



# PRELIMINARY ENGINEERS REPORT

## Faribault County Ditch 52 Improvement

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## Faribault County Ditch 52

February 11, 2022  
Maple Grove, MN



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 Engineer under the laws of the State of Minnesota

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February 11, 2022

Date

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# 1 INTRODUCTION

The petitioned project consists of an improvement of Faribault County Ditch 52 (CD 52). The improvement will increase the capacity of the tile along the Main Trunk and Branches (excluding Branches 32 and 35). The proposed project location and its drainage area are shown in **Figure 1**. The proposed project is a result of a petition received by the Faribault County Board of Commissioners (Board), as Drainage Authority for CD 52, from several landowners requesting the Improvement. A copy of the petition for the improvement is included in **Exhibit A**.

The petition for the improvement of CD 52 states that the drainage system has insufficient capacity and is out of repair. Furthermore, it states the installation of larger and/or deeper tile is required to furnish sufficient drainage capacity and fulfill its original intended purpose; and the proposed improvement will be of public utility and promote the public health. The petition for the Improvement of CD 52 was filed with the Board in accordance with Minnesota Statute (Minn. Stat.) 103E.225. The Board appointed Houston Engineering, Inc. (HEI) as project engineer and ordered the preparation of the Engineer's Preliminary Survey Report in accordance with Minn. Stat. § 103E.241, Subd. 1.

## 1.1 OVERVIEW OF EXISTING DRAINAGE SYSTEM

The CD 52 drainage system is located in Sections 30 and 31 of Blue Earth City Township (T102N, R27W); Section 6 of Elmore Township (T101N R27W); Sections 25, 26, 35, and 36 of Jo Daviess Township (T102N R28W); and Sections 1 and 2 of Pilot Grove Township (T101N R28W). The drainage system was established and constructed in 1916 and consists entirely of tile.

The Main Trunk begins in the southwest quarter of the northeast quarter of Section 1, Township 101 North Range 28 West (Pilot Grove Township); thence westerly through the southeast quarter of the northwest quarter of Section 1, and into the southwest quarter of the northwest quarter of Section 1, turning north into the northwest quarter of the northwest quarter of Section 1; continuing through the southwest quarter of the southwest quarter of Section 36, Township 102 North Range 28 West (Jo Daviess Township), turning north-north-east through the northwest quarter of the southwest quarter of Section 36, through the northeast quarter of the southwest quarter of Section 36, and into the southeast quarter of the northwest quarter of Section 36 where the junction of Branch 70 occurs; then turning east into the southwest quarter of the northeast quarter of Section 36, turning southeast into the northwest quarter of the southeast quarter of Section 36, through the southeast quarter of the northeast quarter of Section 36; thence south through the southwest quarter of the northwest quarter of Section 31, Township 102 North Range 27 West (Blue Earth City Township), the northwest quarter of the southwest quarter of Section 31, and the southwest quarter of the southwest quarter of Section 31; then meandering between Section 31, and Section 6, Township 101 North Range 27 West (Elmore Township); into the northwest quarter of the northwest quarter of Section 6, thence into the southwest quarter of the southwest quarter of Section 31, turning through the southeast

quarter of the southwest quarter of Section 31, south into the northeast quarter of the northwest quarter of Section 6, and the northwest quarter of the northeast quarter of Section 6, turning into the southwest quarter of the southeast quarter of Section 31, thence south back into the northwest quarter of the northeast quarter of Section 6, and east into the northeast quarter of the northeast quarter of Section 6 where CD 52 outlets into a natural channel tributary of the Blue Earth River.

Branch 10 begins and ends in the southeast quarter of the northwest quarter of Section 1 Township 101 North Range 28 West (Pilot Grove Township) where it joins the Main Trunk.

Branch 38 begins in the southeast quarter of the southwest quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), proceeding westerly into the southwest quarter of the southwest quarter of Section 36 to its junction with the Main Trunk.

Branch 70+6 begins in the northeast quarter of the southwest quarter of Section 35 Township 102 North Range 28 West (Jo Daviess Township), thence easterly into the northwest quarter of the southwest quarter of Section 36, turning northeast into the southwest quarter of the northwest quarter of Section 36, just into the southeast quarter of the northwest quarter of Section 36 to its junction with Branch 70.

Branch 70 begins in the southwest quarter of the southwest quarter of Section 25 Township 102 North Range 28 West (Jo Daviess Township), proceeds through the northwest quarter of the northwest quarter of Section 36, through the corner of the southwest quarter of the northwest quarter of Section 36, into the southeast quarter of the northwest quarter of Section 36, at its connection with Branch 70+6, continues east, and terminates at the confluence with the Main Trunk.

Branch 79 begins and end in the southwest quarter of the northeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township) where it joins the Main Trunk.

Branch 102 begins in the northeast quarter of the southeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), proceeding into the southeast quarter of the northeast quarter of Section 36 to the junction with the Main Trunk.

Branch 108 begins in the northeast quarter of the southeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), proceeding into the southeast quarter of the northeast quarter of Section 36 to the junction with the Main Trunk.

Branch 110 begins in the southwest quarter of the southeast quarter of Section 30 Township 102 North Range 27 West (Blue Earth City Township), proceeding westerly into the southeast quarter of the southwest quarter of Section 30, briefly into the southwest quarter of the southwest quarter of Section 30, turning south into the northwest quarter of the northwest

quarter of Section 31, continuing into the southwest quarter of the northwest quarter of Section 31, at its connection with Branch 110+7, and continues south joining the Main Trunk.

Branch 110+7 begins in the southeast quarter of the northeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), proceeding southeasterly into the southwest quarter of the northwest quarter of Section 31 Township 102 North Range 27 West (Blue Earth City Township), where it joins Branch 110.

Branch 110+31 begins in the southeast quarter in Section 25 Township 102 North Range 28 West (Jo Daviess Township), then proceeds southeast where it joins Branch 110 in the southwest quarter of the southwest quarter in Section 30 Township 102 North Range 27 West (Blue Earth City Township).

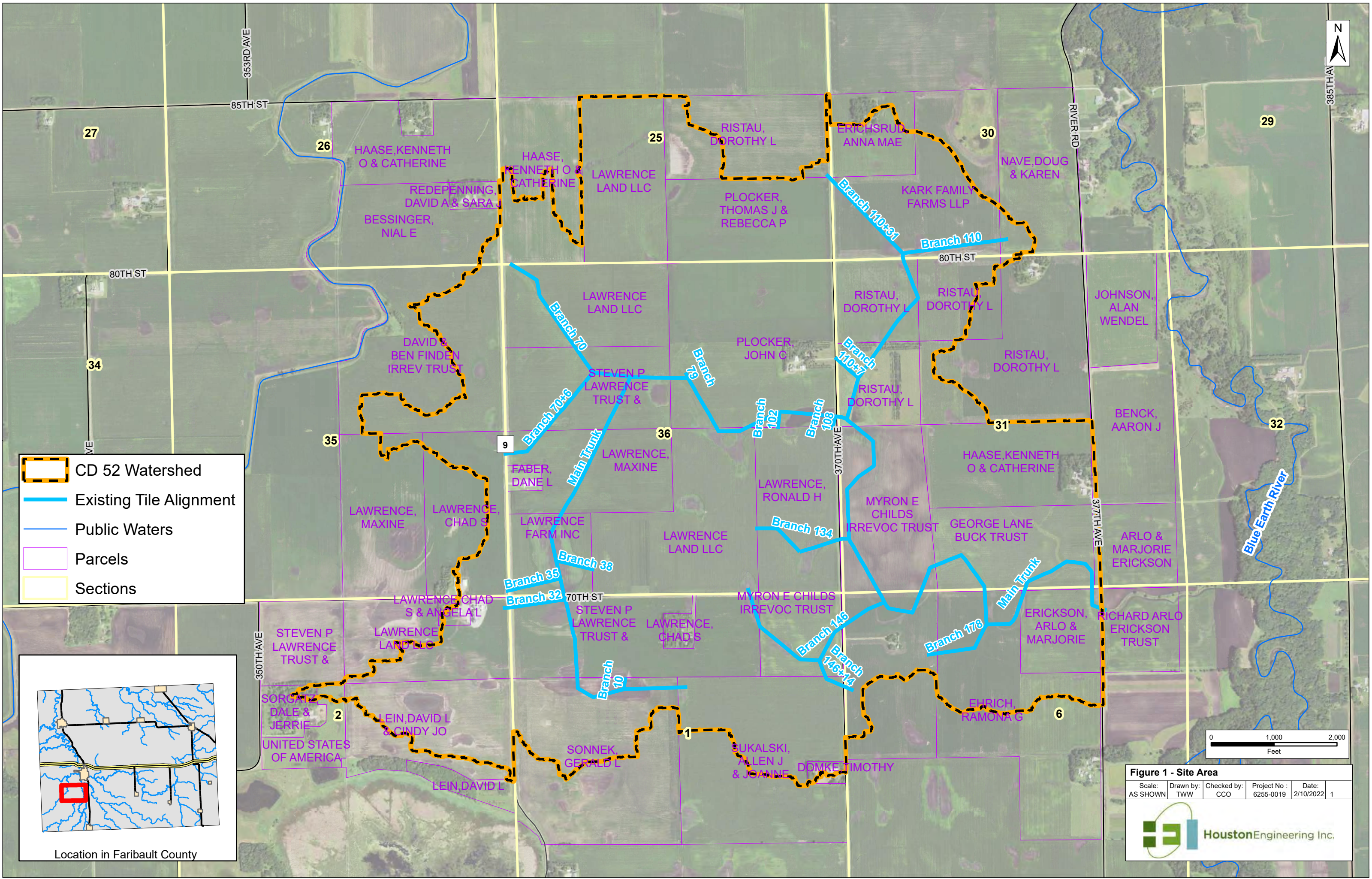
Branch 134 begins in the southwest quarter of the southeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), proceeding easterly through the southeast quarter of the southeast quarter of Section 36, thence into the southwest quarter of the southwest quarter of Section 31 Township 102 North Range 27 West (Blue Earth City Township), to the confluence with the Main Trunk.

Branch 146 begins in the southwest quarter of the southeast quarter of Section 36 Township 102 North Range 28 West (Jo Daviess Township), then proceeds southerly into the northwest quarter of the northeast quarter of Section 1 Township 101 North Range 28 West (Pilot Grove Township), through the northeast quarter of the northeast quarter of Section 1, into the northwest quarter of the northwest quarter of Section 6 Township 101 North Range 27 West (Elmore Township) to its junction with the Main Trunk.

Branch 146+14 begins in the southwest quarter of the northwest quarter of Section 6 Township 101 North Range 27 West (Elmore Township), thence northwesterly into the corner of the southeast quarter of the northeast quarter of Section 1 Township 101 North Range 28 West (Pilot Grove Township), and into the northeast quarter of the northeast quarter of Section 1 where it joins Branch 146.

Branch 178 begins in in the northwest quarter of the northwest quarter of Section 6 Township 101 North Range 27 West (Elmore Township), thence easterly into the northeast quarter of the northwest quarter of Section 6 to the confluence with the Main Trunk.





CD 52 Watershed

Existing Tile Alignment

Public Waters

Parcels

Sections

Location in Faribault County

Figure 1 - Site Area

Scale:	Drawn by:	Checked by:	Project No :	Date:	
AS SHOWN	TWW	CCO	6255-0019	2/10/2022	1

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## 2 PROJECT DESIGN AND SITE SURVEY

### 2.1 SITE SURVEY AND EXISTING CONDITIONS

Landowners have observed prolonged flooding of agricultural lands in the area drained by CD 52. An investigation of the problems being experienced within the drainage area, through examination of the drainage system record and field investigations, indicates that the problems are due to both insufficient capacity and disrepair of the tile system. There have been multiple failures per year over the past decade. The failures, primarily caused by separated joints or collapsed tile, result in repair costs and crop damage, depending on the timing of the failures.

Recently, approximately 2 miles of the Main Trunk tile, out of its 3.5-mile total length, was televised to evaluate the overall condition of CD 52 and identify locations of incoming laterals. The televised segments are shown in **Exhibit B**. The televising discovered 22 locations where the tile is either failing, broken, cracked, or has significant joint displacement. These findings were expected as the tile system was constructed in 1916 and is now over 100 years old. Though the entire system was not reviewed, the televising provides a representative sample of conditions that exist throughout the CD 52 drainage system. As a result of the tile's condition and age, it is past its functional life and cannot be effectively maintained and must be replaced in its entirety to restore it to the as-built condition capacity.

An on-site survey was completed by HEI in October 2021 to determine the location and elevation of the existing tile at the tile outlet and known tile intakes. LiDAR elevation data from the State of Minnesota was utilized to develop drainage patterns and catchment boundaries and determine tile-laying depths. The project site survey is displayed in **Exhibit B**. The survey also collected profile and channel cross sectional elevations in the unnamed tributary near the outlet of CD 52 which was used to assess the adequacy of the outlet (see Section 4.4.2). Historic plan and profile drawings identify the size and grade of the existing concrete tile. Tile sizes range from 4- to 30-inches, providing a theoretical capacity of 1/8 to 1/4 inches per day when it was originally constructed (see **Exhibit C**). Note that function of any given segment of tile is limited by the capacity of any given downstream tile segment.

A Gopher One 'design level Locates' request was completed to identify areas of potential concern for utilities present in the immediate vicinity of the CD 52 tile. Based on this request, several copper and fiber optic lines will require crossing during construction. **Exhibit I** displays the results of the design level locates request. Gopher One shall be contacted prior to construction activities for field locates of these utilities.

### 2.2 PROJECT DESIGN

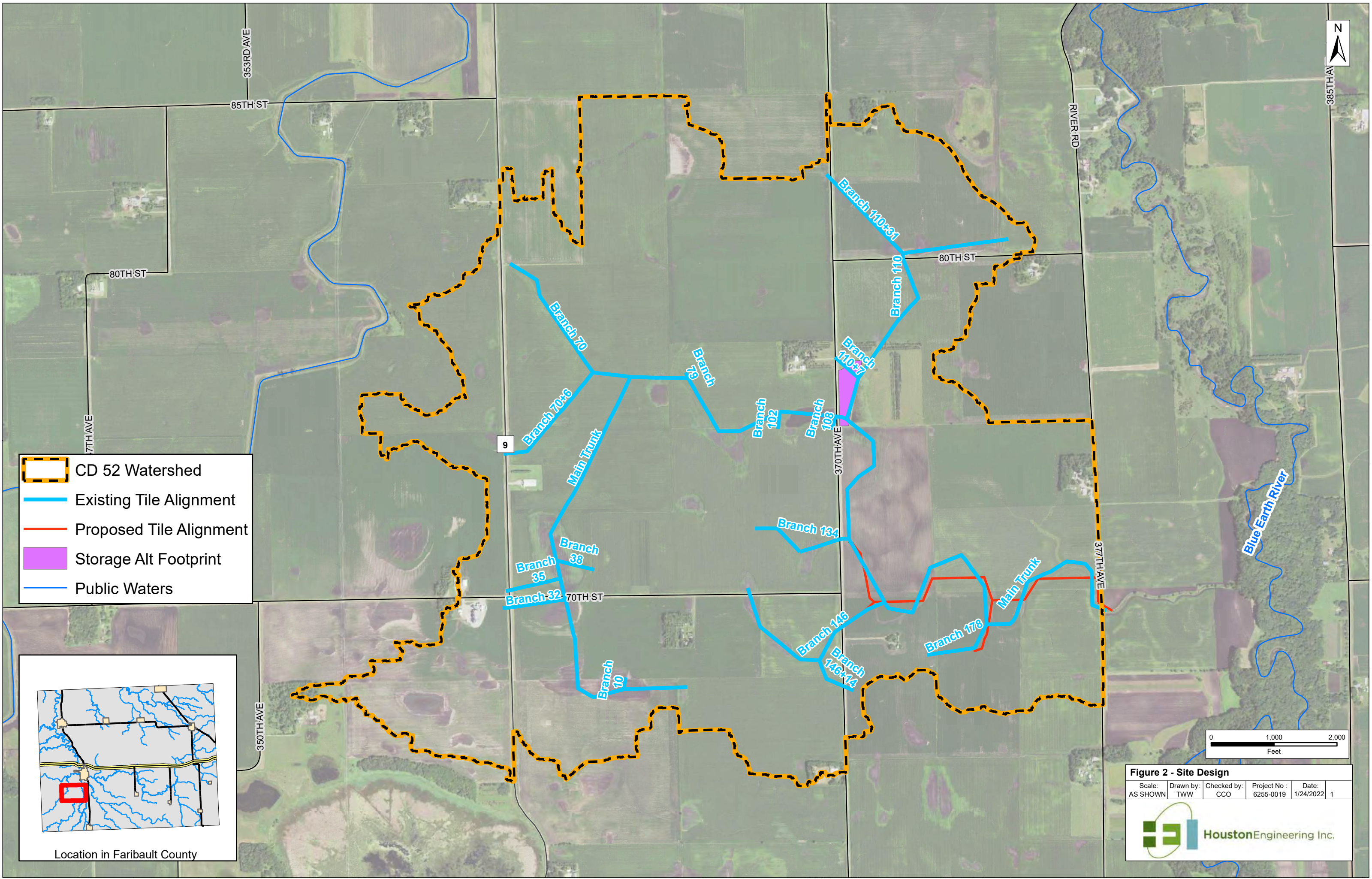
Plan and profile drawings, included as **Exhibit D** to this report, provide a graphical representation of the current system and recommended solution to correct existing flooding and drainage problems in the benefiting area for CD 52. This includes replacement of existing tile with new tile sized to provide a 1/2-inch drainage coefficient. The NRCS recommends a tile



drainage coefficient of 1/2-inch per day for most agricultural lands in this region. This will provide a substantial increase in function compared to existing conditions and will support modern row crop production. **Exhibit C** includes detailed design information regarding tile sizing and slopes. **Exhibit E** provides additional information on the analysis performed to evaluate downstream hydrologic impacts.

Along with providing the additional capacity needed, the proposed design also provides adequate cover for the system. Specifically, a minimum of 4 feet of cover is achieved throughout the project area. Portions of the existing system have limited cover, as little as 2 feet. To gain additional cover, one option is to reduce tile grades. This would require larger tile diameters to maintain necessary capacity and would result in higher project costs. To avoid this, the proposed improvement design includes a partial realignment of the Main Trunk to maintain similar grades but gain depth. The partial realignment is located near the downstream end of the tile system as displayed on **Figure 2**.





