

December 9, 2024

Project B2410030

Mr. Jon Maruska
City of Duluth
411 West 1st Street, Room 107
Duluth, MN 55802

Re: Subsurface Investigation
Duluth Water Main Extension – Lincoln Park 3
North 26th Ave West, North 27th Ave West, North 25th Ave West, North 23rd Avenue West
Duluth, Minnesota

Dear Mr. Maruska:

Braun Intertec Corporation is pleased to provide this letter report for the Lincoln Park 3 portion of the Water Main Extension project in Duluth, Minnesota.

Scope of Services

The City of Duluth is planning to install new water main utilities at various locations throughout Duluth. The design concern is the potential for bedrock being encountered above the planned invert depth of the water main. Our investigation was intended to determine the apparent bedrock depth at the planned exploration locations.

We performed our scope of services for the project in accordance with Purchase Order 2024-00000616 from the City of Duluth. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Staking and clearing the exploration location of underground utilities. LHB, Inc. selected, and we staked the exploration locations. We acquired the surface elevations and locations with GPS technology using the State of Minnesota's permanent GPS base station network.
- Performing fifteen (15) direct push probes, denoted as B1 to B15 to nominal depths of 15 feet or refusal, whichever occurred first.
- Noting any groundwater that was observed during each probe.

- Providing a letter summarizing the depth of each probe.

Results

Direct push probes were conducted at 15 locations as shown on the location sketches attached to this letter. The results are summarized below and on the attached sheets.

North 26th Avenue West: Probes B4 through B6 were conducted on North 26th Avenue West between West 3rd Street and West 4th Street. Refusal was not encountered at any of these locations. All of the probes were extended to a depth of 15 feet. Groundwater was not observed in these probes.

North 27th Avenue West: Probes B1 through B3 were conducted on North 27th Avenue West between West 2nd Street and West 3rd Street. Refusal was not encountered at any of these locations. All of the probes were extended to a depth of 15 feet. Groundwater was not observed in these probes.

North 25th Avenue West: Probes B7 through B9 were conducted on North 25th Avenue West from West 8th Street to the dead end to the north. Refusal was not encountered at any of these locations. All of the probes were extended to a depth of 15 feet. Groundwater was not observed in these probes.

North 23rd Avenue West: Probes B10 through B15 were conducted on North 23rd Avenue West between West 2nd Street and West Superior Street. Refusal was not encountered at any of these locations. All of the probes were extended to a depth of 15 feet. Groundwater was not observed in these probes.

Refusal was not encountered at any of the probe locations, all probes were extended to the planned termination depth of 15 feet. Refusal is defined as the point which the direct push probe could not be advanced further without excessive effort. Refusal can be caused by hardpan, cobbles, boulders, or bedrock.

Groundwater

It should be noted that groundwater may take several hours or days to seep in to and stabilize in an open hole, and our probes were backfilled immediately. Seasonal and annual fluctuations should also be anticipated.

General

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.

To have questions answered or schedule a time to meet and discuss our approach to this project further, please contact Kyle Warmuth (kwarmuth@braunintertec.com) at 218.624.4967.

Sincerely,

BRAUN INTERTEC CORPORATION



Kyle P. Warmuth, PE
Project Engineer



Steven A. Thayer, PE
Senior Manager, Senior Engineer

Attachments:

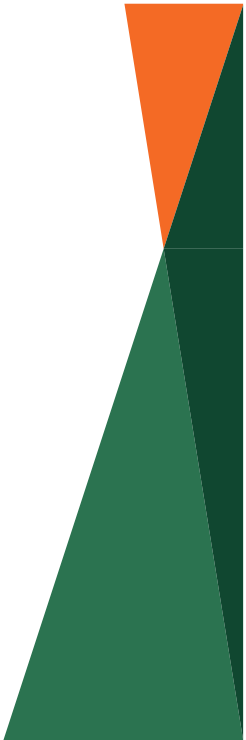
Direct Push Location Sketch with Refusal Depths (3 pages)

Boring Location	Boring Depth (feet)	Surface Elevation (feet)	Northing (UTM)	Easting (UTM)
B1	15	644.9	5179158	566128
B2	15	646.1	5179473	566614
B3	15	648.0	5179482	566604
B4	15	666.0	5179490	566596
B5	15	666.4	5179555	566539
B6	15	675.2	5179566	566526



Denotes Boring Location

**BRAUN
INTERTEC**
The Science You Build On.
4511 W 1st Street, Suite 4
Duluth, MN 55807
218.624.4967
braunintertec.com



Drawing Information

Project No:
B2410030
Drawing No:
Boring Location Sketch
Drawn By: ZS
Date Drawn: 11/14/2024
Checked By: KW
Last Modified: 11/14/2024

