

Harder Avenue Improvements

City of Harris
Chisago County, Minnesota
April 2022

Prepared by:

MSA Professional Services
60 Plato Boulevard #140
St. Paul, MN 55107
www.msa-ps.com

Project No. 09520019

© April 2022 MSA Professional Services, Inc.



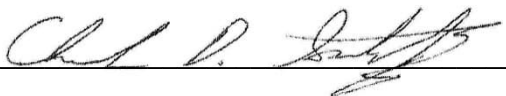
Harder Avenue Improvements

City of Harris, Minnesota

SUBMITTAL 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.

Print Name: Charles Schwartz, P.E.

Signature: 

Date: April 5, 2022

License #: 25765

TABLE OF CONTENTS

	<u>PAGE</u>
I. INTRODUCTION	1
II. PURPOSE.....	2
III. EXISTING CONDITIONS	2
IV. PROPOSED IMPROVEMENTS.....	3
V. RIGHT-OF-WAY, EASEMENTS AND PERMITS	4
VI. INFORMATIONAL MEETINGS	4
VII. RECOMMENDED IMPROVEMENT OPTIONS	4
VIII. FINANCING AND ASSESSMENTS.....	5
IX. NECESSITY AND COST-EFFECTIVENESS	5
X. PROJECT SCHEDULE.....	6
XI. CONCLUSION AND RECOMMENDATION	6

LIST OF TABLES

<i>Table VII.1: Estimate of Project Costs.....</i>	<i>6</i>
<i>Table A.1: Estimate of Probable Costs – Option 1: 24-foot Roadway</i>	<i>Appendix</i>
<i>Table A.2: Estimate of Probable Costs – Option 2: 28-foot Roadway</i>	<i>Appendix</i>

LIST OF EXHIBITS

<i>Exhibit I.1: Project Area</i>	<i>1</i>
<i>Exhibit A.1: Typical Section</i>	<i>Appendix</i>
<i>Exhibit A.2: Assessment Area & Parcel Numbers.....</i>	<i>Appendix</i>
<i>Exhibit A.3: Assessment Role.....</i>	<i>Appendix</i>

I. INTRODUCTION

On November 8, 2021, the City Council unanimously passed a resolution authorizing this Harder Avenue Feasibility Study. The study is necessary to assess whether improvements should be made to the roadway and determine estimated costs of the improvements as recommended. The road improvements will begin at the intersection of Harder Avenue and 420th Street. The project will extend north up Harder Avenue approximately 0.8 miles until it reaches the paved portion.

Exhibit I.1 – Project Area



II. PURPOSE

The purpose of this study is to analyze the necessity, possible alternatives, and cost effectiveness of the proposed street improvements. The study discusses the existing conditions, proposed improvements, estimated construction costs, and financing sources necessary to complete the proposed work.

III. EXISTING CONDITIONS

The existing conditions of the roadway were evaluated to determine current system capacity and areas of concern. As part of the project scope, a site visit and review of available information of the project area was completed. Below is a summary of the information collected on the conditions, separated into the project groupings.

SOILS/BEDROCK

According to the Natural Resources Conservation Service (NRCS) database, the underlying soils can generally be described as:

- Nymore loamy sand, 1 to 6% slopes, hydrologic soil group A. Group A soils typically have a high infiltration rate (low runoff potential) when thoroughly wetted.
- Mahtomedi loamy sand, 1 to 6% slopes, hydrologic group A.

On February 23, 2022, soil borings were completed by Independent Testing Technologies (ITT). Their findings were presented in a March 14, 2022 report. Boring SB-1 was conducted in existing pavement and encountered 5.0 inches of bituminous pavement, but no discernable aggregate base. The rest of the borings were conducted in the existing gravel surfaced roadway and encountered 4.0 to 14.0 inches of aggregate surfacing.