**Figure 2 - Site Design**

Scale: AS SHOWN	Drawn by: TWW	Checked by: CCO	Project No : 6255-0019	Date: 1/24/2022	1
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 **HoustonEngineering Inc.**



## 3 COMPATIBILITY WITH EXISTING PLANS AND STATE LAW

### 3.1 DRAINAGE LAW – MINN. STAT. CHAPTER 103E

The Faribault County Board of Commissioners (the Board) is exercising authority over the petitioned action pursuant to Minn. Stat. chapters 103E. Pursuant to Minn. Stat. § 103E.215, construction of new drainage systems or improvements of existing drainage systems in the Drainage Authority must be initiated by filing a petition with the Board. The proceedings for the construction or improvement of drainage systems must conform to Minn. Stat. chapter 103E. Under this, the Board must give special attention to both the procedural requirements for establishment and construction of a drainage project as well as the policy requirements for establishment as specifically outlined in Minn. Stat. §§ 103E.015 and 103E.341.

#### 3.1.1 PRELIMINARY SURVEY REPORT REQUIRED CONTENTS

Minn. Stat. § 103E.245, Subd. 4, requires the designated Engineer, if they find the improvement feasible, and comply with the environmental and land use criteria in Minn. Stat. § 103E.015, Subd. 1, to include in the Preliminary Survey Report a preliminary plan of the drainage project showing the proposed ditches, tile, laterals, and other improvements, the outlet of the project, the watershed of the drainage project or system, and the property likely to be affected and its known users. The plan must show:

- The elevation of the outlet and the controlling elevations of the property likely to be affected referenced to standard sea level datum, if practical;
- The probable size and character of the ditch necessary to make the plan practicable and feasible;
- The character of the outlet and whether it is sufficient;
- The probable cost of the drains and improvements shown on the plan;
- All other information and data necessary to disclose the practicability, necessity, and feasibility of the proposed drainage project;
- Consideration of the drainage project under the environmental and land use, and multipurpose water management criteria in Section 103E.015, Subd. 1; and
- Other information as ordered by the Drainage Authority.

### 3.2 PERMITTING REQUIREMENTS

#### 3.2.1 LOCAL

The project will require coordination with the Faribault County Soil and Water Conservation District (SWCD) as the Local Government Unit implementing the state Wetland Conservation Act (WCA). The National Wetland Inventory (NWI) and a series of years of aerial photography was reviewed to determine the presence of wetland resources within the drainage system (**Exhibit G**). There are several wetlands present. Based on a review of aerial photography, the wetlands appear to be cultivated annually and farmed Type 1 wetlands. Additionally, there is a constructed or restored wetland near Branch 110 in the SW quarter of NW quarter of Section

31, Blue Earth City Township. This 40-acre tract is in a RIM easement and prohibited from being used for crop production.

There are several options for exemption from WCA permitting and mitigation for drainage system projects. The first option includes exemptions for Type 1 wetlands in an unincorporated area that has been assessed drainage benefits between the dates of January 1, 1972, and January 1, 1992 (Mn Rules 8420.0420 Subp. 3.C.2). This exemption is applicable to the project area and project type if records exist to document that landowners have been assessed costs for maintenance during the specified time period. Additionally, to avoid and minimize wetland impacts, where feasible, the project will be designed utilizing non-perforated pipe in wetlands and limiting the size and number of new intakes. An exemption application may be completed to verify with Faribault SWCD that the project does meet the exemption standards.

### 3.2.2 STATE

A permit will not be required from the Minnesota Department of Natural Resources, since the proposed project does not involve working in any state listed Public Waters. The outlet channel is not a state listed Public Water, but is tributary to the Blue Earth River, which is a state listed Public Water. The Department of Natural Resources have the responsibility to review the Engineer's Report and provide an Advisory Report to the Drainage Authority.

A Stormwater Pollution Prevention Plan will be developed and a permit will be required from the Minnesota Pollution Control Agency, since construction activities will disturb more than five acres of land as part of a drainage project.

### 3.2.3 FEDERAL

Impacts to wetlands are regulated at the Federal level by the US Army Corps of Engineers, implementing Section 404 of the federal Clean Water Act (CWA). The proposed work may be authorized under Nationwide Permit 40, as issued by the U.S. Army Corps of Engineers in 2021. This permit authorizes the construction of drainage tile for agricultural activities. The construction of the tile is authorized under NWP 40, and the project will be designed such that no new wetland drainage will result from the project. Therefore, no mitigation will be required for the project.

The Swampbuster provision of the 1985 Farm Bill was aimed at reducing the conversion of wetlands for agricultural purposes. Farmers who drain, fill, level, clear stumps or otherwise alter a wetland may lose eligibility for U.S. Department of Agriculture (USDA) program benefits. As a result of the proposed improvement, farmers wishing to receive, or continue to receive, USDA program benefits or payments may need to complete Form AD-1026, which is available at the local Farm Service Agency (FSA) office.

### 3.2.4 THREATENED AND ENDANGERED SPECIES

Public drainage systems may encounter situations where Minnesota's Endangered Species Statute (MS 84.0895) and the associated Rules apply. The endangered species program regulates activities that take, import, transport, or sell any portion of an endangered or threatened species where these acts may be allowed by permit issued by the MnDNR. The statutes exempt the accidental, unknowing destruction of designated plants. However, it is the responsibility of the Engineer when preparing a final report to complete due diligence to avoid impacts to threatened and endangered species. Based on a review of the MnDNR's Natural Heritage Information System (NHIS) data (Houston Engineering License Agreement LA-1049), there are no state-listed threatened or endangered species within or within a 1-mile radius of the CD 52 system.

The federally listed threatened mammal species, the northern long-eared bat, is protected under the federal Endangered Species Act. This species is found in Minnesota. However, there are no known roost trees or hibernacula found within Faribault County, and additionally, no tree removals will be proposed as a component of this project, therefore, we do not anticipate impacts to this federally protected species.

## 3.3 EXISTING WATER MANAGEMENT PLANS

Several local water management plans address water quantity and quality concerns at the county and watershed level inclusive of this project area. The following sections summarize water management issues, goals and activities identified in the local water plans.

### 3.3.1 FARIBAULT COUNTY WATER PLAN

The Faribault County Water Plan contains a number of Goals, Objectives and Action Steps to address priority water issues that are relevant to the proposed improvement project. The relevant goals include 1) Protect and restore the quality and manage the quantity of surface water, and 2) Protect drinking water supplies and groundwater quality and quantity. The relevant objectives and action steps identify specific measures to achieve the goals are summarized as follows:

#### **Priority Concern 1; Goal 1:**

Address impacts of altered hydrology, decreased evapotranspiration and storage due to vegetation, land use, and drainage changes. The following is an excerpt from the Faribault County Water Plan:

*"...Adequate drainage is, however, a critical component to a successful farming operation. A key issue is how we look at drainage into the future, single purpose or multipurpose. Multipurpose drainage is engineered drainage systems that provide both private drainage benefits and public water management benefits. While traditional drainage removes excess water from fields through use of ditches and subsurface tile, today, resource professionals, such as SWCDs and the Natural Resource Conservation*



*Service (NRCS), are encouraging utilization of multipurpose drainage practices designed to provide both the benefits of drainage while minimizing negative impacts downstream. The goals of multipurpose drainage are to:*

- 1. Provide adequate drainage for crop planting, productivity, and harvest;*
- 2. Provide more adequate upstream to downstream drainage and protection;*
- 3. Slow water down & reduce damage from flooding;*
- 4. Reduce erosion and keep soil on the land; and*
- 5. Protect and improve water quality.*

*Since many drainage systems are already in place, addressing multipurpose drainage will likely occur in conjunction with a repair, replacement, or improvement project. Multipurpose drainage management goals can be achieved through on field and on drainage system practices. Goals will require a partnership between landowners, the County Drainage Authority, and local resource professionals such as SWCD and NRCS. Multipurpose drainage management efforts began several years ago in Faribault County by utilizing these partnerships to explore watershed water quality treatment systems using a mix of management and implementation practices targeted at locations which make the largest impact. This initiative with landowner engagement will continue to grow into the future to achieve multipurpose drainage management goals.”*

- Objective 1. Implement Multipurpose Drainage Management (MDM) practices to mitigate existing impacts from altered hydrology in agricultural areas.
  - Action: Provide cost share or incentives to implement strategies that reduce peak flow or store tile line water at locally prioritized locations.
  - Action: Implement water retention strategies such as controlled drainage, storage basins, and constructed wetlands at locally prioritized locations.
  - Action: Take drained wetland areas out of production through perpetual easement programs, wetland banking programs, or other financial assistance options.
  - Action: Implement structural practices to reduce, trap, and treat nutrients and sediment. (Goal 2, Objective 2, All Actions.)
- Objective 4. Prevent additional impacts of altered hydrology through regulatory controls and better planning of drainage activities.
  - Action: Continue Drainage Authority meetings to achieve greater consistency and increased communication well in advance of drainage activities.
  - Action: Provide notification to state and local partners prior to repairs and improvements of drainage systems in order to obtain recommendations for mitigating altered hydrology.
  - Action: Early coordination and planning regarding drainage projects to explore opportunities for MDM practices and leverage outside funds authorized by 103E.011, Subp 5.

- Action: Require MDM plans be prepared on 100% of improvement projects. Plan will include project identification, feasibility, cost estimation, and recommendations for a no net increase in flow.
- Objective 7. Information sharing, education, and outreach on strategies to mitigate the effects of altered hydrology.
  - Action: Present MDM plan to Drainage Authorities and landowners on 100% of improvement projects.
  - Action: Promote Minnesota's wetland bank for agriculture.
  - Action: Promote practices that reduce flow, store water, and increase vegetation.
  - Action: Engage and involve producers and landowners in identifying and selecting options to mitigate the effects of altered hydrology for their farm and drainage system.

### **Priority Concern 1; Goal 2:**

Address the quality of surface water through strategies to conserve and manage soil health; strategies to reduce, trap, or treat nutrients and sediment; and information sharing on sustainable farming options. The following is an excerpt from the Faribault County Water Plan.

*"...It will take many land and water best management practices combined to improve water quality, ranging from crop management to large scale water storage. Practices may include in field crop and soil management practices; drainage water management such as alternative tile inlets; surface flow management such as grassed waterways or buffer strips; water storage and infiltration such as saturated buffers, wetlands, or water and sediment control basins (WASCOBs); ditch channel water retention such as structures for water control or two stage ditch; and riparian area restoration and protection. The first of these practices, proper management of soil, is one of the most effective ways for farmers to increase productivity and profitability while improving the environment. Positive results are often realized within the first year and last long into the future. By farming using soil health principles and systems that include no-till, cover cropping and diverse crop rotations, more farmers are actually increasing their soil's organic matter and improving microbial activity. As a result, farmers are sequestering more carbon, increasing water infiltration, improving wildlife and pollinator habitat, all while harvesting higher yields and increased profitability."*

- Objective 1. Implement management practices to conserve and manage soil health; and reduce, trap, and treat nutrients and sediment.
  - Provide cost share or incentives for landowners to implement buffers on "other waters" or around field intakes.
- Objective 2. Implement structural practices to reduce, trap, and treat nutrients and sediment.
  - Replace open tile intakes with alternative tile intakes.

- Replace side inlets with conservation-based inlets on county drainage systems.
- Implement structural BMPs on prioritized sites to manage overland flow or field runoff.
- Provide cost share or incentives to treat tile drainage water to reduce nutrient transport to surface waters.
- Implement BMPs identified in MDM plans to reduce erosion and sedimentation and improve water quality.
- Implement Multipurpose Drainage Management (MDM) practices (Goal 1, Objective 1, All Actions).

Many of the action steps are overlapping across the plan's goals and implementation of drainage BMPs to address the issues around water quality or quantity delivered to the natural watercourses in the county. The plan's implementation largely relies on external funding sources and voluntary landowner participation. Along with implementing BMPs, the Drainage Authority can and does hold public outreach meetings to increase awareness and education for local landowners regarding drainage law and 103.E. This helps achieve greater consistency across the watershed for drainage projects and practices. The Drainage Authority actively prepares Multiuse Drainage Management plans and is proactive in the redetermination of benefits. Later sections in this report discuss the potential for field management and structural practices.

### 3.3.2 CONSISTENCY WITH WATER PLANS

The Faribault County Water Plan identifies its consistency with other water plans stating that “the priority concerns that were developed for Faribault County directly reflect the goals, objectives, and actions outlined in these other related plans and documents. Related plans include: the Faribault County Zoning Ordinance, Faribault County Comprehensive Plan 2015-2035, adjoining county's Local Water Management Plans, Blue Earth Turbidity TMDL, Blue Earth Fecal Coliform TMDL, BWSR's Nonpoint Priority Funding Plan 2014, MPCA Minnesota Nonpoint Source Management Program Plan 2013-2017, MPCA Nitrogen in Minnesota Surface Waters 2013, Nitrogen Fertilizer Management Plan 2013, and Sediment Reduction Strategy for the Minnesota River Basin.

Under current conditions, excess surface water runoff is delivering sediment and nutrients to the unnamed tributary at the outlet of CD 52 which drain into the Blue Earth River contributing to the impairments. Additionally, the poor condition of the existing tile allows for the introduction of sediment through the tile system through cracks or offset joints. The Blue Earth River is listed on the Minnesota Pollution Control Agency's (MPCA) Impaired Waters List for aquatic life, aquatic consumption, and aquatic recreation.

Though the Greater Blue Earth River Basin TMDL does not appear to address agricultural drainage directly, the improvement, when combined with planned surface intake BMPs will do

two things: (1) by creating better subsurface drainage, infiltration capacity in the soil will increase and surface runoff will be reduced for smaller more frequent rainfalls, thus reducing TP and sediment delivery on an annual basis to the impaired water; and (2) replacing the old, deteriorated tile having offset joints and cracks with plastic pipe will further reduce sediment delivery. The project is not anticipated to increase fecal coliform bacteria concentration or turbidity and may have the potential to decrease turbidity through construction of in-line BMPs and reduction of sediment loss due to blow-outs. Based on the impairments (fecal coliform bacteria aquatic life, aquatic consumption, and aquatic recreation), the drainage system improvement project includes components that are part of a reasonable TMDL implementation strategy and therefore is consistent with the Faribault County Water Plan and the Greater Blue Earth River TMDL.

Early coordination with state and local partners was pursued in late 2021. A meeting occurred on October 1, 2021 between Faribault County drainage staff, MnDNR staff and Houston Engineering to discuss the improvement project. The nature and condition of the outlet channel was discussed alongside of the stressors of the Blue Earth River that the outlet channel is tributary to. During this call, exploration of specific alternative measures were identified (discussed later in section 3.2) while recognizing that the Drainage Authority can only include project components that provide a benefit to landowners, since they are assessed the cost of the system, unless external funding is available. To further the investigation of alternatives, Houston Engineering coordinated with the Faribault SWCD in December of 2021 regarding potential conservation BMPs in the CD 52 watershed and the availability of external funding (see Section 4.10). Since the CD 52 improvement will not affect the viability of these practices, the implementation of BMP's can and should be investigated and implemented independently of the improvement project.

## 4 CONSIDERATIONS

### 4.1 PROJECT COSTS AND PUBLIC AND PRIVATE BENEFITS

Minn. Stat. § 103E.015, Subd 1(1) requires the Drainage Authority to consider private and public benefits and costs of proposed drainage projects.

#### 4.1.1 PRIVATE BENEFIT

The private benefits expected from the project accrue mainly to agricultural lands that lie adjacent to the proposed improvement. These private benefits would be experienced through reduced overland flooding, reduced seepage, and erosion prevention. A secondary benefit would be reduced maintenance cost, as the project will replace a substantial amount of aging tile.

#### 4.1.2 PUBLIC BENEFIT

Benefits to public transportation systems include improved drainage for 377<sup>th</sup> Ave, 370<sup>th</sup> Ave, 70<sup>th</sup> St, 80<sup>th</sup> St, and CSAH 9. The proposed project will reduce the duration of standing water adjacent to the roads by improving drainage capacity from the contributing drainage area. Additional public benefits include an increase in regional economic activity, and protection and preservation of tax base. The project will not adversely affect downstream surface water runoff rates and volumes, which in turn will not adversely affect sediment and phosphorus delivery to downstream waters.

#### 4.1.3 COSTS

A detailed breakdown of the project costs is included as **Exhibit F** to this report. In addition to economic costs, there are other non-quantifiable factors to be considered. These include impacts on the environment, social costs, and cultural costs. Because the land use of the project area is predominantly agricultural, there will be some potential for adverse impacts in the area. These adverse impacts will include inconveniences caused by the construction operations, and other miscellaneous impacts associated with construction. Construction activities should not cause a significant amount of traffic impairment and construction inconvenience due to traffic rerouting and other related activities. In addition, typical noise and dust problems associated with the construction operations will likely occur but given the rural nature of the project location, minimal impact is anticipated.

### 4.2 ALTERNATIVE MEASURES

Alternative measures must be considered before establishing a drainage project per Minn. Stat. § 103E.015, Subd 1(2). The alternative measures considered must include elements to (i) conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses (ii) reduce downstream peak flows and flooding (iii) provide adequate drainage system capacity (iv) reduce erosion and sedimentation and (v) protect or improve water quality. Listed below are the feasible alternatives and followed by the consideration given to each:

#### 4.2.1 DO NOTHING

This alternative will maintain the status quo in terms of insufficient agricultural drainage which limits the economic viability of agriculture in the watershed. Due to the age of the system, it will continue to rapidly deteriorate, requiring significant cost to maintain until it is improved or repaired. Additionally, the current drainage system contributes excessive sediment and nutrients to downstream impaired stream reaches due to tile failures. For these reasons, the Do Nothing alternative is not preferred.

#### 4.2.2 REPAIR

Repair of the drainage system would resolve, to some degree, the excessive contributions of sediment and nutrients to downstream impairments but would not enhance the economic



viability of agriculture in the CD 52 watershed. Repair would also fail to resolve the issue with lack of cover depth over the existing tile. Therefore, it is not a feasible alternative.

### **4.2.3 IMPROVEMENT**

Improvement of the drainage system will not adversely affect the contributions of sediment and nutrients to downstream impairments, reduce short and long-term maintenance needs, enable sufficient cover depth for long term viability, and enhance agricultural production.

#### **4.2.3.1 PREFERRED ALTERNATE: 1/2-INCH DESIGN DRAINAGE COEFFICIENT**

As detailed within Section 1.2 this Preliminary Engineer's Report.

#### **4.2.3.2 ALTERNATIVE MEASURE: 3/8-INCH DESIGN DRAINAGE COEFFICIENT**

This alternative reduces the design drainage coefficient from 1/2-inch to 3/8-inch. It results in smaller tile diameter dimensions and therefore some lowering of project costs, but also provides a smaller increase in drainage benefit compared to sizing to the 1/2-inch drainage coefficient. A lesser drainage coefficient is typically considered when hydrologic changes are significant enough to make the adequacy of the outlet uncertain. The Drainage Authority should consider the reduction in improvement project cost as well as drainage performance resulting from this alternative along with the needs of the petitioners and the potential water quality effects of the project as detailed throughout this report.

