date: 11/25/2025

ITEM NO.	MNDOT SPECIFICATION NO.	DESCRIPTION	UNIT	ESTIMATED TOTAL QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL COST
121	2511.507	RANDOM RIPRAP CLASS II	C Y	16.7	\$ 115.00	\$ 1,920.50
122	2511.507	RANDOM RIPRAP CLASS III	C Y	10	\$ 125.00	\$ 1,250.00
123	2573.502	STORM DRAIN INLET PROTECTION	EACH	3	\$ 200.00	\$ 600.00
124	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	L F	300	\$ 6.00	\$ 1,800.00
125	2573.602	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH	3	\$ 1,500.00	\$ 4,500.00
126	2575.504	ROLLED EROSION PREVENTION CATEGORY 20	S Y	1110	\$ 4.00	\$ 4,440.00
127	2575.505	SEEDING	ACRE	0.3	\$ 6,000.00	\$ 1,800.00
128	2575.608	SEED MIX OATS	LB	7	\$ 5.00	\$ 35.00
129	2575.608	SEED MIX RESIDENTIAL TURFGRASS	LB	34	\$ 15.00	\$ 510.00
130	2575.608	SEED MIX LAKEVILLE NATIVE BUFFER	LB	6	\$ 70.00	\$ 420.00
CONSTRUCTION TOTAL						\$ 79,485.50
CONTINGENCY TOTAL (8%)						\$ 6,358.84
SUBTOTAL						\$ 85,844.34
INDIRECT COST TOTAL (25%)						\$ 21,461.09
TOTAL						\$ 107,305.43
GRAND TOTAL						\$ 5,793,885.38

DISCLAIMER:

In review of this Opinion of Probable Cost, the Client understands that the Consultant has no control over the availability of labor, equipment or materials, market conditions, or the Contractor's method of pricing. This Opinion of Probable Cost is made on the basis of the Consultant's professional judgment and experience. The Consultant makes no warranty, expressed or implied, regarding the ultimate bids or negotiated cost of the Work.



Appendix C

Draft Geotechnical Report, Braun Intertec

Geotechnical Evaluation Report

City of Lakeville Project 26-02 Street Rehabilitation

Lakeville, Minnesota

Prepared for

City of Lakeville

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

Richard S. Jett, PE
Senior Engineer
License Number: 58781
October 16, 2025

Braun Intertec Corporation

Project B2506309

October 16, 2025

Project B2506309

Stephen Ferraro
City of Lakeville
20195 Holyoke Ave
Lakeville, MN 55044

Re: Geotechnical Evaluation Report
City of Lakeville Project 26-02 Street Rehabilitation
Lakeville, Minnesota

Dear Mr. Ferraro:

We are pleased to present this Geotechnical Evaluation Report for the above-referenced project. The following report provides the results of our evaluation and should be read in its entirety.

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 Richard Jett at 815.545.7059 (rjett@braunintertec.com) or Matt Ruble at 952.995.2247 (mruble@braunintertec.com).

Sincerely,
Braun Intertec Corporation

Richard S. Jett, PE
Senior Engineer

Matthew P. Ruble, PE
Vice President, Principal Engineer



Table of Contents

1.0	Introduction	1
1.1	Project Description	1
1.2	Site Conditions	7
1.3	Purpose	7
1.4	Background Information and Reference Documents	7
1.5	Scope of Services	8
2.0	Results	9
2.1	Geologic Overview	9
2.2	Coring Results	9
2.3	Ground Penetrating Radar (GPR) Results	13
2.4	Boring Results	15
2.5	Groundwater	16
2.6	Laboratory Test Results	17
3.0	Recommendations	17
3.1	Design and Construction Discussion	17
3.1.1	Pavement Rehabilitation Approach	17
3.1.2	Rehydrated Concrete Considerations	19
3.2	Rehabilitation via Mill and Overlay	20
4.0	Procedures	20
4.1	Penetration Test Borings	20
4.2	Ground Penetrating Radar	21
4.2.1	GPR Data Collection	21
4.2.2	GPR Analysis	21
4.3	Power Auger Borings	21
4.4	Exploration Logs	21
4.4.1	Log of Boring Sheets	21
4.4.2	Geologic Origins	22
4.5	Material Classification and Testing	22
4.5.1	Visual and Manual Classification	22
4.5.2	Laboratory Testing	22
4.6	Groundwater Measurements	22
5.0	Qualifications	22
5.1	Variations in Subsurface Conditions	22
5.1.1	Material Strata	22
5.1.2	Groundwater Levels	23
5.2	Continuity of Professional Responsibility	23
5.2.1	Plan Review	23
5.2.2	Construction Observations and Testing	23
5.3	Use of Report	23



5.4 Standard of Care23

Appendix

- Soil Boring Location Sketch
- Log of Boring Sheets ST-1 through ST-13
- Core Photographs
- GPR Scans
- Descriptive Terminology of Soil

List of Tables

Table 2-1. Subsurface Profile Summary 9
 Table 2-2. Statistics of GPR-Estimated Bituminous Pavement Thicknesses 13
 Table 2-3. Subsurface Profile Summary* 16
 Table 3-1. Pavement Rehabilitation Approach 17

List of Figures

Figure 1-1. Existing roadway layout showing Kenrick Avenue (pink). 2
 Figure 1-2. Existing roadway layout showing Junelle Path (light blue) 3
 Figure 1-3. Existing roadway layout showing Javelin Court (light blue), Jasper Court (light pink), Upper 178th Street West (yellow), Jamaica Circle (dark green), Jalisco way (red), Jalisco Court (pink), Jaguar Path (green), Jaguar Circle (dark yellow), Jacquard Path (blue), Ingrid Court (orange), and Jasmine Court (purple) 4
 Figure 1-4. Existing roadway layout showing Jaguar Path (green), Jasmine Avenue (yellow), 176th Street West (brown), and Jaguar Court (light purple) 5
 Figure 1-5. Existing roadway layout showing 178th Street West (orange), Ixonia Avenue (blue), Iten Court North (green), Iten Court South (light green), Italy Path (brown), Isle Avenue (pink), and Irons Court (red) 6
 Figure 1-6. Existing roadway layout showing 176th Circle (purple), Ixonia Ave (light blue), 177th Circle West (dark pink), Italy Path (brown), Italy Court (light purple), Isleton Avenue (light green), Isleton Court (light pink), and 176th Court West (red) 7



1.0 Introduction

1.1 Project Description

This geotechnical evaluation report addresses the proposed rehabilitation of various local roadways throughout the City of Lakeville, Minnesota as part of CP 26-02. The following bituminous roadways are included in this project:

- **Kenrick Avenue** from 185th Street West to Orchard Trail to 185th Street West
- **Junelle Path** from Kenrick Avenue to Cul-De-Sac
- **Jasmine Avenue** from 175th Street West to Jaguar Path
- **Jaguar Path** from 175th Street West to 200 feet East of Jay Court
- **176th Street West** from Jaguar Path to Cul-De-Sac
- **Jaguar Court** from Jaguar Path to Cul-De-Sac
- **Jalisco Way** from Upper 178th Street West to Jaguar Path
- **Jaguar Circle** from Jaguar Path to Cul-De-Sac
- **Jacquard Path** from Jaguar Path to 275 feet North of Tank Structure
- **Ingrid Court** from Jaguar Path to Cul-De-Sac
- **Jasmine Court** from Jaguar Path to Cul-De-Sac
- **Upper 178th Street West** from Jaguar Path to Jaguar Path
- **Javelin Court** from Upper 178th Street West to Cul-De-Sac
- **Jasper Court** from Upper 178th Street West to Cul-De-Sac
- **Jamaica Circle** from Upper 178th Street West to Cul-De-Sac
- **Jalisco Court** from Upper 178th Street West to Jaguar Path
- **178th Street West** from Jaguar Path to Ipava Avenue
- **Ixonia Avenue** from 175th Street West to the End of the Roadway (0.5 Mile)
- **Italy Path** from 175th Street West to Ixonia Avenue
- **Isleton Avenue** from 175th Street West to 178th Street West
- **176th Court West** from Jaguar Path to Cul-De-Sac
- **Irons Court** from 178th Street West to Cul-De-Sac



- **Isle Avenue** from Italy Path to 178th Street West
- **Isleton Court** from Iselton Avenue to Cul-De-Sac
- **Italy Court** from Italy Path to Cul-De-Sac
- **Iten Court** North and South of 178th Street West to Cul-De-Sacs
- **177th Circle West** from Ixonia Avenue to Cul-De-Sac
- **176th Circle** from Ixonia Avenue to Cul-De-Sac

It is anticipated that the majority of the work will consist of mill and overlay treatments with the potential for full depth mill (FDM).

The roadways included within this project scope, with the notable exception to Kenrick Avenue, generally appear to be classified as local residential roadways with an Average Annual Daily Traffic (AADT) of less than 600 vehicles per day. Kenrick Avenue, based on MnDOT's Traffic Mapping Application, is classified as an Urban Major Collector and has a most recent AADT of 9490 (2022).

Figure 1-1 through Figure 1-6 below show an illustration of the existing roadway alignments.



Figure 1-1. Existing roadway layout showing Kenrick Avenue (pink).

Figure taken from Google Earth.



Figure 1-2. Existing roadway layout showing Junelle Path (light blue)
Figure taken from Google Earth

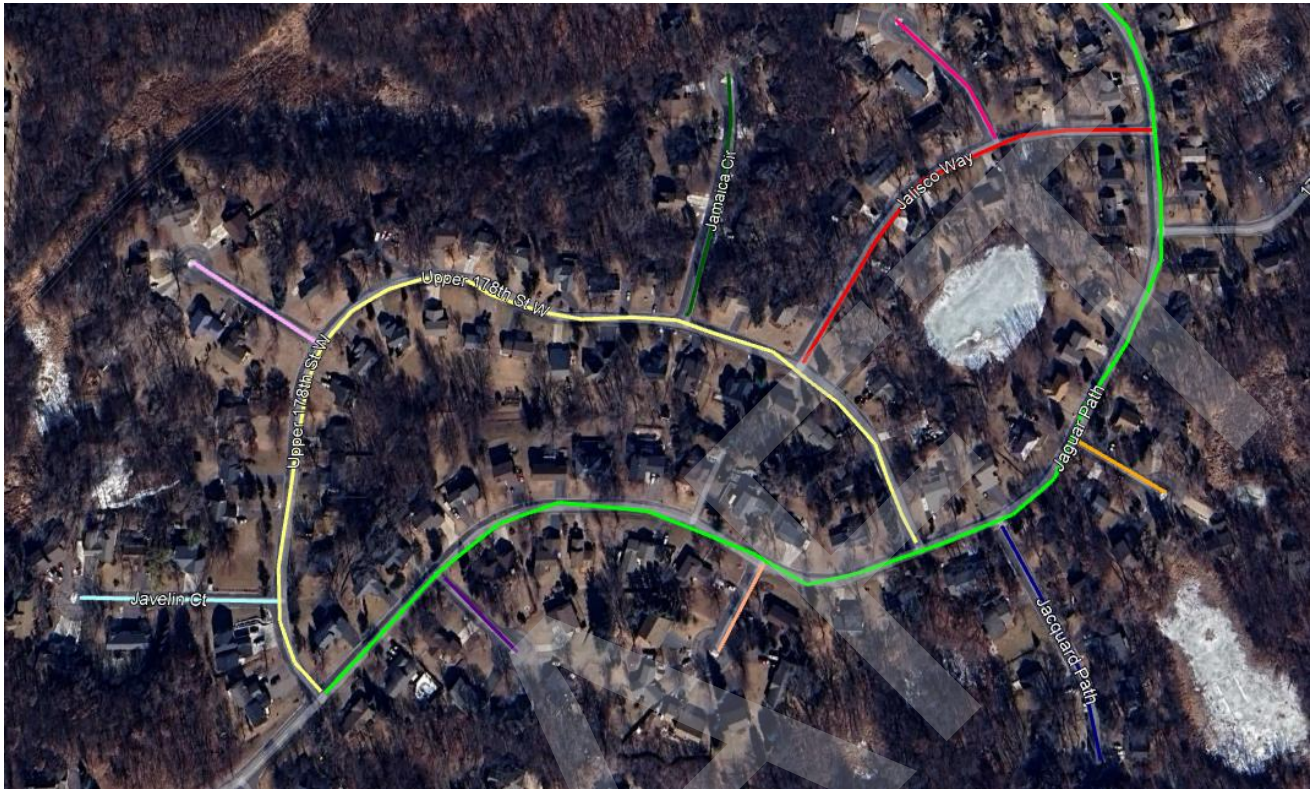


Figure 1-3. Existing roadway layout showing Javelin Court (light blue), Jasper Court (light pink), Upper 178th Street West (yellow), Jamaica Circle (dark green), Jalisco Way (red), Jalisco Court (pink), Jaguar Path (green), Jaguar Circle (dark yellow), Jacquard Path (blue), Ingrid Court (orange), and Jasmine Court (purple)

Figure taken from Google Earth



Figure 1-4. Existing roadway layout showing Jaguar Path (green), Jasmine Avenue (yellow), 176th Street West (brown), and Jaguar Court (light purple)

Figure taken from Google Earth.

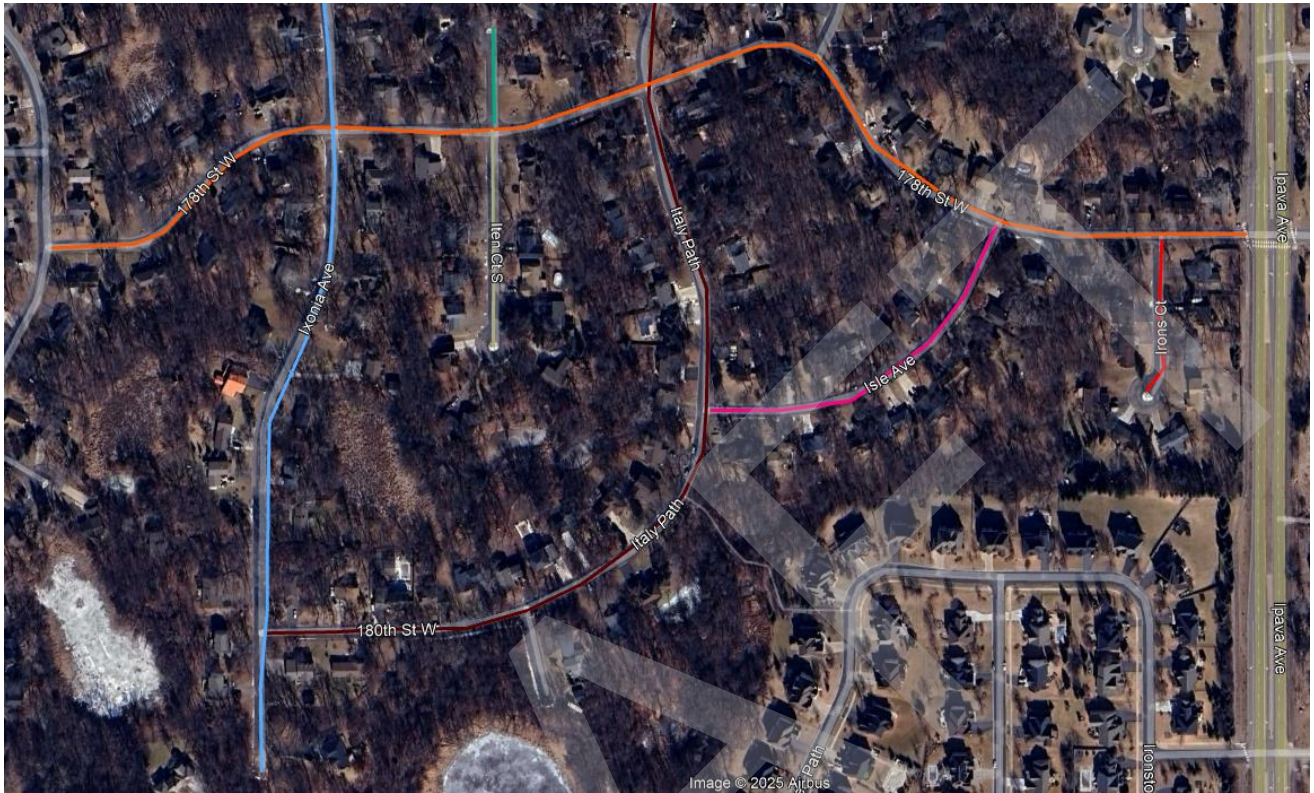


Figure 1-5. Existing roadway layout showing 178th Street West (orange), Ixonia Avenue (blue), Iten Court North (green), Iten Court South (light green), Italy Path (brown), Isle Avenue (pink), and Irons Court (red)
Figure taken from Google Earth.

DR



Figure 1-6. Existing roadway layout showing 176th Circle (purple), Ixonia Ave (light blue), 177th Circle West (dark pink), Italy Path (brown), Italy Court (light purple), Isleton Avenue (light green), Isleton Court (light pink), and 176th Court West (red)

Figure taken from Google Earth.

1.2 Site Conditions

A majority of the roadways are generally classified as low volume residential roadways, with the exception of Kenrick Avenue, which is generally classified as an Urban Major Collector. All roadways included within this project are bituminous. We understand that these roadways are currently maintained under the existing City of Lakeville Street maintenance program.

1.3 Purpose

The purpose of the geotechnical services was to characterize existing pavement conditions throughout the proposed corridors and provide geotechnical recommendations for use in the design and rehabilitation of the above outlined roadways.

1.4 Background Information and Reference Documents

We reviewed the City of Lakeville 26-02 Project Map, provided by the City of Lakeville (undated). In addition, we have used several publicly available sources of information including topography maps obtained from the



Minnesota Department of Natural Resources (MnTOPO website), MnDOT Traffic Mapping Application, and Google Earth aerial photographs.

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.

1.5 Scope of Services

We performed our scope of services for the project in accordance with our Proposal for a Geotechnical Evaluation (QTB217249), dated June 30, 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 the exploration location of underground utilities. We coordinated with the City of Lakeville to select the exploration locations and we staked the finalized exploration locations. We acquired the surface elevations and locations with GPS technology using the State of Minnesota's permanent GPS base station network. The Boring and Coring Location sketch included in the Appendix illustrates the approximate locations of the soil borings and pavement cores.
- Performing Ground Penetrating Radar (GPR) scans in both travel directions along the length of each roadway included in this project.
- Performing 13 standard penetration test (SPT) borings, denoted as ST-1 to ST-13, to nominal depths of 5 to 15 feet below grade across the project site.
- Performing 73 pavement cores and shallow power auger borings (C-1 through C-73) along the project alignment.
- Performing 20 companion pavement cores, designated as C-9a, C-11a, C-13a, C-16a, C-19a, C-24a, C-27a, C-29a, C-35a, C-39a, C-42a, C-46a, C-48a, C-50A, C-55A, C-59A, C-63A, C-64A, C-67a, and C-70a closer to the curblin of the roadway to evaluate pavement thickness consistency across the roadway profile. At these companion locations, only the bituminous thickness was measured.
- 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 rehabilitation of existing pavements.

Our scope of services did not include environmental services or testing and our geotechnical personnel performing this evaluation are not trained to provide environmental services or testing. We can provide environmental services or testing at your request.



2.0 Results

2.1 Geologic Overview

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. We did not perform a detailed investigation of the geologic history for the site.

2.2 Coring Results

Table 2-1 provides a summary of the soil boring results, in the general order we encountered the strata. Our field staff appeared to observe thick sections of aggregate in some of the core holes. It can be difficult to discern the difference between aggregate base and compacted subbase material that contains gravel, therefore the actual aggregate thickness could be less than that reported below.

Table 2-1. Subsurface Profile Summary

Core Number	Associated Roadway	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)	Subgrade Soils	Pavement Core Conditions
C-1	Kendrick Avenue / 185 th Street West	6	9 1/4	SP	Good condition
C-2		7 3/4	10 1/4	SP	Good condition
C-3		7 1/2	10	SP	Good condition
C-4		4 3/4	19 1/4	SP	Good condition
C-5		5 1/4	8 3/4	SP	Debonded at 2" from the surface, some degradation at interface
C-6		4	10 1/4	SP	Good condition
C-7		3 3/4	8 1/4	SP	Good condition
C-8	Junelle Path	4 1/4" bituminous over 8 3/4" concrete	---	SP	Good condition
C-9		3 3/4" bituminous over 6 3/4" concrete	---	SP-SM	Good condition
C-9a		5	---	---	---
C-10*		3 1/2	13 1/2	SP-SM	Minor stripping



Core Number	Associated Roadway	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)	Subgrade Soils	Pavement Core Conditions
C-11		4" bituminous over 10" concrete	---	SP	Good condition
C-11a		4 3/4	---	---	Debonded at 2 1/2" from the surface
C-12	Jasmine Avenue	4 1/2	8 3/4	---	Good condition
C-13*	Jaguar Path	4 1/4	7 3/4+	---	Good condition
C-13a		3 3/4	---	---	Good condition
C-16*		3 1/2	18+	SM	Minor stripping
C-16a		4 3/4	---	---	Minor stripping
C-18		5 3/4	13	SC	Severe stripping and degradation, debonded at 1 1/2" from the surface
C-29		5	13	SC	Severe stripping, debonded at 2" from the surface
C-29a		3 1/4	---	---	Severe stripping, moderate raveling, debonded at 1 1/2" from the surface
C-33*		4	7+	SM	Minor stripping, debonded at 2" from the surface
C-35		2 3/4	20	---	Good condition
C-35a		3 1/4	---	---	Moderate stripping and degradation
C-38		3 3/4	14	SM	Moderate stripping
C-23		Upper 178 th Street West	3	17	SM
C-24*	4 1/4		17+	SM	Minor raveling, debonded at 1" from the surface, some degradation
C-24a	4 1/2		---	---	Minor stripping
C-26*	4		21+	---	Minor stripping, moderate surface raveling
C-27*	3 1/2		7+	SM	Moderate stripping, raveling
C-27a	3 3/4		---	---	Severe stripping and raveling, debonded at 2" from the surface
C-28	4 1/2		15	SM	Minor stripping
C-19*	Jalisco Way		3	18+	SP-SM
C-19a		3 1/2	---	---	Minor stripping



Core Number	Associated Roadway	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)	Subgrade Soils	Pavement Core Conditions	
C-21*		3 1/2	20+	SM	Good condition	
C-31*	Javelin Court	3 1/2	22+	SM	Good condition	
C-30*	Jasper Court	5	23+	SM	Minor stripping	
C-22*	Jamaica Circle	4 1/2	22+	SP-SM	Good condition	
C-25*		4	9+	SM	Good condition	
C-32 *	Jasmine Court	3 1/2	23+	SM	Minor stripping	
C-34	Ingrid Court	4 3/4	20	SC	Moderate stripping	
C-36*	Jacquard Path	4	7+	---	Good condition	
C-73		3 3/4	20	SM	Minor stripping	
C-37	Jaguar Circle	4	14	SC	Severe raveling	
C-20	Jalisco Court	4 1/4	19	SM	Good condition	
C-39	178 th Street West	4 1/4	17	SM	Moderate stripping	
C-39a		4 1/4	---	---	Minor stripping	
C-61		4 1/4	12	SM	Good condition	
C-62*		5 3/4	13+	---	Good condition	
C-63		6	12	SM	Minor stripping	
C-63a		5	---	---	Good condition	
C-64		5 3/4	10	SM	Good condition	
C-64a		5 3/4	---	---	Minor stripping	
C-65		4 1/2	20	SM	Debonded at 2" from the surface	
C-17*		Jaguar Court	4 3/4	19+	SM	Minor stripping
C-14*		176 th Street West	4 3/4	9 1/2+	---	Good condition
C-15*			5 1/2	12+	---	Moderate stripping, debonded at 1 1/2" from the surface
C-40		Ixonía Avenue	4 3/4	14 1/4	SM	Good condition
C-42	4 1/4		15	SM	Good condition	
C-42a	3 1/2		---	---	Good condition	
C-44*	4		24+	---	Good condition	
C-45	6 1/4		10 1/2	SM	Severe stripping and degradation, debonded at 4" from the surface	
C-46	4 1/2		15 1/2	SC	Minor stripping	
C-46a	5 1/4		---	---	Minor stripping	



Core Number	Associated Roadway	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)	Subgrade Soils	Pavement Core Conditions	
C-47*		4 1/4	9+	---	Moderate stripping	
C-43	177 th Circle West	3 3/4	12 1/4	SM	Good condition	
C-41	176 th Circle West	2 3/4	10 1/2	SM	Minor stripping	
C-57*	Iten Court South	4 3/4	16+	SM	Moderate raveling	
C-72*	Iten Court South	5 1/2	16+	SM	Minor stripping	
C-56	Iten Court North	6	16	SC	Minor stripping	
C-48	Italy Path	4 3/4	18	SM	Minor stripping	
C-48a		5	---	---	Minor stripping and raveling	
C-49		3 3/4	13	SC	Good condition	
C-50*		3 1/2	20+	SP-SM	Good condition	
C-50a		3 1/2	---	---	Good condition	
C-51*		3 1/2	11+	---	Good condition	
C-52		4 1/2	16	SM	Good condition	
C-53*		4 1/2	8+	---	Good condition	
C-55		3 3/4	8	SM	Good condition	
C-55a		3 1/2	---	---	Good condition	
C-58		5	10	SC	Moderate raveling	
C-59		Isle Avenue	4 3/4	14	SC	Good condition
C-59a		4 3/4	---	---	Good condition	
C-60	Irons Court	4 1/2	10	SC	Minor raveling	
C-54*	Italy Court	3 3/4	8 1/2+	---	Minor raveling	
C-66	Isleton Avenue	4 3/4	10	SM	Good condition	
C-67		4 1/2	14	SM	Minor raveling	
C-67a		5 1/2	---	---	Debonded at 2" from the surface	
C-68*		4 1/2	10+	---	Good condition	
C-69*	Isleton Court	4 1/4	16+	SM	Minor raveling	
C-70	176 th Court West	4" bituminous over 3" concrete	18	SC	Good condition	
C-70a		4	---	---	Minor raveling	



Core Number	Associated Roadway	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)	Subgrade Soils	Pavement Core Conditions
C-71		4 1/4" bituminous over 3" concrete	20	SP	Minor raveling

*Encountered refusal within apparent aggregate base.