Below the aggregate, boring SB-2 encountered silty sand (SM) fill to 2.5 feet, followed by native, fine grained poorly graded sand with silt (SP-SM) to 5.0 feet and then poorly graded sand (SP) to termination at 14.9 feet. Boring SB-3 encountered silty sand (SM) fill to 2.5 feet, followed by native, fine grained poorly graded sand with silt (SP-SM) to 5.0 feet and then poorly graded sand (SP) to termination at 14.9 feet. Boring SB-4 encountered silty sand (SM) fill to 2.5 feet, followed by native, poorly graded sand (SP) to termination at 14.9 feet. Groundwater was not encountered in any of the borings on Harder Avenue during drilling.

TRAFFIC

The gravel section of Harder Avenue is a low volume local road, providing access to residential households located along the project route. At this time average daily traffic (ADT) has not been accessed by the City or MnDOT. Commercial vehicles from Knife River are encouraged to use the paved section of Harder Avenue.

EXISTING ROADWAY

Harder Avenue from 420th Street to its northern connection where it meets pavement is a rural roadway (no curb and gutter). It is approximately 30 feet wide throughout its entire length. The paved northern section of Harder Avenue is 28 feet wide. While the paved portion of Harder Avenue is in need of reconditioning, the City is not including it in the scope of this project. According to the Chisago County GIS Map, the right-of-way width is 66-feet along the Harder Avenue corridor. The driving surface throughout the project area is gravel.

Harder Avenue consist of a gravel surface mixed with the underlying sand sub-base. In 2019, the City placed 2-inches of gravel along the roadway, costing \$21,200. According to the soil borings, the aggregate thickness varied between 4 – 14 inches.

It has been the observation of the City of Harris that the road exhibits reasonable strength and therefore the roadway sub-base should not require substantial strengthening before paving the surface. The City will assess the need for additional gravel prior to paving and possibly add gravel as necessary as part of their normal street maintenance practice for gravel roads. For the purpose of this report, we have incorporated an additional 2-inches of gravel into the project scope. If the City adds gravel to Harder Avenue under its normal maintain practice, it would lower assessment amounts accordingly. The surface and shoulder width of Harder Avenue appear wide enough to install 24-foot or 28-foot wide pavement in accordance with the City's standard street section.

OTHER PAVING PROJECTS

Combining projects into a larger project typically leads to better unit pricings. Cost savings result from; economies of scale, only one set of construction contracts to prepare, lower contractor mobilization costs, and one construction project to administrate. Other paving projects to consider bidding concurrently with the Harder Avenue project include:

- Falcon Avenue – The City recently contributed funds from Chisago County to pave the road south of the Gun Club.
- Ginger Avenue – The Whispering Pines development is located north of 425th Street. The surface course of pavement was never placed when this development was originally constructed in the early 2000s.

IV. PROPOSED IMPROVEMENTS

A “shape and pave” project typically includes adding aggregate base course (gravel) as needed, shaping of the crown of the roadway, minor ditch grading to facilitate drainage, and paving the surface of the roadway. Exhibit A.2 depicts the typical cross section recommended for this project.

Harder Avenue is ideally suited for the shape and pave improvement project from 420th to where it is paved. There will be no work done on Harder Avenue where it is already paved. We propose that these roadways be improved to best fit the existing roadway embankment to minimize expenses.

The improvements will add approximately 2 inches of new Class 5 aggregate to add strength to the sub-base before placing Hot Mix Asphalt. Our office reached out to the contractor that typically grades Harder Avenue for his input. He is of the opinion that a 2-inch mat of Hot Mix Asphalt will perform adequately for the City's needs. This is an approach Lent Township regularly takes on similar projects. The geotechnical consultant recommends the pavement thickness be increased to 3.5-inches. The improvements will be within the permitted right-of-way; primarily contained within the existing roadway as traveled and the shoulder area. No minor grading of ditches to accommodate the desired width of the roadways is included in the project scope.

In keeping with the City of Harris design standards, the return radii at intersections will be a minimum of 30 feet for collector roads. The bituminous mat will be extended out at mailboxes and driveways. These extensions will be implemented to strengthen the shoulder and prevent the edge of bituminous pavement mat from breaking off or raveling. Widening the edge of the bituminous mat at driveways also protects the pavement of the driving lane. Where driveways are paved and extended close to the edge of the traveled way, the bituminous pavement will be extended to meet the existing driveway pavement.