#### **4.2.3.3 ALTERNATIVE MEASURE: STORAGE**

Consideration was given to incorporating temporary storage of runoff into the CD 52 improvement project. As a Multipurpose Drainage Management (MDM) solution, storage can offset increases in peak discharges from an improvement, provide water quality treatment and potentially wildlife habitat if appropriately designed. Since the proposed improvement project does not result in a peak discharge increase at its outlet, storage is not required for the adequacy of the outlet. Instead, this alternative measure is considered as a potential cost-savings measure by allowing tile dimensions to be reduced due to the storage along with providing other public environmental benefits. If runoff is temporarily stored, the tile capacities can be reduced downstream of the storage feature while still providing the same drainage benefit. Incorporating storage into the drainage system project requires a landowner(s) voluntary participation.

An area near the intersection of Branch 110 with the Main Trunk (NW ¼ of Section 30, Blue Earth City Township), see **Figure 2**, was analyzed due to the surrounding topography and the feasibility of directing Branch 110 tile into a storage basin without limiting drainage upstream of the storage basin. While this specific location is analyzed, other location(s) may be considered in the future if desired by the Drainage Authority.

The storage feature within the hydrologic model was assumed to capture the entire volume of the 1/2-inch runoff event from the Branch 110 drainage area, at total of 13.5 acre-feet. This

effectively removes 323 acres from the design calculations to size the Main Trunk tile segments downstream of Branch 110. The storage feature's outlet is conceptually analyzed as a small diameter pipe allowing for a gradual drawdown following the precipitation event. Once the storage basin is full, a secondary outlet allows water to enter the Main Trunk tile or existing surface flow paths.

Water quality benefits of the storage feature include capture of suspended sediments and other pollutants bound to sediment particles. Dissolved pollutants may also be reduced from vegetative uptake depending on the residence or drawdown time and overall design of the basin. Wildlife habitat is expected to be minimal unless a permanent pool is established. The costs identified for the storage feature do not include creation of a permanent pool. Additional costs for earthwork, vegetation management and design would apply if a permanent pool is incorporated. A permanent pool also improves maintenance and aesthetics aspects of the storage feature.

Following preliminary sizing and development of an opinion of probable construction cost, incorporation of storage yields approximately \$189,000 reduction in tile installations costs (see **Appendix F**). The cost to construct the storage feature including land acquisition is estimated to be approximately \$170,000. Thus, the net effect in construction cost from incorporating the storage feature is an increase of approximately \$19,000. The costs above do not consider additional engineering, administrative long-term maintenance. As the storage project costs more than the benefit to landowners of the CD 52 system, it should not be constructed without outside funding. Outside funding is competitive and not guaranteed, requiring over a year to procure. The Drainage Authority may consider the merits of such a project along with input from the petitioners, while weighing the anticipated timeline for implementation. Local water management officials may also consider further developing BMP concepts independent of the improvement project and implement them at a later time following the improvement.

### 4.3 LAND USE

Per Minn. Stat. § 103E.015, Subd 1(3), the Drainage Authority must consider the present and anticipated land use including the compatibility of the project with local land use plans. Land within the project area is primarily zoned as 'General Agriculture District' according to the current Zoning Map. The Faribault County Land Use Ordinance has a stated purpose of allowing suitable areas of Faribault County to be retained in agricultural use. It considers applicable uses for flood control, watershed structures, farm drainage systems and erosion control structures. The proposed project falls squarely within the purpose of preserving viable agricultural land.

The present land use within the project area is, for the most part, agricultural. In general, land use will remain agricultural for the foreseeable future. Based on the Land Use Ordinance

Section 7A-2 “Allow suitable areas of Faribault County to be retained in agricultural use”, the project is compatible with local land use plans.

## 4.4 CURRENT AND POTENTIAL FLOODING

Per Minn. Stat. § 103E.015, Subd 1(4), the Drainage Authority must consider the current and potential flooding characteristics of property in the drainage project or system and downstream for the 5-, 10-, 25- and 50-year flood events, including the adequacy of the outlet for the drainage project. **Appendix E** gives a summary of the modeling approach and derivation of hydrologic inputs to analyze the CD 52 system in XP-SWMM.

### 4.4.1 DRAINAGE SYSTEM

As a result of the poor existing drainage coefficient, even the 2-year, 24-hour rainfall (3.06-inches) results in extended surface pooling in depressional areas drained by CD 52. Additionally, portions of the CD 52 alignment generally follow natural surface conveyance patterns and when the existing tile is flowing at capacity, the excess runoff travels overland. When such a rainfall occurs during the late spring or early summer, planted crops will experience nearly total die-off in inundated areas or along surface flow paths and require replanting. When a substantial rainfall occurs mid-summer, there is no chance for replanting and the entire crop in these areas may be lost for the season.

The drainage coefficient is determined through use of the Manning’s Equation accounting for tile diameter, slope, roughness, and drainage area contributing to each inlet. It is a representation of the amount of runoff volume the tile can convey in a 24-hour time period. It is a basic representation of the system capacity but does not account for details of the watershed such as infiltration, ponding and timing of precipitation. The current drainage coefficient of CD 52 is calculated to be approximately 1/8-inch. The proposed improvement increases the capacity to a 1/2-inch drainage coefficient. A table of current and improved drainage coefficients is provided in **Exhibit C**.

### 4.4.2 DOWNSTREAM IMPACTS

The improvement project was evaluated with detailed modeling methodologies in XP-SWMM to determine its effect on peak flows at the CD 52 outlet, approximately 150 feet east of 377<sup>th</sup> Ave. Reference **Appendix E** for further details regarding the hydrologic and hydraulic modeling approach. In addition to the CD 52 tile outlet, there is also a 60-inch CMP culvert through 377<sup>th</sup> Ave which outlets to the same tributary channel as the CD 52 tile. The flows passing through the culvert, CD 52 tile, and road overtopping (for larger rainfall events) combine to make up the existing discharges and peak flows from the CD 52 watershed.

Following the improvement, the CD 52 drainage tile will have a larger capacity. In the eastern portion of the CD 52 watershed near the Main Trunk alignment, the topography does not have sizeable natural depressions and as a result, runoff from this area conveyed overland on surface drainage paths when the tile capacity is exceeded. There are several natural

depressions in upper portions of the watershed and upstream of road embankments. The hydrologic modeling incorporates temporary surface storage from these depressions for both the existing and improved scenarios.

With the improvement, a larger portion of runoff is carried via the larger tile as opposed to the surface flow paths. The tile's increased capacity is mitigated by a decrease in the surface flow. Additionally, the runoff conveyed by the tile is travelling at a higher velocity compared to the overland surface flow path accelerating the delivery of runoff to the CD 52 outlet.

The resulting effect, as tabulated in **Table 1**, is that the peak discharge at the CD 52 outlet from the combined tile and the 60-inch CMP road crossing at 377<sup>th</sup> Ave. is reduced by approximately 10% for the 2-, 5-, 10-, 25-, 50- and 100-year, 24-hour events. **Figure 3** displays the combined CD 52 tile and 377<sup>th</sup> Ave. discharges for the same events. Noticeable in all events is that the peak discharge with the improvement occurs approximately 30-40 minutes later compared to the existing condition. This can be attributed to the CD 52 tile's more efficient conveyance compared to the overland surface flow path and the greater volume carried by the tile in the improvement.

The same amount of temporary storage is available for both the existing and improved scenarios. In general, the depressional areas and areas upstream of road embankments see similar water levels for both scenarios but the duration of storage is shorter with the improvement as expected. This shorter duration of storage with the improvement does not influence the peak discharges at the outlet due to their location in the watershed. The reduction in storage duration does increase discharges following the peak.

**Table 1** - Summary of Peak Discharges at CD 52 Outlet

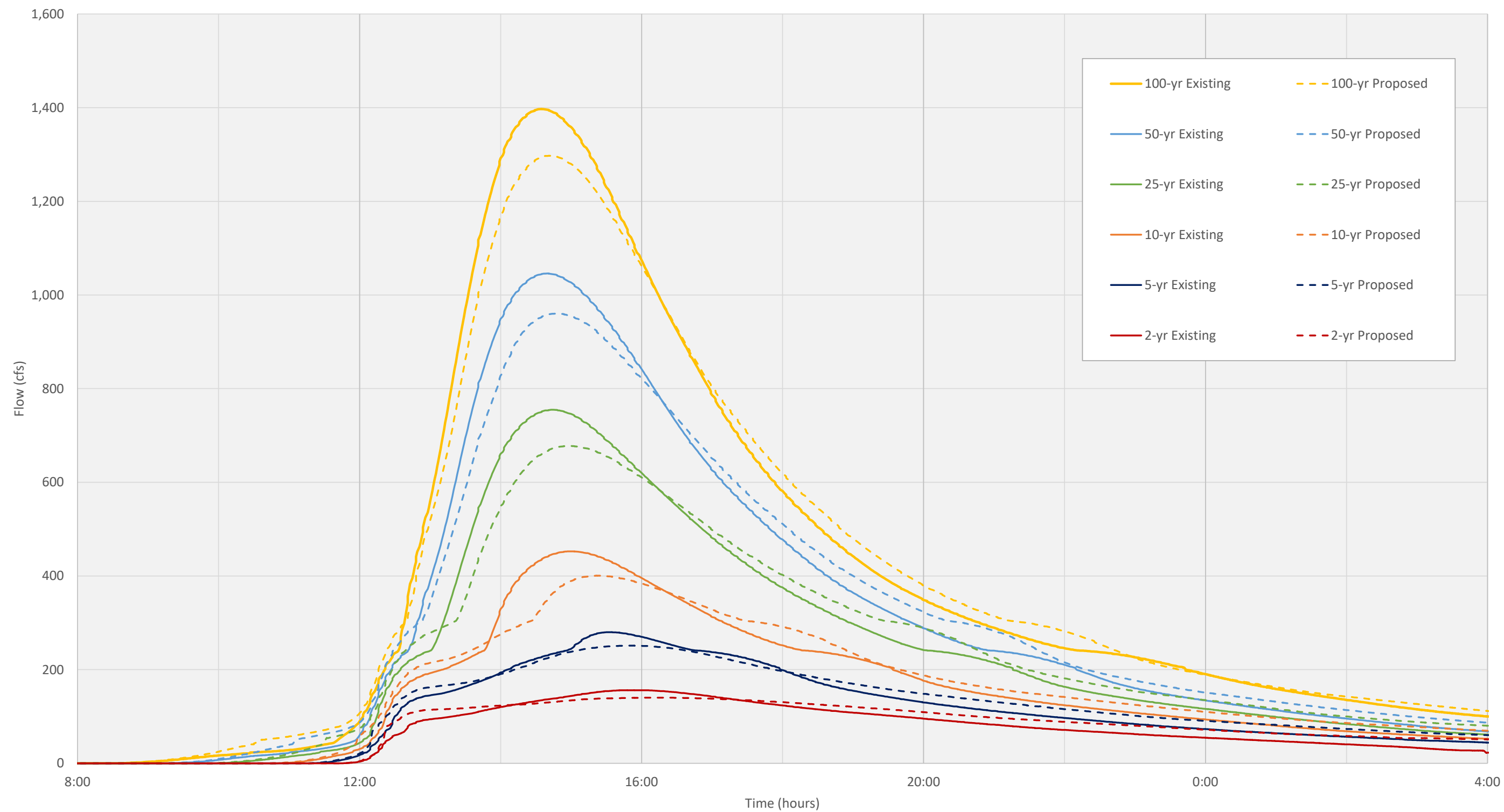
Event	Tile Flow (cfs)			Culvert Flow + Roadway Overflow (cfs)			Total Flow (cfs)		
	Existing	Proposed	Difference	Existing	Proposed	Difference	Existing	Proposed	Difference
2-year	50	88	+38	106	52	-54	156	140	-16
5-year	59	111	+52	221	141	-80	280	251	-29
10-year	61	125	+64	392	276	-116	452	400	-52
25-year	61	128	+67	694	553	-141	755	680	-75
50-year	63	130	+67	983	830	-153	1,046	960	-85
100-year	66	136	+70	1,331	1,162	-170	1,397	1,297	-100

Smaller, more frequent events than the 2-year rainfall were not evaluated. During these smaller events, a larger percentage of the water is flowing through the tile system compared to the natural surface runoff patterns as described above. To determine if there is scour and erosion potential in the outlet channel from a hydrologic change during smaller events, the current 2-year peak discharge was used to calculate velocity and shear stresses in the channel. Based on

the hydraulic model results, the maximum velocity is 2.8 feet per second and the shear stress is 0.3 pounds / square foot. Similarly with the flow hydrographs, the proposed conditions velocity and shear stress see a slight reduction compared to the existing. The Minnesota Drainage guide recommends a maximum velocity of 4 feet per second (for the clay loam soils present in this area according to the SSURGO soils database), indicating that there is minimal risk for scour or erosion issues in the outlet channel for rainfall events less than the 2-year. Because the project decreases peak outflow rates for rainfall events equal to or greater than a 2-year recurrence; and it results in low-scouring velocities for rainfall events less than a 2-year recurrence; the existing outlet is adequate for the project.



Figure 3 - Outlet Hydrograph  
(Total Combined Flow from Tile + Overland and Culvert)



## 4.5 WETLANDS

Minn. Stat. § 103E.015, Subd 1(5) requires the Drainage Authority to consider the effects on wetlands. The petitioned project bisects several wetlands identified on the National Wetland Inventory (NWI) database (see **Exhibit G**). Based on a review of aerial photography, these appear to be cultivated annually and are cultivated Type 1 wetlands. These wetlands are currently highly degraded by cultivation practices and existing drainage, and no new wetlands will be impacted by the improvement project. The project will qualify for a federal Nation Wide Permit 40 (concerning agricultural practices) and a WCA Drainage exemption, as detailed in Section 3.2. In addition, reference Section 3.2.3 for the USDA form AD-1026 regarding the Swampbuster provision of the 1985 Farm Bill and the local landowner's benefits.

## 4.6 WATER QUALITY

Minn. Stat. § 103E.015, Subd 1(6) requires that the Drainage Authority consider the effects of the proposed drainage project on water quality. The occurrence of an extreme runoff condition during project construction could cause an increased sediment load into the downstream channel system. However, a Stormwater Pollution Prevention Plan will be prepared for the project, which will minimize the likelihood of a substantial sediment discharge following rainfall events. The downstream water quality following completion of the project will change little from the current condition. The improved tile will be clean and free of sediment blockages. Inlets sized for televising/inspection will be incorporated into the project design which do not currently exist and will allow future potential maintenance issues to be identified and addressed. The project will not drain new lands downstream, and thus the discharge of nutrients will remain similar or decrease in volume from an increase of infiltration potential due to a likely increase in water holding capacity of the soil.

## 4.7 FISH AND WILDLIFE RESOURCES

Minn. Stat. § 103E.015, Subd 1(7) requires the Drainage Authority to consider the effects of the proposed project on fish and wildlife resources. The proposed improvement project does not contemplate any major excavation in any existing natural watercourse or lakes, thus effects on fish resources will be insignificant. There is no destruction of prairie or wooded wildlife habitat contemplated as part of this project. Reference Section 3.2.4 for discussion on the NHIS review as well as Federally listed threatened mammal species.

## 4.8 GROUNDWATER

Minn. Stat. § 103E.015, Subd 1(8) requires the Drainage Authority to consider the effects of the proposed drainage project on shallow groundwater availability, distribution and use. The average pipe depth of the improvement is approximately 8 feet, the maximum depth is nearly 14 feet, and the shallowest depths are approximately 4 feet. The elevation profile of the improvement is lowered along low segments to achieve a minimum cover of 4 feet. The project pipe depth will generally be at or below that of the existing pipe elevations. This is critical for the reconnection of laterals and outlet adequacy for private tiling. Because of these factors, the

proposed improvement project should have little or no impact on existing shallow ground water resources within the project drainage area.

## 4.9 ENVIRONMENTAL IMPACT

Minn. Stat. § 103E.015, Subd 1(9) requires the Drainage Authority to consider the effects on the overall environmental impact of the proposed drainage project. The project engineer and project sponsors for this project envision that the overall impact of the project will contain no long-term adverse effects on the environment beyond the potential for wetland drainage. While construction operations will result in some downstream deposition of sediment, these effects are small in magnitude and temporary in comparison to the long-term benefits anticipated from the project operation.

## 4.10 EXTERNAL FUNDING

In accordance with Minn. Stat. § 103E.015, Subd. 1a., the Engineer on behalf of the Drainage Authority investigated the potential use of external sources of funding to facilitate the purposes of Minn. Stat. § 103E.011, subd. 5., which are for wetland preservation or restoration or creation of water quality improvements or flood control. The types of projects that meet the Minn. Stat. § 103E.011, subd. 5, purposes of wetland, water quality or flood control improvements include wetland restoration, grass waterways, water and sediment control basins, alternative tile intakes, denitrifying bioreactors, drainage water management and several other types.

A request was sent to the Faribault County SWCD (see **Exhibit H**) during development of PER that they identify both funding sources and specific project opportunities within the CD 52 watershed. SWCD staff intend to take the following steps during the improvement proceeding:

- Facilitate a discussion during a joint committee meeting of SWCD and Faribault County Board;
- Submit a copy of the PER to the SWCD Board for comment;
- Attend public hearings on the improvement project and promote conservation practice opportunities;
- Develop a written response to the request for external funding; and
- Pursue implementation of practices based on interest from landowners.

Construction of these BMPs requires voluntary landowner participation and is subject to the availability of the funding. These BMP's do not need to coincide with the improvement project.

## 4.11 MULTI PURPOSE DRAINAGE MANAGEMENT PLAN

### 4.11.1 INTRODUCTION

This section addresses the requirement within the Faribault County Water Plan to develop a Multipurpose Drainage Management (MDM) plan anytime a drainage system improvement is petitioned for. This MDM Plan identifies potential locations for implementing MDM practices to increase storage or reduce, trap, and treat nutrients or sediment prior to runoff exiting the CD 52

system. Implementation of practices will require field verification, availability of funding and landowner participation.

#### 4.11.2 METHODOLOGY

This analysis of alternative methods was completed using the Prioritize, Target, and Measure Application (PTMApp), version 3.1.0289. PTMApp (<https://bwsr.state.mn.us/ptmapp-theory-and-documentation>) was created as a tool by the Board of Soil and Water Resources (BWSR) to utilize a large amount of geospatial data to find suitable locations for best management practices or conservation practices that are commonly implemented within agricultural areas. During the most recent update to the PTMApp-Desktop toolbar (2021), practice types were upgraded from the generalized “treatment group” practice structure. The six treatment groups were replaced by 24 specific NRCS practice types, which greatly enhanced how the GIS tool characterizes suitable practice locations.