2.3 Ground Penetrating Radar (GPR) Results

GPR was used to approximate pavement layer thicknesses along each of the roadways for this project. The data was collected at a nominal 1-foot interval in both directions of travel. Where “ground truth” (soil boring/coring) data was obtained, the interpreted layers from the GPR scan were compared directly to the measured thicknesses to validate the accuracy of the GPR analysis. It should be noted that significant ambient interference was observed throughout the project area.

Based on our analysis using the RADAN software program, [Table 2-2](#) provides the interpreted average pavement layer thicknesses and statistical data for the roadways in this project. The graphs in the Appendix show the interpreted layer depth per foot along the roadway. We recommend referring to these graphs to see how thicknesses vary.

Table 2-2. Statistics of GPR-Estimated Bituminous Pavement Thicknesses

Segment	Direction	Bituminous Thickness (inches)					Apparent Aggregate Base ² (inches)		
		Avg	Std Dev	Min ¹	Max	10th Pctl	Avg	Min ¹	Max
Kendrick Avenue / 185 th Street*	EB	5.7	1.4	3.3	13.0	4.2	---	---	---
	WB	5.8	1.7	1.5	12.7	4.1	---	---	---
Junelle Path	NB	4.1	1.0	2.5	7.7	3.2	5.1	1.2	10.2
	SB	3.9	1.1	2.3	8.9	2.9	4.7	1.1	10.3
Jasmine Avenue	EB	4.1	0.8	2.6	6.7	3.1	5.3	1.8	9.6
	WB	4.8	1.4	2.4	8.8	3.6	3.9	1.1	9.3
Jaguar Path	NB	3.3	0.7	0.8	6.4	2.5	5.3	0.8	14.7
	SB	3.3	0.6	1.7	6.7	2.7	4.6	0.9	9.5
176 th Street West	EB	3.8	0.5	2.0	7.2	3.1	4.5	0.9	10.2
	WB	4.0	0.5	2.2	5.9	3.4	4.2	1.1	8.2
Jaguar Court	EB	4.8	0.6	2.9	6.5	4.1	---	---	---
	WB	5.2	1.0	2.5	7.8	3.7	---	---	---
Jalisco Way	EB	3.3	0.5	2.0	5.2	2.7	4.1	1.7	9.5



Segment	Direction	Bituminous Thickness (inches)					Apparent Aggregate Base ² (inches)		
		Avg	Std Dev	Min ¹	Max	10th Pctl	Avg	Min ¹	Max
	WB	3.6	0.6	1.5	5.8	2.9	4.6	1.0	8.3
Jaguar Circle	EB	4.5	0.9	2.6	7.5	3.5	3.9	1.6	10.4
	WB	5.3	1.0	2.5	7.8	4.1	3.3	0.8	6.7
Jacquard Path	NB	3.4	0.6	1.9	5.8	2.6	3.1	0.8	7.2
	SB	4.1	0.7	2.3	6.6	3.3	3.0	0.3	6.5
Ingrid Court	NB	4.4	1.1	2.6	8.9	3.4	4.8	2.1	8.7
	SB	4.4	0.9	2.4	6.8	3.2	5.3	2.0	12.0
Jasmine Court	NB	3.6	0.6	2.4	6.0	2.9	4.2	1.0	7.4
	SB	4.5	0.9	2.5	8.9	3.2	3.2	0.9	8.6
Upper 178 th Street West	NB	3.5	0.7	0.9	6.2	2.7	4.8	1.0	9.0
	SB	3.3	0.7	1.3	6.2	2.6	4.7	0.5	9.8
Javelin Court	EB	3.9	0.9	2.2	7.0	2.8	4.4	1.2	6.6
	WB	4.3	0.7	2.6	7.3	3.6	4.0	0.7	8.6
Jasper Court	EB	4.3	0.8	2.2	6.3	3.4	4.3	1.3	10.6
	WB	4.2	0.8	2.2	7.4	3.1	3.9	1.3	9.7
Jamaica Circle	NB	3.8	0.9	2.3	7.9	3.0	9.0	5.9	15.0
	SB	4.3	0.7	2.6	6.8	3.5	8.8	4.9	13.2
Jalisco Court	NB	4.0	0.9	2.5	8.4	3.1	12.9	7.2	18.8
	SB	4.2	0.8	2.3	7.1	3.3	7.2	3.4	12.3
178 th Street West	EB	4.4	0.7	1.5	8.2	3.6	---	---	---
	WB	4.5	0.8	1.7	8.2	3.6	---	---	---
Ixonía Avenue*	NB	4.1	0.7	2.2	7.8	3.3	---	---	---
	SB	3.9	0.7	1.2	6.7	3.1	---	---	---
Italy Path*	NB	3.9	0.7	1.6	7.3	3.1	---	---	---
	SB	4.0	0.6	0.2	10.7	3.2	---	---	---
Isleton Avenue	NB	4.3	0.5	2.7	6.9	3.7	---	---	---
	SB	4.4	0.7	2.3	9.2	3.4	---	---	---
176 th Court West	NB	3.7	0.4	2.6	6.3	3.2	7.4	2.6	6.3
	SB	4	0.4	2.8	5.5	3.5	5.6	2.0	10.3
Irons Court	NB	4.4	0.7	2.6	7.0	3.5	---	---	---
	SB	4.7	0.7	2.8	7.4	4.0	---	---	---
Isle Avenue	NB	4.3	0.7	2.4	7.3	3.3	---	---	---
	SB	4.3	0.4	2.3	6.1	3.9	---	---	---
Isleton Court	EB	4.2	0.8	2.2	6.2	3.0	---	---	---
	WB	4.5	0.7	2.9	6.7	3.5	---	---	---
Italy Court	EB	4.4	0.5	3.3	6.9	3.8	7.4	4.4	12.0



Segment	Direction	Bituminous Thickness (inches)					Apparent Aggregate Base ² (inches)		
		Avg	Std Dev	Min ¹	Max	10th Pctl	Avg	Min ¹	Max
	WB	4.2	0.7	2.3	6.5	3.2	7.0	2.3	11.5
Iten Court South	NB	4.5	0.5	2.7	7.5	3.9	---	---	---
	SB	4.4	0.5	2.3	6.2	3.7	---	---	---
Iten Court North	NB	5.0	0.8	3.0	7.6	4.1	---	---	---
	SB	4.7	0.5	3.3	6.8	4.1	---	---	---
177 th Circle West	EB	4.1	0.4	2.9	6.0	3.5	---	---	---
	WB	4.4	0.6	2.5	6.6	3.6	---	---	---
176 th Circle	EB	4.8	0.9	3.2	8.1	3.7	---	---	---
	WB	4.1	1.0	2.6	7.4	3.2	---	---	---

1. Minimum values can be extreme outliers resulting from noise and other erroneous readings. We recommend using 10th percentile values and consulting the graphics attached to this report.

2. Apparent aggregate base was not observed continuously throughout the scanned road profile. Values provided in this table are based on very limited data and may not be representative of actual conditions.

*Aggregate base statistics were not included due to limited sample size of data available.

Substantial ambient interference of the GPR signal made it difficult to interpret layer transitions below those of the bituminous layer. As such, a second layer (likely aggregate base) was not visible throughout large portions of the project alignment. In addition, a majority of the aggregate base thicknesses outlined in the above table generally indicated significantly thinner aggregate base sections than we observed in our pavement cores and soil borings. It is likely that this discrepancy is due to a combination of significant ambient signal interference, relative density of the existing aggregate base sections, and minimal material differences between the apparent aggregate base and underlying subgrade material. An increase in density of the apparent aggregate base section can increase the signals that are reflected just below the bituminous layer and therefore make it difficult to observe the true bottom of apparent aggregate base.

We included thickness data in [Table 2-1](#) in the limited areas which there was a discernable apparent aggregate base layer. A lack of a visible layer in the GPR scan does not imply an absence of one within the pavement section. Our cores suggested a probable aggregate base layer within the pavement section throughout all of the project areas.

2.4 Boring Results

[Table 2-3](#) 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.



Table 2-3. Subsurface Profile Summary*

Strata	Soil Type -USCS Classification	N-Values	Commentary and Details
Pavement section	---	---	<ul style="list-style-type: none"> See Table 2-1.
Fill ²	SM, CL, SC, ML	8 to 24	<ul style="list-style-type: none"> Encountered beneath the pavement surface in each boring and extended to depths ranging from approximately 4 1/2 to 14 1/2 feet below existing grade. Borings ST-2, ST-3, ST-4, ST-7, ST-9, ST-11 and ST-12 were terminated within the existing fill soils. Existing fill soils in Borings ST-2, ST-5, ST-6, ST-9, and ST-12 contained bituminous debris. Slightly organic layers were intermixed within fill soils in Borings ST-6 and ST-7. Generally ranged from light brown to black in color. Moisture conditions were generally moist.
Glacial deposits	SP (Outwash)	19 to 37	<ul style="list-style-type: none"> Encountered beneath the pavements and fill soils and extended to the termination depths of the borings. Predominantly consisted of silt and clay-laden soils with the exception of ST-13 where a layer of granular soils was encountered. Generally, trace amounts of gravel. Relative densities of the granular soils were generally medium dense to dense. Relative consistencies of the clay and silt laden soils were generally medium to very stiff with occasional zones of hard soils. Generally ranged from brown to gray in color. Moisture conditions were generally moist.
	SC, SM, CL (Till)	7 to 58	

¹We 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, and it should not be assumed it is suitable for reuse.

²For simplicity in this report, we define fill to mean existing, uncontrolled, or undocumented fill.

2.5 Groundwater

We did not observe groundwater while performing our borings. Given the generally encountered clay and silt laden soils, 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. Given our experience on other similar projects performed in the area, the project team should anticipate that perched groundwater may be encountered on site, although none was explicitly observed in our soil borings.



2.6 Laboratory Test Results

The boring logs show the results of laboratory testing we performed, next to the tested sample depth.

Moisture content tests performed on select soil samples indicated moisture contents ranging from 7 to 14 percent moisture by weight. Sieve analysis tests performed on select soil samples indicated from 30 to 77 percent particles, by weight, passing the No. 200 sieve. Organic content tests performed on select fill soil samples indicated organic contents ranging from 1 to 2 percent organic material by weight.

3.0 Recommendations

3.1 Design and Construction Discussion

3.1.1 Pavement Rehabilitation Approach

Based on the results of our pavement cores, soil borings, and ground penetrating radar (GPR) scans, the project roadways included in the City of Lakeville CP 26-02 as outlined in Section 1.1 are generally suitable for rehabilitation using Mill and Overlay Techniques. [Table 3-1](#) below outlines our recommended rehabilitation methods for each of the project roadways.

Table 3-1. Pavement Rehabilitation Approach

Roadway	Rehabilitation Recommendation
Kenrick Avenue / 185 th Street West	2 inch mill and overlay
Junelle Path*	1 1/2 inch mill and overlay
Jasmine Avenue	1 1/2inch mill and overlay
Jaguar Path*	1 1/2 inch mill and overlay
Upper 178 th Street	2 inch mill and overlay
Jalisco Way	1 1/2inch mill and overlay
Javelin Court	1 1/2 inch mill and overlay
Jasper Court	1 1/2inch mill and overlay
Jamaica Court	1 1/2inch mill and overlay
Jasmine Court	1 1/2inch mill and overlay
Ingrid Court	1 1/2inch mill and overlay
Jacquard Path	1 1/2inch mill and overlay
Jaguar Circle	1 1/2or 2 inch mill and overlay
Jalisco Court	1 1/2inch mill and overlay
178 th Street West	1 1/2inch mill and overlay
Jaguar Court	1 1/2or 2 inch mill and overlay



Roadway	Rehabilitation Recommendation
176 th Street West	1 1/2 inch mill and overlay
Ixonia Avenue*	1 1/2inch mill and overlay
177 th Circle West	1 1/2or 2 inch mill and overlay
176 th Circle	Full Depth Mill
Iten Court (South)	1 1/2 or 2 inch mill and overlay
Iten Court (North)	1 1/2 or 2 inch mill and overlay
Italy Path	1 1/2inch mill and overlay
Isle Avenue	1 1/2inch mill and overlay
Irons Court	1 1/2or 2 inch mill and overlay
Italy Court	1 1/2inch mill and overlay
Isleton Avenue	1 1/2inch mill and overlay
Isleton Court	1 1/2inch mill and overlay
176 th Court West	1 1/2inch mill and overlay

It should be noted that our recommended rehabilitation methods in the above table are based on the assumption that a minimum of 1 1/2 inches of bituminous pavement should be used as a base for milling operations. Areas which exhibit thinner than anticipated bituminous thicknesses may need to adjust milling depths to accommodate the thinner layers. The 10th percentile GPR data indicates that some of the project roadways may have less than 1 1/2 inches of bituminous pavement left following milling operations. Care should be taken along these roadways, including Junelle Path, Jaguar Path, Upper 178th Street, Jalisco Way Javelin Court, Jasmine Court, and Jacquard Path. Where we have provided multiple mill depth options, the project team should take this data into account.

Based on the core conditions and encountered bituminous thicknesses, Jaguar Circle, Jaguar Court, 177th Circle West, Iten Court (both north and south), and Irons Court are suitable for a 1 1/2 inch or 2 inch mill and overlay based on the City’s preference. The pavement in these areas is generally in reasonable to good condition with adequate thickness to facilitate mill and overlay operations for both provided mill depths based on pavement core and GPR data.

The existing conditions along Junelle Path, Jasmine Avenue, Jaguar Path, Jalisco Way, Javelin Court, Jasper Court, Jamaica Court, Jasmine Court, Ingrid Court, Jacquard Path, Jalisco Court, 178th Street West, 176th street West, Ixonia Avenue, Italy Path, Isle Avenue, Italy Court, Isleton Avenue, Iselton Court, and 176th Court West indicate that a 1 1/2 mill and overlay will be suitable for these locations.

The existing conditions at Kenrick Avenue/ 185th Street West and Upper 178th indicate a 2 inch mill and overlay is recommended at those locations.



It should be noted that we encountered debonding at the following core locations:

- **Kenrick Avenue**, Core C-5 at a depth of 2 inches
- **Junelle Path**, Core C-11A at a depth of 2 1/2 inches
- **Jaguar Path**, Cores C-18 and C-29 at a depth of 1 1/2 inches
- **Jaguar Path**, Core C-33 at a depth of 2 inches
- **Upper 178th Street West**, Core C-65 at a depth of 2 inches
- **176th Street West**, Core C-15 at a depth of 1 1/2 inches
- **Ixonia Avenue**, Core C-45 at a depth of 4 inches
- **Isleton Avenue**, Core C-67A at a depth of 2 inches

It should be noted that mill depths in these core areas (and other debonded areas not detected by cores) will likely need to be adjusted deeper during milling, as it will be especially important in these areas to make sure that the entire debonded layer is milled. It should be noted that C-45 along Ixonia Avenue indicated debonding at a depth of approximately 4 inches below existing grade. The project team should adjust the mill depth cautiously in this area, as it is likely that the debonded layer will vary from what we encountered in our pavement core. If the debonded layer gets shallower than 4 inches, we would recommend that the mill depth is adjusted to a full depth mill in order to remove the debonded layer entirely.

Due to the pavement conditions along 176th Circle, we recommend that a full depth mill is considered to accommodate the thinner pavement section that was encountered at this location. This will make sure that the same equipment used along adjacent roadways can be used along this stretch of roadway even with the existing poor pavement conditions. As previously noted, there is the potential that a full depth mill will also be needed near C-45 along Ixonia Avenue depending on the depth and extent of the debonded layer at this location.

A detailed evaluation of pavement surface conditions, which will influence the suitability and service life of the overlays, was outside of the scope of our evaluation. This will be the primary factor influencing the performance of the selected rehabilitation option. The risk and additional cost of repairs with additional milling and/or excavation to reach a suitable surface for overlay placement must also be considered. In general, this will include areas with surface distresses such as fatigue/alligator distress and edge cracks. We recommend further reviewing the condition data from the city's pavement management system for signs that these types of distresses are prevalent within the project area.

3.1.2 Rehydrated Concrete Considerations

During our exploration of the project areas, we encountered what appeared to be rehydrated concrete layers, both intact and decomposed, located directly below the bituminous layer along Junelle Path and 176th Court West. We are recommending that surficial bituminous pavement in these areas be rehabilitated using shallow mill and overlay techniques, so the rehydrated concrete layer will not be disturbed during



rehabilitation. The project team should be aware, however, that the potential presence of the more rigid rehydrated concrete layer directly below the bituminous layer has a higher probability of future reflective cracking within the new bituminous layer above, however reflective cracking is common in many overlay areas. If the project team wishes to prevent these additional reflective cracking, this rehydrated concrete layer should be removed and replaced with compacted aggregate base. Should it be left in place, additional maintenance efforts should be anticipated in this area.

3.2 Rehabilitation via Mill and Overlay

A detailed visual assessment of the pavement surface condition was not included in the scope of this evaluation. However, based on the completed pavement cores and hand auger borings performed along the roadways as outlined in Section 1.1, it appears that a majority of the project roadways are suitable for rehabilitation via mill and overlay techniques. We recommend an experienced engineer walk the milled surface to delineate areas for these repairs based on conditions exposed by the milling process.

As typical for an overlay, reflective cracking will occur quickly, and crack sealing and other maintenance will be necessary. We recommend a mill thickness of as outlined in Section 3.1.1, with the replacement mix meeting SPWEA340C. In roadways where multiple mill depths are provided, the final mill depth will be up to the City's preference, as both options are suitable based on the pavement samples we obtained. The thicker mill and overlay will generally provide a slightly longer lifespan with a generally higher initial cost. The mill and overlay should proceed in general accordance with MnDOT Specifications 2232 and 2360.

The surface condition prior to milling can also indicate where repairs may be necessary. This includes distresses such as severe longitudinal and transverse cracking, alligator/fatigue cracking of any severity, potholes, and other 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 or where traffic loads are concentrated.

4.0 Procedures

4.1 Penetration Test Borings

We drilled the penetration test borings with a truck-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at



2 1/2- or 5-foot intervals in general accordance with ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

4.2 Ground Penetrating Radar

4.2.1 GPR Data Collection

GPR data was collected in August of 2025. GPR collection occurred at posted speed limits and data was recorded continuously along each street (scan interval of 1-foot), in both directions of travel except for cul-de-sac sections. A calibration file, required for data post-processing, was collected at the onset of testing.

4.2.2 GPR Analysis

Data collected by the GPR unit was returned to our office and analyzed to estimate the pavement thickness using RADAN 7.0, a software package included with the GSSI RoadScan system. The software includes tools to delineate pavement layer transitions with thickness estimates based on measured signal time and amplitude.

Where “ground-truth” data (ores) 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, with adjustments if necessary to improve accuracy or data clarity.

4.3 Power Auger Borings

We obtained core samples of the pavement using a portable coring machine advancing a 4-inch diameter core barrel. Immediately after completing the coring, we repaired the bituminous pavement with a coldmix bituminous patch. We measured the cores to obtain approximate bituminous thickness and noted their material conditions based on visual observation. The Appendix includes images of the cores.

We performed the power auger borings using a truck mounted auger. We inferred the soil classifications and strata depths from the cuttings brought to the surface by dead pulling the auger after screwing it to selected depths in the ground. At desired depths, we placed auger cuttings in bags and jars.

4.4 Exploration Logs

4.4.1 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 and other in-situ 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.

4.4.2 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 and other in-situ testing 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 .

4.5 Material Classification and Testing

4.5.1 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.

4.5.2 Laboratory Testing

The exploration logs in the [Appendix](#) note the results of the laboratory tests performed on geologic material samples. We performed the tests in general accordance with ASTM procedures.

4.6 Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes noted on the boring logs.

5.0 Qualifications

5.1 Variations in Subsurface Conditions

5.1.1 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.

5.1.2 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.

5.2 Continuity of Professional Responsibility

5.2.1 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.

5.2.2 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.

5.3 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.

5.4 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

Soil Boring Location Sketch

Log of Boring Sheets ST-1 through ST-13

Core Photographs

GPR Scans

Descriptive Terminology of Soil



- Coring Location
- Boring Location



0 100 200'



SCALE: 1" = 200'

Source: Google Earth Imagery

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Project No:
B2506309

Drawing No:
Boring Coring Sketch

Drawn By: ZS
Date Drawn: 8/7/2025
Checked By: RSJ
Last Modified: 10/7/2025

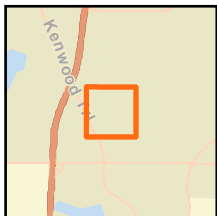
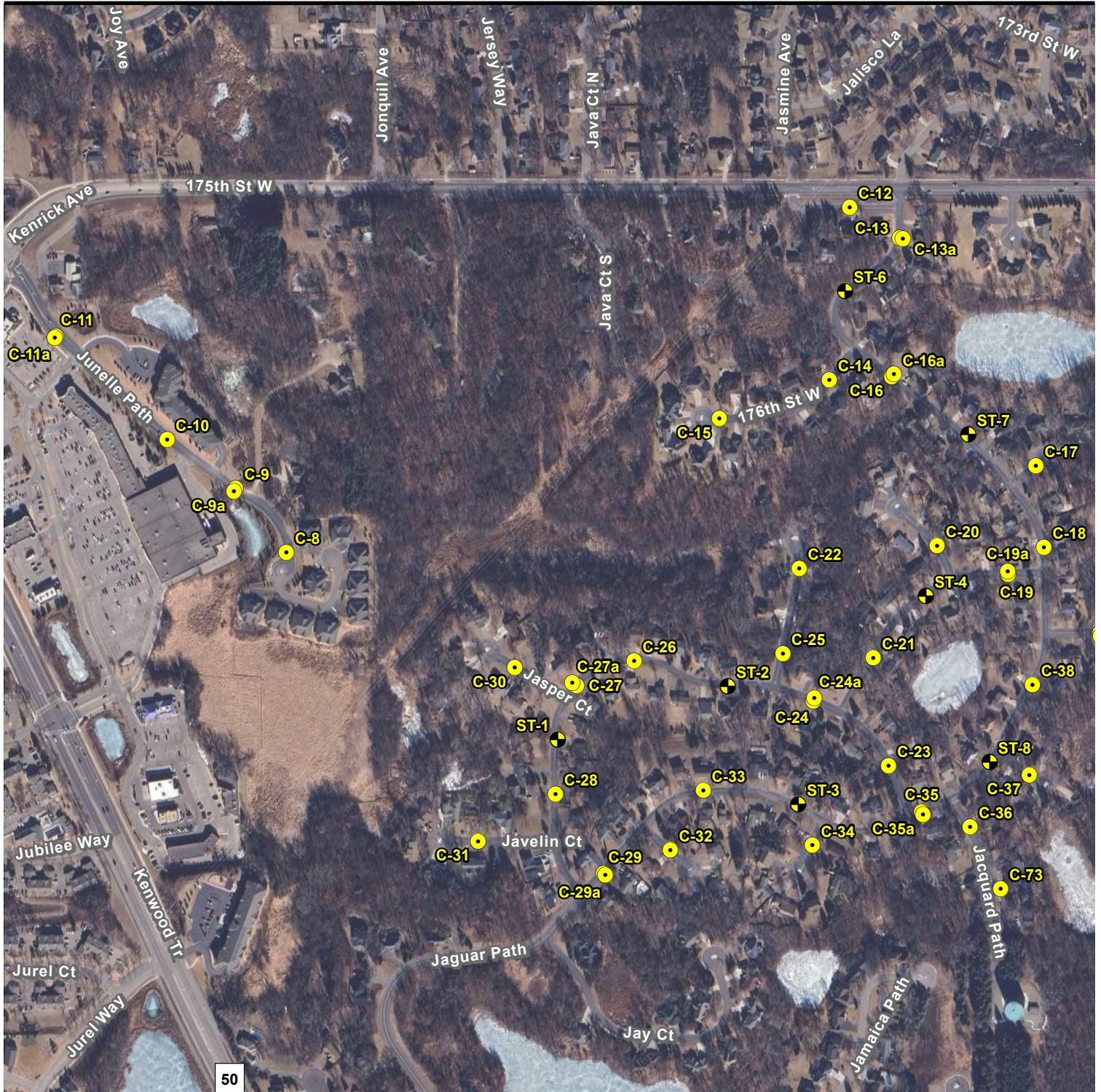
City of Lakeville Project 26-02 Street Rehabilitation