We recommend the City contract for placement and final preparation of the aggregate base course as well as the placement of the bituminous pavement. It is assumed that the City would complete any necessary drainage improvements and final restoration. With small projects, the City would pay a premium for the mobilization of different crews to accomplish these tasks. The increased costs on a small project drive the costs to a point that they would not be sustainable.

V. RIGHT-OF-WAY, EASEMENTS AND PERMITS

The Harder Avenue right-of-way is 66-feet wide. Both the proposed options will not exceed the current width of the roadway.

VI. INFORMATIONAL MEETINGS

City Staff has not yet held the neighborhood meeting to solicit public feedback for the proposed project. The City will conduct Improvement and Assessment Hearings in accordance with the MN 429 Special Assessment Statute as the improvements are to be assessed.

VII. RECOMMENDED IMPROVEMENT OPTIONS

MSA Professional Services, Inc. (MSA) develops opinions of construction cost based on the complexity of the proposed project and the bid prices received on previous similar projects. The volume of projects bidding, the cost of raw materials, the cost of fuels and other various factors can have a significant impact on the cost of construction.

In this case, we have bid prices other projects in nearby communities. This study assumes the paving of these gravel roads can be completed at reasonably similar prices. The first option is to pave Harder Avenue with a 24-foot roadway to conform with the City's standards. The second

option is to pave Harder Avenue with a 28-foot roadway to match the existing pavement in the northern section of the roadway.

The estimated construction costs and associated overhead costs for the proposed improvements are summarized in Table VII.1 below. A detailed estimate considered can be found in the Appendix on Exhibits A.1-2.

Table VII.1: Estimated Project Costs

	OPTION 1 – 24-foot Roadway	OPTION 2 – 28-foot Roadway
HARDER AVENUE IMPROVEMENTS	\$242,000	\$278,000

VIII. FINANCING AND ASSESSMENTS

It is assumed the improvements as discussed in this report will be financed through the “adjusted front footage method” of assessment. To determine the adjusted front footage of each lot, the assessable cost is divided by the actual frontage benefiting from the improvement. Street construction projects are typically assessed over a 20-year period. Per City Assessment Manual, interest is assessed at 2% over the average interest rate of bonds rounded to the nearest ¼ percent.

For a 24-foot roadway, assessments range from \$10,010 – \$40,280 per parcel. For a 28-foot roadway, assessments range from \$11,500 – \$46,250 per parcel. Assuming an interest rate of 5% over a 20-year period, assessment for a 24-foot wide road equates to total annual cost of \$800 – \$3,230 depending upon each parcels front footage. These would increase to \$920 – \$3710 per assessment for a 28-foot wide road.

IX. NECESSITY AND COST-EFFECTIVENESS

It is our opinion that Harder Avenue should be paved with a bituminous surface. The continuous grading efforts and additions of gravel to maintain the surface are costly to the City and deplete natural resources. As is typical in rural residential areas, traffic along gravel roads can cause annoying and irritating dust problems.

The proposed shape and pave improvement is cost effective for the City. Other paving options for improving the roadway surface are not suitable. Portland cement concrete paving is expensive and unrealistic for this application. The life cycle costs of concrete can only be justified for roads subjected to heavy and frequent traffic loading.

The paving of Harder Avenue is also feasible from an engineering perspective. The City of Harris has improved streets in various parts of the City and found the improvements to increase the value of the properties benefiting from the improvements. The street cross section shows both

an acceptable width for the pavement surface and shoulders and the structural strength to support the anticipated traffic loading.

If necessary, minor drainage improvements should be completed by City forces ahead of the improvements included herein to protect the street structure from saturation during the more frequent rainfalls and spring snowmelt.