The tool utilizes publicly available geographic information system (GIS) data in conjunction with Natural Resources Conservation Service (NRCS) suitability guidance to locate areas within the watershed that may be feasible for the installation or implementation of a wide variety of practices. Practices located using PTMApp are intended for planning and discussion purposes only, and any practices that are presented through PTMApp should be field verified to determine if they are indeed plausible. The presence or absence of a practice as presented by PTMApp does not imply that a location is guaranteed to be suitable or unsuitable for conservation or management practice placement. PTMApp also does not account for existing management or conservation practices already on the landscape.

PTMApp considers up to twenty-four different common management and conservation practice types for suitable placement. They are all listed in the NRCS Field Office Technical Guide. The set of practices is divided into two broad categories.

1. Management practices - These are land management strategies that can be implemented on a farmed field. Examples include: Nutrient Management for Phosphorus, Nitrogen, or groundwater protection, Tillage Management, Reduced Tillage, No Tillage, Cover Crops and Critical Area Planting
2. Structural practices - These are constructed practices that can be installed within a farm field, at the field edge, or along a drainage channel. Examples include: Water and Sediment Control Basin (WASCOB), Farm pond, Drainage water management, Grassed Waterway, and Denitrifying Bioreactor

The practices within each broad category are based on a larger set of practices that have been shown through research to be effective at improving water quality and/or increasing water holding capacity on the landscape. **Table 2** provides the general purpose and PTMApp’s suitability criteria for practices. PTMApp often offers more suitable practice locations than other

conservation planning models (e.g., ACPF), but spatial placement of practices are typically very similar as shown in comparison studies.

Many other management and structure practice types were also analyzed within PTMApp but were excluded from this review due to characteristics of the CD 52 watershed. For example, practices relying on the presence of a stream or ditch channel were not evaluated since a channel is not present in the watershed. Specifically, the following practices were not evaluated: filter strips, riparian buffers, saturated buffers, multi-stage ditches, grade stabilizations, streambank and shoreline restorations, large wetland restorations, regional wetlands, infiltration trenches, perennial crops, prescribed grazing, and forage/biomass planting.

#### 4.11.3 POTENTIAL PRACTICE LOCATIONS

Management and structural practice locations identified by the PTMApp tool are presented on maps in **Exhibit J**. Several management practices (nutrient management for phosphorus, nutrient management for nitrogen, reduced tillage, no tillage, and cover crops) can be applied to any cultivated farm field, and are not explicitly displayed on the maps.

Suitable locations for water and sediment control basins (WASCOBs) are output from PTMApp as linear features that show concentration flow channels on the landscape along which a WASCOB could be positioned. The drainage area to each potential WASCOB location has also been presented in **Exhibit J** but does not represent the extent of the potential ponded area.

Locations that are presented by PTMApp as suitable for drainage water management represent only small areas on the landscape, and likely do not show the entire spatial extent of a manageable subsurface tile drain system. PTMApp provides a general area where drainage water management could be feasible, however on-the-field analysis is required to verify suitability and extent.

Interested landowners should contact the SWCD for more information about the management and structural practice implementation opportunities.

**Table 2 – PTMApp Structural and Management Practices**

Practice	NRCS code	Definition	Purpose	PTMApp Suitability Criteria
Nutrient management for phosphorus or nitrogen	590	Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.	Budget, supply, and conserve nutrients for plant production. Minimize pollution of surface and groundwater resources. Properly utilize manure and other organic byproducts as plant nutrient sources. Maintain or improve the physical, chemical, and biological condition of soil.	Cultivated Cropland
Nutrient management of groundwater for nitrate	590	Same as above	Reduce infiltration of nitrogen to the groundwater system	Cultivated Cropland, depth to groundwater is >10 ft.
Reduced tillage	345	Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting.	Reduce sheet, rill, and wind erosion. Maintain or increase soil quality and organic matter content. Increase plant-available moisture.	Cultivated Cropland
No tillage	329	Limiting soil disturbance to manage the amount, orientation and distribution of crop and plant residue on the soil surface year around.	Reduce sheet, rill and wind erosion and excessive sediment in surface waters. Maintain or increase soil health and organic matter content. Increase plant-available moisture.	Cultivated Cropland



Practice	NRCS code	Definition	Purpose	PTMApp Suitability Criteria
Cover crops	340	Planting grasses, legumes, and forbs for seasonal vegetative cover.	Reduce erosion from wind and water. Maintain or increase soil health and organic matter content. Reduce water quality degradation by utilizing excessive soil nutrients. Improve soil moisture use efficiency. Minimize soil compaction.	Cultivated Cropland
Critical area planting	342	Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal practices.	Stabilize areas with existing or expected high rates of soil erosion by wind or water. Rehabilitate and revegetate degraded sites that cannot be stabilized using normal establishment techniques.	Cultivated cropland, drainage area to the location is greater than 5 acres and less than 100 acres, SPI* > 0.5
Water and sediment control basin (WASCOB)	638	Constructing an earth embankment or a combination ridge and channel across the slope of a minor drainageway.	Reduce gully erosion. Trap sediment. Reduce and manage runoff.	Cultivated cropland, areas prone to receiving high volume of sediment, contributing drainage area >40 acres, SPI* > 0.8, >0.1 ac-ft of water storage potential
Farm pond/ Wetland	378	Establishing a water impoundment by excavating a pit/dugout or by constructing an embankment to trap excess water.	To provide water for livestock, fish and wildlife, recreation, fire control, develop renewable energy systems, and other related uses, and to maintain or improve water quality.	Minimum depth of 0.5 ft, minimum surface area of 1 acre, not in the location of any national wetland inventory (NWI) wetland, contributing drainage area <500 acres, volume must be greater than the volume delivered to the pond during a 10yr, 24hr precipitation event.

Practice	NRCS code	Definition	Purpose	PTMApp Suitability Criteria
Drainage water management	554	Managing subsurface drainage volume and water table elevation by regulating the flow from a surface or subsurface agricultural drainage system.	Reduce nutrient, pathogen, and pesticide loading from drainage systems into downstream receiving waters. Improve productivity, health, and vigor of plants. Reduce oxidation of organic matter in soils.	Cultivated cropland, slope <1%, non-hydric soils <sup>#</sup> , depth to groundwater >3ft.
Grassed waterway	412	Establishing suitable vegetation within a shaped or graded channel to convey surface water at a non-erosive velocity using a broad and shallow cross section to a stable outlet.	To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding. To prevent gully formation. To protect/improve water quality.	Cultivated cropland, slope >3% and <12%, contributing drainage area >5 acres and <100 acres
Denitrifying bioreactor	605	Installing a structure that uses a carbon source (e.g. woodchips) to reduce the concentration of nitrate in subsurface agricultural drainage flow.	Improve water quality by reducing the concentration of nitrate in flow from subsurface agricultural drainage systems	Cultivated cropland, average slope of surrounding area >1%, non-hydric soils <sup>#</sup> , contributing drainage area >15 acres and <100 acres

Notes:

\* SPI - Stream Power Index, a measure of the erosive power of flowing water. Calculated based on land slope and upstream drainage area.

# Non-hydric soils - soils that are not frequently flooded or saturated at the soil surface during the growing season

## 5 PUBLIC UTILITY, BENEFIT OR WELFARE

In accordance with Minn. Stat. § 103E.015, Subd 2, consideration was given to the conservation of soil, water, forests, wild animals, and related natural resources, and to other public interests affected, together with other material matters as provided by law in determining whether the project will be of public utility, benefit, or welfare, the project engineers provide the following observations.

- Presently, the area drained by CD 52 is not utilized for municipal, industrial, or irrigation purposes within the project area. It is not anticipated that these uses will materialize in the foreseeable future with or without the proposed improvements.
- Recreational activities are currently limited within the project area. There is no anticipated adverse effect on recreation in this area.
- Since the drainage system consists entirely of drain tile, there is no anticipated public navigation potential.
- The project elements as proposed in this report include no drainage opportunities of existing lakes, wetlands, or other protected water environments. Therefore, the proposed project will have little or no effect on fish resources.
- Regarding the federally listed threatened Northern Long-Eared Bat, there are no known roost trees or hibernacula located within the project area. Additionally, no tree removal is proposed, therefore the project will not result in a taking of this federally listed species.

The proposed improvement will be of public utility and benefit and will promote the public health and welfare. Public utility and benefit is achieved by providing more efficient drainage to agricultural properties and public roads within the drainage area. The improvement will protect property values and improve the economy of agricultural production. Public health and welfare is achieved by reducing the frequency of wet and overflowed land which will improve the general sanitary condition of the community, relieve low wet or stagnant and unhealthful conditions, and protect the overflowed property – just as was sought to be achieved in the original proceedings to establish CD 52.

## 6 OPINION OF PROBABLE CONSTRUCTION COST

The estimated total project costs for the ditch improvement described in this report are as follows:

**Table 3** – Opinion of Probable Construction Costs

Proposed Improvements	Construction Cost*	Other Costs**	Total Cost
Improvement of CD 52	\$2,532,000	\$427,000	\$2,959,000

\*Includes 20% construction contingency.

\*\*Other costs include: Viewing at 0.5%, engineering based on 5% of construction cost, and legal and other administrative costs estimated at 1% of construction costs, construction management at 11% of construction costs, and temporary damages at \$625 per acre.

A detailed breakdown of the project costs is included as **Exhibit F** to this report, Project Itemized Cost Estimate.

## 7 SEPERABLE MAINTENANCE

In its order initiating proceedings and appointing the engineer to prepare a preliminary survey report, the Drainage Authority instructed the engineer to include in this preliminary survey report an investigation of the current condition of the portion of the drainage system proposed to be improved and provide a recommendation on the propriety of a separable maintenance allocation of project costs. The Drainage Authority has indicated that the existing tile is in poor condition based upon the recent amount and types of repairs that have been required to maintain function of CD 52, the items observed within the portion of CD 52 that was televised and given the general age of the system, originally constructed in 1916, it is recommended that the existing tile be replaced regardless of improvement proceedings. The cost to repair existing Main Trunk tile and Branches by replacement at its current sizing was separately estimated from the improvement cost and found to be **\$2,369,000** (see **Exhibit F**). It is recommended that the Viewers consider these as separable maintenance costs relative to the improvement in further ditch proceedings.

## 8 RECOMMENDATIONS

In the opinion of the Project Engineer, the proposed project outlined herein is necessary, feasible, and practical. It is recommended that the Drainage Authority take the necessary legal and administrative steps to proceed with Improvement of CD 52. This includes the ordering of the Engineer to make a detailed survey with plans and specifications and appointing viewers to assess benefits and damages. Input from the Drainage Authority is required regarding which alternatives, if any, are desired for further analysis. If the Multipurpose Drainage Management alternative is pursued to incorporate storage, the Drainage Authority must give further guidance on where viable storage sites are to be located, in conjunction with willing landowners, and be prepared to explore further funding options.

## EXHIBIT A – IMPROVEMENT PETITION



## PETITION FOR IMPROVEMENT OF DRAINAGE SYSTEM

TO: FARIBAULT COUNTY BOARD OF COMMISSIONERS, AS DRAINAGE  
AUTHORITY FOR FAIRBAULT COUNTY DITCH NO. 52

Petitioners respectfully represent, state and request the following:

**1. Jurisdiction.**

The undersigned Petitioners constitute: (1) at least 26% of the owners of the property affected by the proposed improvement; (2) at least 26% of the owners of property that the proposed improvement passes over; (3) the owners of at least 26% of the property area affected by the proposed improvement; or (4) the owners of at least 26% of the property area that the proposed improvement passes over.

**2. Designation of Drainage System.**

This Petition requests the improvement of the drainage system known by and designated as Faribault County Ditch No. 52 ("CD 52") located in Faribault County, Minnesota.

**3. Need for Improvement.**

The drainage system has insufficient capacity or needs enlarging or extending to furnish sufficient capacity or a better outlet. The drainage system is out of repair and the improvement petitioned for herein is for a separable portion of the drainage system. Therefore, a portion of the cost may be assessed as a repair.

**4. Description of Proposed Improvement.**

The proposed improvement would consist of improving, enlarging, and deepening the entirety of CD 52 and branch lines (with the exception of Branch 35, and Branch 32), which currently consists of buried tile, as well as realigning certain portions of CD 52. CD 52 would be enlarged and its capacity increased, either by replacing existing buried tile or installing tile parallel to existing buried tile, to provide an increased drainage coefficient consistent with recommended drainage capacity of tile systems for modern agricultural practices. The improvement would consist of realigning and straightening the main trunk line of CD 52 from its outlet into the unnamed tributary of the Blue Earth River in Section 5 of Elmore Township to its intersection with Branch 146 near the northwest corner of Section 6 of Elmore Township. In addition, the following tile lines would be enlarged and their capacity increased: CD 52 Main Trunk, Branch 178, Branch 146, Branch 146+14, Branch 134, Branch 110, Branch 110+7, Branch 108, Branch 102, Branch 79, Branch 70, Branch 70+6, Branch 38, and Branch 10. If deemed feasible and prudent by the project engineer, the improvement may include, in addition to or as an alternative to the straightening of the main trunk line of CD 52, flattening tile grades in combination with larger tile sizes, or lowering and extending the outlet of CD 52 further downstream into the unnamed creek currently serving as an outlet. Preliminary designs of the proposed improvement, subject to any alterations deemed prudent or necessary by the project



engineer, and the location of the improvement and affected area, is depicted in the preliminary feasibility study describing the proposed improvement attached hereto as Exhibit A.

Set forth below is a list of the 40-acre tracts or government lots that the proposed improvement would pass over, together with the names and addresses of the owners of those tracts; to-wit:

	Owner	Address	PID	Description	Sec	Twp	Rge	County
1.	Kark Family Farms Llp	C/O Farmers National CO #16472 PO Box 542016 Omaha, NE 68154	020301400	SW¼ SW¼	30	102N	27W	Faribault
2.	Kark Family Farms Llp	C/O Farmers National CO #16472 PO Box 542016 Omaha, NE 68154	020301400	SE¼ SW¼	30	102N	27W	Faribault
3.	Doug & Karen Nave	34899 30th St Elmore, MN 56027	020300700	SW¼ SE¼	30	102N	27W	Faribault
4.	Lawrence Land LLC	1120 Highland Dr Blue Earth, MN 56013	100360100	NW¼ NW¼	36	102N	28W	Faribault
5.	Dorothy L Ristau Life Estate Etal	37620 80th St Blue Earth, MN 56013	020310400	NW¼ NW¼	31	102N	27W	Faribault
6.	Steven P Lawrence Trust & Berneda J Lawrence Disc Tr	1120 Highland Drive Blue Earth, MN 56013	100360102	SW¼ NW¼	36	102N	28W	Faribault
7.	Steven P Lawrence Trust & Berneda J Lawrence Disc Tr	1120 Highland Drive Blue Earth, MN 56013	100360102	SE¼ NW¼	36	102N	28W	Faribault
8.	Thomas J Plocker	118 South Holland Street Blue Earth, MN 56013	100360800	SW¼ NE¼	36	102N	28W	Faribault
9.	Thomas J Plocker	118 South Holland Street Blue Earth, MN 56013	100360800	SE¼ NE¼	36	102N	28W	Faribault
10.	Dorothy L Ristau Life Estate Etal	37620 80th St Blue Earth, MN 56013	020310401	SW¼ NW¼	31	102N	27W	Faribault
11.	Maxine Lawrence	1025 Highland Dr Blue Earth, MN 56013	100360300	NW¼ SW¼	36	102N	28W	Faribault

	Owner	Address	PID	Description	Sec	Twp	Rge	County
12.	Maxine Lawrence	1025 Highland Dr Blue Earth, MN 56013	100360300	NE¼ SW¼	36	102N	28W	Faribault
13.	Lawrence Land LLC	1120 Highland Dr Blue Earth, MN 56013	100360600	NW¼ SE¼	36	102N	28W	Faribault
14.	Myron E Childs Irrevoc Trust Denise L Wolf Trustee	PO Box 194 Elmore, MN 56027	020310700	NW¼ SW¼	31	102N	27W	Faribault
15.	Myron E Childs Irrevoc Trust Denise L Wolf Trustee	PO Box 194 Elmore, MN 56027	020310700	SW¼ SW¼	31	102N	27W	Faribault
16.	Lawrence Farm Inc	1120 Highland Dr Blue Earth, MN 56013	100360200	SW¼ SW¼	36	102N	28W	Faribault
17.	Ronald H Lawrence	1025 Highland Drive Blue Earth, MN 56013	100360700	SE¼ SE¼	36	102N	28W	Faribault
18.	George Lane Buck Trust	15 Oak Park Court Bettendorf, IA 52722	020310200	SE¼ SW¼	31	102N	27W	Faribault
19.	George Lane Buck Trust	15 Oak Park Court Bettendorf, IA 52722	020310200	SW¼ SE¼	31	102N	27W	Faribault
20.	Steven P Lawrence Trust & Berneda J Lawrence Disc Tr	1120 Highland Drive Blue Earth, MN 56013	140010701	NW¼ NW¼	01	101N	28W	Faribault
21.	Steven P Lawrence Trust & Berneda J Lawrence Disc Tr	1120 Highland Drive Blue Earth, MN 56013	140010701	NW¼ NE¼	01	101N	28W	Faribault
22.	Myron E Childs Irrevoc Trust Denise L Wolf Trustee	PO Box 194 Elmore, MN 56027	140010100	NE¼ NE¼	01	101N	28W	Faribault
23.	Myron E Childs Irrevoc Trust Denise L Wolf Trustee	PO Box 194 Elmore, MN 56027	070060200	NW¼ NW¼	06	101N	27W	Faribault
24.	Myron E Childs Irrevoc Trust Denise L Wolf Trustee	PO Box 194 Elmore, MN 56027	070060200	SW¼ NW¼	06	101N	27W	Faribault
25.	Ramona G Ehrich	6471 377th Avenue Blue Earth, MN 56013	070060300	NE¼ NW¼	06	101N	27W	Faribault

	Owner	Address	PID	Description	Sec	Twp	Rge	County
26.	Arlo & Marjorie Erickson Revocable Trust	20490 Parallel Rd C/O Richard Erickson Tonganoxie, KA 66086	070060500	NW¼ NE¼	06	101N	27W	Faribault
27.	Richard Arlo Erickson Trust Richard Arlo Erickson Trustee	PO Box 1008 Tonganoxie, KS 66086	070060600	NE¼ NE¼	06	101N	27W	Faribault
28.	Gerald L Sonnek	58214 240th St Mankato, MN 56001	140010200	SW¼ NW¼	01	101N	28W	Faribault
29.	Gerald L Sonnek	58214 240th St Mankato, MN 56001	140010200	SE¼ NW¼	01	101N	28W	Faribault
30.	Allen J & Joanne Sukalski	5966 385th Ave Blue Earth, MN 56013	140010400	SW¼ NE¼	01	101N	28W	Faribault

**5. Public Utility and Health.**

The proposed improvement will be of public utility and will promote the public health.