Various Streets

Lakeville, Minnesota

**Boring and Coring
Location Sketch**

Sheet:
1 of 3



- Coring Location
- Boring Location



0 250 500'



SCALE: 1" = 500'

Source: Google Earth Imagery

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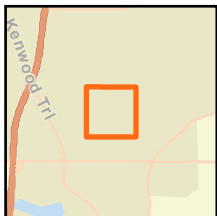
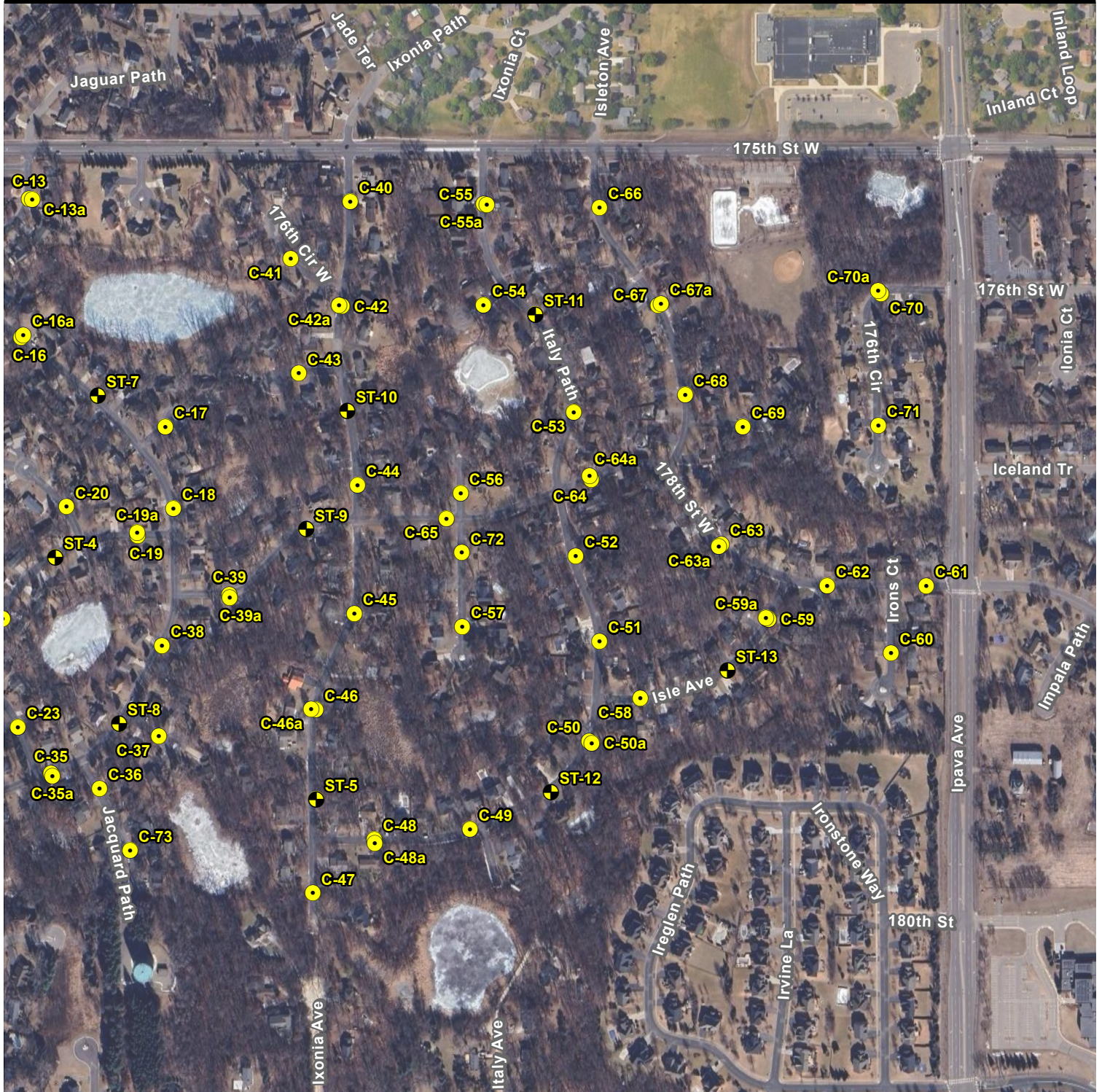
City of Lakeville Project 26-02 Street Rehabilitation

Various Streets

Lakeville, Minnesota

**Boring and Coring
Location Sketch**

Sheet:
2 of 3



- Coring Location
- Boring Location



0 250 500'



SCALE: 1" = 500'

Source: Google Earth Imagery

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Last Modified: 10/7/2025

City of Lakeville Project 26-02 Street Rehabilitation

Various Streets

Lakeville, Minnesota

**Boring and Coring
Location Sketch**

Sheet:
3 of 3

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-1	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 179646.6	EASTING: 510674.7
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1073.4 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1072.6		BITUMINOUS, 6 inches of bituminous over 3 1/2 inches of apparent aggregate base					
0.8		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, moist					
1071.4		FILL: CLAYEY SAND (SC), trace Gravel, brown, moist		5-6-6 (12) 14"		10	
2.0				5-6-8 (14) 12"			
			5				No recovery at 7 feet
				4-5-5 (10) 0"			
1063.9		SANDY LEAN CLAY (CL), trace Gravel, brown, moist, stiff (GLACIAL TILL)	10	6-4-6 (10) 14"			
1060.9		SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, moist, stiff (GLACIAL TILL)		4-5-5-7 (10) 14"			
1058.9		END OF BORING	15				Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-3	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 179414.7	EASTING: 511535.2
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1144.2 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1143.0		BITUMINOUS, 9 1/2 inches of bituminous over 6 inches of apparent aggregate base					
1.3 1142.2		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist					
2.0		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown, moist		5-6-6 (12) 14"		11	P200=55%
			5	6-8-8 (16) 14"			
1138.2 6.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.
			10				
			15				

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-4	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 180158.2	EASTING: 511991.8
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1130.6 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1129.3		BITUMINOUS, 6 inches of bituminous over 10 inches of apparent aggregate base					
1.3 1128.6		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, moist		5-5-7 (12) 14"		14	P200=77%
2.0		FILL: SANDY SILT (ML), CLAY layers, light brown, moist					
1126.1		FILL: SANDY LEAN CLAY (CL), SILT layers, light brown, moist	5	6-5-6 (11) 14"			
4.5							
1123.6		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, moist		5-6-8 (14) 18"		9	
7.0							
			10	22-8-9 (17) 0"			No recovery at 10 feet Drillers noted Gravel below 10 feet
							No recovery at 12 feet
				9-12-12-11 (24) 0"			
1116.1		END OF BORING					Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings	15				

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-5	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 179293.8	EASTING: 512924.0
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1127.9 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1126.9		BITUMINOUS, 7 inches of bituminous over 5 inches of apparent aggregate base					
1.0		FILL: SILTY SAND with GRAVEL (SM), fine to coarse-grained, bituminous debris, dark brown, moist		6-6-8 (14) 16"			
1125.9		FILL: CLAYEY SAND (SC), trace Gravel, brown, moist					
2.0			5	5-7-7 (14) 10"		13	
1120.9		CLAYEY SAND (SC), trace Gravel, brown, moist, stiff to very stiff (GLACIAL TILL)		7-6-7 (13) 14"			
7.0			10	8-5-8 (13) 0"			No recovery at 9 1/2 feet
				6-7-9-9 (16) 10"			
1113.4		END OF BORING	15				Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-6	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 181250.9	EASTING: 511702.6
DRILLER: J. Vloo	LOGGED BY: R. Jett	START DATE: 08/19/25	END DATE: 08/19/25		
SURFACE ELEVATION: 1116.6 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1115.5		BITUMINOUS, 7 inches of bituminous over 6 inches of apparent aggregate base					
1.1		FILL: SILTY SAND (SM), fine to coarse-grained, little Gravel, bituminous debris, dark brown, moist		7-8-8 (16) 14"			
1114.6		FILL: CLAYEY SAND (SC), trace Gravel, dark brown, moist					
2.0							
1112.1		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, slightly organic, CLAY layers, dark brown to black, moist	5	8-11-12 (23) 14"		11	OC=2%
4.5				6-5-6 (11) 12"			
1107.1		SANDY LEAN CLAY (CL), trace Gravel, gray to dark brown, moist, medium (GLACIAL TILL)	10	4-3-4 (7) 14"		17	
9.5				3-5-5-6 (10) 16"			
1104.1							
12.5							
1102.1		END OF BORING	15				Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-7	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 180736.2	EASTING: 512143.9
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1122.6 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1121.4		BITUMINOUS, 8 inches of bituminous over 6 inches of apparent aggregate base					
1.2		FILL: SILTY SAND with GRAVEL (SM), fine to coarse-grained, bituminous debris, dark brown, moist		6-5-6 (11) 14"		12	OC=2%
1120.6		FILL: SANDY LEAN CLAY (CL), trace Gravel, slightly organic, gray to dark brown, moist		6-7-9 (16) 14"			
2.0							
			5				
1116.6		END OF BORING					Water not observed while drilling.
6.0		Boring then backfilled with auger cuttings					
			10				
			15				

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-8	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 179564.2	EASTING: 512219.6
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1131.7 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1130.1		BITUMINOUS, 9 inches of bituminous over 10 1/2 inches of apparent aggregate base					
1.6		FILL: CLAYEY SAND (SC), trace Gravel, slightly organic, dark brown, moist		8-5-5 (10) 14"			
1127.2		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, slightly organic, dark gray to dark brown, moist	5	8-6-10 (16) 14"		10	OC=1%
				6-5-3 (8) 0"			No recovery at 7 feet
1122.2		SANDY LEAN CLAY (CL), SILT layers, gray, moist, very stiff (GLACIAL TILL)	10	5-7-11 (18) 16"			
1119.2		CLAYEY SAND (SC), trace Gravel, brown, moist, very stiff (GLACIAL TILL)		7-10-12-12 (22) 16"			
1117.2		END OF BORING	15				Water not observed while drilling.
		Boring then backfilled with auger cuttings					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-9	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 180257.9	EASTING: 512888.6
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/19/25	END DATE: 08/19/25	
SURFACE ELEVATION: 1119.5 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1118.3		BITUMINOUS, 6 inches of bituminous over 9 inches of apparent aggregate base					
1.3 1117.5		FILL: SILTY SAND with GRAVEL (SM), fine to coarse-grained, bituminous debris, dark brown, moist		3-3-5 (8) 10"		12	P200=58%
2.0		FILL: SANDY SILT (ML), trace Gravel, light brown, moist					
1115.0		FILL: SANDY LEAN CLAY (CL), SANDY SILT layers, brown, moist	5	5-4-4 (8) 14"			
4.5							
1113.5		END OF BORING					Water not observed while drilling.
6.0		Boring then backfilled with auger cuttings					
			10				
			15				

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-10	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 180681.2	EASTING: 513035.1
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/20/25	END DATE: 08/20/25	
SURFACE ELEVATION: 1110.6 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1109.1		BITUMINOUS, 7 inches of bituminous over 12 inches of apparent aggregate base					
1.6		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, CLAY layers, brown, moist		3-5-5 (10) 12"		7	
			5	4-5-4 (9) 6"			
				3-5-6 (11) 12"			
1101.1		SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, moist, very stiff (GLACIAL TILL)	10	10-11-13 (24) 14"			
				17-28-30-33 (58) 0"			No recovery at 12 feet
1096.1		END OF BORING	15				Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-11	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 181025.9	EASTING: 513707.2
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/20/25	END DATE: 08/20/25	
SURFACE ELEVATION: 1096.7 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1094.8		BITUMINOUS, 8 inches of bituminous over 15 inches of apparent aggregate base					
1.9		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist		8-5-8 (13) 10"		7	
1090.7			5	7-8-10 (18) 10"			
6.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.
			10				
			15				

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2506309				BORING: ST-13	
Geotechnical Evaluation				LOCATION: Captured with RTK GPS.	
City of Lakeville Project 26-02 Street Rehabilitation				DATUM: NAD 1983 HARN Adj MN Dakota (US Feet)	
Lakeville, Minnesota				NORTHING: 179753.6	EASTING: 514393.5
DRILLER: J. Vloo	LOGGED BY: R. Jett		START DATE: 08/20/25	END DATE: 08/20/25	
SURFACE ELEVATION: 1116.8 ft	RIG: 7519	METHOD: 3 1/4" HSA	SURFACING: Bituminous	WEATHER:	

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
1115.6		BITUMINOUS, 7 inches of bituminous over 9 inches of apparent aggregate base					
1.3		FILL: CLAYEY SAND (SC), trace Gravel, brown, moist		4-6-6 (12) 10"		13	
1112.3		SILTY SAND (SM), fine to medium-grained, trace Gravel, light brown, moist, very stiff (GLACIAL TILL)	5	5-7-10 (17) 14"			
1109.8		CLAYEY SAND (SC), trace Gravel, light brown, moist, very stiff (GLACIAL TILL)		7-7-8 (15) 14"		12	
1107.3		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, light brown, moist, medium dense to dense (GLACIAL OUTWASH)	10	17-11-8 (19) 14"			
				11-18-19-14 (37) 16"			
1102.3		END OF BORING	15				Water not observed while drilling.
14.5		Boring then backfilled with auger cuttings					

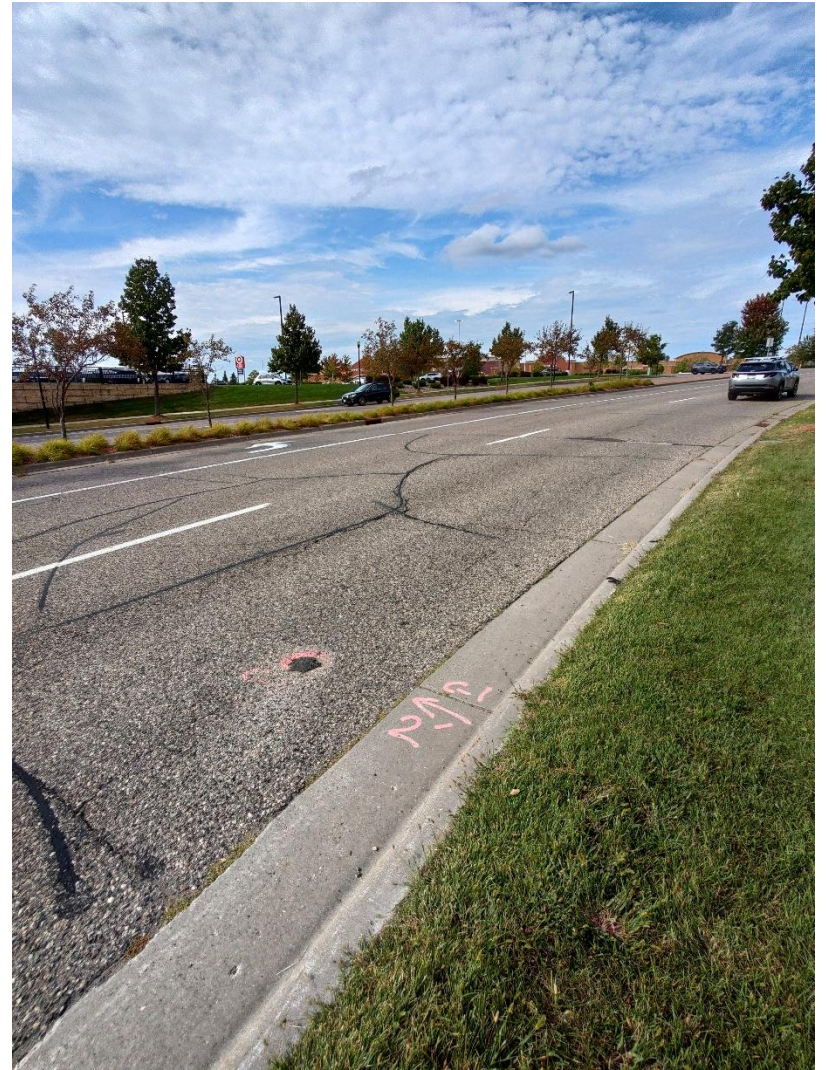


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City of Lakeville
Project 26-02

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C-1



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Project 26-02

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C-1
Surface



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City of Lakeville
Project 26-02

B2506309

C-2



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City of Lakeville
Project 26-02

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C-2
Surface



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City of Lakeville
Project 26-02

B2506309

C-3

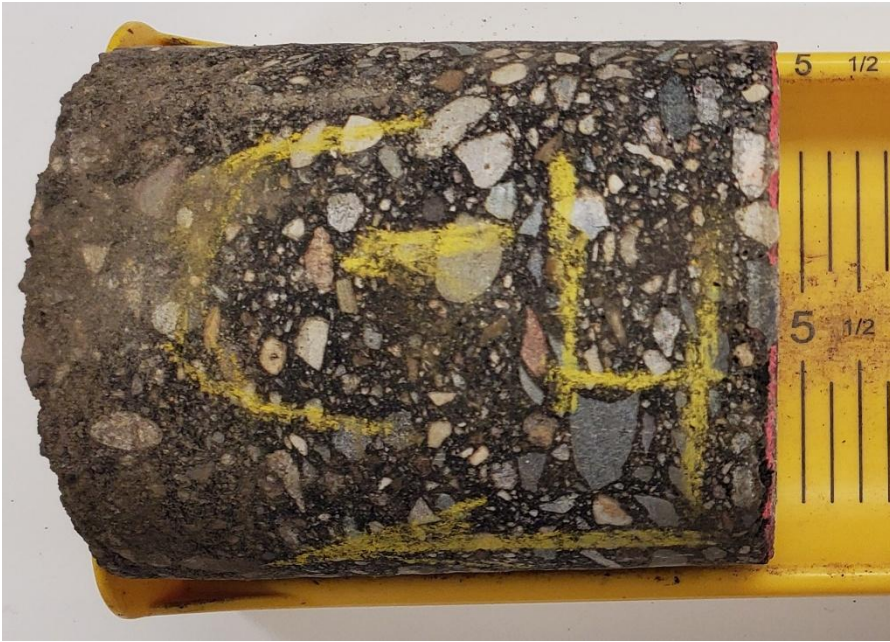


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City of Lakeville
Project 26-02

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C-3
Surface



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City of Lakeville
Project 26-02

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C-4



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City of Lakeville
Project 26-02

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C-4
Surface



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City of Lakeville
Project 26-02

B2506309

C-5



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Project 26-02

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C-5
Surface



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City of Lakeville
Project 26-02

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C-6

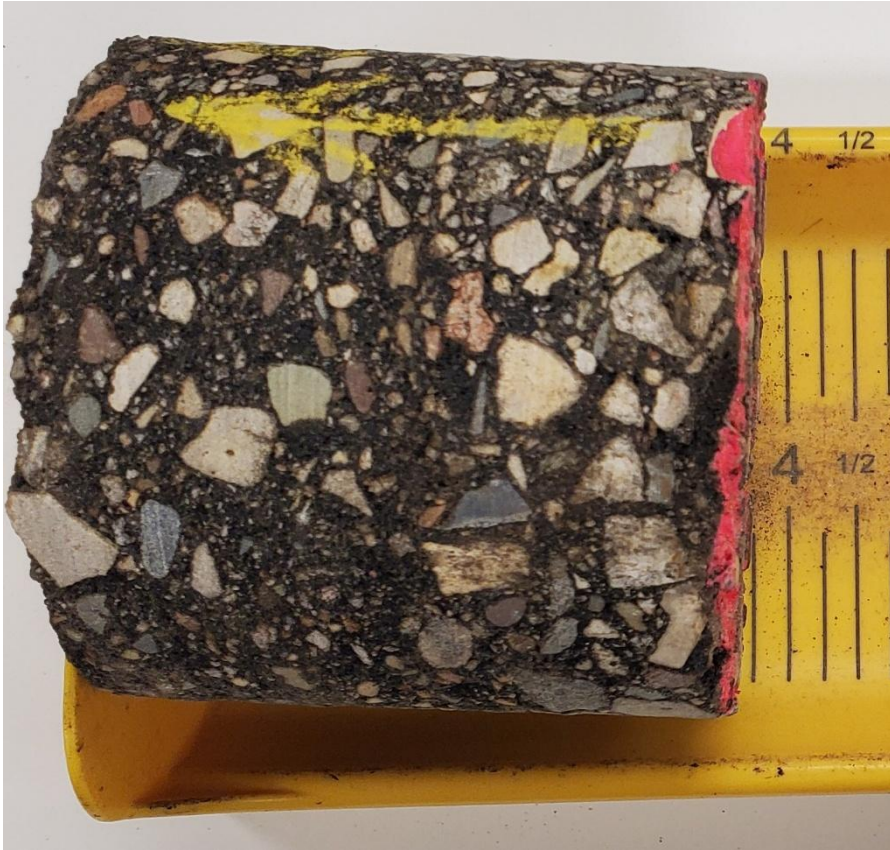


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Project 26-02

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C-6
Surface



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Project 26-02

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C-7



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City of Lakeville
Project 26-02

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C-7
Surface

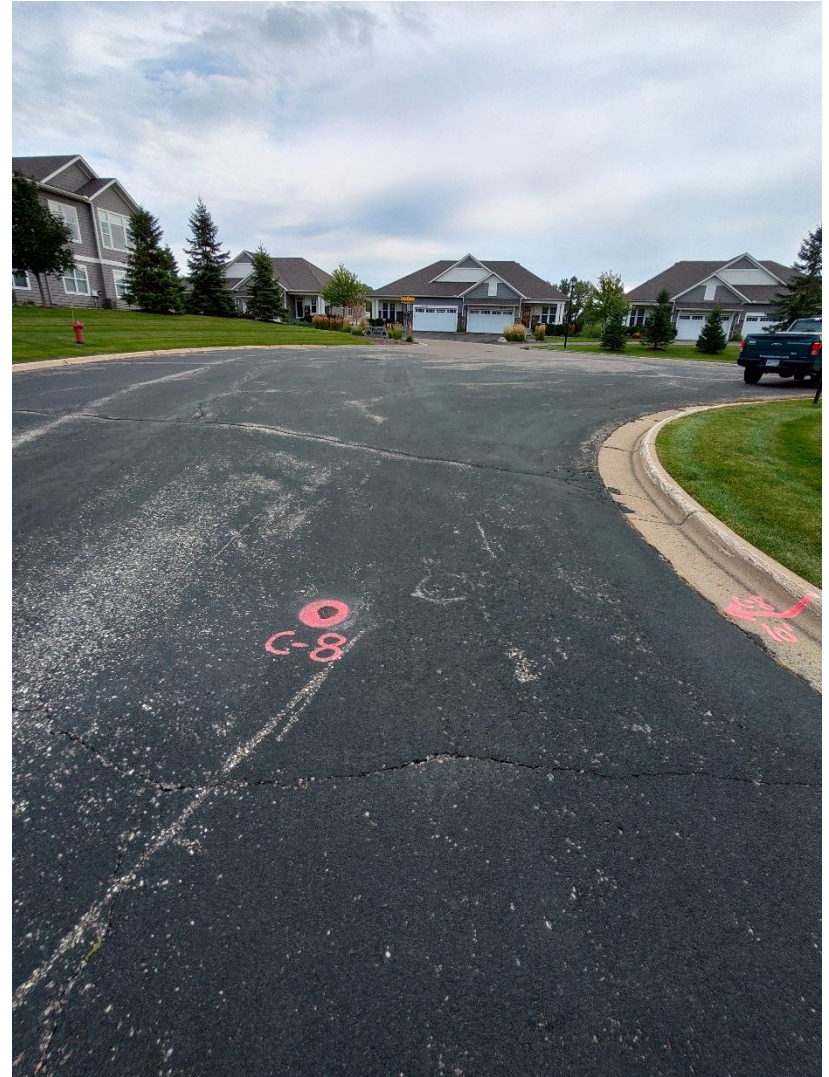


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City of Lakeville
Project 26-02

B2506309

C-8



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City of Lakeville
Project 26-02

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C-8
Surface



BRAUN
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City of Lakeville
Project 26-02