Project Information

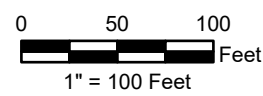
Duluth Water Main
Extension - Lincoln 3

Lincoln Park

Duluth, Minnesota

Boring Location
Sketch

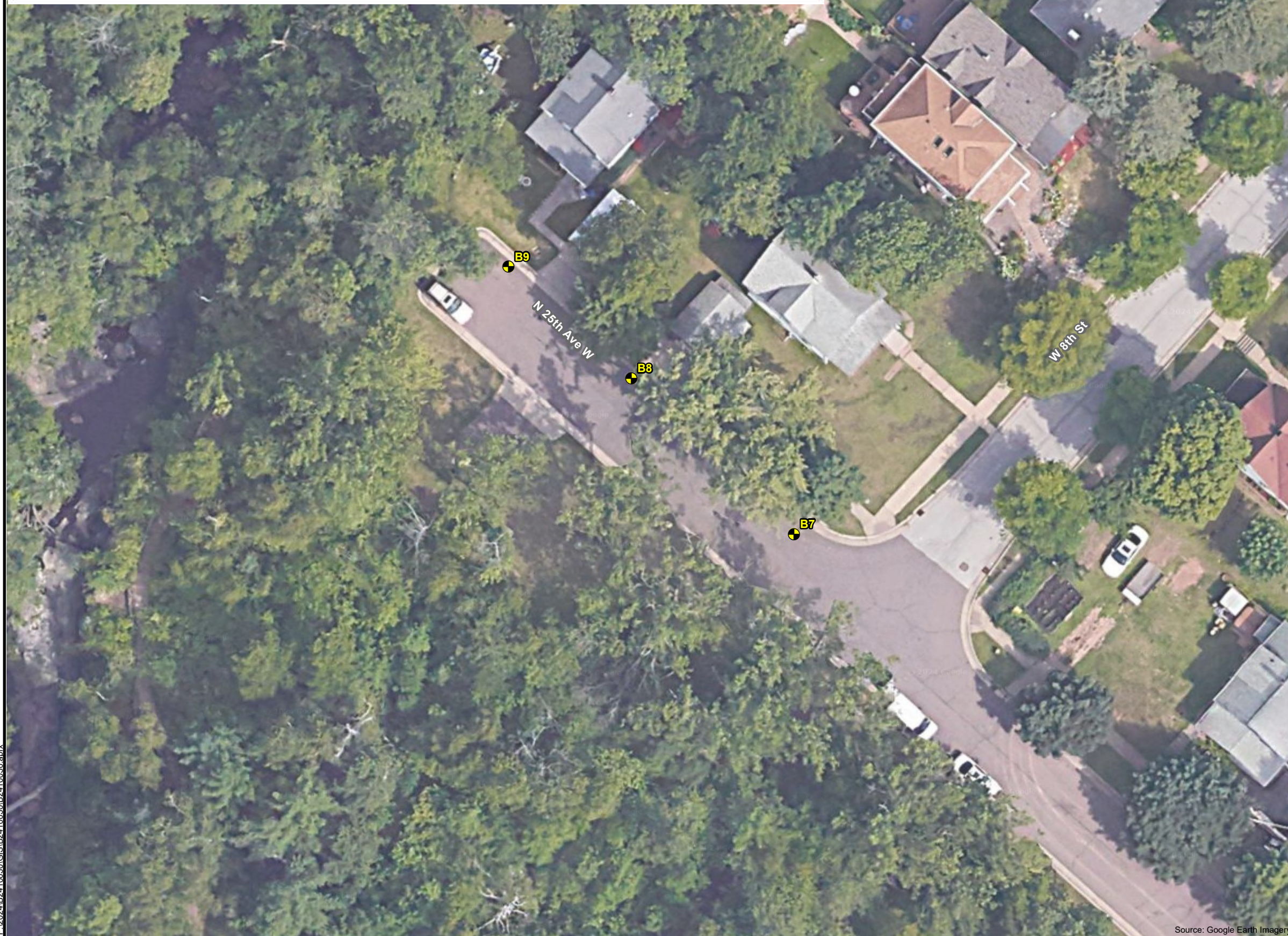
Sheet:
1 of 3



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Source: Google Earth Imagery

Boring Location	Boring Depth (feet)	Surface Elevation (feet)	Northing (UTM)	Easting (UTM)
B7	15	817.8	5179575	566517
B8	15	819.3	5179166	566119
B9	15	820.0	5179178	566105



☉ Denotes Boring Location



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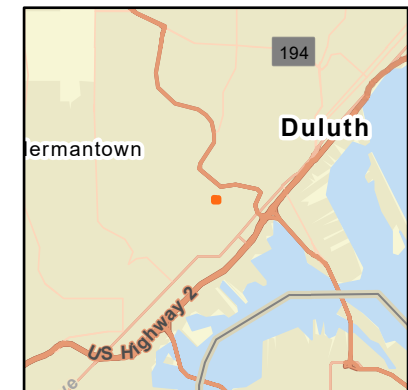
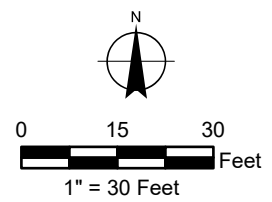
Project Information