**6. Agreement by Petitioners.**

The undersigned Petitioners have been informed and understand that they may not withdraw as a petitioner at any time after this Petition is accepted by the drainage authority, except with the written consent of all other Petitioners on the filed Petition. Also, the undersigned Petitioners acknowledge and agree that they will pay all costs and expenses that may be incurred if the improvement proceedings are dismissed.

**7. Cost Bond.**

One or more petitioners shall cause a bond to be filed or a check to be delivered in the amount of at least \$10,000.00 payable to the drainage authority. The bond or payment will be conditioned to pay the costs incurred if the proceedings are dismissed or if a contract is not awarded to construct the proposed improvement described in the petition.

WHEREFORE, the Petitioners respectfully request the following:

- a. That the drainage authority accept this Petition, review it and determine that it is legally adequate; and
- b. That the drainage authority appoint Joe Lewis of Houston Engineering, or another qualified engineer, as the project engineer for purposes of the proposed improvement and direct the engineer to prepare an engineer's preliminary report for the proposed improvement, including allowing the engineer to analyze other

potential routes for the proposed improvement and whether separable maintenance may be employed.

Dated: July 29, 2020.



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Dean M. Zimmerli #0396791

*[dzimmerli@gislason.com](mailto:dzimmerli@gislason.com)*

**GISLASON & HUNTER LLP**

Attorneys for Petitioners

2700 South Broadway

P. O. Box 458

New Ulm, MN 56073-0458

Phone: 507-354-3111

Fax: 507-354-8447



[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAULT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Lawrence Farm INC

Ownership (check one):

☐ Individual  
☐ Co-Owners (# of co-owners: \_\_\_\_\_)  
☐ Partner (name of partnership: \_\_\_\_\_)  
☒ Corporation or limited liability company (name of corporation or LLC: \_\_\_\_\_)  
☐ Trust (complete name of trust: \_\_\_\_\_)  
☐ Other (explanation: \_\_\_\_\_)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

<u>Tract Description</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>	<u>County</u>
<u>SW 1/4 SW 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>Faribault</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Dated: 7/20/21

Lawrence Farm Inc  
by the Lawrence Pres  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAUT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Steven P. Lawrence Trust  
Bernada J Lawrence Disclaimer Trust

Ownership (check one):

☐ Individual  
☐ Co-Owners (# of co-owners: \_\_\_\_\_)  
☐ Partner (name of partnership: \_\_\_\_\_)  
☐ Corporation or limited liability company (name of corporation or LLC: \_\_\_\_\_)  
☒ Trust (complete name of trust: STEVEN P LAWRENCE TRUST)  
☐ Other (explanation: BERNADA J LAWRENCE DISCLAIMER TRUST)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

Tract Description	Section	Township	Range	County
<u>SW 1/4 NW 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>Faribault</u>
<u>SE 1/4 NW 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>"</u>
<u>NW 1/4 NW 1/4</u>	<u>01</u>	<u>101N</u>	<u>28W</u>	<u>"</u>
<u>NW 1/4 NE 1/4</u>	<u>01</u>	<u>101N</u>	<u>28W</u>	<u>"</u>

Dated: 7/21/21

Steven P Lawrence  
as Trustee for the Steven P Lawrence Trust  
(signature)

Dated: 7/21/21

Steven P Lawrence  
as Trustee for the Bernada J  
(signature) Lawrence Disclaimer Trust

Dated: \_\_\_\_\_

(signature)

[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAULT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Lawrence Land LLC

Ownership (check one):

☐ Individual  
☐ Co-Owners (# of co-owners: \_\_\_\_\_)  
☐ Partner (name of partnership: \_\_\_\_\_)  
☒ Corporation or limited liability company (name of corporation or LLC: Lawrence Land LLC)  
☐ Trust (complete name of trust: \_\_\_\_\_)  
☐ Other (explanation: \_\_\_\_\_)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

Tract Description	Section	Township	Range	County
NW 1/4 NW 1/4	36	102N	28W	Faribault
NW 1/4 SE 1/4	36	102N	28W	"

Dated: 7/20/21

Lawrence Land LLC  
By [Signature]  
 (signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
 (signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
 (signature)

[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAULT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Chad Lawrence  
Angela Lawrence

Ownership (check one):

☒ Individual  
☐ Co-Owners (# of co-owners: 2)  
☐ Partner (name of partnership: \_\_\_\_\_)  
☐ Corporation or limited liability company (name of corporation or LLC: \_\_\_\_\_)  
☐ Trust (complete name of trust: \_\_\_\_\_)  
☐ Other (explanation: \_\_\_\_\_)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

<u>Tract Description</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>	<u>County</u>
<u>E 1/2 SE 1/4</u>	<u>35</u>	<u>102N</u>	<u>R28W</u>	<u>Faribault</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Dated: 7-20-21

Chad S. Lawrence  
(signature)

Dated: 7-20-21

Angela Lawrence  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)



[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAULT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Ronald H. Lawrence

Ownership (check one):

☒ Individual  
☐ Co-Owners (# of co-owners: \_\_\_\_\_)  
☐ Partner (name of partnership: \_\_\_\_\_)  
☐ Corporation or limited liability company (name of corporation or LLC: \_\_\_\_\_)  
☐ Trust (complete name of trust: \_\_\_\_\_)  
☐ Other (explanation: \_\_\_\_\_)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

<u>Tract Description</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>	<u>County</u>
<u>SE 1/4 SE 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>Faribault</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Dated: 7-21-21

Ronald H. Lawrence  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

[Signature pages to follow]  
SIGNATURE PAGES FOR  
PETITION FOR IMPROVEMENT TO FARIBAUT COUNTY DITCH NO. 52

Name of Petitioner(s) (please print or type):

Maxine Lawrence  
\_\_\_\_\_

Ownership (check one):

☒ Individual  
\_\_\_\_ Co-Owners (# of co-owners: \_\_\_\_\_)  
\_\_\_\_ Partner (name of partnership: \_\_\_\_\_)  
\_\_\_\_ Corporation or limited liability company (name of corporation or LLC: \_\_\_\_\_)  
\_\_\_\_ Trust (complete name of trust: \_\_\_\_\_)  
\_\_\_\_ Other (explanation: \_\_\_\_\_)

Statement of Authority:

The undersigned states and represents that if he or she is executing in a representative capacity, he or she has the authority to execute on behalf of the respective partnership, corporation, limited liability company, trust or other such entity.

The above-named Petitioner(s) owns the following tract(s) which the proposed improvement will pass over or which is affected by the proposed improvement.

Tract Description	Section	Township	Range	County
<u>NW 1/4 SW 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>Faribault #1</u>
<u>NE 1/4 SW 1/4</u>	<u>36</u>	<u>102N</u>	<u>28W</u>	<u>"</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Dated: 7/21/21

Ronald L. Lawrence  
POA for Maxine A. Lawrence  
(signature)

Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

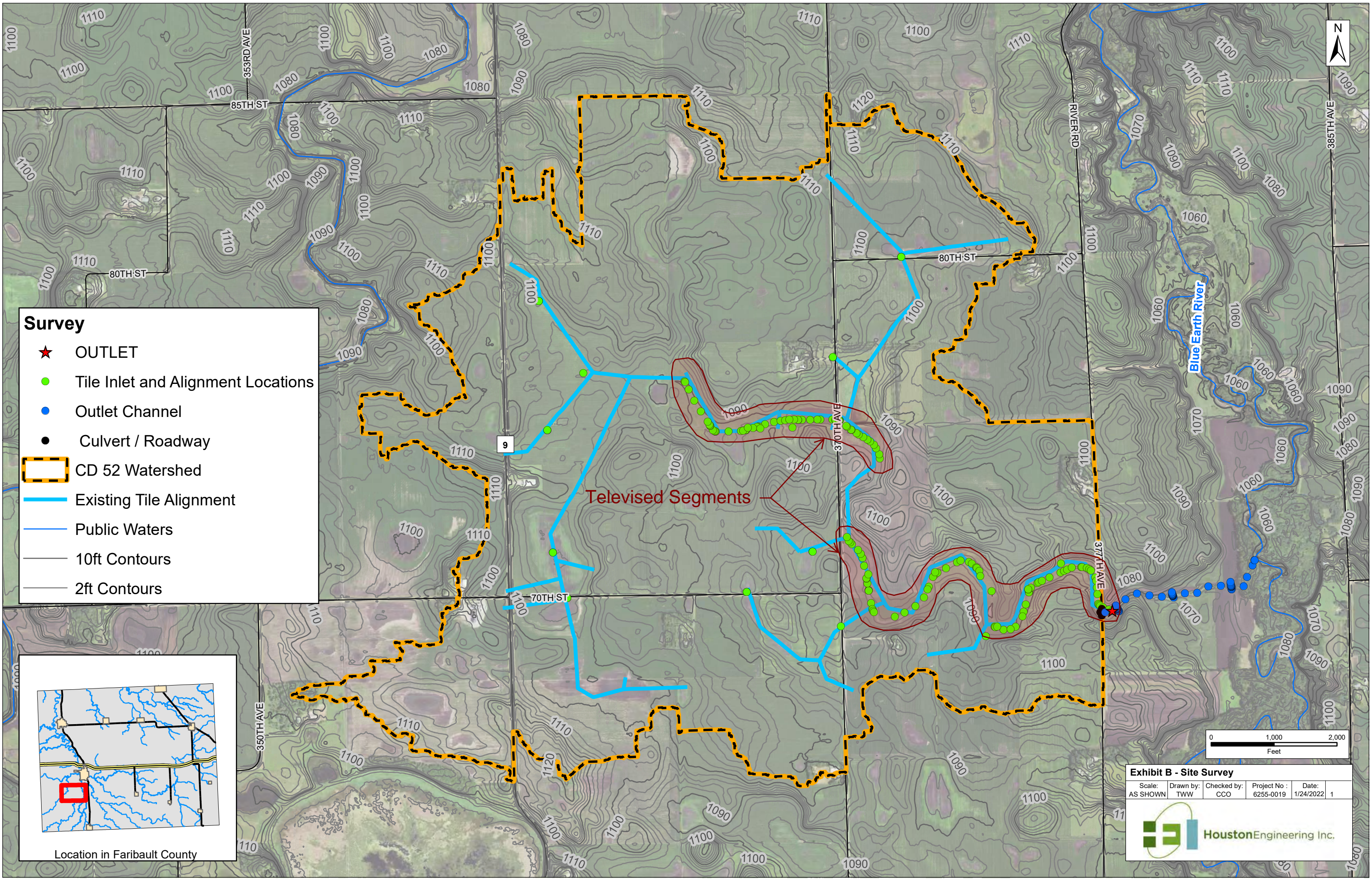
Dated: \_\_\_\_\_

\_\_\_\_\_  
(signature)

## EXHIBIT B – SITE SURVEY

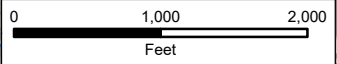
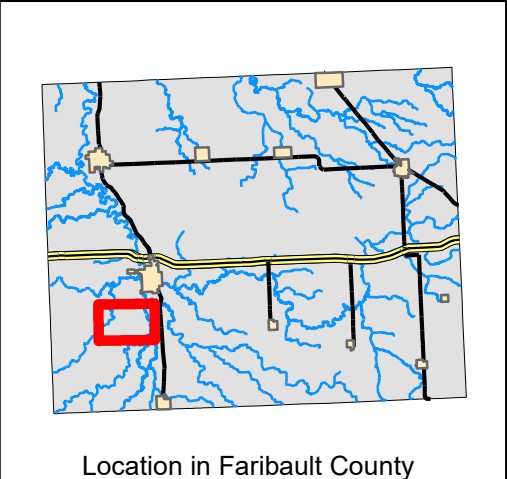







**Survey**

- ★ OUTLET
- Tile Inlet and Alignment Locations
- Outlet Channel
- Culvert / Roadway
- ▭ CD 52 Watershed
- Existing Tile Alignment
- Public Waters
- 10ft Contours
- 2ft Contours



**Exhibit B - Site Survey**

Scale: AS SHOWN	Drawn by: TWW	Checked by: CCO	Project No : 6255-0019	Date: 1/24/2022	1
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 **HoustonEngineering Inc.**



## EXHIBIT C – DESIGN CALCULATIONS

### EXISTING TILE HYDRAULICS (AS-CONSTRUCTED)

Cumulative Area (acres)	Tile Diameter (inches)	Discharge (cfs)	Drainage Coefficient** (inches/day)
Main Trunk			
2,041	30	21.1	0.25
1,972	30	21.1	0.25
1,851	28	13.7	0.18
1,633	28	13.8	0.20
1,633	28	9.7	0.14
1,445	26	8.2	0.13
1,390	26	8.3	0.14
1,066	22	7.2*	0.17*
1,010	22	7.2	0.17
993	22	6.0	0.14
873	22	5.9	0.16
654	20	5.3	0.19
525	20	5.3	0.24
347	16	2.7	0.19
347	16	2.4	0.17
281	14	0.7*	0.12*
259	12	0.7*	0.12*
149	10	0.7	0.12
66	10	1.2	0.43
66	10	0.7	0.24
11	4	0.1	0.21
Branch 178			
18.5	7	1	1.23
7.6	7	0.8	2.45
Branch 146+14			
51	7	0.5	0.22
5	7	0.6	2.71
Branch 146			
138	12	1.5	0.26
114	10	1.4	0.3
68	8	0.6	0.2
Branch 134			
55	10	1.1	0.46
55	10	0.9*	0.38*
55	7	0.9	0.38
55	7	1.1	0.48





Branch 110+7			
62	12	2.3	0.9
62	12	4.7	1.81
Branch 110+31			
15	7	N/A***	N/A***
Branch 110			
323	16	3.1	0.23
195	10	1.7	0.2
133	12	2.6	0.48
133	12	1.5	0.27
133	10	0.7	0.13
133	7	0.1	0.02
133	7	0.9	0.15
Branch 108			
4	7	1.2	6.76
Branch 102			
18	7	0.7	0.93
Branch 79			
219	12	1.5	0.16
Branch 70+6			
122	10	0.8	0.15
88	10	0.8	0.21
88	10	2	0.54
Branch 70			
179	14	2.7	0.36
57	10	1.1	0.46
57	10	0.6	0.24
35	10	1	0.72
35	10	2	1.39
Branch 38			
4	8	0.7	4.21
Branch 35			
22	7	0.4	0.39
22	8	0.9	0.96
Branch 32			
110	8	0.6	0.13
Branch 10			
23	7	0.3	0.36

\*Flow and Discharge Coefficient based on upstream tile segment. Slope at this location is 0.0% based on design plans and/or survey data

\*\*Drainage coefficient is based on a smooth wall (as-constructed) condition. Current efficiency of the system is substantially less due to deterioration of the tile and offsetting of joints.

\*\*\*Invert and slope data unavailable to calculate capacity and Discharge Coefficient



## IMPROVED CONDITION

Station start/stop		Cumulative Area (acres)	Tile Diameter (inches)	Discharge (cfs)	Drainage Coefficient (inches/day)
Main Trunk					
26+98	29+50	2,041	42	40.3	0.47
29+50	33+50	1,972	42	40.5	0.49
33+50	46+75	1,851	42	40.4	0.52
46+75	51+99	1,633	42	40.3	0.59
51+99	75+71	1,633	42	40.4	0.59
75+71	86+71	1,445	42	40.4	0.67
86+71	112+80	1,390	42	40.3	0.69
112+80	113+42	1,066	36	27.6	0.62
113+42	120+24	1,010	36	26.7	0.63
120+24	128+94	993	36	26.9	0.64
128+94	143+93	873	36	26.7	0.73
143+93	146+93	654	30	16.4	0.62
146+93	152+12	525	30	16.4	0.62
152+12	159+15	347	30	16.5	0.62
159+15	185+74	347	24	9.1	0.62
185+74	188+64	281	24	9.1	0.77
188+64	192+09	259	24	10.5	0.96
192+09	194+24	149	18	4.8	0.77
194+24	204+58	66	12	1.6	0.59
204+58	214+14	66	12	1.6	0.59
214+14	224+27	11	6	0.3	0.71
Branch 178					
0+0	9+25	18	6	0.6	0.8
9+25	16+26	8	6	0.6	1.94
Branch 146+14					
0+0	4+29	51	10	1.4	0.65
4+29	8+97	5	6	0.4	2.09
Branch 146					
0+0.00	7+51.95	138	12	3.4	0.6
7+51.95	14+52.20	114	12	2.9	0.6
14+52.20	31+82.60	68	12	1.6	0.58
Branch 134					
0+0	5+99	55	8	1.1	0.47



5+99	8+75	55	8	1.1	0.48
8+75	15+75	55	8	1.2	0.51
15+75	16+75	55	6	1.1	0.47
Branch 110+7					
0+0	5+00	62	10	1.3	0.5
Branch 110+31					
0+0	17+54	15	6	0.4	0.71
Branch 110					
0+0	5+40	323	15	6.2	0.46
5+40	7+40	195	15	4.9	0.6
7+40	17+69	133	15	5.2	0.93
17+69	30+48	133	15	3.4	0.6
30+48	32+94	133	15	3.4	0.6
32+94	42+92	133	15	3.4	0.6
42+92	47+12	133	12	3.5	0.63
Branch 108					
0+0.00	1+81.60	4	6	0.8	4.65
Branch 102					
0+0	1+38	18	6	1	1.35
Branch 79					
0+0	1+20	219	10	4.3	0.47
Branch 70+6					
8+25	20+69	122	18	3.8	0.74
1+00	8+25	88	15	2.3	0.63
0+0	1+00	88	8	2.1	0.57
Branch 70					
0+0	6+02	179	15	5.8	0.77
6+02	10+13	57	12	2.3	0.94
10+13	22+36	57	12	1.6	0.67
22+36	29+20	35	10	0.7	0.47
29+20	30+20	35	8	1.3	0.9
Branch 38					
0+0	6+22	4	6	0.5	2.97
Branch 10					
0+0	1+90	23	6	0.5	0.54