B2506309

C-9

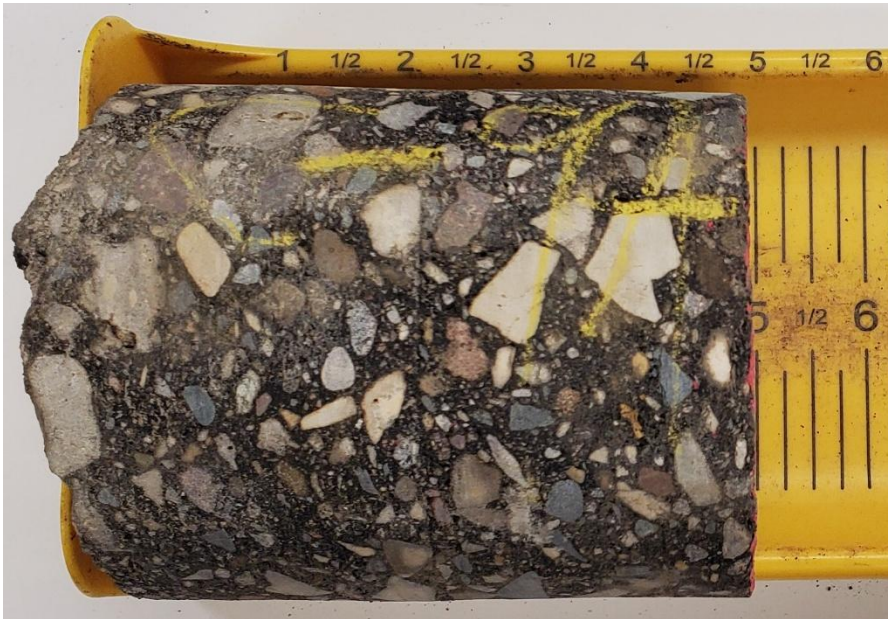


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City of Lakeville
Project 26-02

B2506309

C-9
Surface



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City of Lakeville
Project 26-02

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C-9A

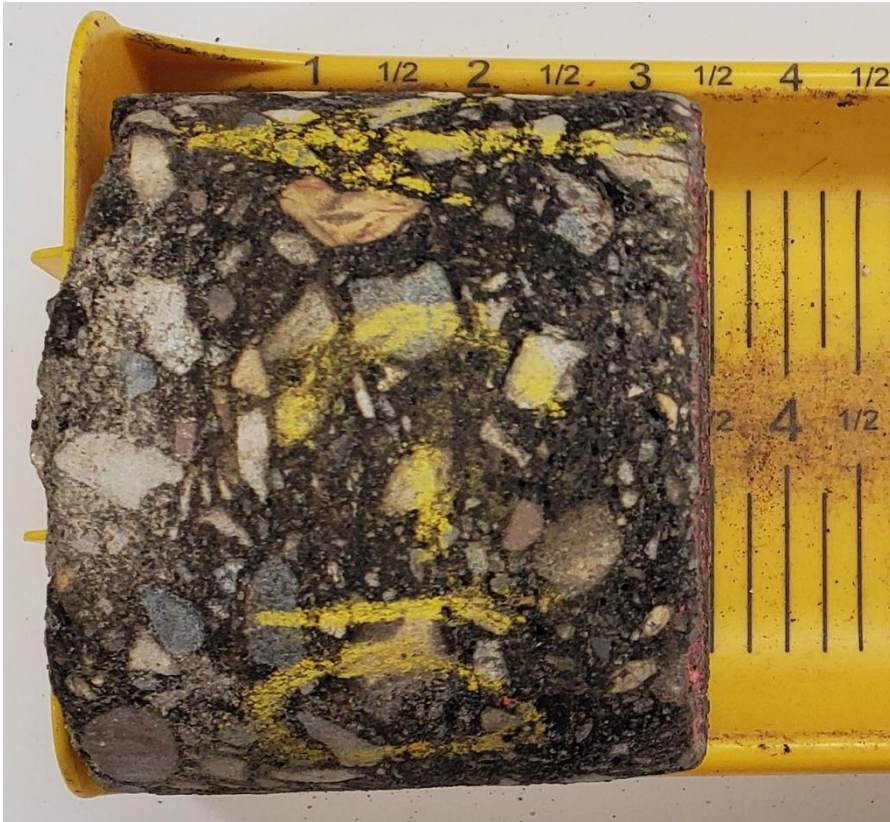


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City of Lakeville
Project 26-02

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C-9A
Surface



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City of Lakeville
Project 26-02

B2506309

C-10

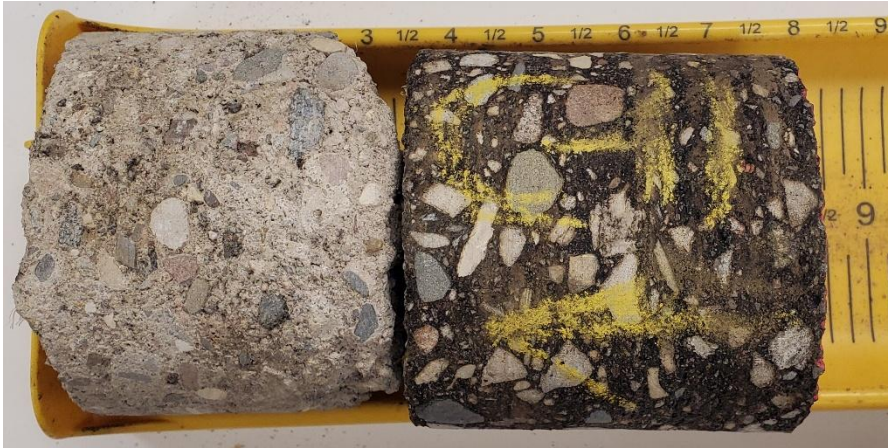


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City of Lakeville
Project 26-02

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C-10
Surface



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City of Lakeville
Project 26-02

B2506309

C-11



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City of Lakeville
Project 26-02

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C-11
Surface



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City of Lakeville
Project 26-02

B2506309

C-11A



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City of Lakeville
Project 26-02

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C-11A
Surface

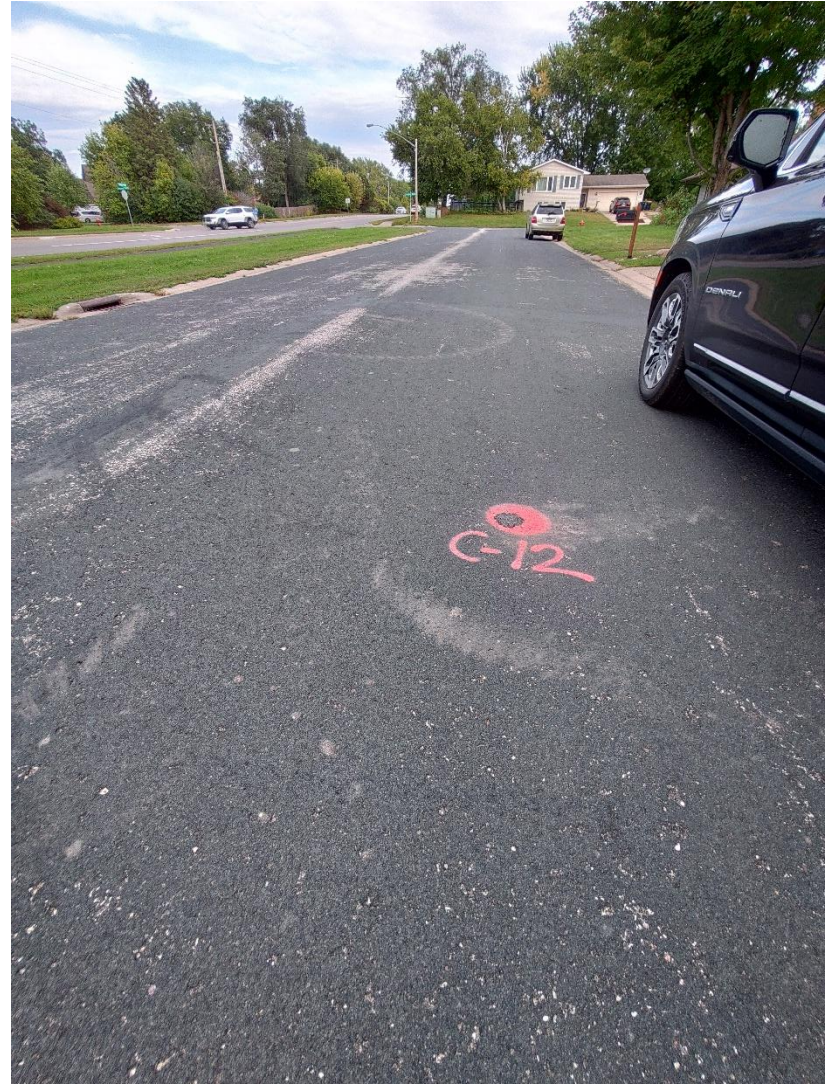


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City of Lakeville
Project 26-02

B2506309

C-12



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INTERTEC

City of Lakeville
Project 26-02

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C-12
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-13

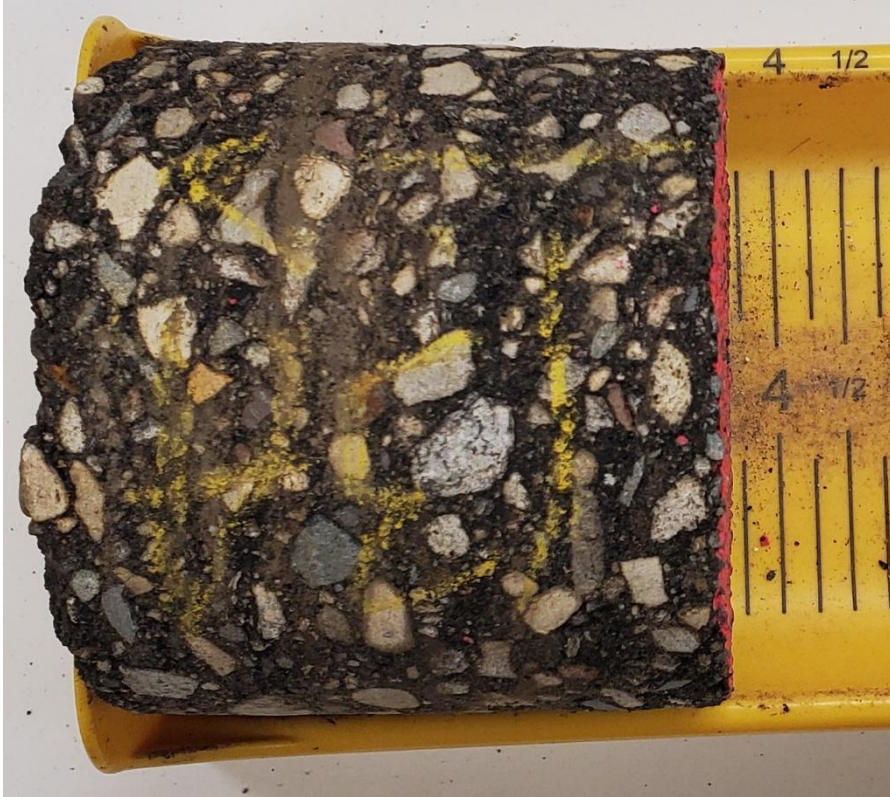


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City of Lakeville
Project 26-02

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C-13
Surface



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City of Lakeville
Project 26-02

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C-13A



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INTERTEC

City of Lakeville
Project 26-02

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C-13A
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-14



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-14
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-15



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-15
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-16



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-16
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-16A



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C16A



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-17



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-17
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-18

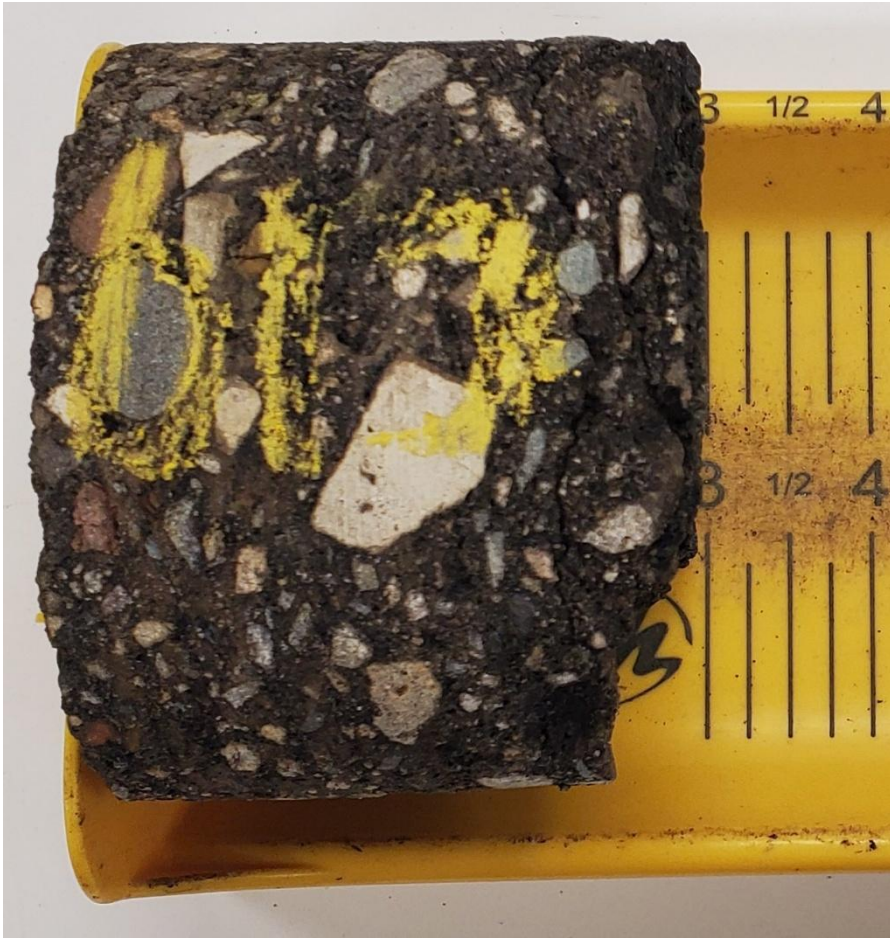


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-18
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-19



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-19
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-19A



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-19A
Surface



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INTERTEC

City of Lakeville
Project 26-02

B2506309

C-20

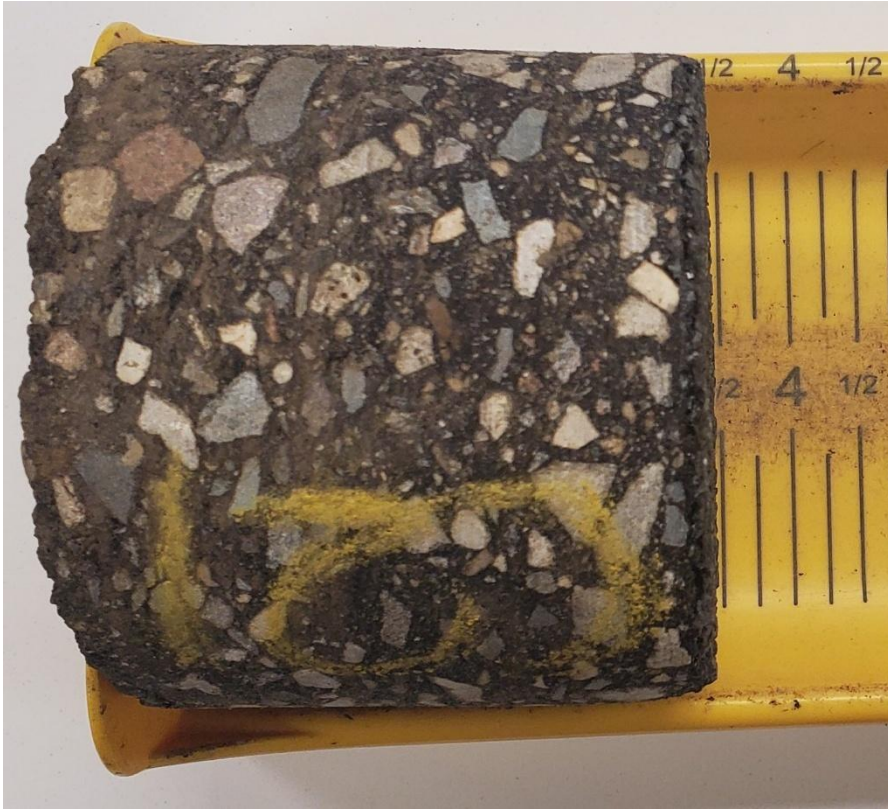


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City of Lakeville
Project 26-02

B2506309

C-20
Surface



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City of Lakeville
Project 26-02

B2506309

C-21



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-21
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-22

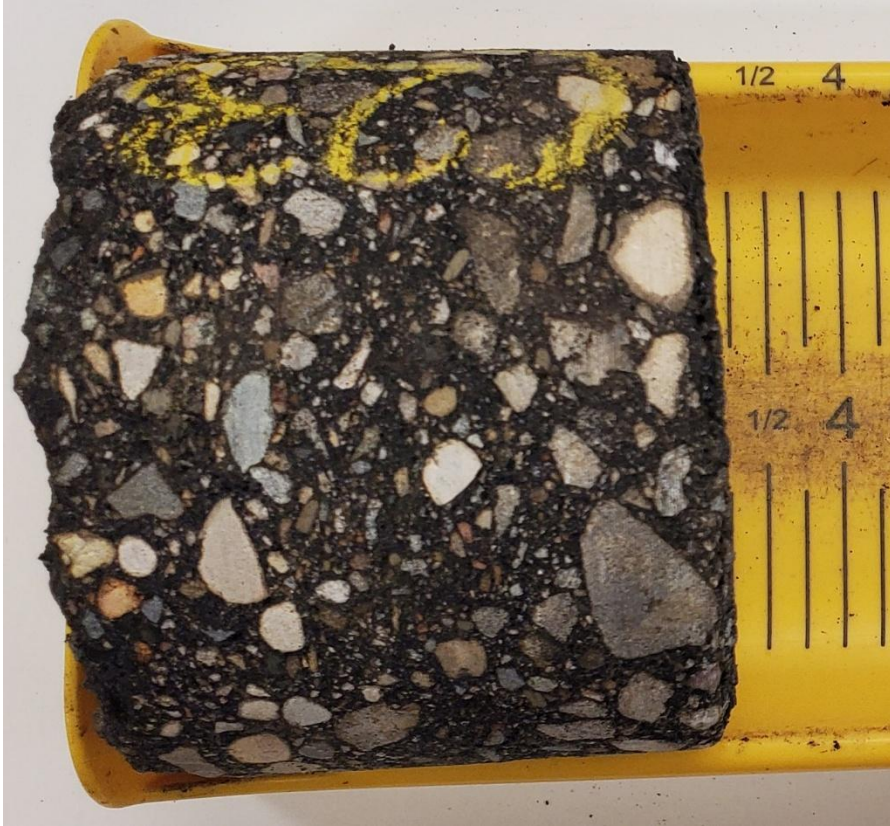


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-22
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-23



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-23



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-24



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-24
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-24A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-24A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-25



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-25



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-26



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-26



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-27



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-27
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-27A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-27A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-28



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-28
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-29



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-29
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-29A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-29A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-30



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-30
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-31

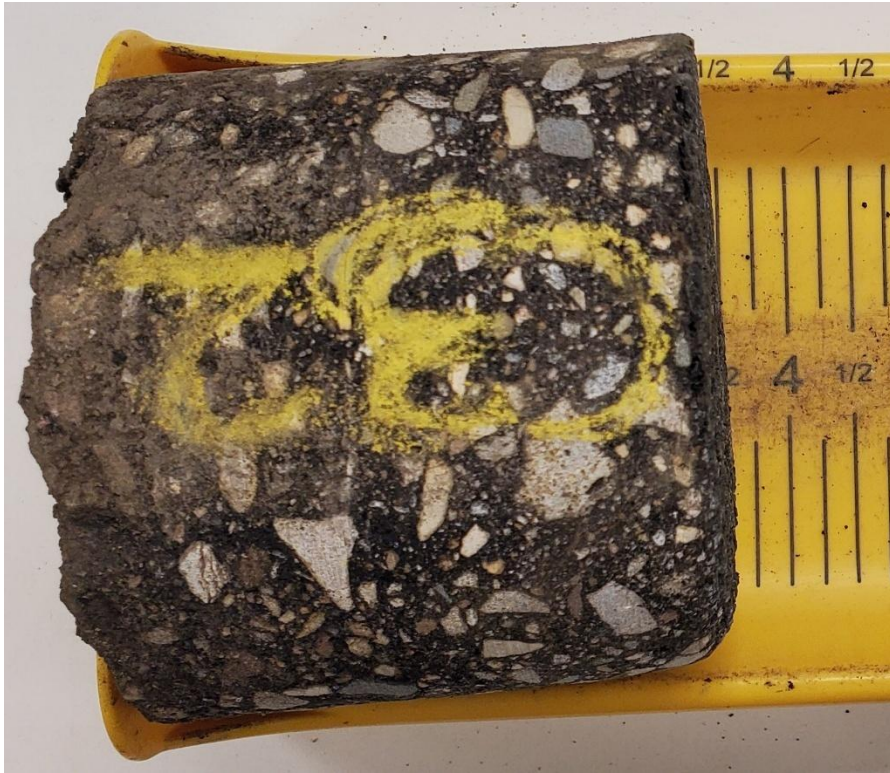


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-31
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-32



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-32
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-33



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-33
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-34



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-34
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-35



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-47
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-35A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-35A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-36



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-36
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-37

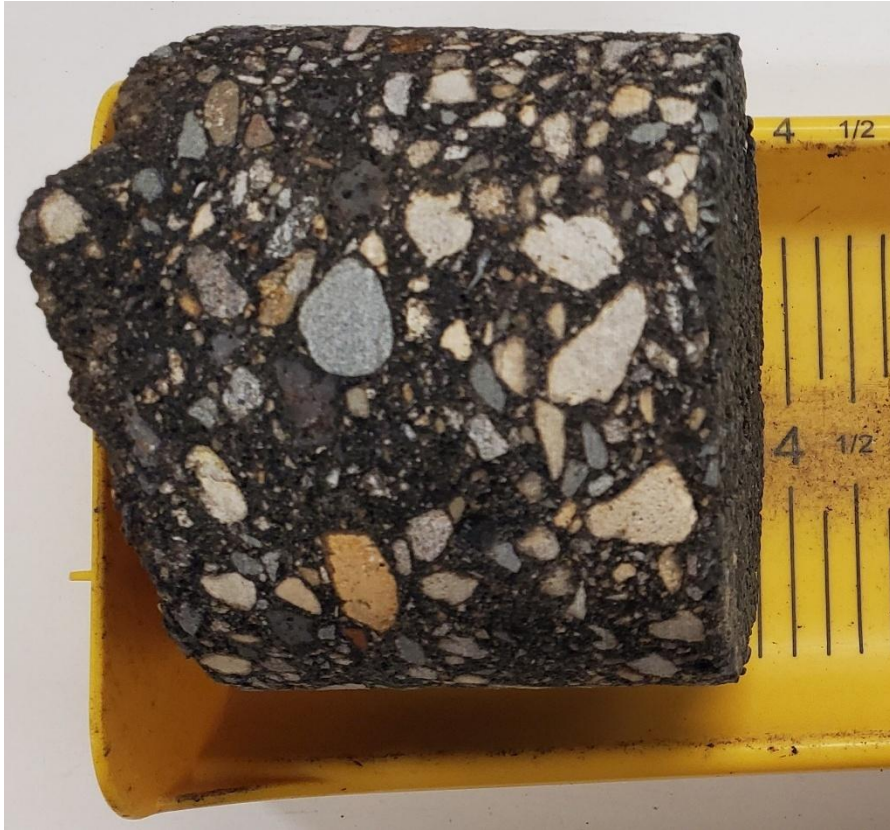


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-37
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-38



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-38
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-39

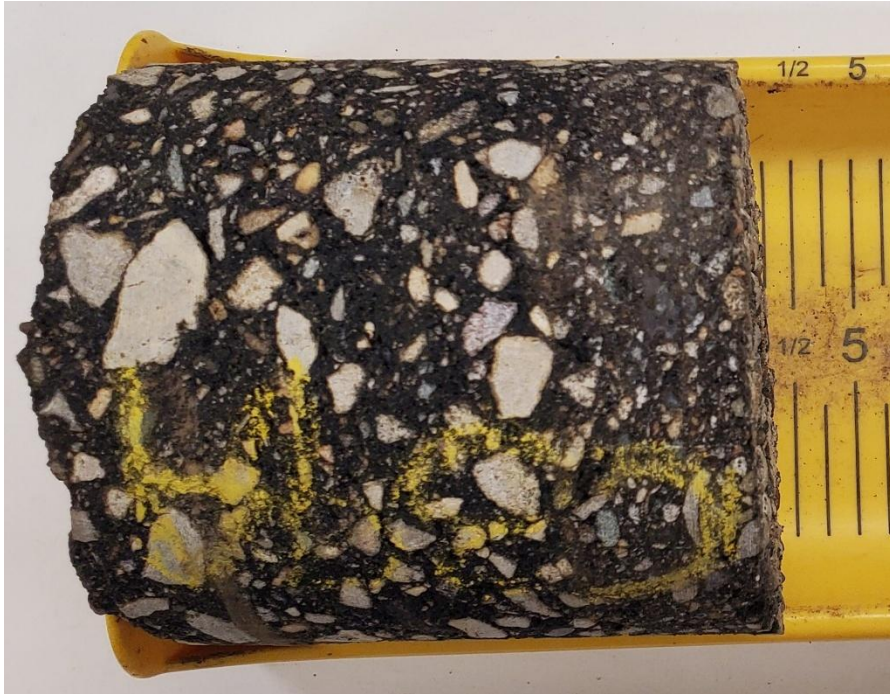


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-39
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-39A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-39A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-40



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-40
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-41