X. PROJECT SCHEDULE

Task	Action	Date
1	Council Receives the Feasibility Study and Orders the Improvement Hearing	April 11, 2022
2	First Published Notice	April 21, 2022
3	Second Published Notice	April 28, 2022
4	Improvement Hearing and Council Orders Improvement	May 9, 2022
5	Council Approves Plans and Orders Bid Advertisement	June 13, 2022
6	First Published Notice	June 23, 2022
7	Second Published Notice	June 30, 2022
8	Bid Letting	July 7, 2022
9	Council Receives Bids and Orders Assessment Hearing	July 11, 2022
10	First Published Notice	July 21, 2022
11	Second Published Notice	July 28, 2022
12	Assessment Hearing	August 11, 2022
12	Council Awards Project	September 12, 2022
13	Construction Begins	September 2022
14	Construction Complete	October 2022
15	Warranty Review	Summer 2023

XI. CONCLUSION & RECOMMENDATION

It is recommended that the City choose Option 1: 24-foot Roadway. The total estimated project cost of the project, which includes the roadway improvements as well as overhead and contingency cost, is \$242,000. It is recommended that this study be used as a guide for the layout, design, cost allocation, and project scheduling for the public improvements. It is future recommended that the City bid this project with Falcon Avenue south of the Gun Club and Ginger Avenue within the Whispering Pines Subdivision. The next step in the assessment project process is to order the Improvement Hearing.

APPENDIX

Table A.1

PROJECT DESCRIPTION: HARDER AVENUE FEASIBILITY STUDY - OPTION 1

MSA PROJECT NUMBER: 09520019

CREATED BY: EEB

CHECKED BY:

DATE UPDATED 4/5/2022
ESTIMATE YEAR: 2021
CONSTRUCTION YEAR: 2022

ITEM NO.	DESCRIPTION	QTY.	UNIT	UNIT PRICE	TOTAL PRICE
	<u>SCHEDULE 1.0 - STREET</u>				
1	MOBILIZATION	1	LS	\$7,000.00	\$7,000.00
2	REMOVE BITUMINOUS PAVEMENT	145	SY	\$10.00	\$1,450.00
3	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	131	LF	\$4.00	\$524.00
4	SALVAGE MAIL BOX	10	EA	\$150.00	\$1,500.00
5	SUBGRADE EXCAVATION (EV)	208	CY	\$18.00	\$3,744.00
6	AGGREGATE SURFACING, (LV), CLASS II	184	CY	\$35.00	\$6,440.00
7	AGGREGATE BASE CLASS 5	1760	TON	\$18.00	\$31,680.00
8	MILL BITUMINOUS SURFACE (1.5")	13	SY	\$20.00	\$260.00
9	BITUMINOUS MATERIAL FOR TACK COAT	587	GAL	\$5.00	\$2,935.00
10	TYPE SP 9.5 WEAR COURSE MIXTURE 2B (STREET)	1070	TON	\$65.00	\$69,550.00
11	TYPE SP 12.5 NON-WEARING COURSE MIXTURE 2B (STREET)	1426	TON	\$65.00	\$92,690.00
12	TRAFFIC CONTROL	1	LS	\$2,000.00	\$2,000.00
CONSTRUCTION SUBTOTAL					\$219,773.00
					