## EXHIBIT D – PRELIMINARY DESIGN PLANS

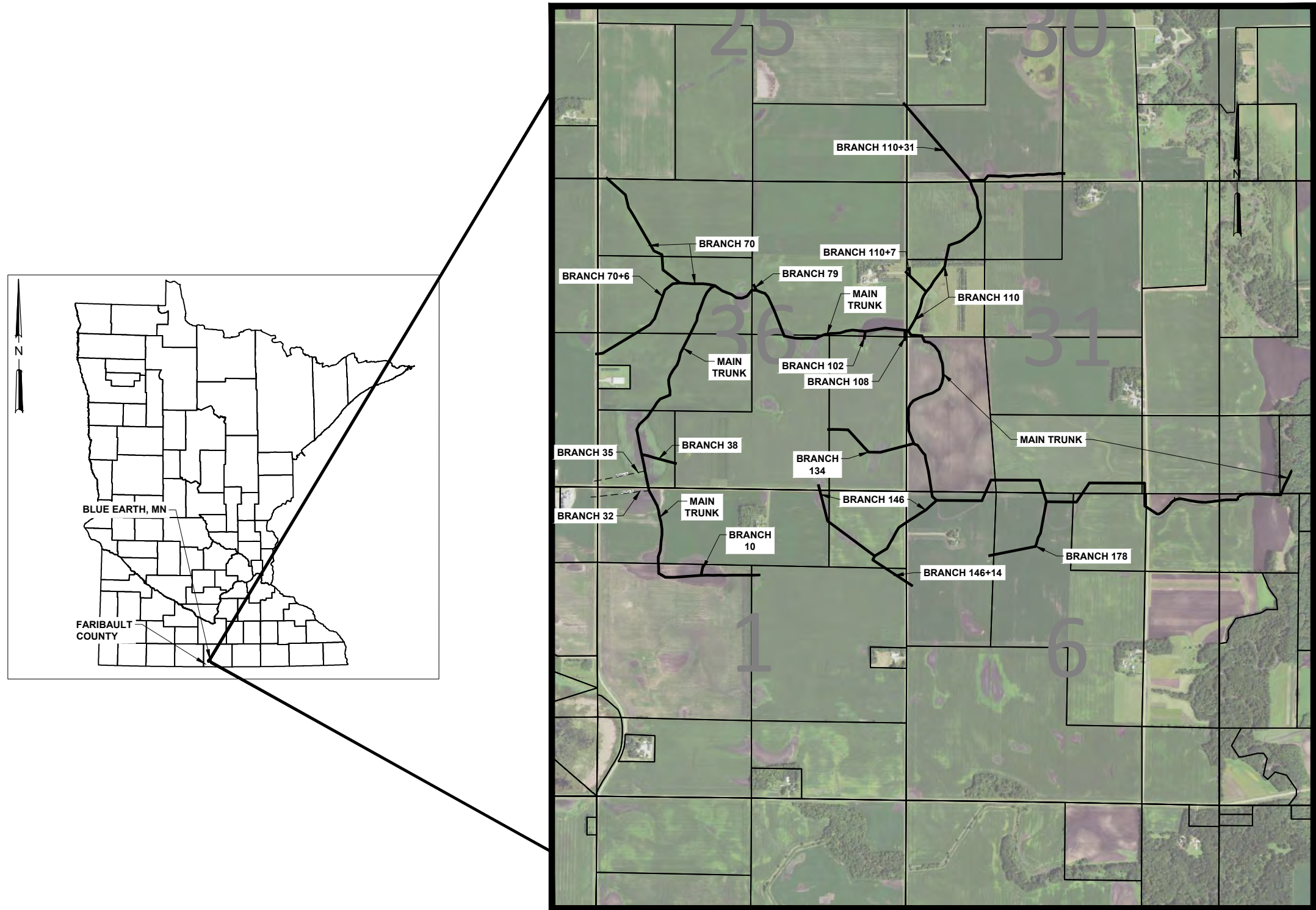


# FARIBAULT COUNTY DITCH 52 REPAIR REPORT

## FARIBAULT COUNTY

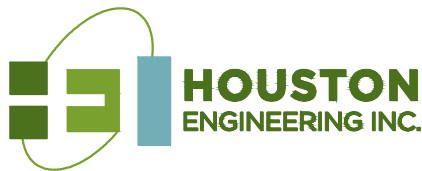
### JO DAVIESS, BLUE EARTH CITY, PILOT GROVE & ELMORE TOWNSHIPS

### FEBRUARY 2022



DRAWING INDEX	
SHEET #	SHEET TITLE
1	COVER SHEET
2	PLAN & PROFILE MAIN TRUNK
3	PLAN & PROFILE MAIN TRUNK
4	PLAN & PROFILE MAIN TRUNK
5	PLAN & PROFILE MAIN TRUNK
6	PLAN & PROFILE BRANCHES 178 & 146
7	PLAN & PROFILE BRANCHES 146+14 & 134
8	PLAN & PROFILE BRANCHES 110 & 110+7
9	PLAN & PROFILE BRANCHES 110+31
10	PLAN & PROFILE BRANCHES 108, 102 & 79
11	PLAN & PROFILE BRANCHES 70 & 70+6
12	PLAN & PROFILE BRANCHES 38 & 10

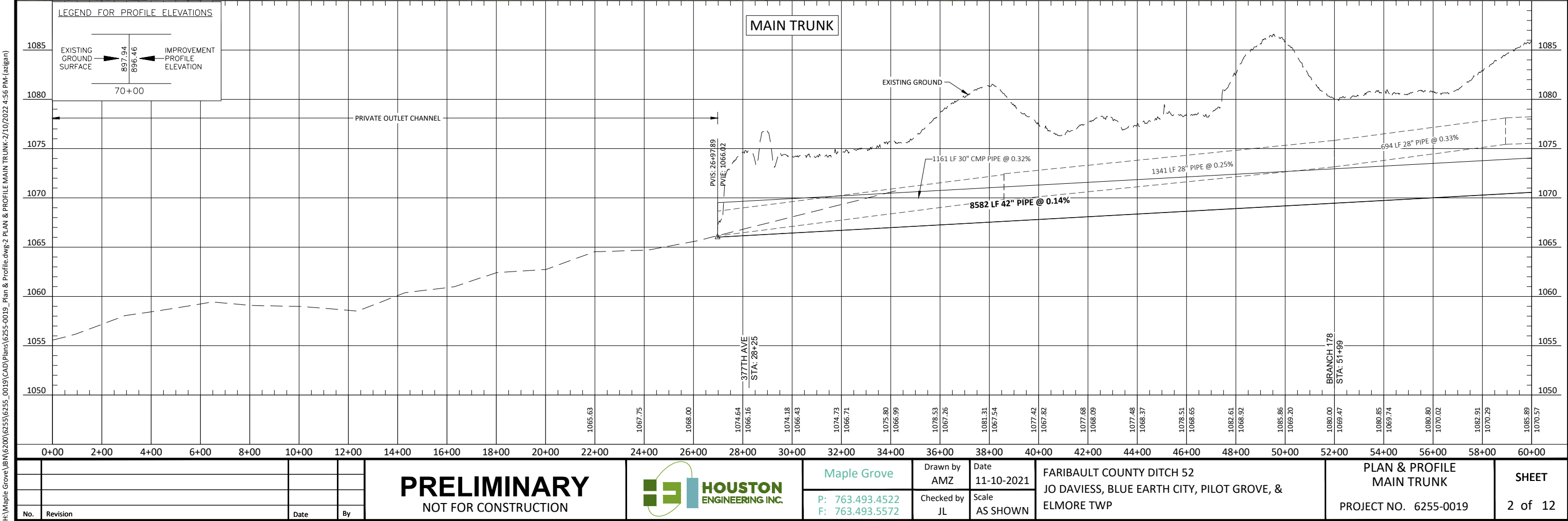
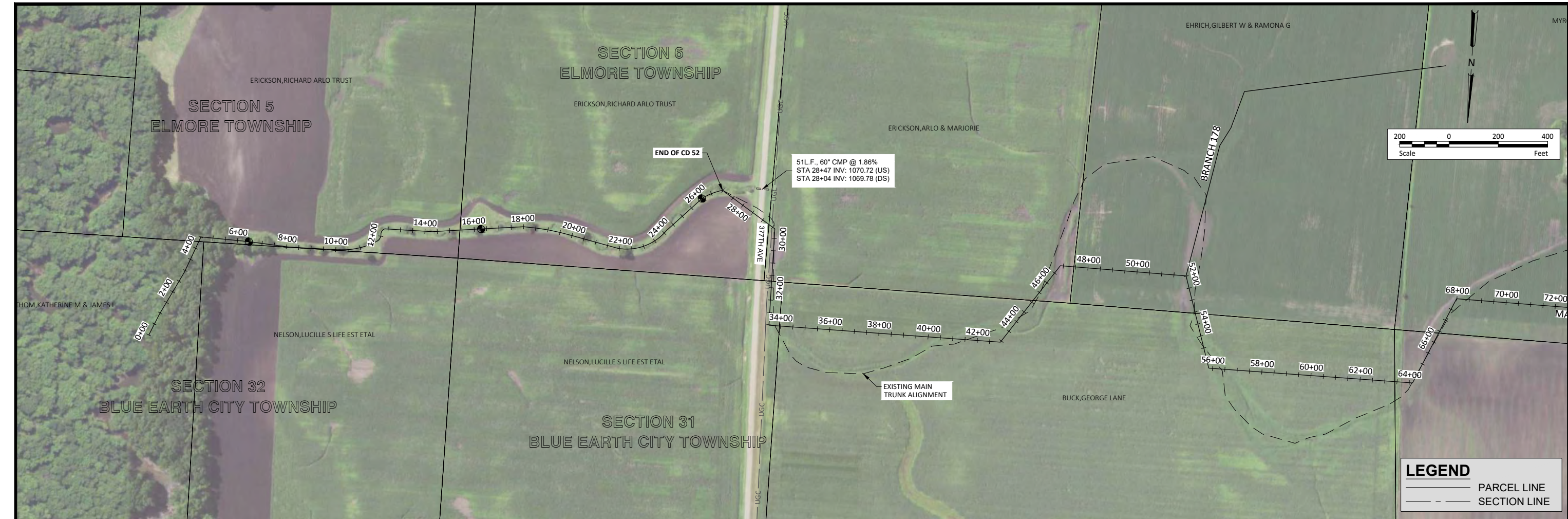
PREPARED BY:



MAPLE GROVE, MINNESOTA

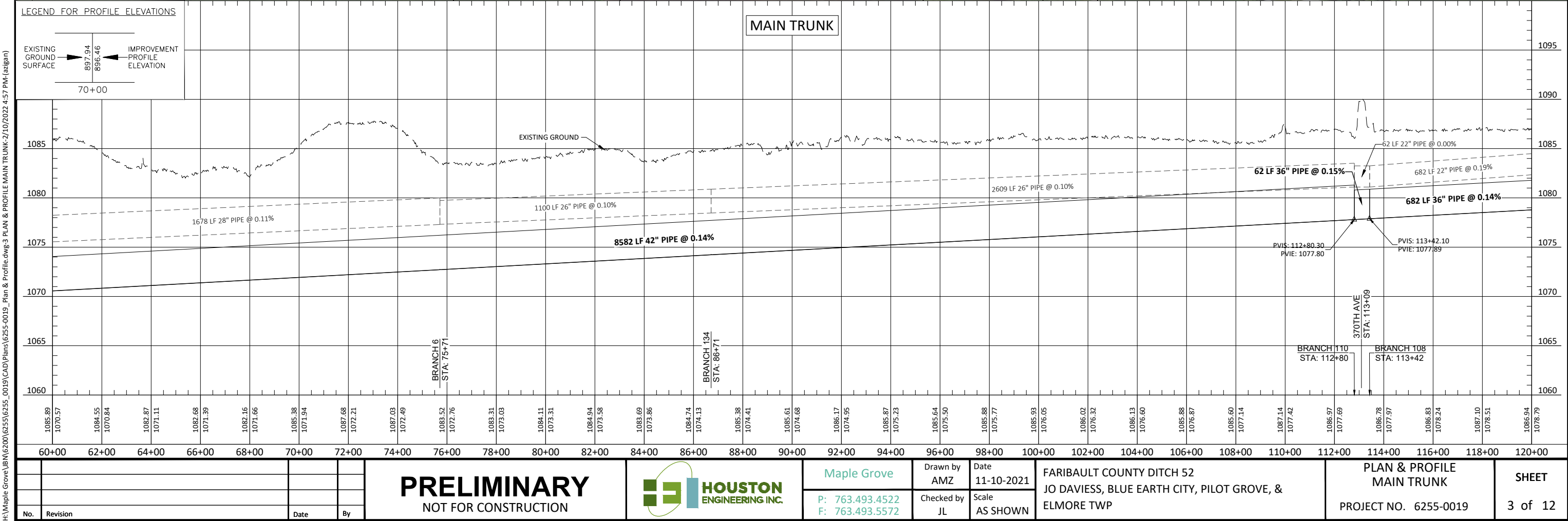
**PRELIMINARY**  
Not for Construction





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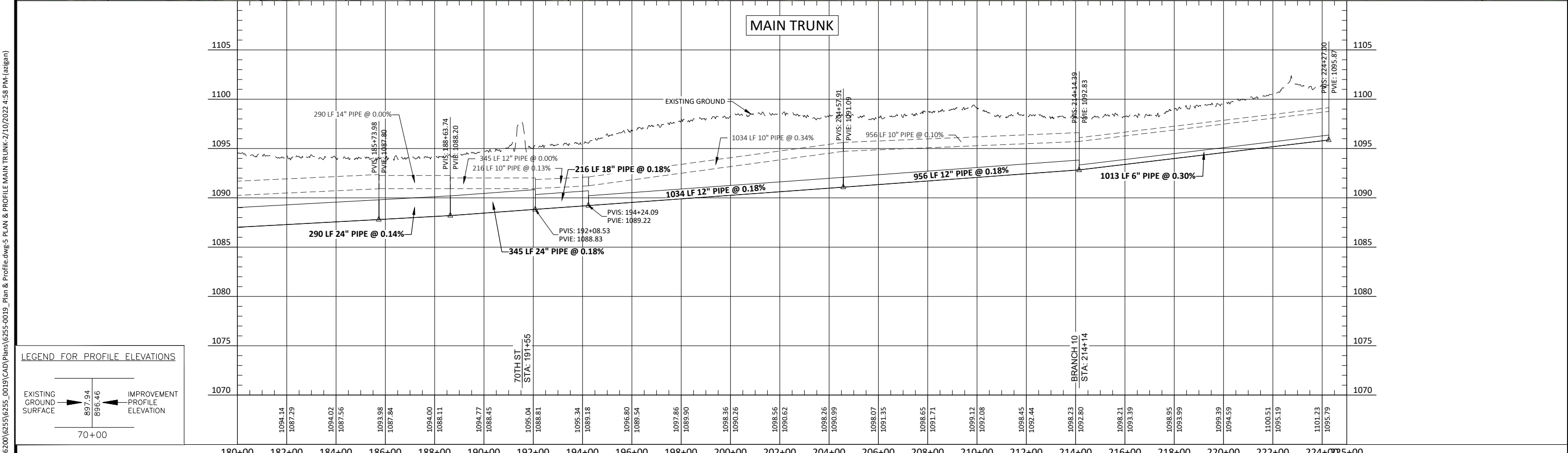