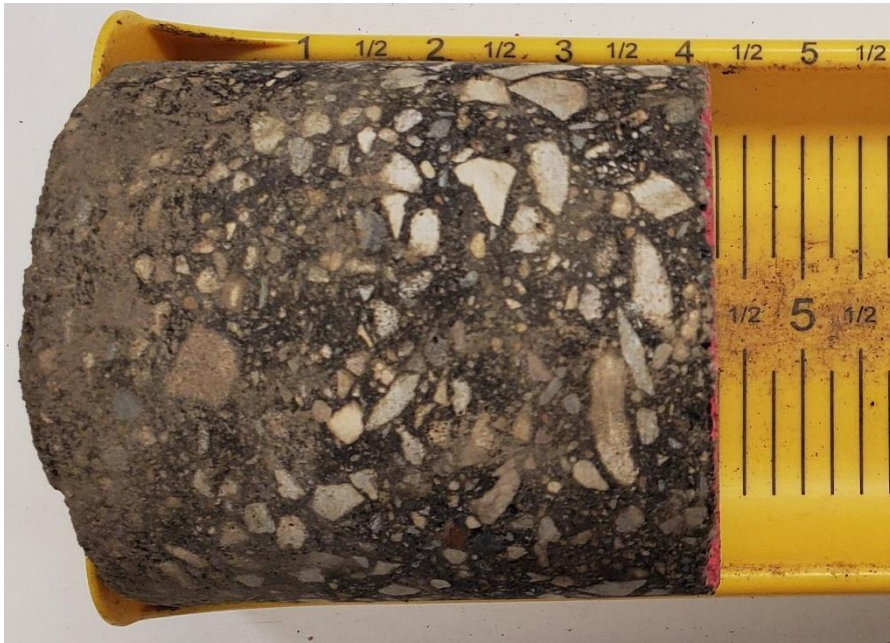


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-41
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-42

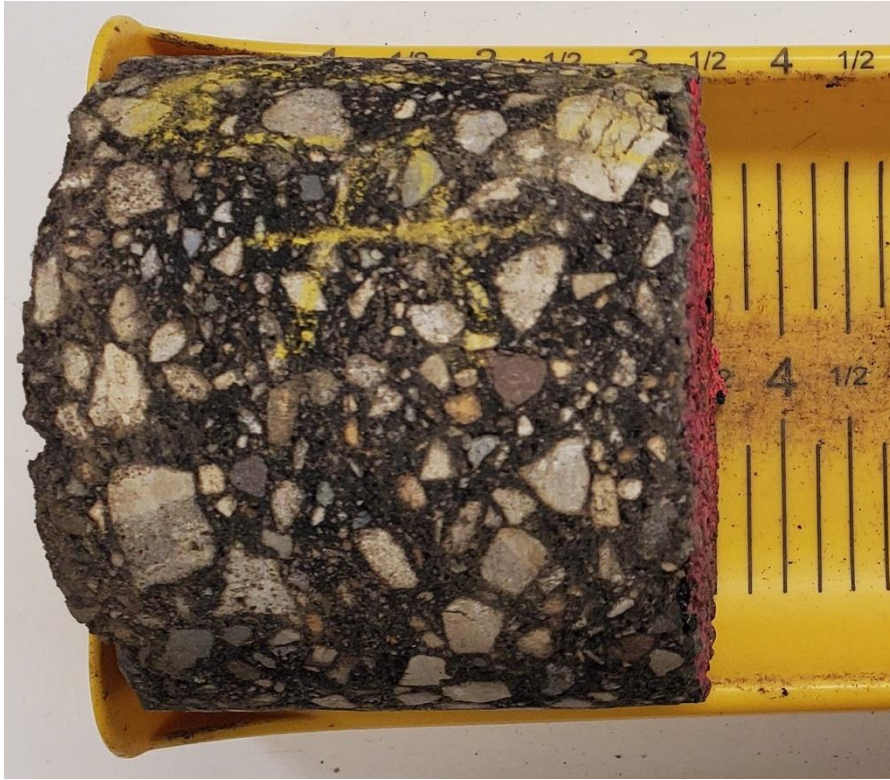


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-42
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-42A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-42A
Surface

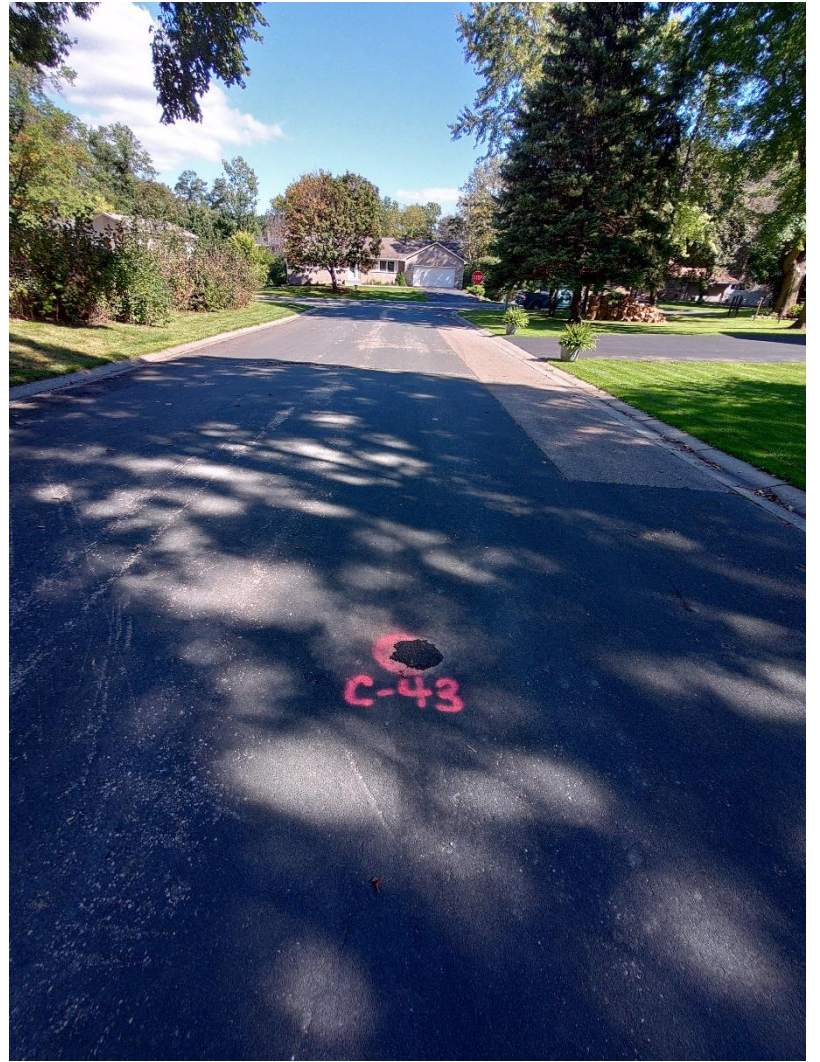


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-43

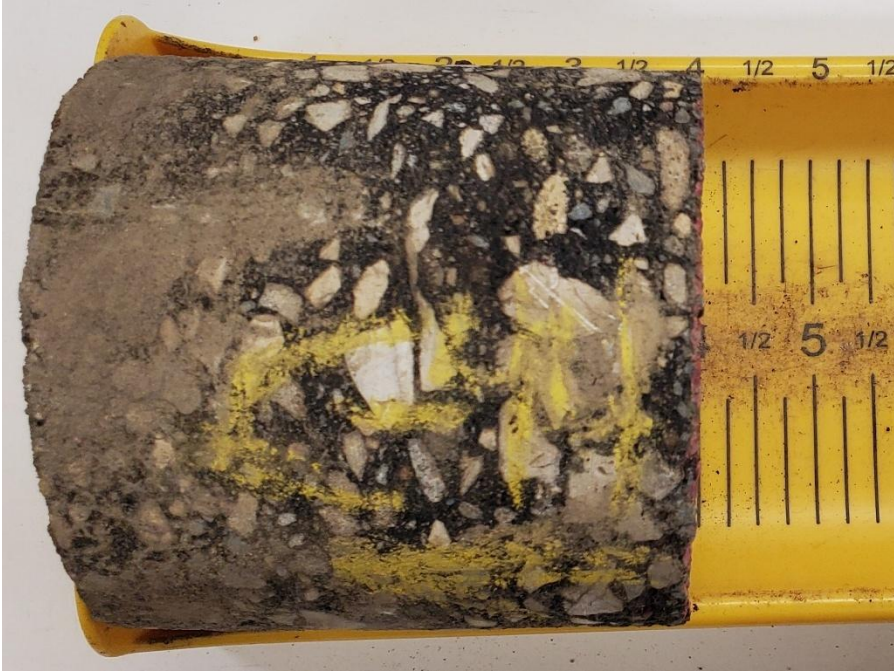


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-43
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-44A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-44
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-45

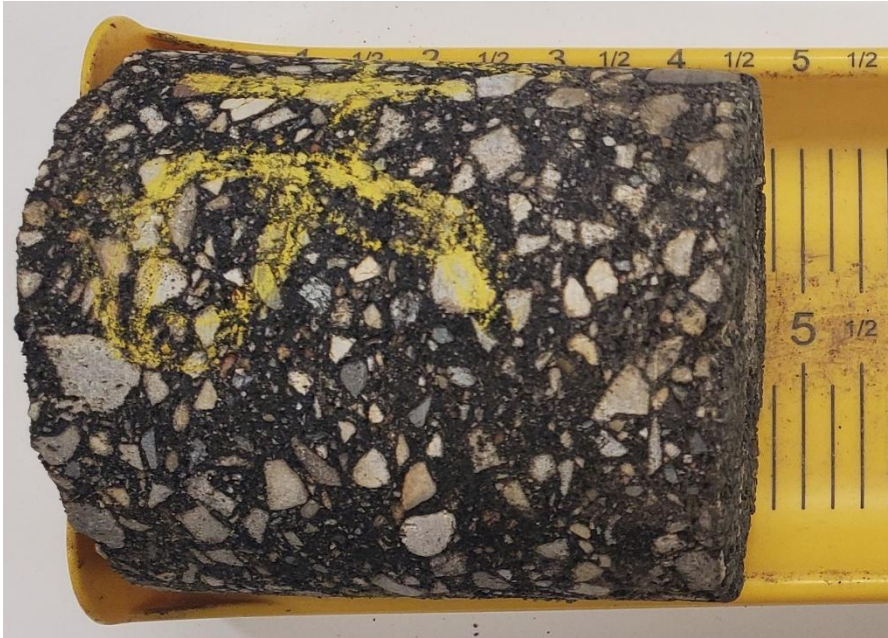


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-45
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-46



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-46
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-46A

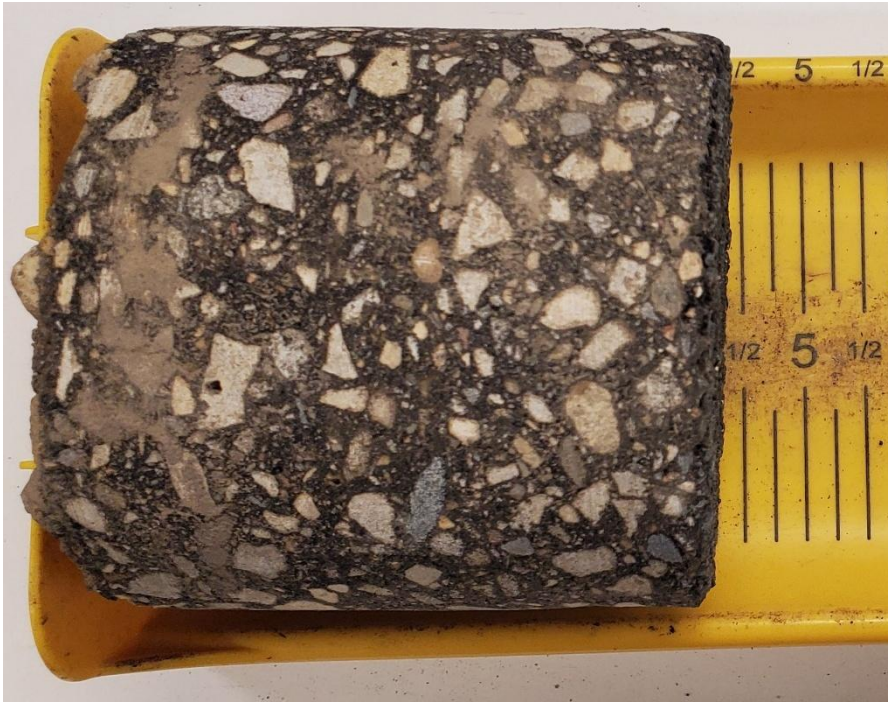


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-46A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-47



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-47
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-48

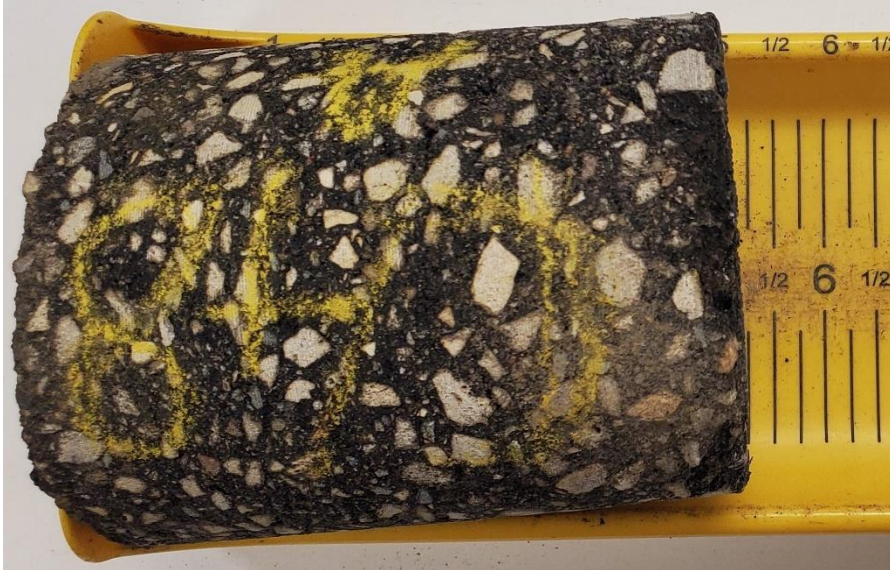


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-48
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-48A

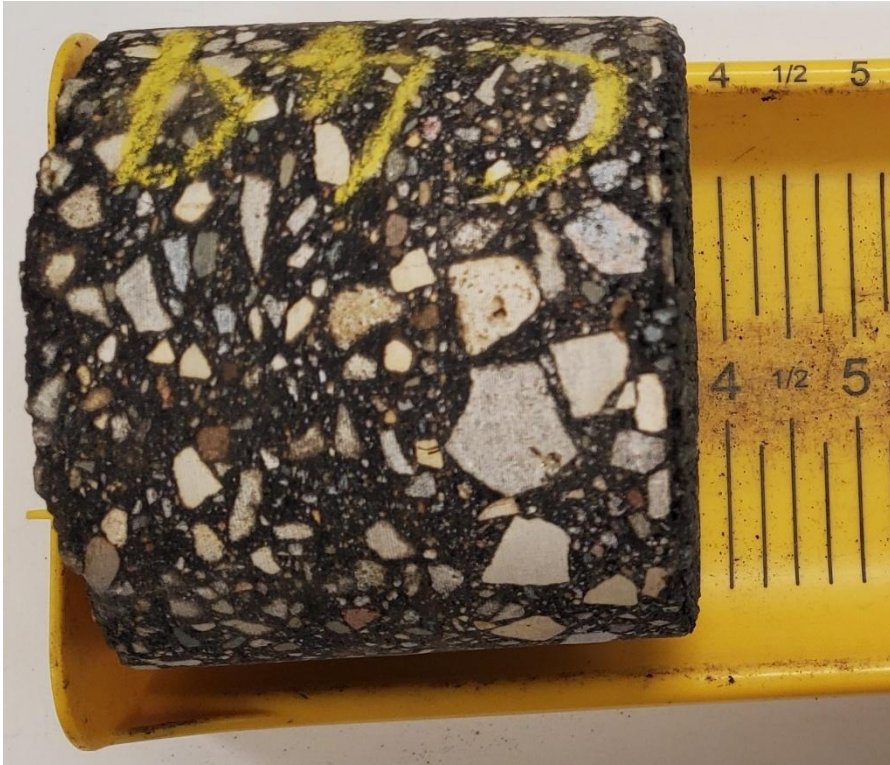


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-48A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-49



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-49
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-50

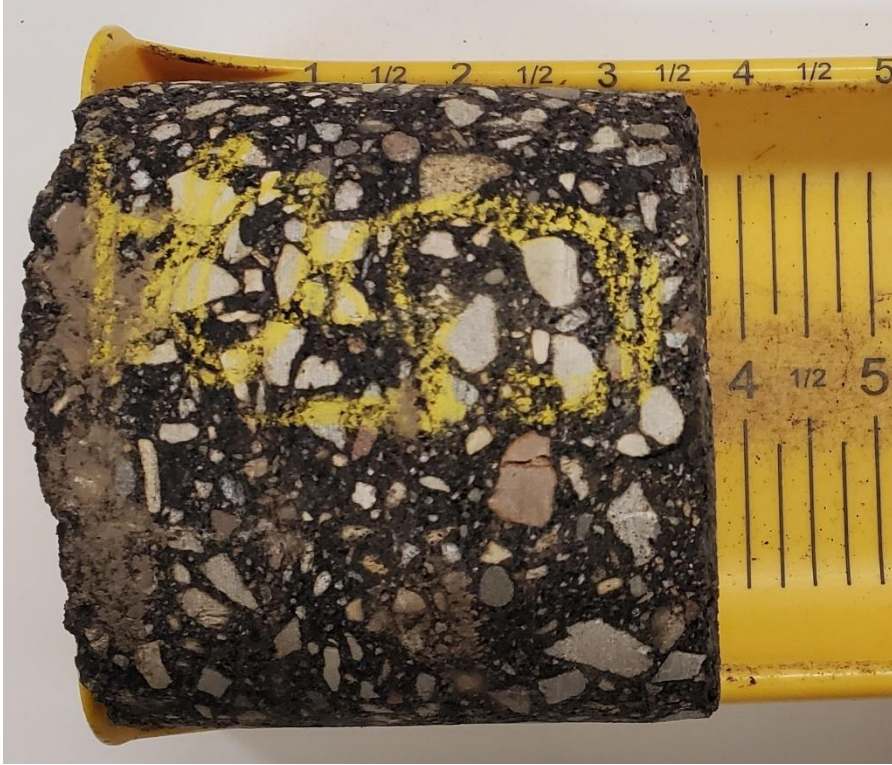


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-50
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-50A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-50A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-51



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-51
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-52

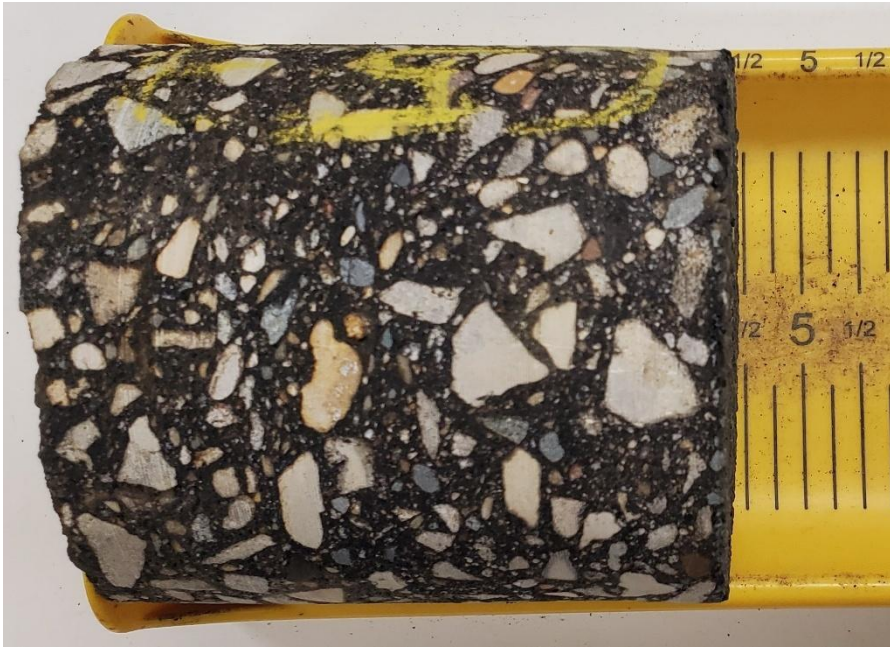


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-52
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-53

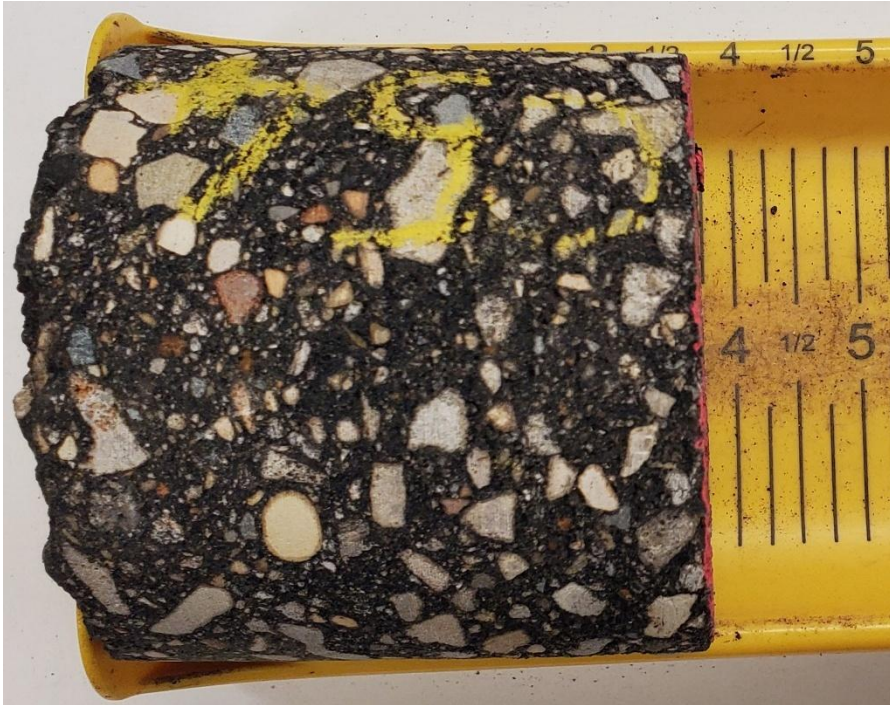


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-53
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-54



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-54
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-55



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-55
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-55A

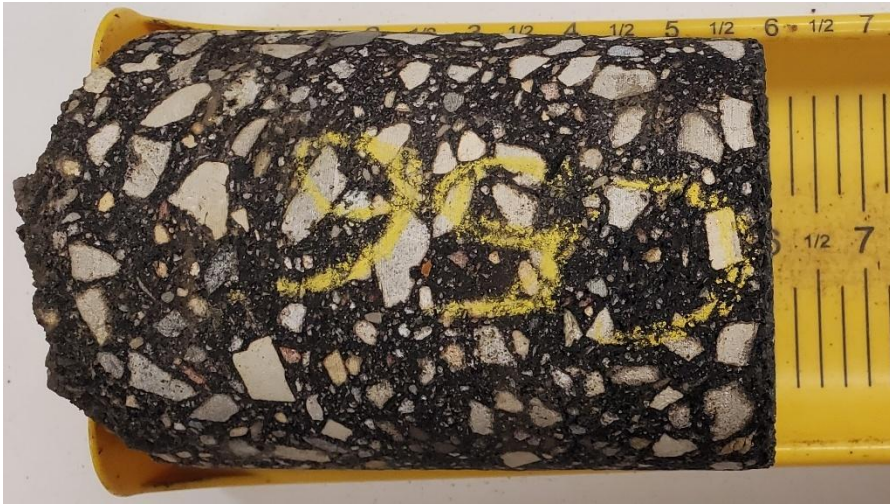


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-55A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-56

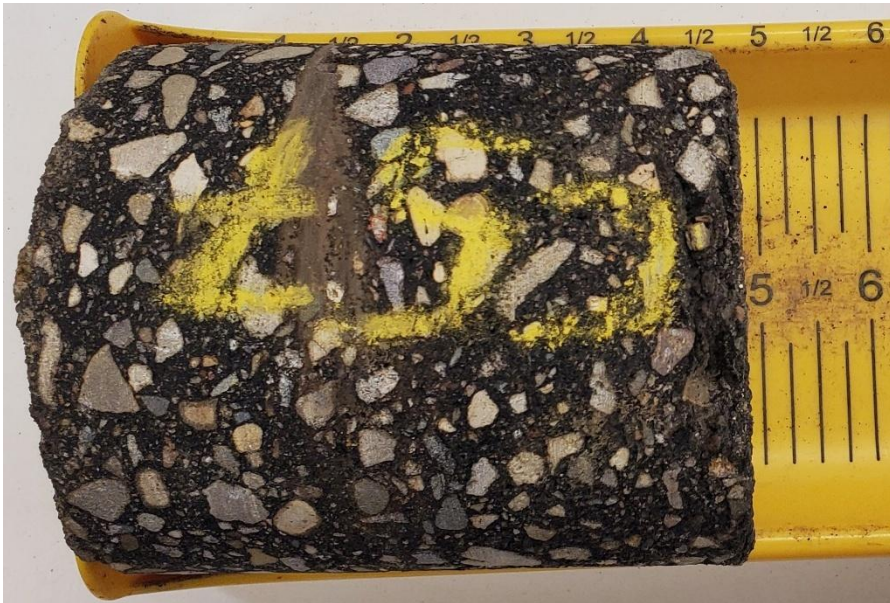


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-56
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-57