CONTINGENCY 22%					\$21,977.00
TOTAL COST:					\$241,750.00

Table A.2

PROJECT DESCRIPTION: HARDER AVENUE FEASIBILITY STUDY - OPTION 2

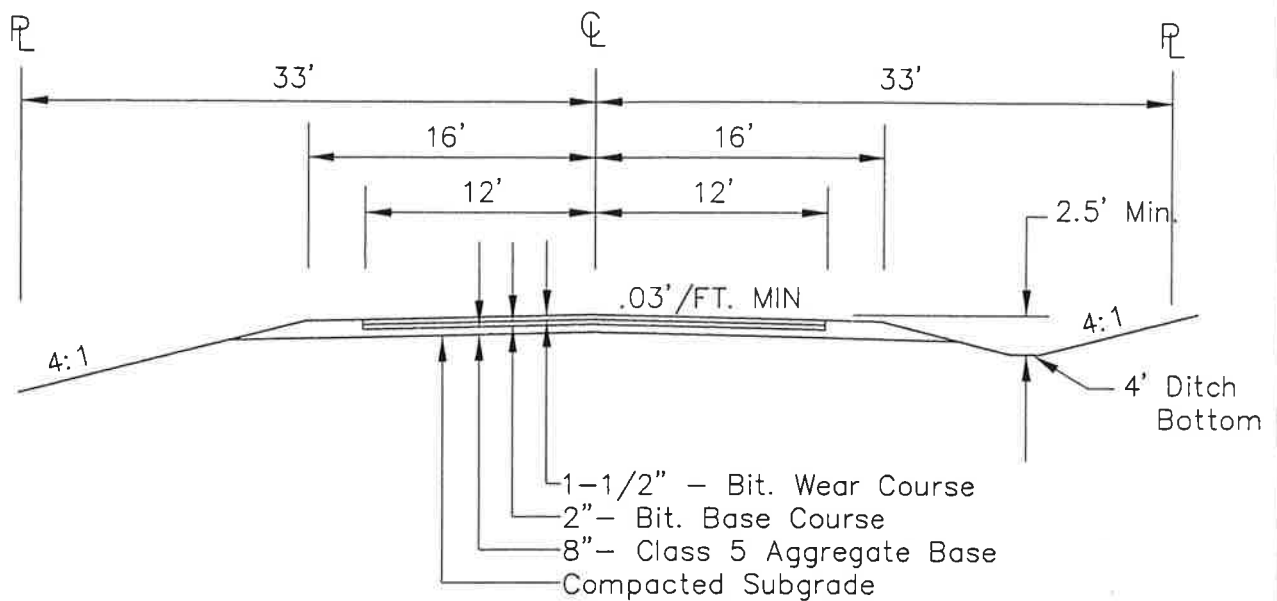
MSA PROJECT NUMBER: 09520019

CREATED BY: EEB

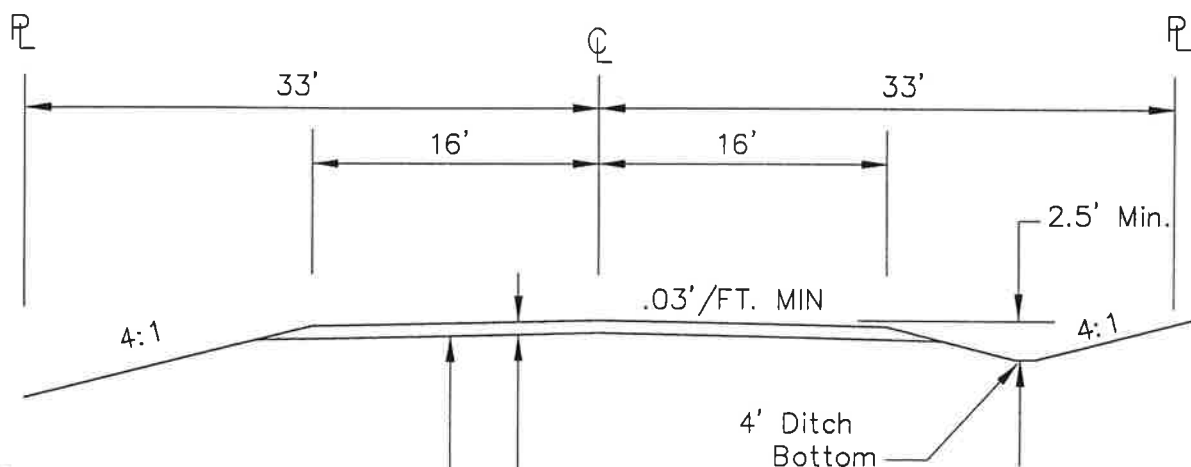
CHECKED BY:

DATE UPDATED 4/5/2022
ESTIMATE YEAR: 2021
CONSTRUCTION YEAR: 2022

ITEM NO.	DESCRIPTION	QTY.	UNIT	UNIT PRICE	TOTAL PRICE
	<u>SCHEDULE 1.0 - STREET</u>				
1	MOBILIZATION	1	LS	\$7,000.00	\$7,000.00
2	REMOVE BITUMINOUS PAVEMENT	145	SY	\$10.00	\$1,450.00
3	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	131	LF	\$4.00	\$524.00
4	SALVAGE MAIL BOX	10	EA	\$150.00	\$1,500.00
5	SUBGRADE EXCAVATION (EV)	238	CY	\$18.00	\$4,284.00
6	AGGREGATE SURFACING, (LV), CLASS II	184	CY	\$35.00	\$6,440.00
7	AGGREGATE BASE CLASS 5	2011	TON	\$18.00	\$36,198.00
8	MILL BITUMINOUS SURFACE (1.5")	13	SY	\$20.00	\$260.00
9	BITUMINOUS MATERIAL FOR TACK COAT	685	GAL	\$5.00	\$3,425.00
10	TYPE SP 9.5 WEAR COURSE MIXTURE 2B (STREET)	1248	TON	\$65.00	\$81,120.00
11	TYPE SP 12.5 NON-WEARING COURSE MIXTURE 2B (STREET)	1664	TON	\$65.00	\$108,160.00
12	TRAFFIC CONTROL	1	LS	\$2,000.00	\$2,000.00
CONSTRUCTION SUBTOTAL					\$252,361.00
					
CONTINGENCY 22%					\$25,236.00
TOTAL COST:					\$277,597.00



BITUMINOUS STREET



NOTES:

1. All organic or other unsuitable material shall be removed from beneath the roadway.
2. A test roll of the prepared subgrade shall be preformed by the owner in the presence of a city inspector. The city has the authority to require additional subgrade correction.