LEGEND

PARCEL LINE

SECTION LINE



LEGEND FOR PROFILE ELEVATIONS

EXISTING GROUND SURFACE

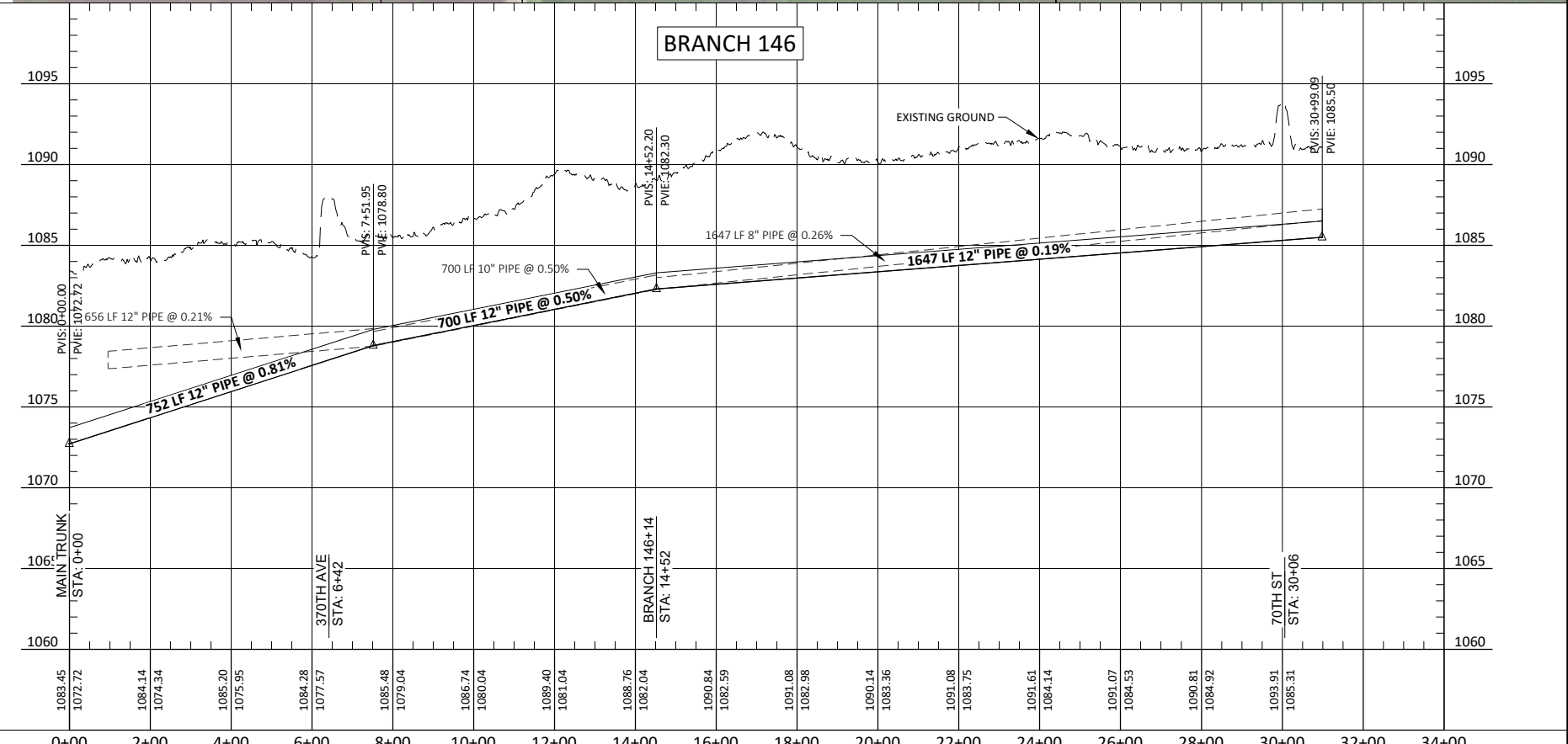
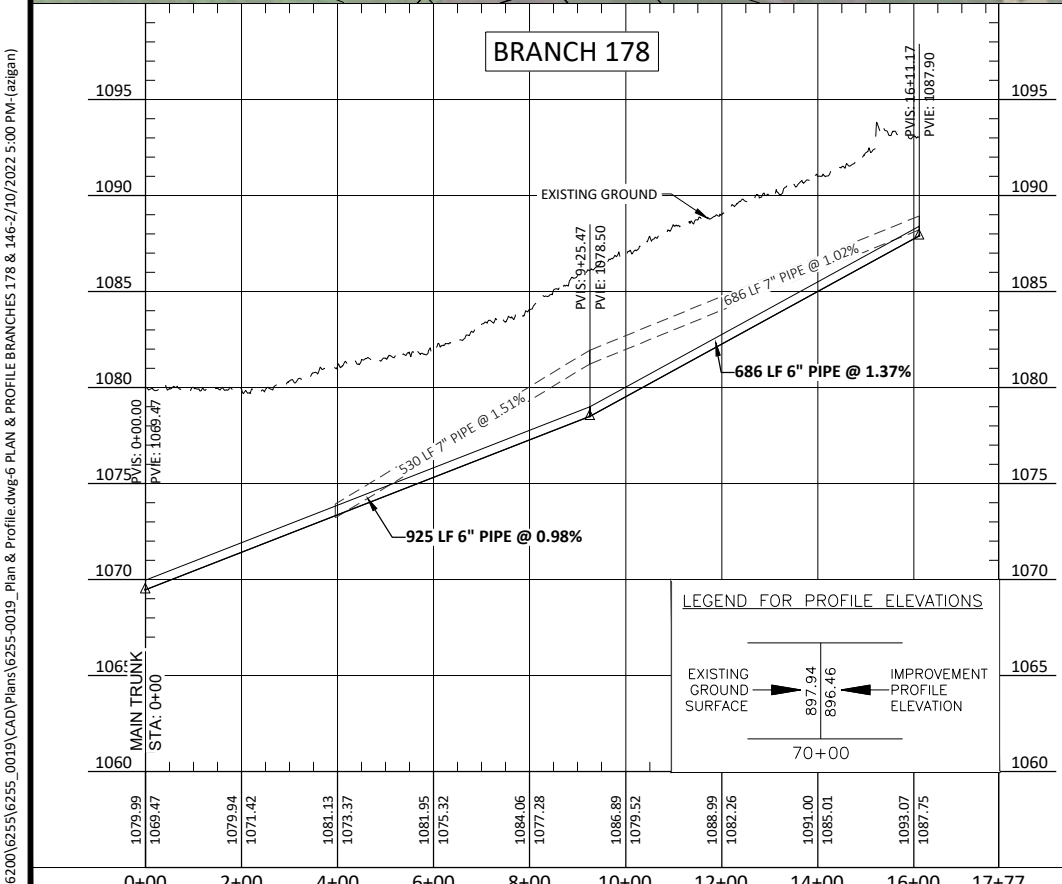
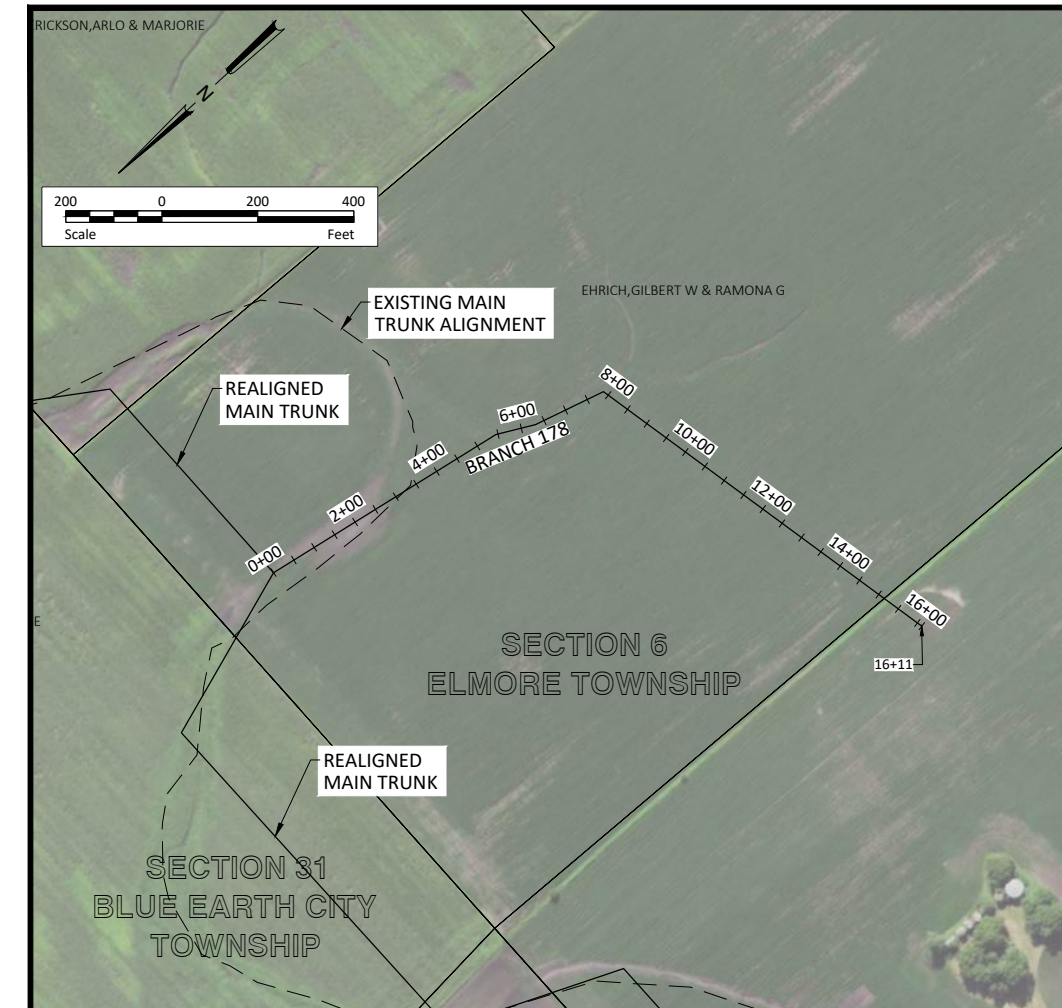
IMPROVEMENT PROFILE ELEVATION

70+00

<div><div></div><div></div><div></div><div></div></div>				<div>PRELIMINARY</div> <div>NOT FOR CONSTRUCTION</div>				<div><div></div><div>HOUSTON</div><div>ENGINEERING INC.</div></div>		<div>Maple Grove</div> <div>P: 763.493.4522</div> <div>F: 763.493.5572</div>		<div>Drawn by</div> <div>AMZ</div>	<div>Date</div> <div>11-10-2021</div>	<div>FARIBAULT COUNTY DITCH 52</div> <div>JO DAVIESS, BLUE EARTH CITY, PILOT GROVE, &amp;</div> <div>ELMORE TWP</div>				<div>PLAN &amp; PROFILE</div> <div>MAIN TRUNK</div>	<div>SHEET</div> <div>5 of 12</div>
No.	Revision	Date	By									Checked by	Scale					PROJECT NO. 6255-0019	
												JL	AS SHOWN						

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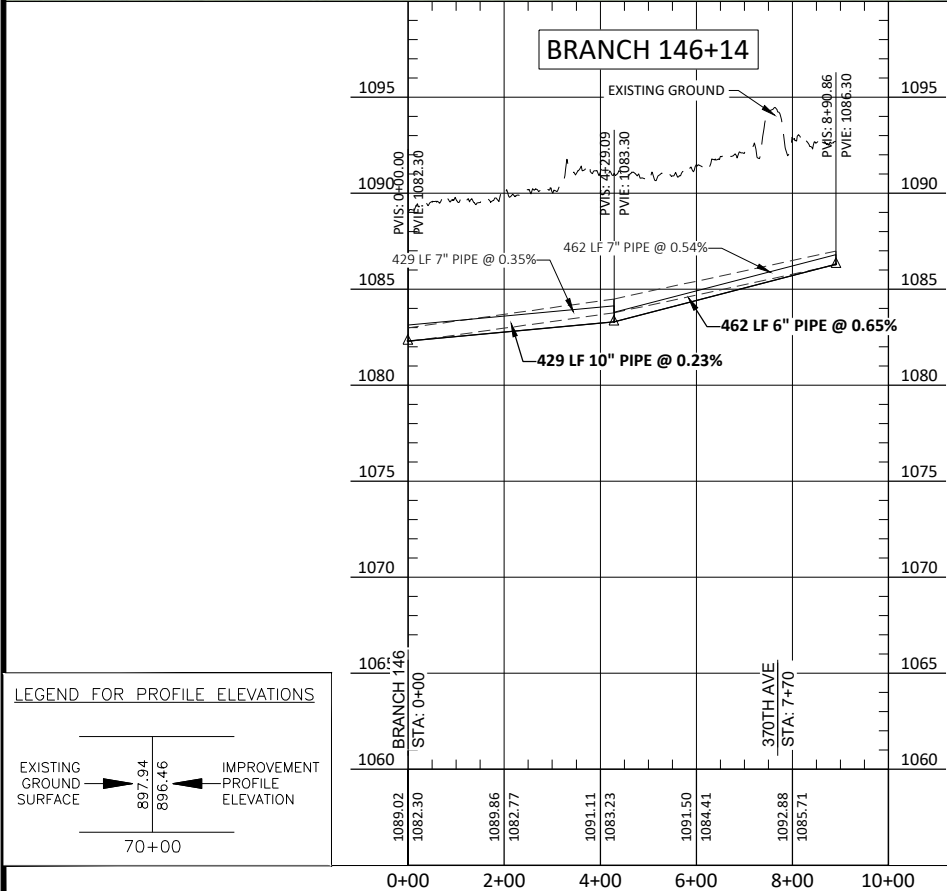