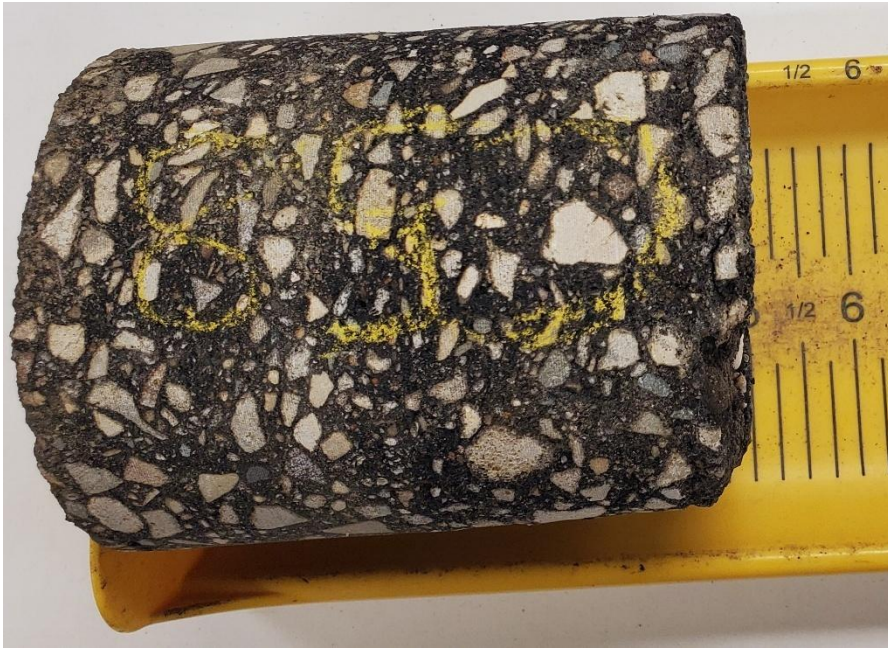


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-57
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-58



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-58
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-59



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-59
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-59A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-59A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-60



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-60
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-61



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-61
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-62



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-62
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-63



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-63
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-63A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-63A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-64



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-64
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-64A

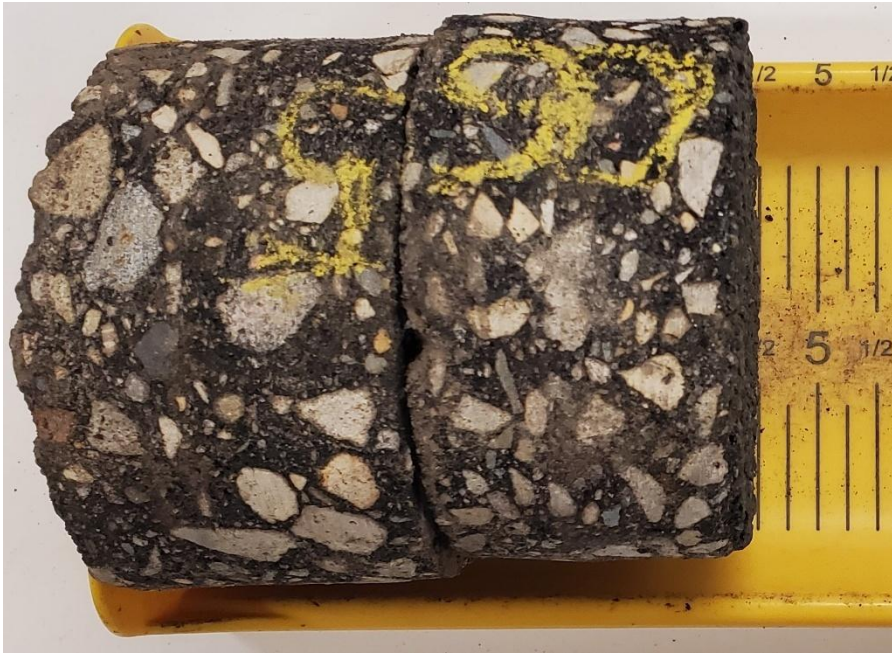


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-64A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-65



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-65
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-66



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-66
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-67



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-67
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-67A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-67A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-68



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-68
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-69

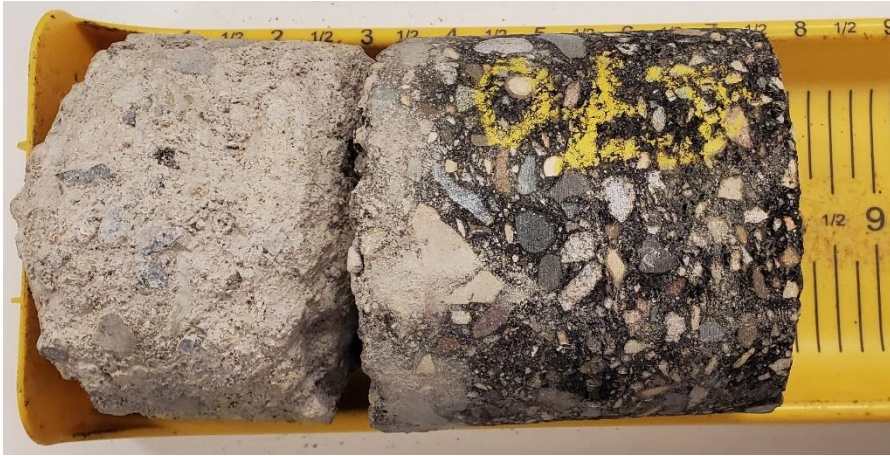


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-69
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-70

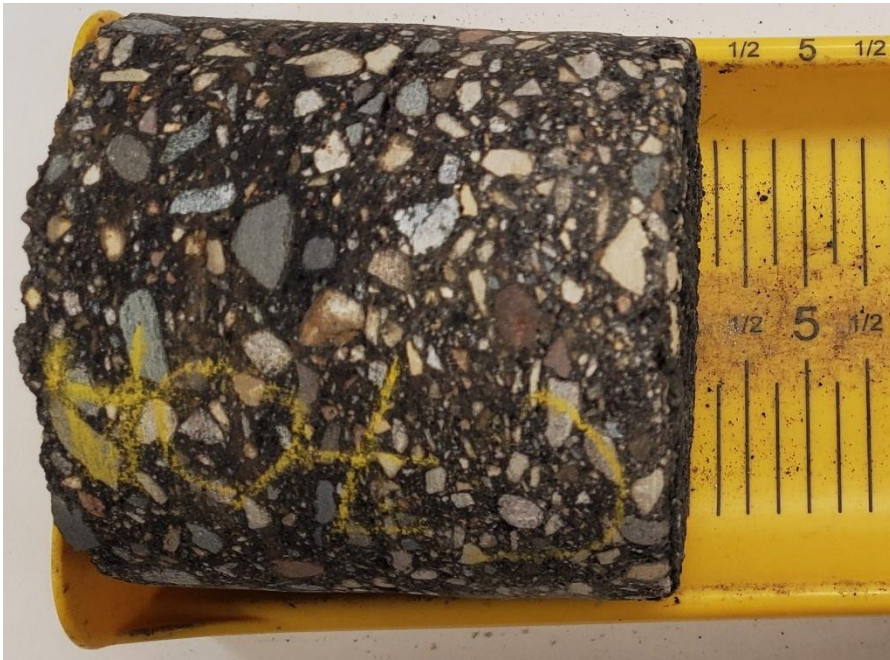


BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-70
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-70A



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-70A
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-71



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-71
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-72



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-72
Surface



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

C-73



BRAUN
INTERTEC

City of Lakeville
Project 26-02

B2506309

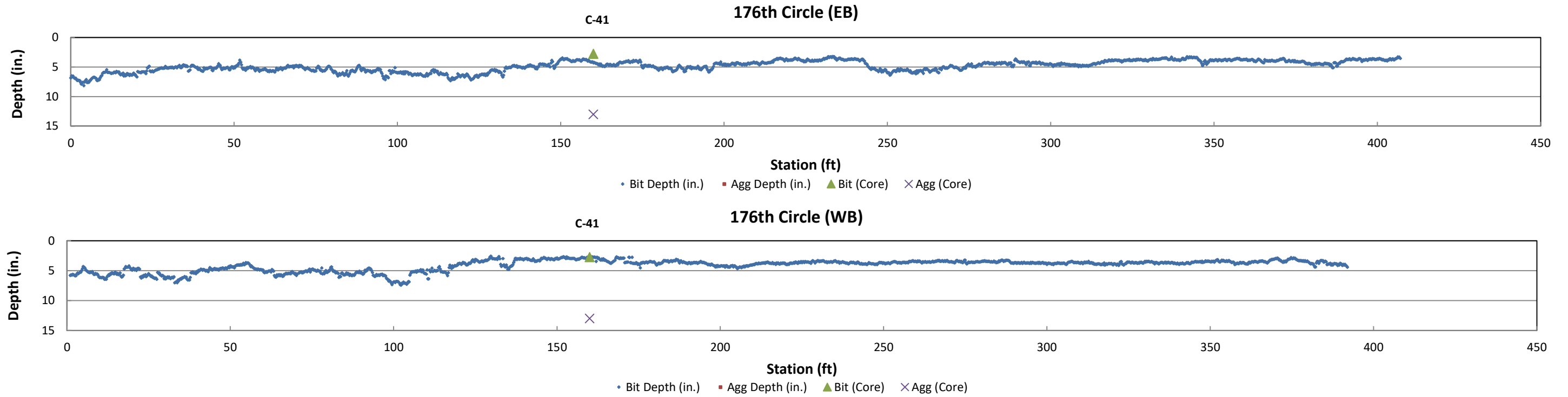
C-73
Surface

GPR Results: 176th Circle - Cul-de-sac to Ixonia Avenue

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway 176th Circle
 From Cul-de-sac
 To Ixonia Avenue



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

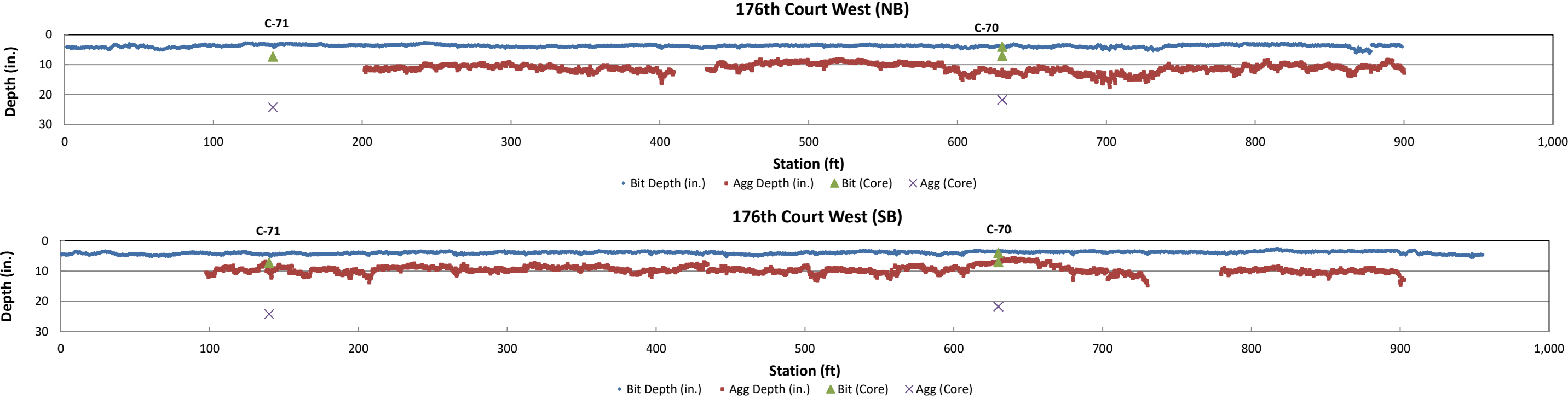


GPR Results: 176th Court West - Cul-de-sac to Ipava Avenue

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway 176th Court West
 From Cul-de-sac
 To Ipava Avenue



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed



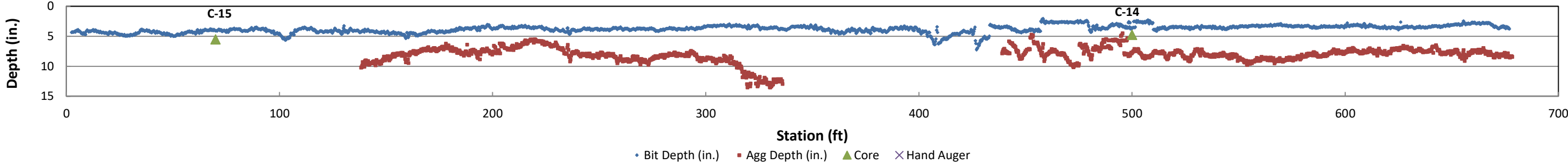
GPR Results: 176th Street West - Cul-de-sac to Jaguar Path

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway 176th Street West
 From Cul-de-sac
 To Jaguar Path

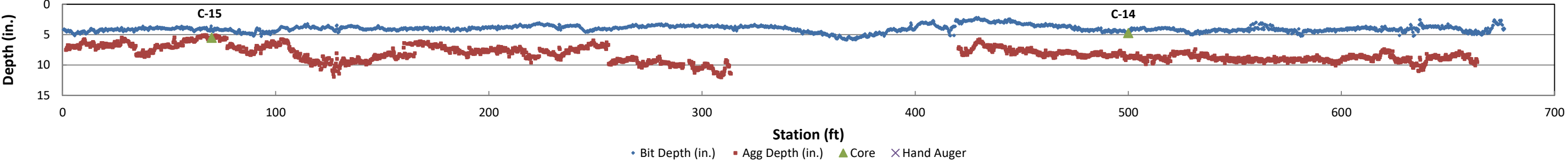


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

176th Street West (EB)



176th Street West (WB)



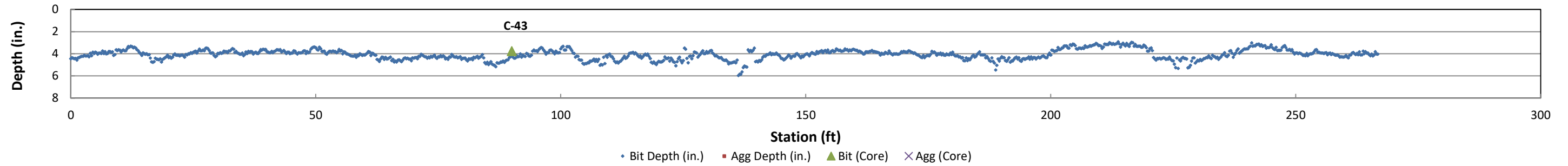
GPR Results: 177th Circle West - Cul-de-sac to Ixonia Ave

Location City of Lakeville 26-01
 Project No. B2506309
 Roadway 177th Circle West
 From Cul-de-sac
 To Ixonia Ave

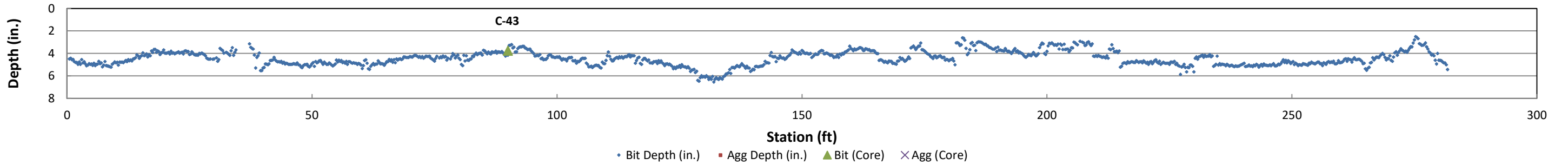


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

177th Circle West (EB)



177th Circle West (WB)



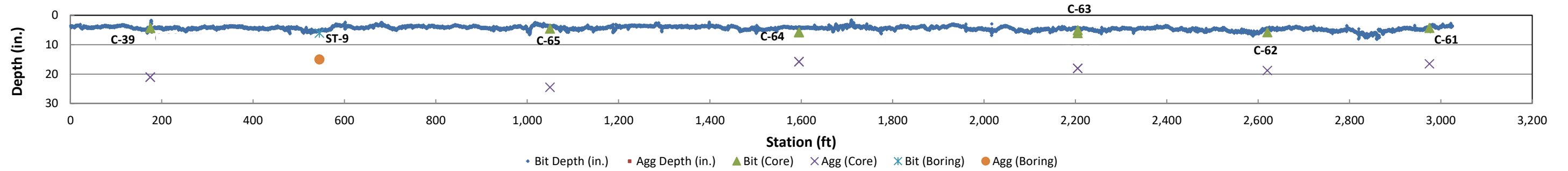
GPR Results: 178th Street West - Jaguar Path to Ipava Avenue

Location City of Lakeville 26-01
 Project No. B2506309
 Roadway 178th Street West
 From Jaguar Path
 To Ipava Avenue

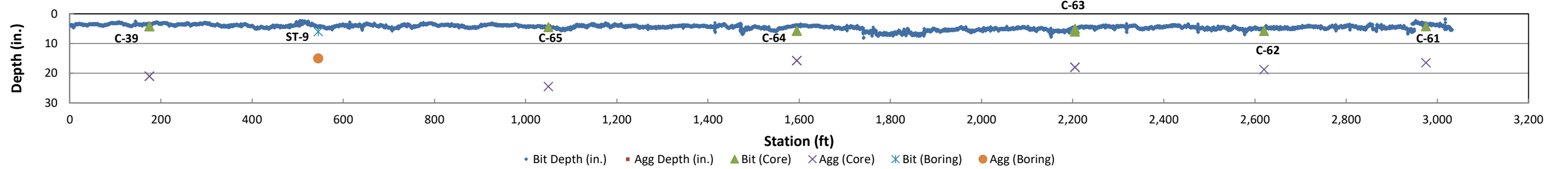


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

178th Street West (EB)



178th Street West (WB)



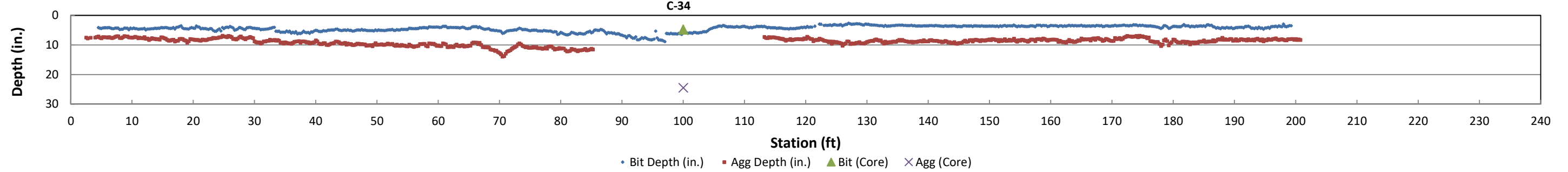
GPR Results: Ingrid Court - Cul-de-sac to Jaguar Path



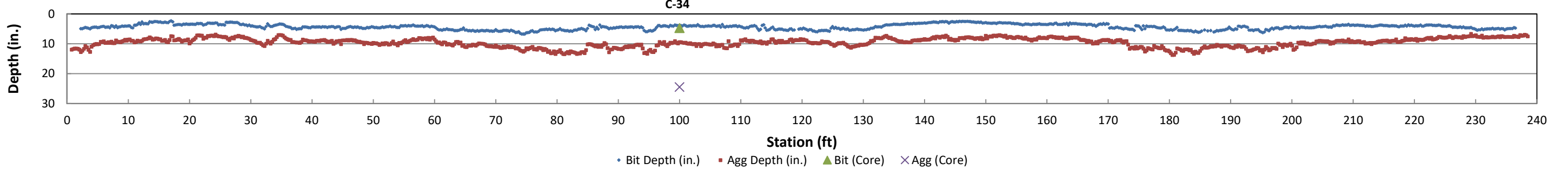
Location: City of Lakeville 26-01
Project No.: B2506309
Roadway: Ingrid Court
From: Cul-de-sac
To: Jaguar Path

Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Ingrid Court (NB)



Ingrid Court (SB)



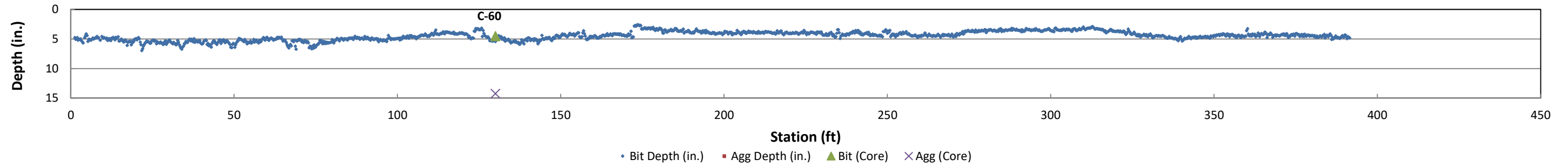
Location City of Lakeville 26-01
 Project No. B2506309
 Roadway Irons Court
 From Cul-de-sac
 To 178th Street West

Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

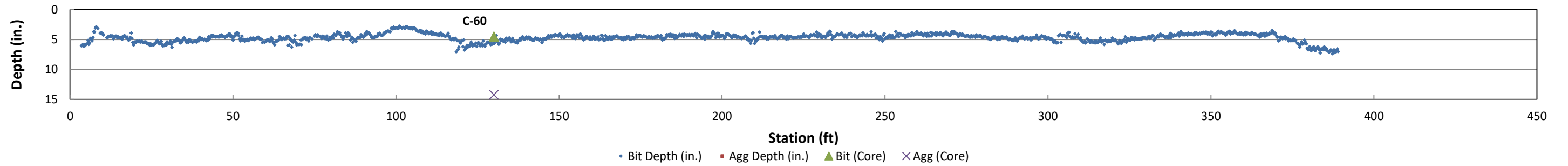
GPR Results: Irons Court - Cul-de-sac to 178th Street West



Irons Court (NB)



Irons Court (SB)



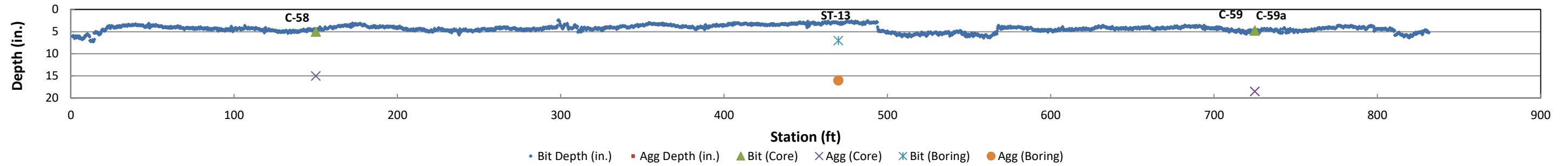
GPR Results: Isle Avenue - Italy Path to 178th Street West

Location City of Lakeville 26-01
 Project No. B2506310
 Roadway Isle Avenue
 From Italy Path
 To 178th Street West

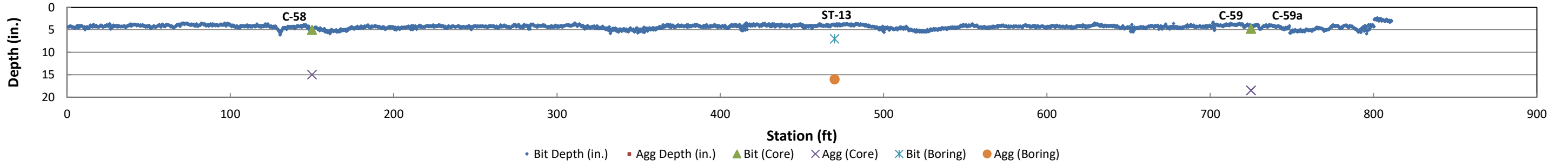


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Isle Avenue (EB)



Isle Avenue (WB)



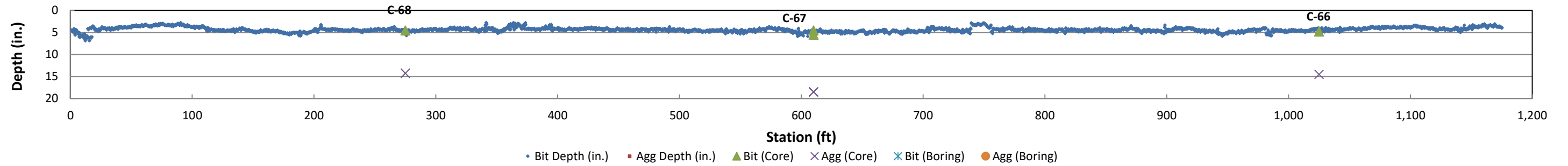
GPR Results: Isleton Avenue - 178th Street West to 175th Street West