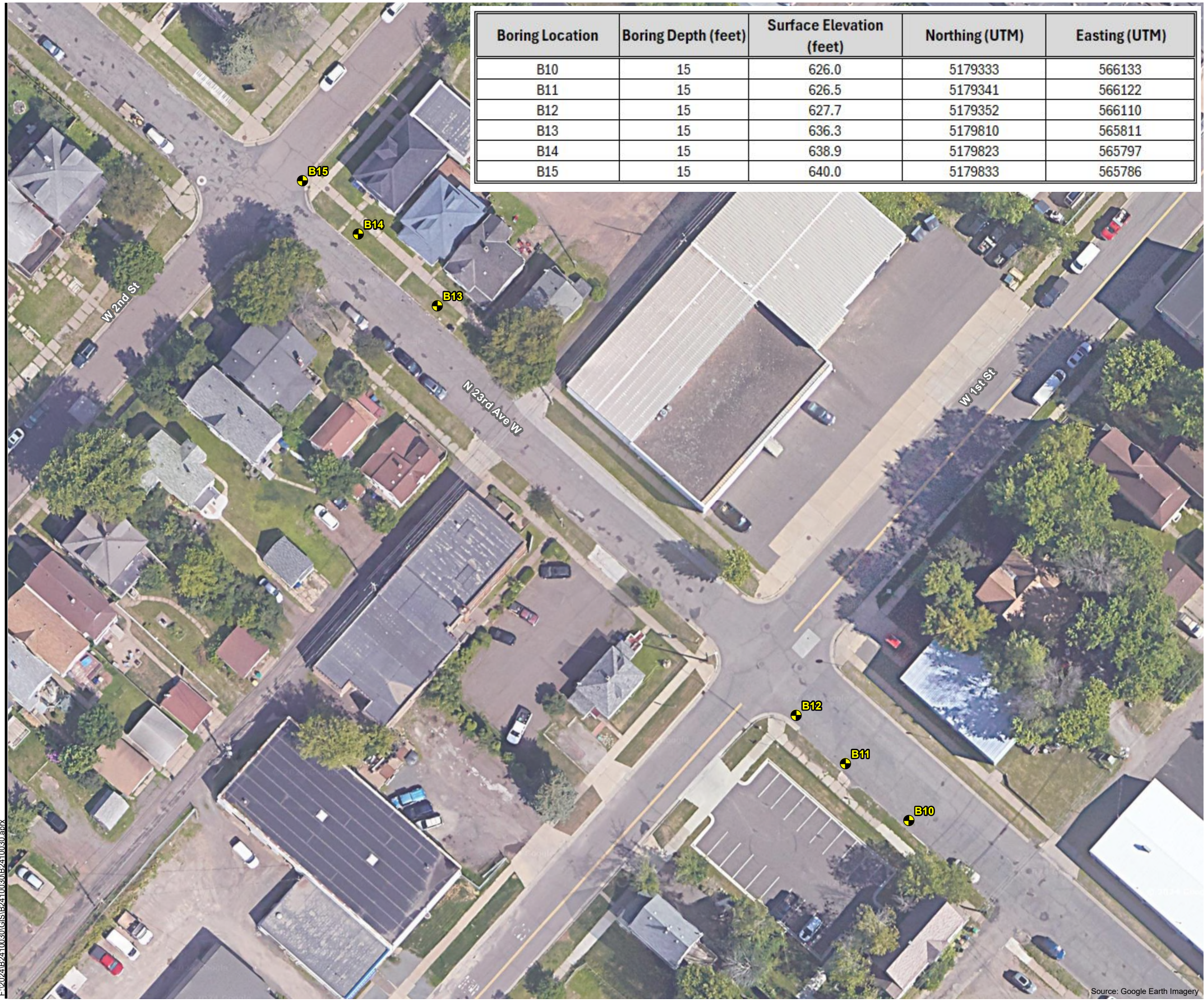
Duluth Water Main
Extension - Lincoln 3

Lincoln Park

Duluth, Minnesota

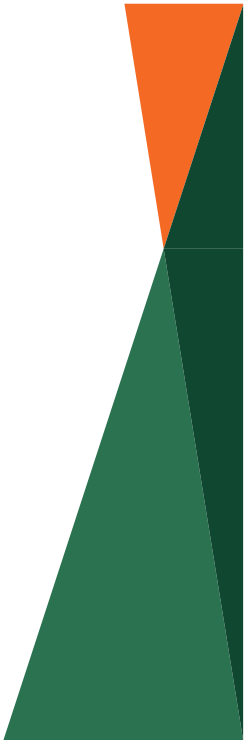
**Boring Location
Sketch**





Boring Location	Boring Depth (feet)	Surface Elevation (feet)	Northing (UTM)	Easting (UTM)
B10	15	626.0	5179333	566133
B11	15	626.5	5179341	566122
B12	15	627.7	5179352	566110
B13	15	636.3	5179810	565811
B14	15	638.9	5179823	565797
B15	15	640.0	5179833	565786

● Denotes Boring Location



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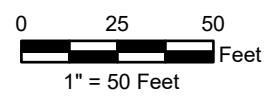
Project Information

Duluth Water Main
Extension - Lincoln 3

Lincoln Park

Duluth, Minnesota

Boring Location
Sketch



F:\2024\B2410030\GIS\B2410030\B2410030.aprx

Source: Google Earth Imagery