GRAVEL STREET

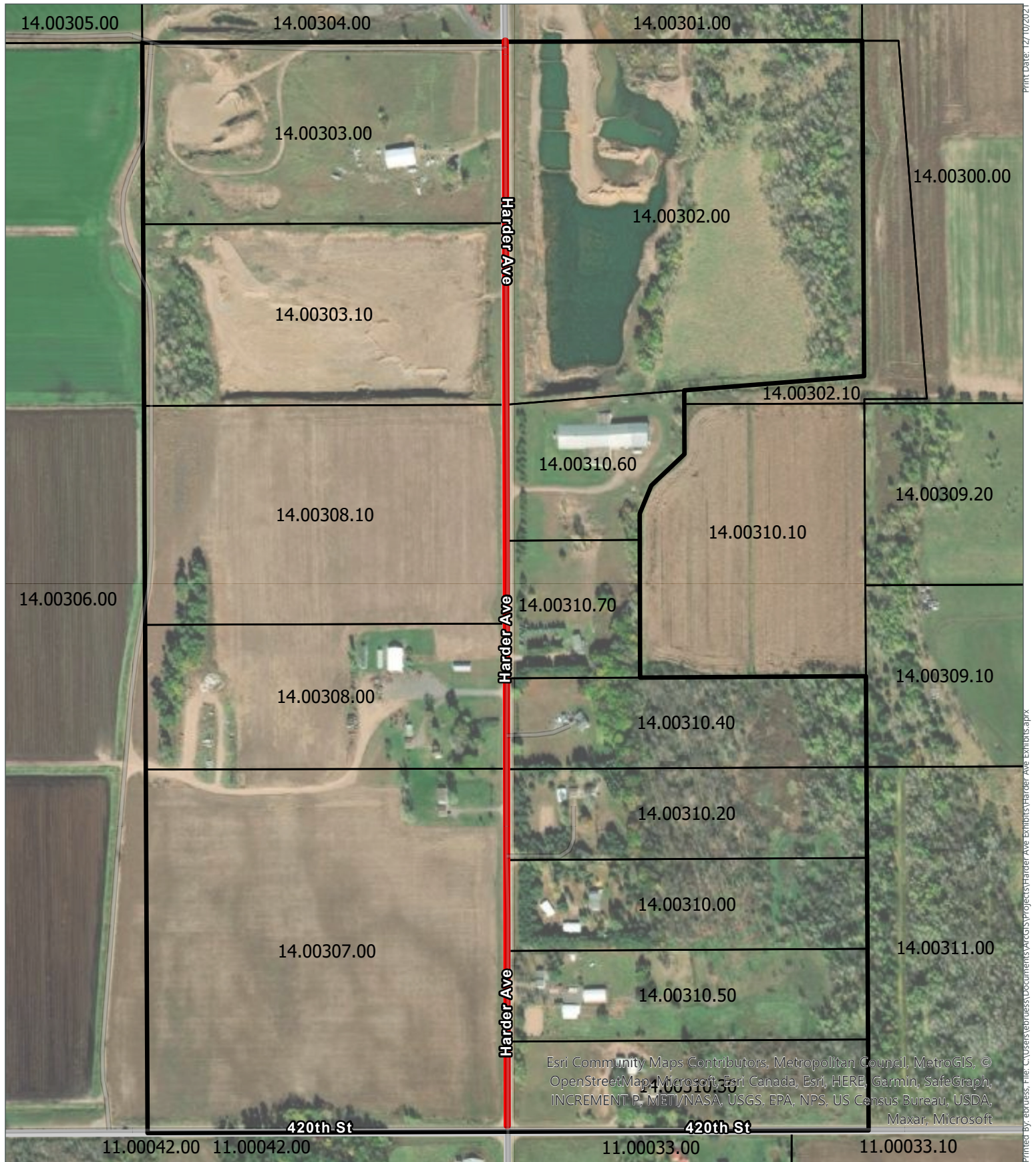
STANDARD DETAILS
TYPICAL SECTIONS FOR RESIDENTIAL STREETS
RURAL SECTION

HARRIS, MINNESOTA

Last Revision:
MAR.2005

BRA Plate No.
M-1

City Plate No.
STR-09



Print Date: 12/10/2021
 Printed by address: File: C:\Users\rbt\Documents\Projects\Harder Ave Exhibit\Harder Ave Exhibit.aprx



EXHIBIT A. 2

ASSESSMENT AREA & PARCEL NUMBERS

HARRIS
 CHISAGO COUNTY, MN



Exhibit A.3

HARDER AVENUE IMPROVEMENTS PROJECT

HARRIS, MINNESOTA

MSA PROJECT NO. 09520019

ASSESSMENT ROLE

NO.	PIN NUMBER	OWNER	PROPERTY ADDRESS	CITY	STATE	ZIP	Adjusted Front Footage	Assessment
1	14.00310.40	VILLAFUERTE JEFFREY	42275 HARDER AVE	HARRIS	MN	55032	328.06	\$10,011
2	14.00308.00	EDWARD FIELDS & SONS INC	42298 HARDER AVE	HARRIS	MN	55032	528.49	\$16,127
3	14.00303.10	KNIFE RIVER CORP-NORTH CENTRAL	42945 HARDER AVE	HARRIS	MN	55032	659.1	\$20,113
4	14.00310.20	MILLER PAUL W & STEPHEN P	42189 HARDER AVE	HARRIS	MN	55032	330	\$10,070
5	14.00307.00	EDWARD FIELDS & SONS INC	42230 HARDER AVE	HARRIS	MN	55032	1320	\$40,280
6	14.00310.60	ED FIELDS & SONS INC	42439 HARDER AVE	HARRIS	MN	55032	493.89	\$15,071
7	14.00310.50	STEVEN D & SHARI J DENNY REVOCABLE TRUST	42095 HARDER AVE	HARRIS	MN	55032	330	\$10,070
8	14.00310.30	ONEY FRANK A & SHELLEY L	7874 420TH ST	HARRIS	MN	55032	330	\$10,070
9	14.00302.00	KNIFE RIVER CORP-NORTH CENTRAL	42945 HARDER AVE	HARRIS	MN	55032	1318.19	\$40,225
10	14.00303.00	NOWAK BRUCE MARK	42680 HARDER AVE	HARRIS	MN	55032	659.1	\$20,113
11	14.00310.70	MOELLER ALEC	42325 HARDER AVE	HARRIS	MN	55032	500	\$15,258
12	14.00310.00	NEURER KERRY W & ANITA C	42181 HARDER AVE	HARRIS	MN	55032	330	\$10,070
13	14.00308.10	KNIFE RIVER CORP-NORTH CENTRAL	42945 HARDER AVE	HARRIS	MN	55032	795.4	\$24,272

Total 241,750