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Isleton Avenue
 From 178th Street West
 To 175th Street West

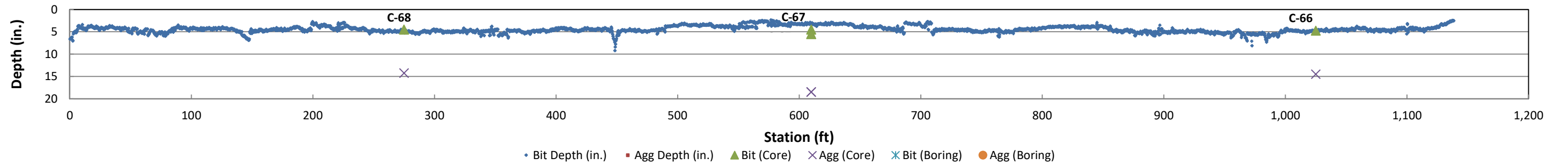


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Isleton Avenue (NB)



Isleton Avenue (SB)



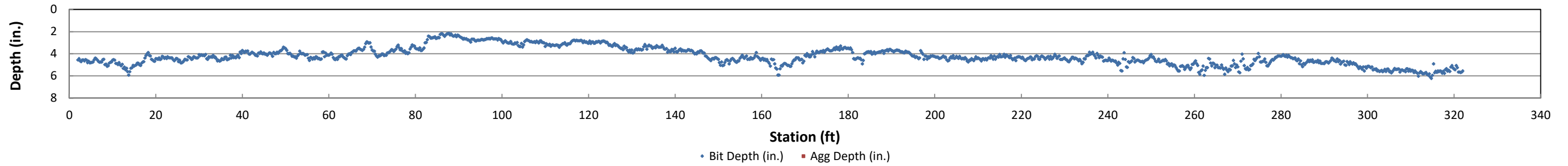
GPR Results: Isleton Court - Isleton Avenue to Cul-de-sac

Location City of Lakeville 26-02
Project No. B2506309
Roadway Isleton Court
From Isleton Avenue
To Cul-de-sac

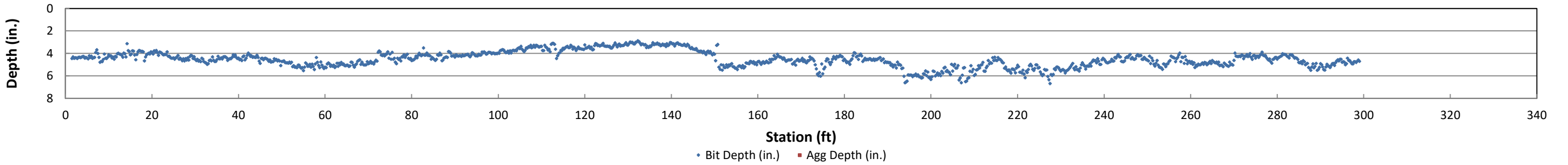


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Isleton Court (EB)



Isleton Court (WB)



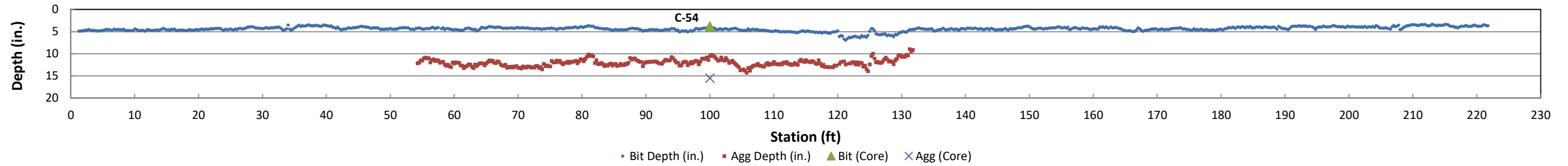
GPR Results: Italy Court - Cul-de-sac to Italy Path

Location City of Lakeville 26-02
Project No. B2506309
Roadway Italy Court
From Cul-de-sac
To Italy Path

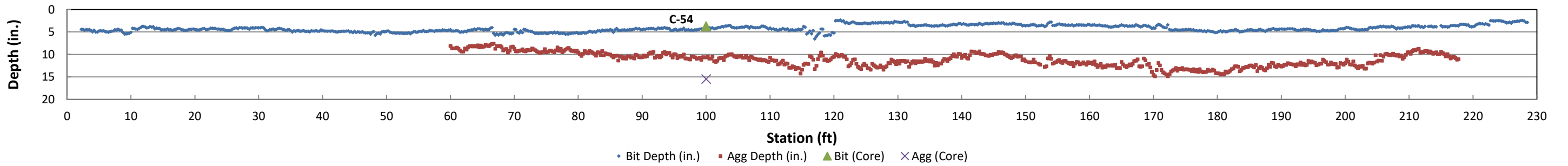


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Italy Court (EB)



Italy Court (WB)



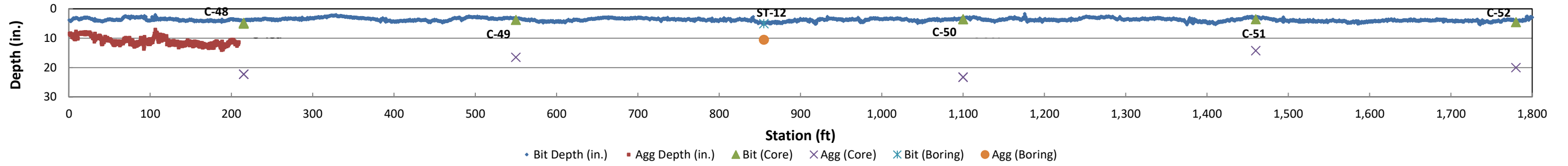
GPR Results: Italy Path - Ixonia Avenue to 175th Street West

Location City of Lakeville 26-02
Project No. B2506309
Roadway Italy Path
From Ixonia Avenue
To 175th Street West

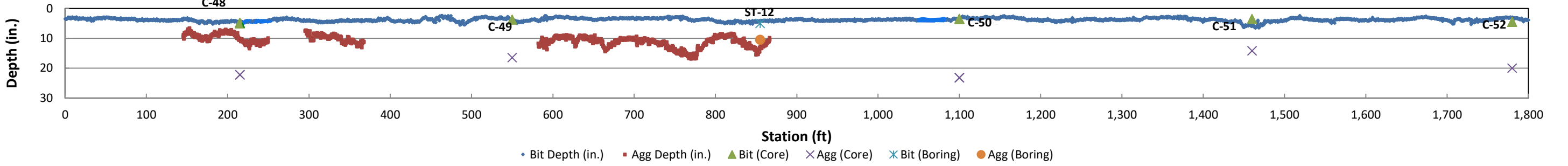


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

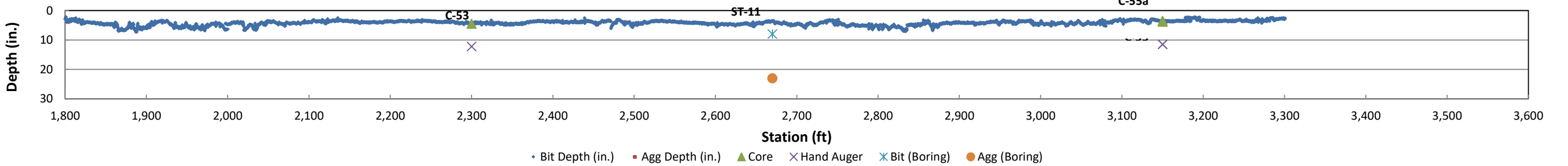
Italy Path (NB)



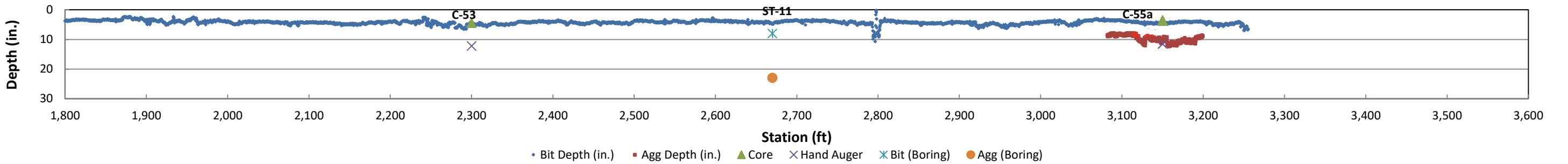
Italy Path (SB)



Italy Path (NB)



Italy Path (SB)



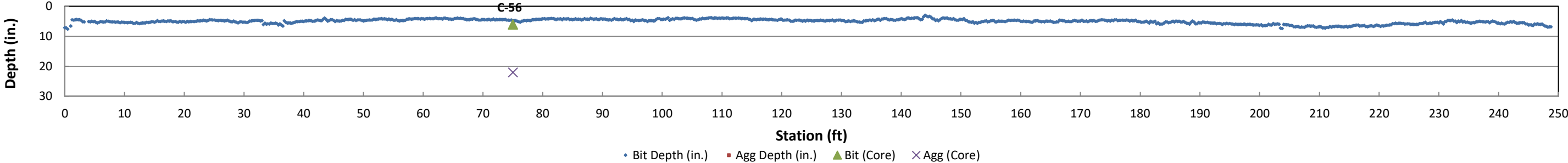
GPR Results: Iten Court North - 178th Street West to Cul-de-sac

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Iten Court North
 From 178th Street West
 To Cul-de-sac

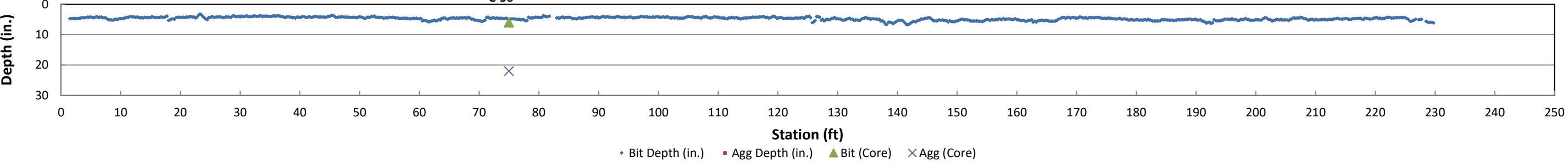


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Iten Court North (NB)



Iten Court North (SB)

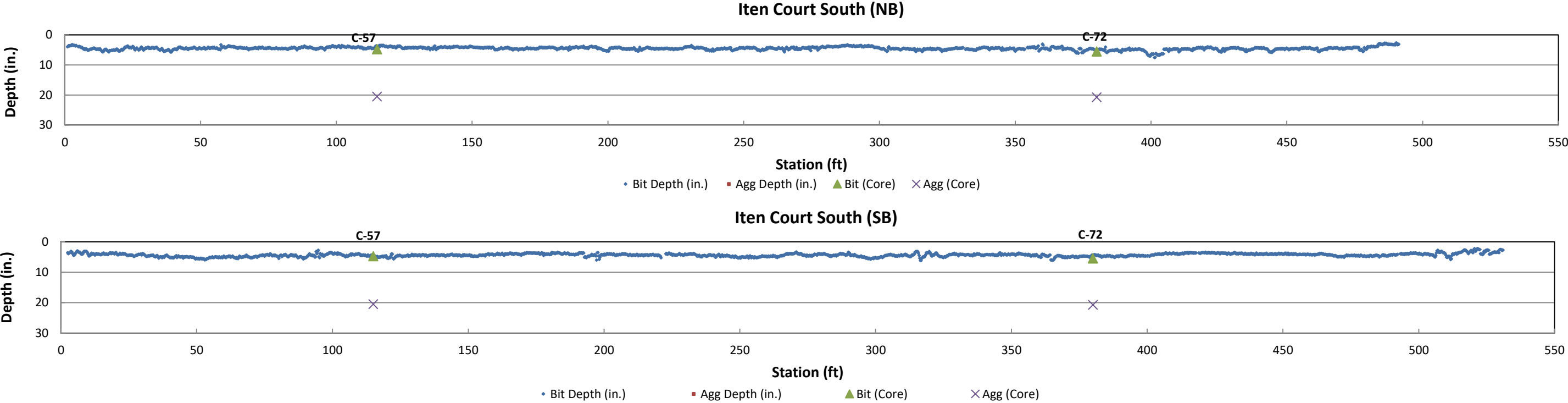


GPR Results: Iten Court South - Cul-de-sac to 178th Street West

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Iten Court South
 From Cul-de-sac
 To 178th Street West



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed



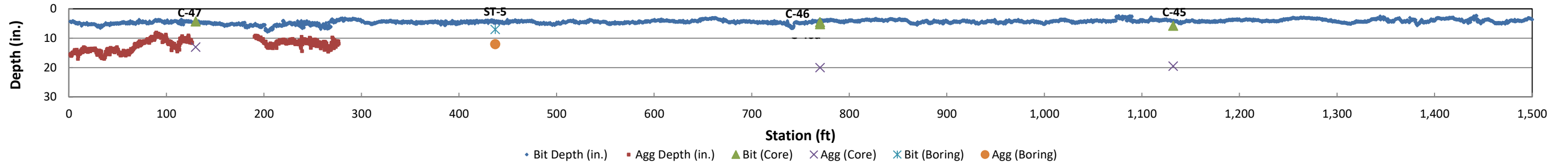
GPR Results: Ixonia Avenue - Cul-de-sac to 175th Street West

Location City of Lakeville 26-02
Project No. B2506309
Roadway Ixonia Avenue
From Cul-de-sac
To 175th Street West

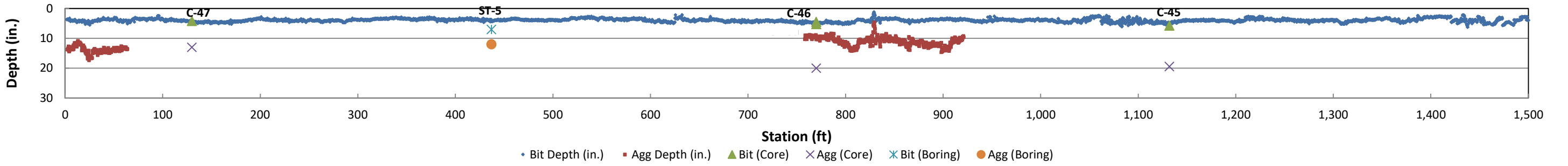


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

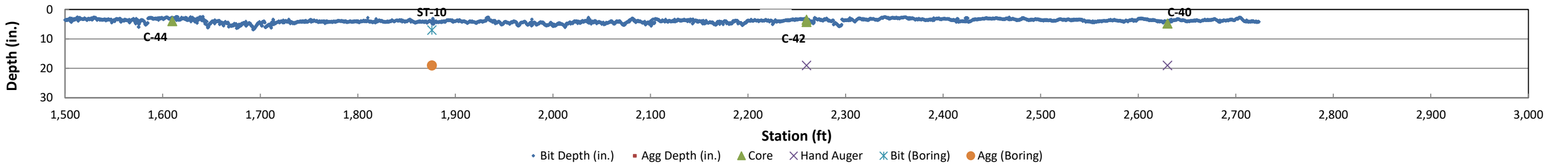
Ixonia Avenue (NB)



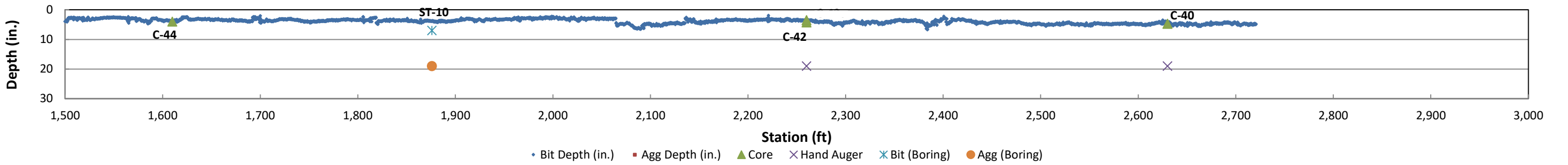
Ixonia Avenue (SB)



Ixonia Avenue (NB)



Ixonia Avenue (SB)



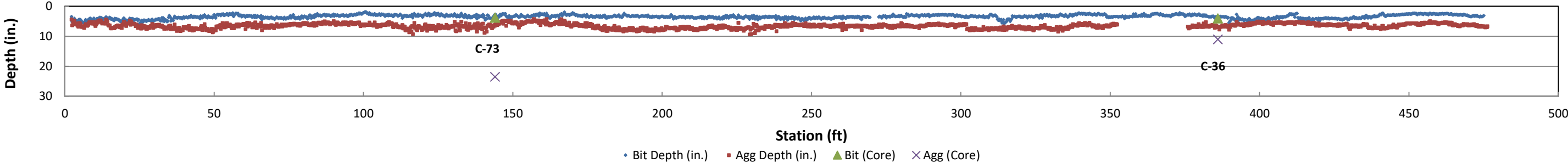
GPR Results: Jacquard Path - Cul-de-sac to Jaguar Path

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jacquard Path
 From Cul-de-sac
 To Jaguar Path

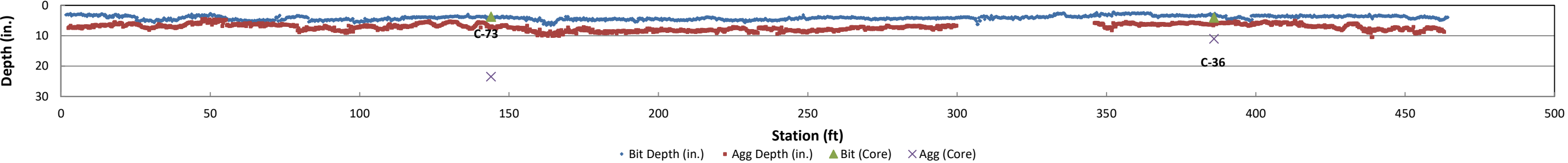


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Jacquard Path (NB)



Jacquard Path (SB)



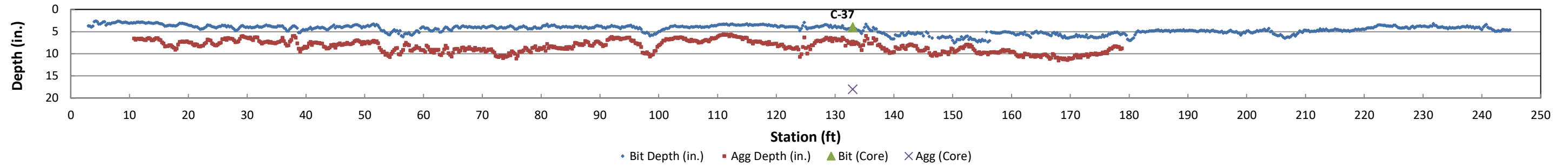
GPR Results: Jaguar Circle - Jaguar Path to Cul-de-sac



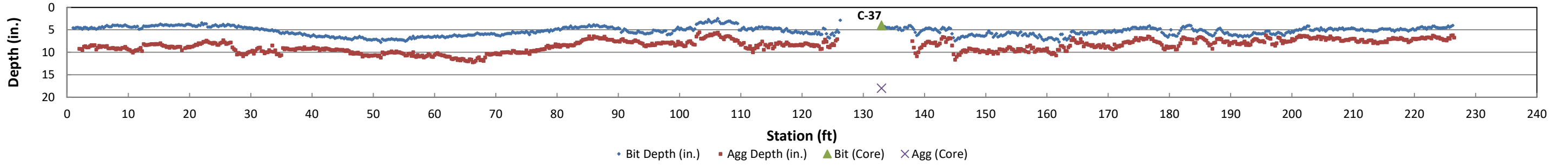
Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jaguar Circle
 From Jaguar Path
 To Cul-de-sac

Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Jaguar Circle (EB)



Jaguar Circle (WB)



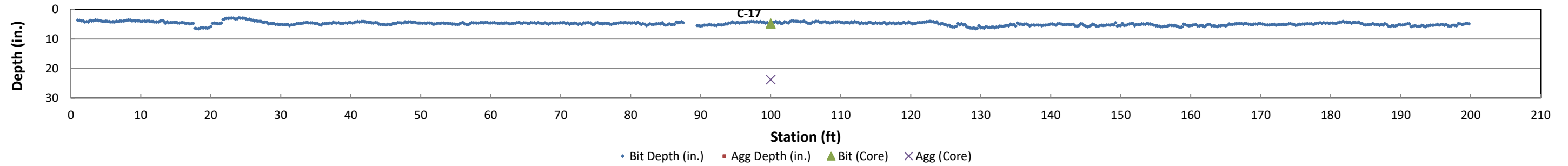
GPR Results: Jaguar Court - Jaguar Path to Cul-de-sac



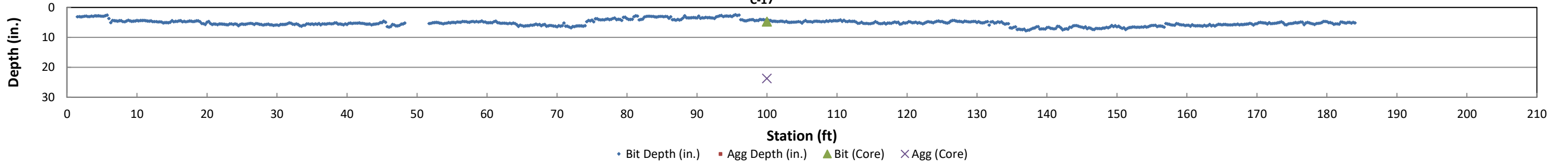
Location City of Lakeville 26-02
Project No. B2506309
Roadway Jaguar Court
From Jaguar Path
To Cul-de-sac

Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Jaguar Court (EB)



Jaguar Court (WB)

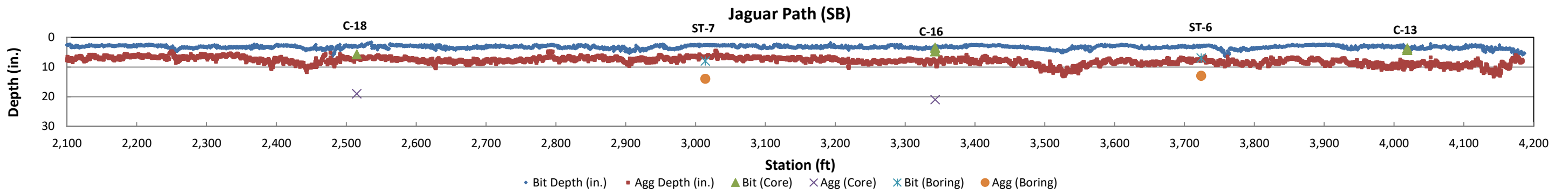
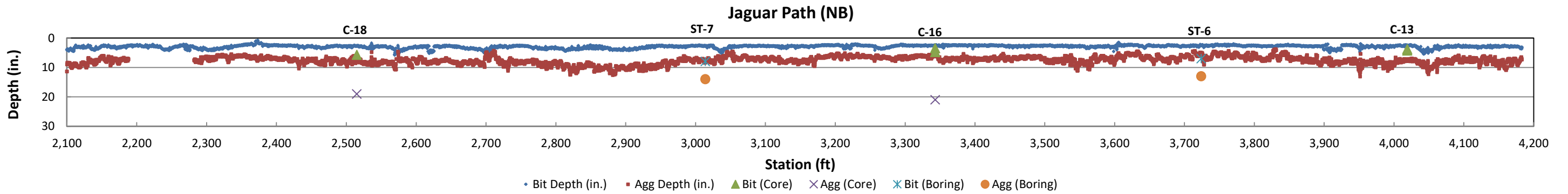
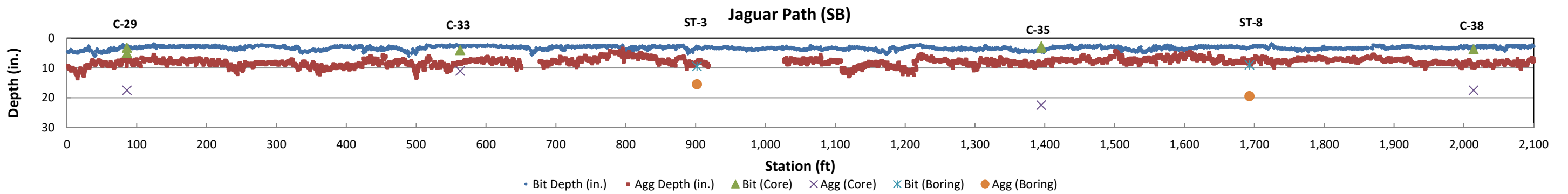
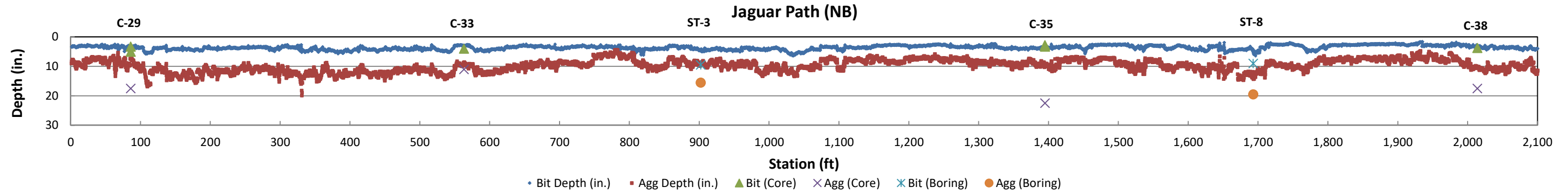


GPR Results: Jaguar Path - Upper 178th Street West to 175th Street West

Location: City of Lakeville 26-02
 Project No.: B2506309
 Roadway: Jaguar Path
 From: Upper 178th Street West
 To: 175th Street West



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

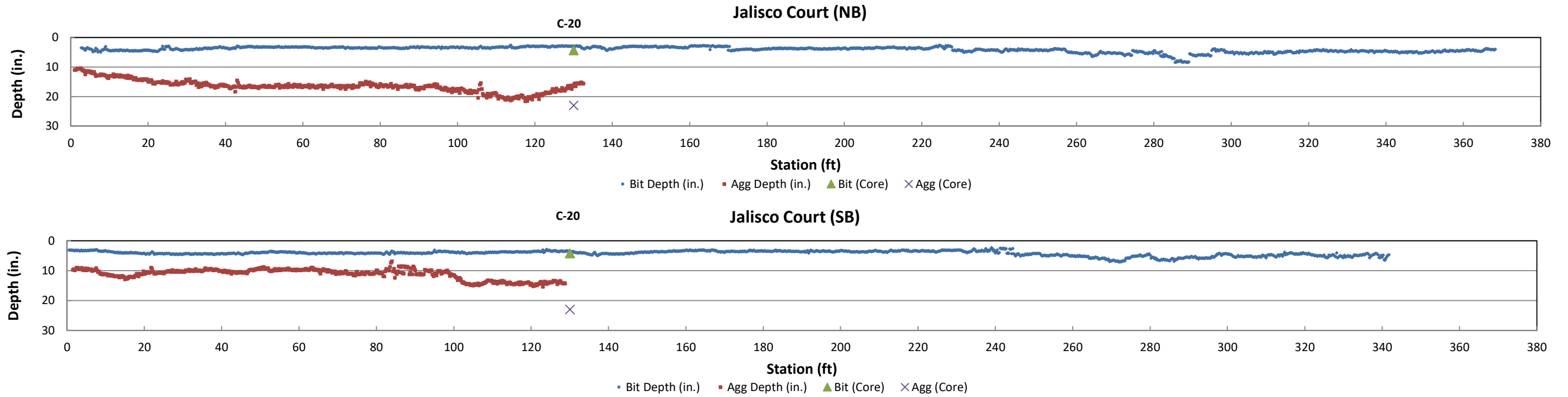


GPR Results: Jalisco Court - Jalisco Way to Cul-de-sac



Location City of Lakeville 26-02
Project No. B2506309
Roadway Jalisco Court
From Jalisco Way
To Cul-de-sac

Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

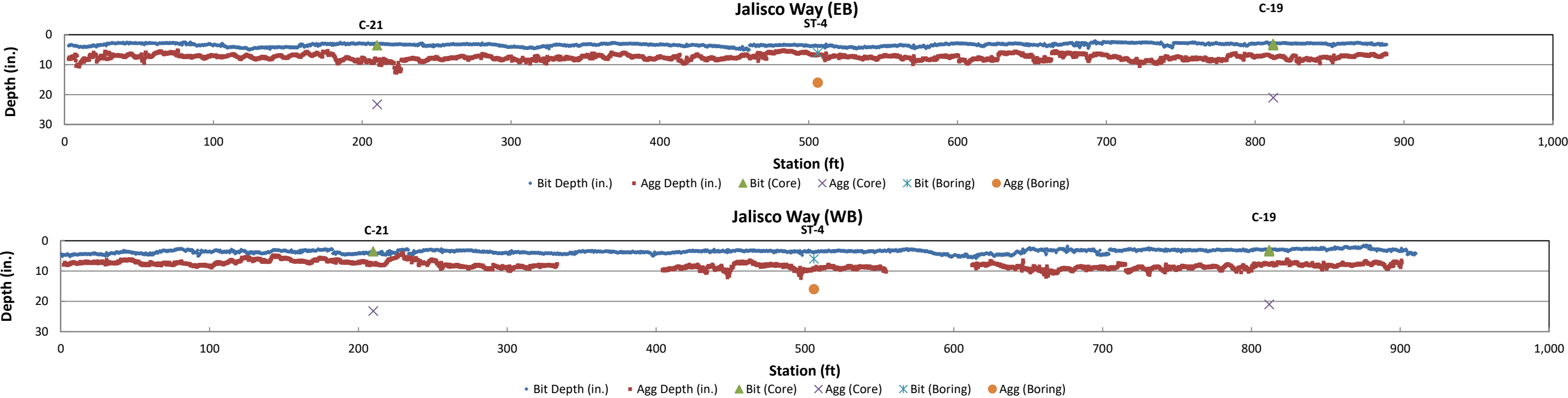


GPR Results: Jalisco Way - Upper 178th Street to Jaguar Path

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jalisco Way
 From Upper 178th Street
 To Jaguar Path



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

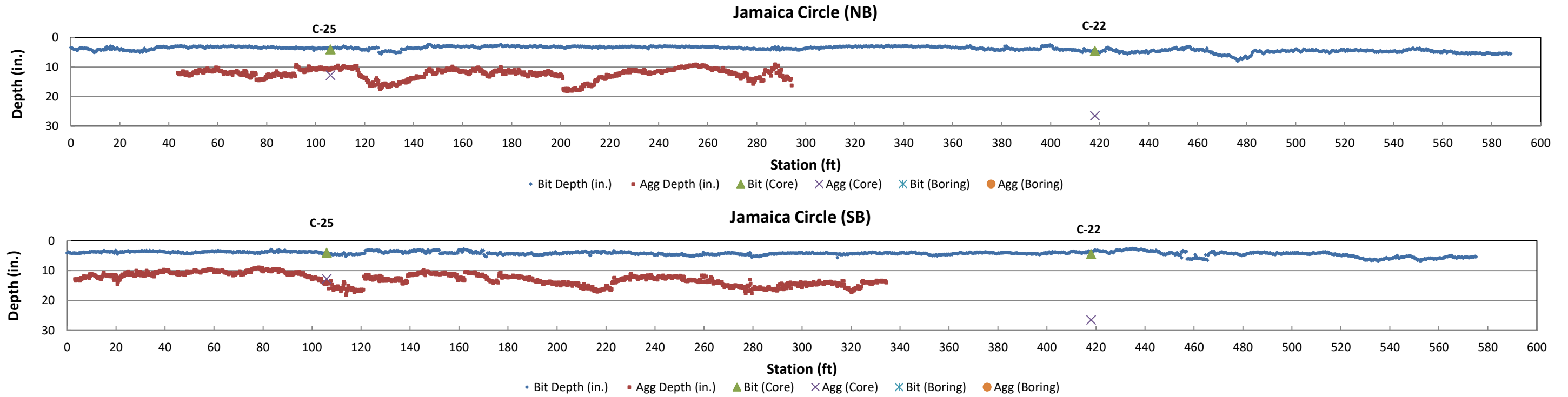


GPR Results: Jamaica Circle - Upper 178th Street to Cul-de-sac

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jamaica Circle
 From Upper 178th Street
 To Cul-de-sac



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

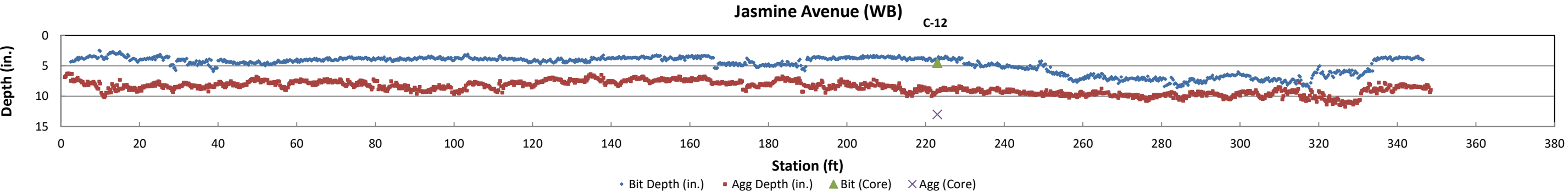
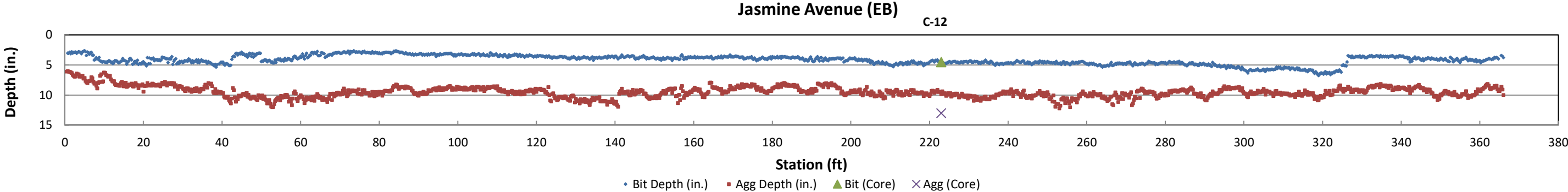


GPR Results: Jasmine Avenue - 175th Street West to Jaguar Path

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jasmine Avenue
 From 175th Street West
 To Jaguar Path



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed



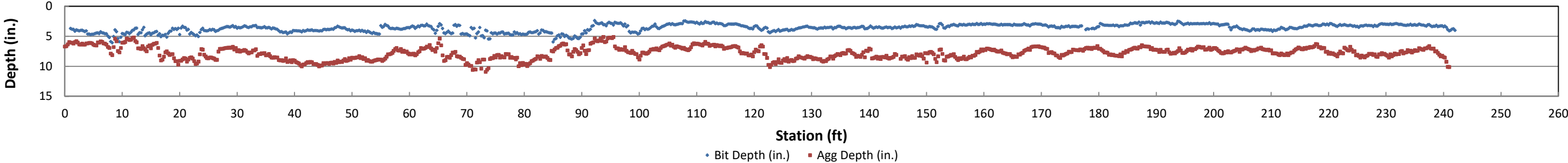
GPR Results: Jasmine Court - Jaguar Path to Cul-de-sac

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jasmine Court
 From Jaguar Path
 To Cul-de-sac

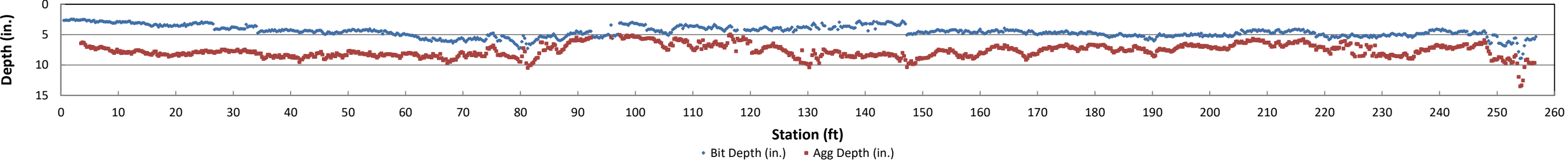


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Jasmine Court (NB)



Jasmine Court (SB)



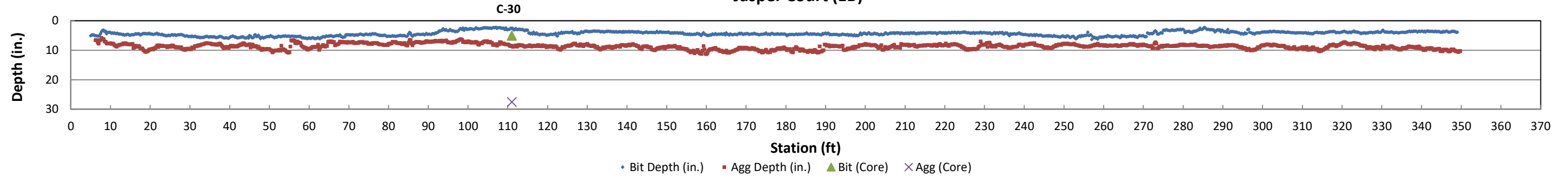
GPR Results: Jasper Court - Cul-de-sac to Upper 178th Street

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Jasper Court
 From Cul-de-sac
 To Upper 178th Street

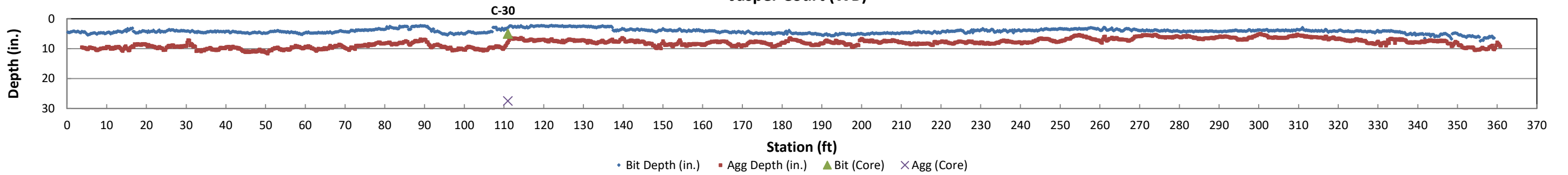


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Jasper Court (EB)



Jasper Court (WB)



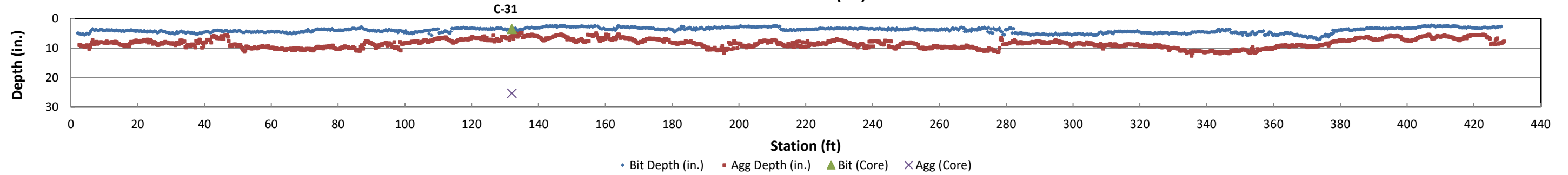
GPR Results: Javelin Court - Cul-de-sac to Upper 178th Street

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Javelin Court
 From Cul-de-sac
 To Upper 178th Street

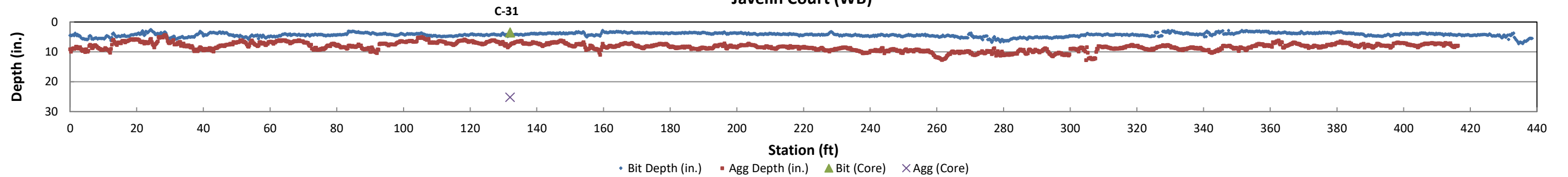


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Javelin Court (EB)



Javelin Court (WB)

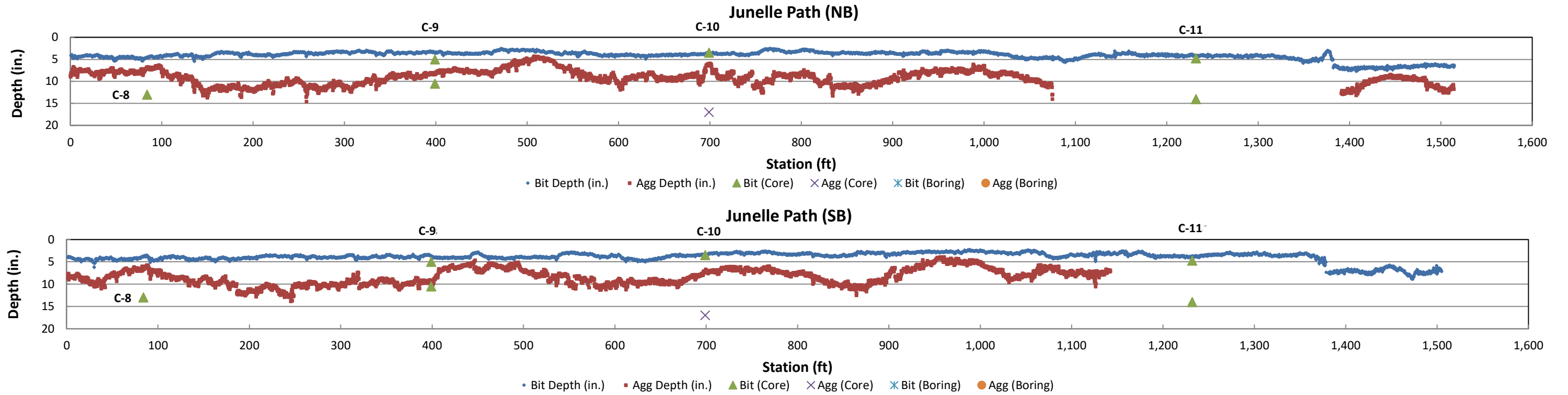


GPR Results: Junelle Path - Cul-de-sac to Kenrick Avenue

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Junelle Path
 From Cul-de-sac
 To Kenrick Avenue



Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed



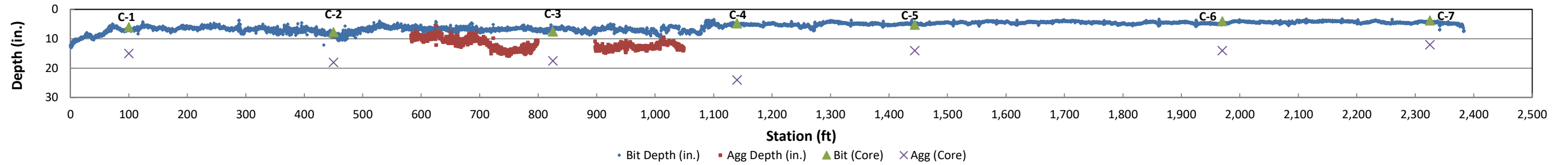
GPR Results: Kenrick Avenue - 185th Street West to 185th Street West

Location City of Lakeville 26-01
 Project No. B2506309
 Roadway Kenrick Avenue
 From 185th Street West
 To 185th Street West

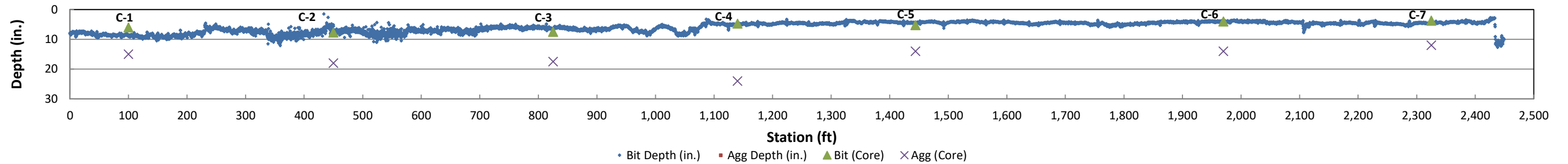


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed

Kenrick Avenue (EB)



Kenrick Avenue (WB)

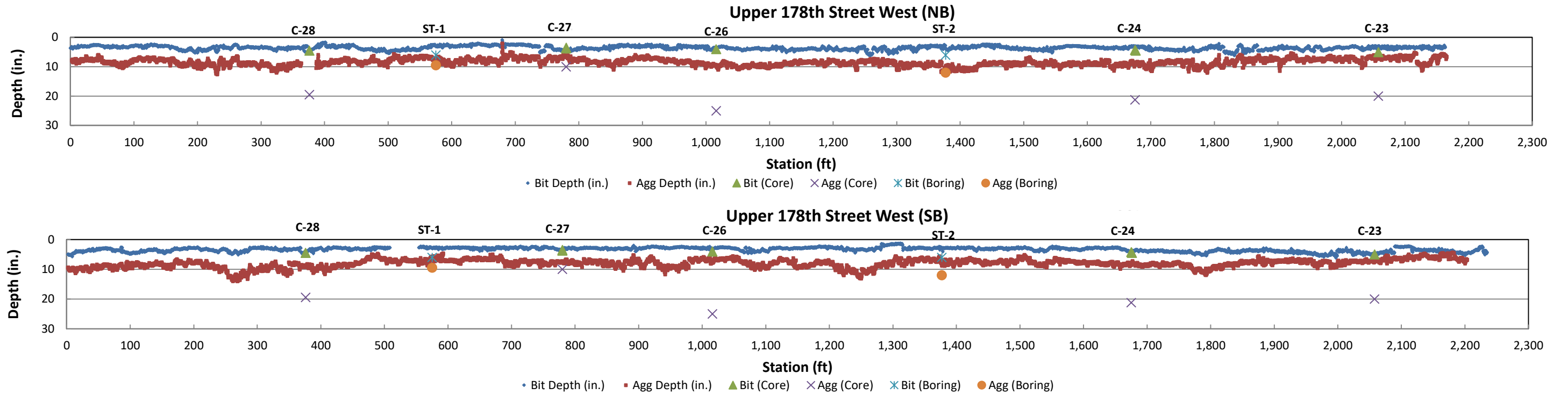


GPR Results: Upper 178th Street West - Jaguar Path to Jaguar Path

Location City of Lakeville 26-02
 Project No. B2506309
 Roadway Upper 178th Street West
 From Jaguar Path
 To Jaguar Path

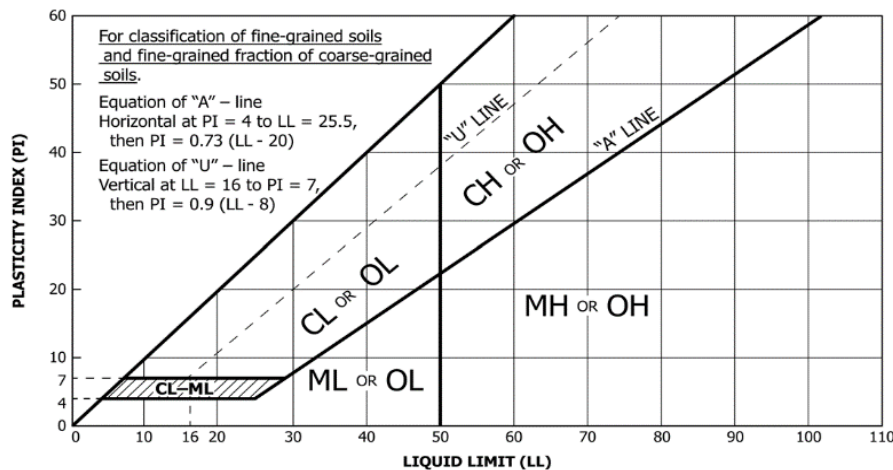


Note: stations are positive in the NB or EB direction; SB or WB scans have been reversed



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
		Gravels with Fines (More than 12% fines ^C)	$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$) ^D	GP	Poorly graded gravel ^E
			Fines classify as ML or MH	GM	Silty gravel ^{EFG}
	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
		Sands with Fines (More than 12% fines ^H)	$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$) ^D	SP	Poorly graded sand ^I
			Fines classify as ML or MH	SM	Silty sand ^{FGI}
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 ^{KLM}
			PI < 4 or plots below "A" line ^J	ML	Silt ^{KLM}
	Silts and Clays (Liquid limit 50 or more)	Organic	Liquid Limit – oven dried < 0.75 Liquid Limit – not dried < 0.75	OL	Organic clay ^{KLMN} Organic silt ^{KLMO}
		Inorganic	PI plots on or above "A" line	CH	Fat clay ^{KLM}
			PI plots below "A" line	MH	Elastic silt ^{KLM}
		Organic	Liquid Limit – oven dried < 0.75 Liquid Limit – not dried < 0.75	OH	Organic clay ^{KLMP} Organic silt ^{KLMQ}
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 $\geq 15\%$ 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 $\geq 15\%$ 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 $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.
 M. If soil contains $\geq 30\%$ 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
WD	Wet density, pcf
P200	% Passing #200 sieve
MC	Moisture content, %
OC	Organic content, %
q _p	Pocket penetrometer strength, tsf
q _u	Unconfined compression test, tsf
LL	Liquid limit
PL	Plastic limit
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..... $\geq 15\%$

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

☒	Standard Penetration Test	☐	Rock Core
☒	Modified California (MC)	☐	Thinwall (TW)/Shelby Tube (SH)
☒	Auger	☒	Texas Cone Penetrometer
☒	Grab Sample	☒	Dynamic Cone Penetrometer