**LEGEND**

— PARCEL LINE

- - SECTION LINE



**LEGEND FOR PROFILE ELEVATIONS**

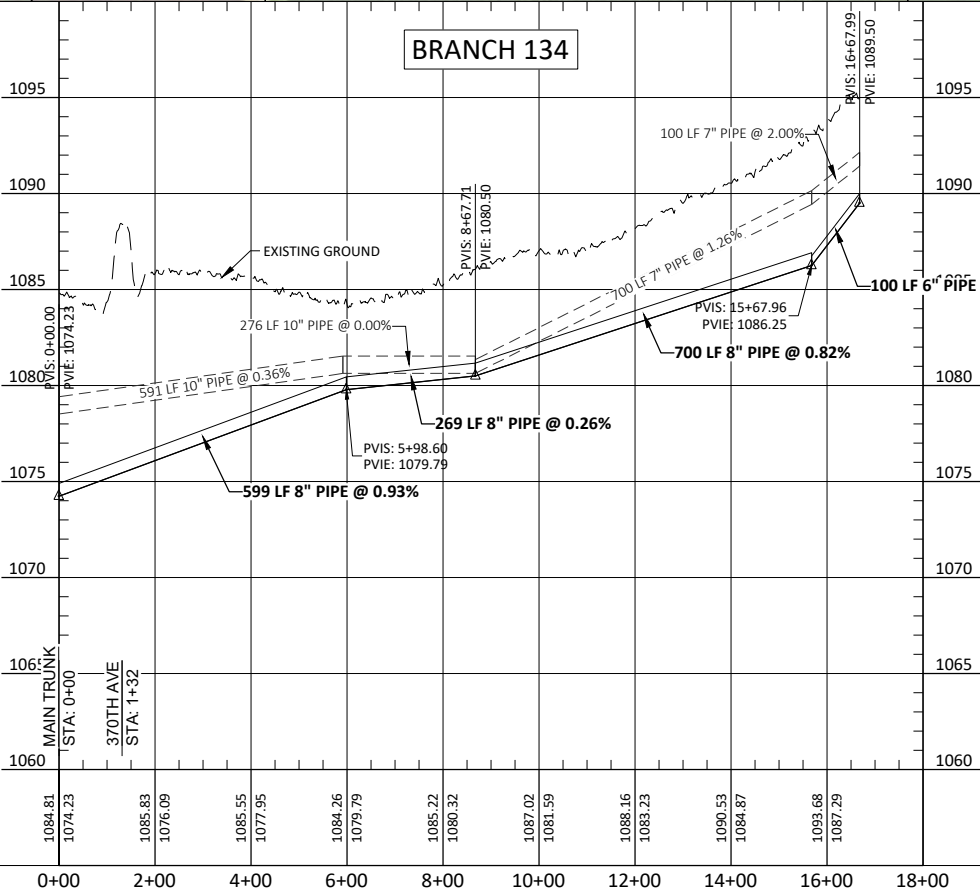
EXISTING GROUND SURFACE

IMPROVEMENT PROFILE ELEVATION

897.94

896.46

70+00



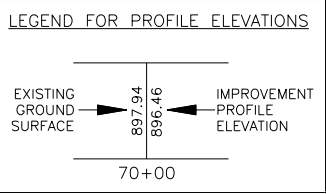
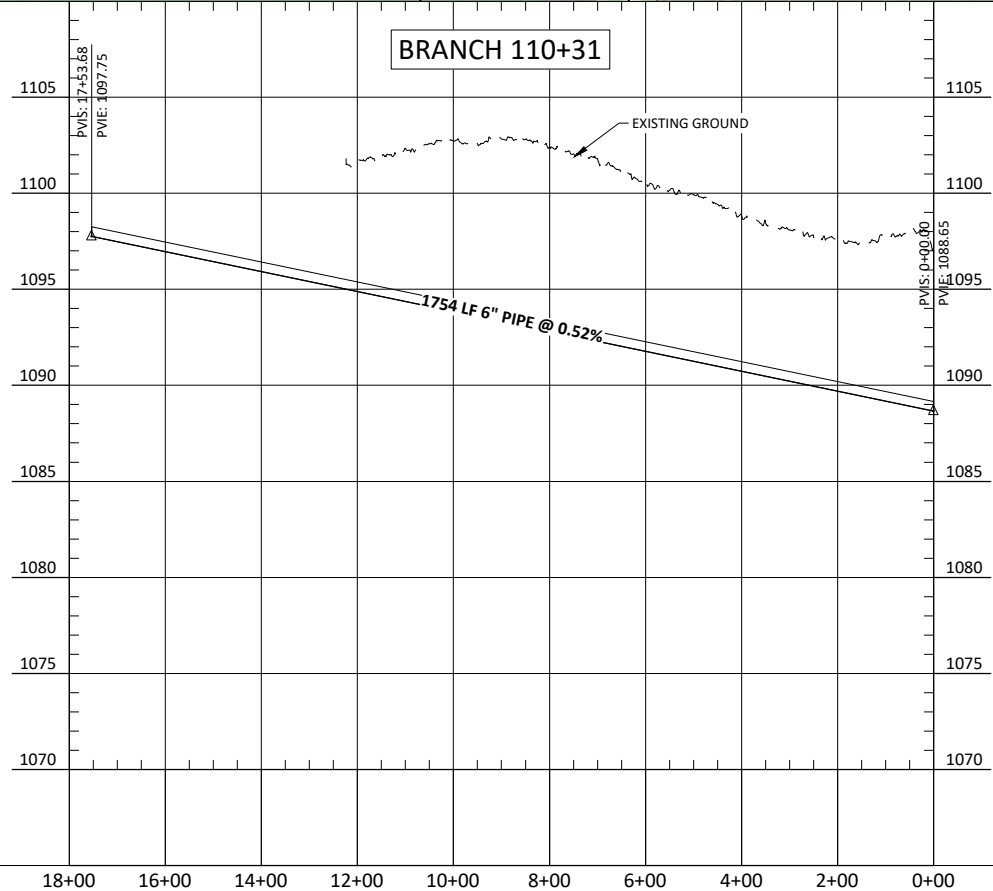
<div><div></div><div></div><div></div><div></div></div>				<div>PRELIMINARY</div> <div>NOT FOR CONSTRUCTION</div>		<div><div></div><div>HOUSTON</div><div>ENGINEERING INC.</div></div>		<div>Maple Grove</div> <div>P: 763.493.4522</div> <div>F: 763.493.5572</div>		<div>Drawn by</div> <div>AMZ</div> <div>Checked by</div> <div>JL</div>		<div>Date</div> <div>11-10-2021</div> <div>Scale</div> <div>AS SHOWN</div>		<div>FARIBAULT COUNTY DITCH 52</div> <div>JO DAVIESS, BLUE EARTH CITY, PILOT GROVE, &amp;</div> <div>ELMORE TWP</div>		<div>PLAN &amp; PROFILE</div> <div>BRANCHES 146+14 &amp; 134</div> <div>PROJECT NO. 6255-0019</div>		<div>SHEET</div> <div>7 of 12</div>	
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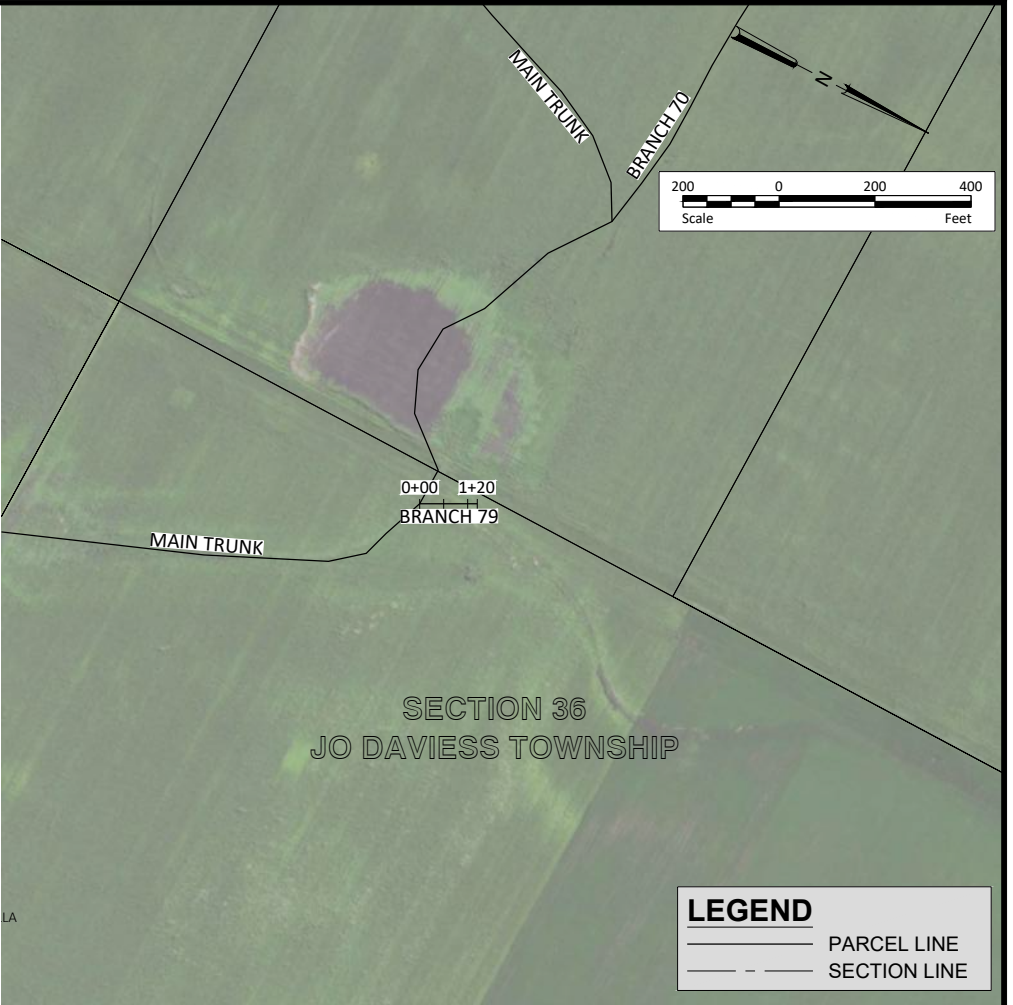
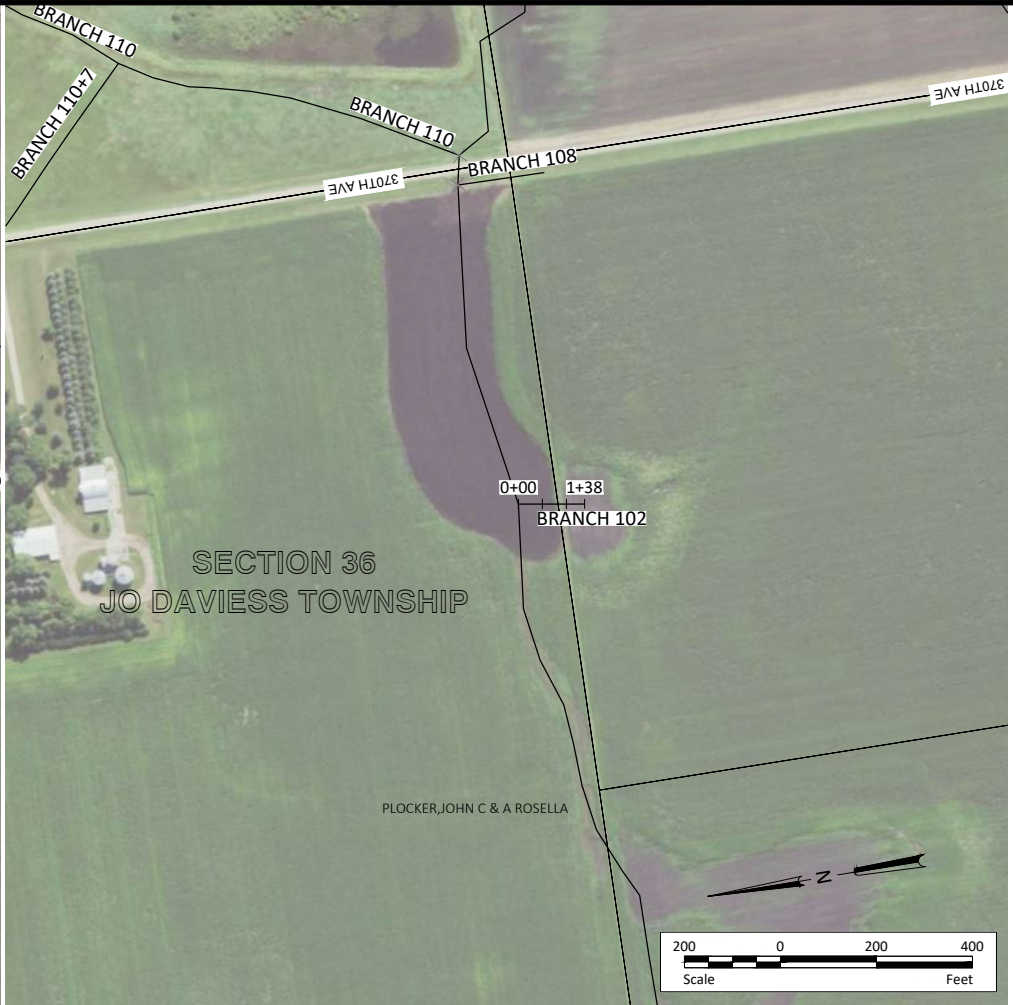
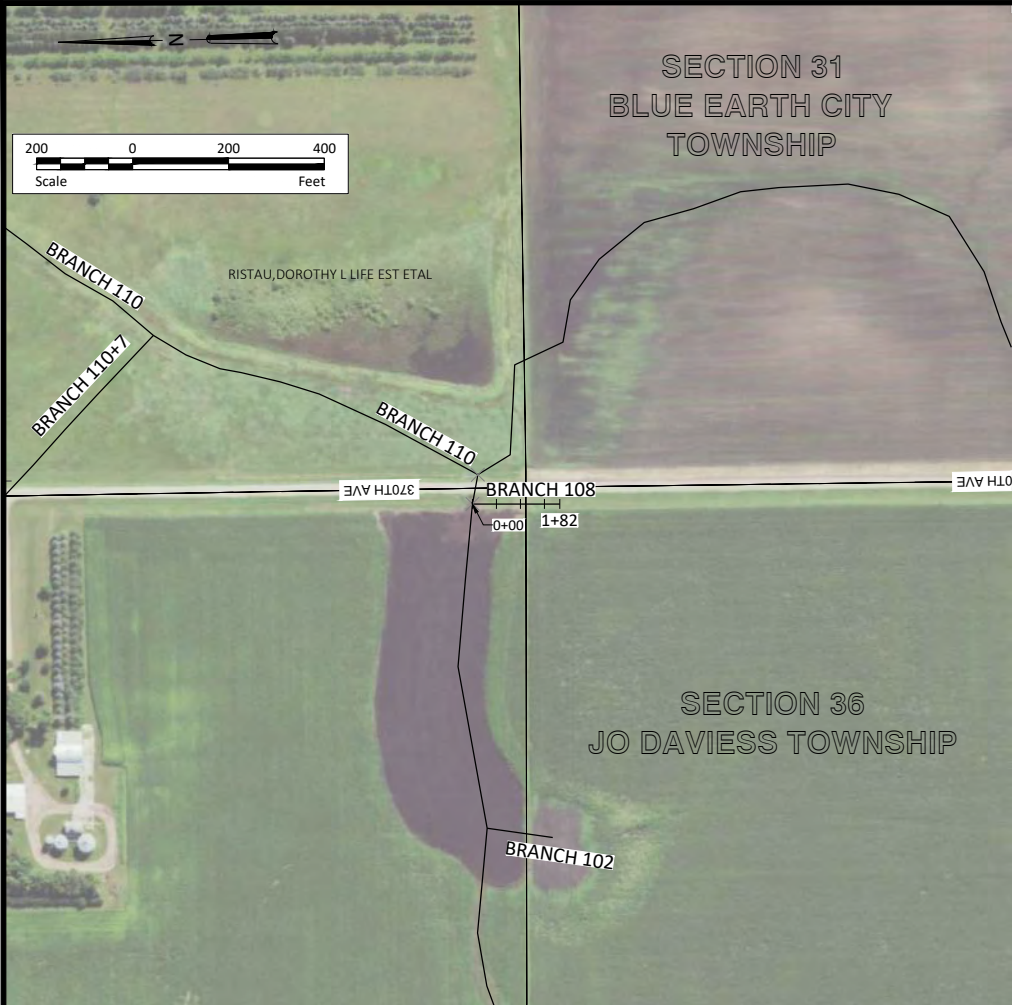




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No.	Revision	Date	By								

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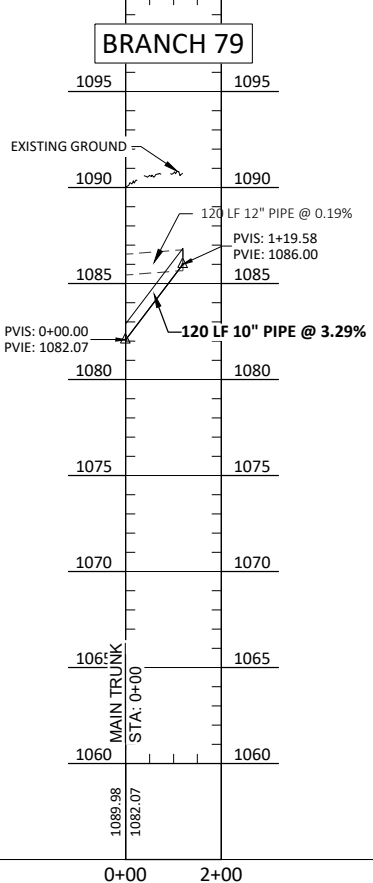
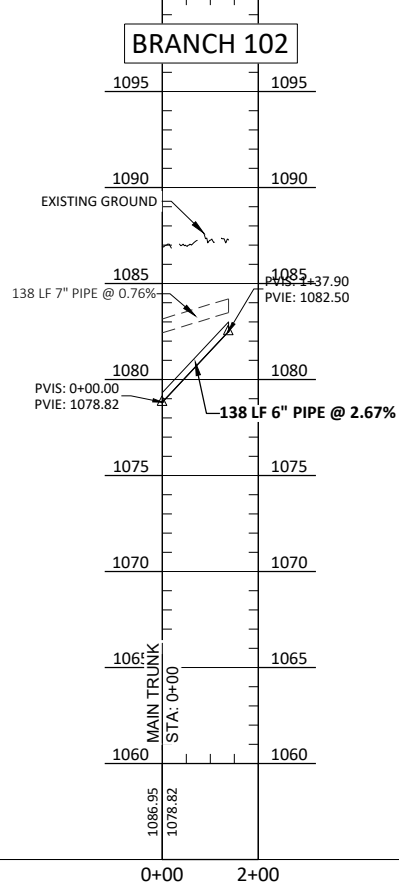
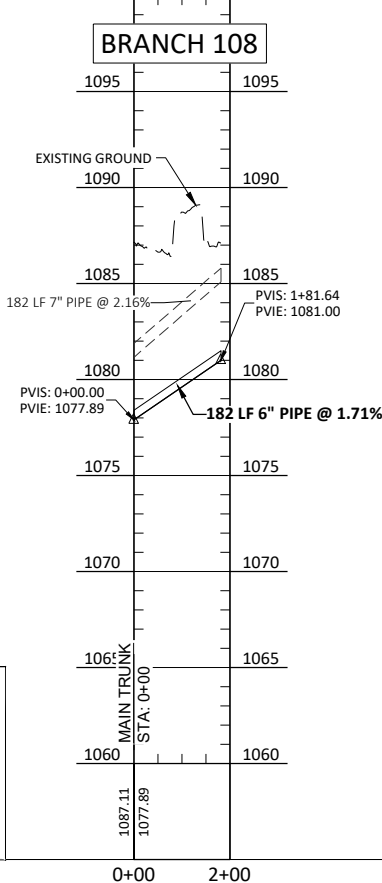
LEGEND

—

PARCEL LINE

- - -

SECTION LINE



LEGEND FOR PROFILE ELEVATIONS

EXISTING GROUND SURFACE

IMPROVEMENT PROFILE ELEVATION

897.94

896.46

70+00

No.	Revision	Date	By

PRELIMINARY  
NOT FOR CONSTRUCTION



Maple Grove  
P: 763.493.4522  
F: 763.493.5572

Drawn by  
AMZ  
Checked by  
JL  
Date  
11-10-2021  
Scale  
AS SHOWN

FARIBAULT COUNTY DITCH 52  
JO DAVIESS, BLUE EARTH CITY, PILOT GROVE, &  
ELMORE TWP

PLAN & PROFILE BRANCHES  
108, 102 & 79  
PROJECT NO. 6255-0019

SHEET  
10 of 12

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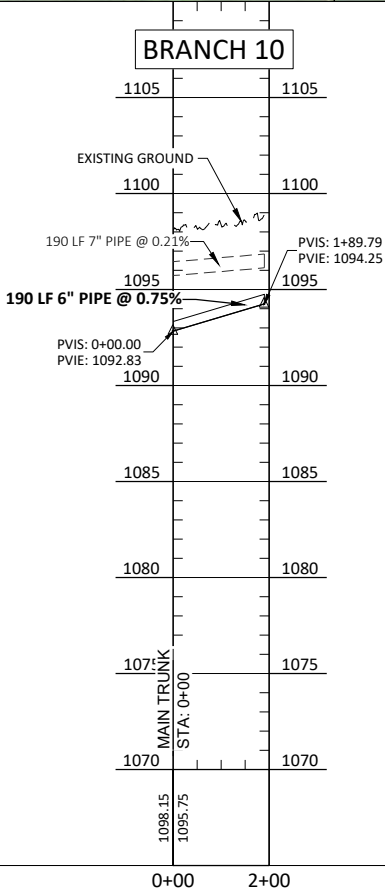
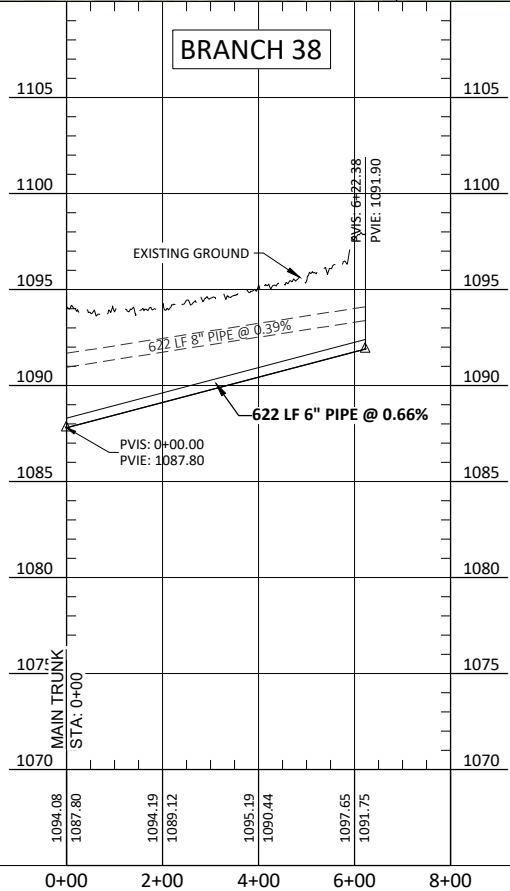




**LEGEND**

— PARCEL LINE

- - - SECTION LINE



**LEGEND FOR PROFILE ELEVATIONS**

EXISTING GROUND SURFACE	897.94	IMPROVEMENT PROFILE ELEVATION	896.46
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70+00

				<div><div>PRELIMINARY</div><div>NOT FOR CONSTRUCTION</div></div>		Maple Grove	Drawn by AMZ	Date 11-10-2021	FARIBAULT COUNTY DITCH 52 JO DAVIESS, BLUE EARTH CITY, PILOT GROVE, & ELMORE TWP	PLAN & PROFILE BRANCHES 38 & 10  PROJECT NO. 6255-0019	SHEET  12 of 12
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No.	Revision	Date	By								

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## EXHIBIT E – HYDROLOGIC ANALYSIS SUMMARY

### Approach

The analysis was performed using XPSWMM (version 2018.2.1) hydrologic modeling software. Both existing and proposed models were created using Curve-Number (CN) hydrologic theory, which estimates runoff volumes based on the combination of rainfall input, soil type, and land use at any given location (NRCS TR55).

### Hydrology Inputs

Using the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14, in combination with the Hydrology Guide for Minnesota, a basic rainfall frequency was established, and corresponding rainfall to runoff correlation was determined. Rainfall amounts over the CD 52 drainage area were obtained from the Atlas-14 Point Precipitation Frequency database. The rainfall inputs and corresponding return periods, to both existing and proposed models, are displayed in the table below.

Return Period (Years)	Rainfall (inches)
2	3.06
5	3.84
10	4.60
25	5.80
50	6.85
100	8.01

The CN dataset was created using 2016 National Land Cover Database (NLCD) Land Use data with Soil Survey Geographic Database (SSURGO) soils data. More specifically, the land use classification and hydrologic soil types were cross referenced with the Natural Resources Conservation Service (NRCS) Technical Release-55 (TR-55) lookup values to determine the curve number at any given location. It should be noted that for both existing and proposed models, the hydrologic soil groups assigned were assumed to be under "drained" conditions, meaning that soils are assumed to not be saturated and therefore have a higher infiltrability. Using GIS spatial analysis tools, a weighted average CN value was assigned to each catchment delineated within the study area.

### Catchment Delineation

The catchment boundaries for the models were delineated by combining GIS mapping of the existing tile network with Light Detection and Ranging (LiDAR) topography. Catchments were delineated to known and assumed surface intake locations along the public drain tile. The study areas models include a total of 33 catchments, spanning approximately 2,040 acres. Catchment sizes range from approximately 4 acres to 218 acres.

### Travel Time

Travel time for catchment hydrograph routing was determine using the Velocity Method described in the NRCS National Engineering Handbook. This methodology estimates travel time for a catchment area as the sum of the sheet flow time, shallow concentrated flow time, and open channel flow time, from the



hydraulically furthest point to the outlet of a catchment. All component travel times are calculated based on the length, slope, and surface roughness of a the flow path.

### Storage

Surface depressional storage within the study area was included in the model to accurately replicate the connection between pipe and surface flows. Stage-Area curves were developed for natural surface basins and the upstream sides of road crossings. The stage-area curves were developed using MnDNR LiDAR data for Faribault County. This accounts for ponding in the watershed for existing and proposed conditions.

### Pipes

Drain tile and culverts were simulated in XPSWMM as pipes. Sizes and inverts for drain tile in the existing conditions model were obtained from survey or the original construction plans of CD 52. Culvert data was either assumed or obtained from survey data. Existing (as-constructed) conditions drain tile was modeled using a roughness coefficient of 0.014. Proposed conditions drain tile was modeled using a roughness coefficient of 0.012 based on material supplier recommendation.

### Channels

When the pipe network capacity is exceeded, additional flow paths are needed to provide surface conveyance. One way of achieving this in a model is by creating an overflow channel. Locations of required overflow channels were determined using flow accumulation mapping of the LiDAR data combined with surcharge locations within the pipe system of the model. Additional model overflow information was derived from GIS data including the upstream/downstream invert elevations (surface elevations) and length. Overflow channels are represented by a trapezoidal-shaped channel with a bottom width of 10 feet and a channel side slope of 1:50. Roughness was assumed to be 0.035 for row crop surfaces.

### Weirs

Throughout the models, weirs are used to allow storage areas to spill into adjacent nodes or storage areas. Storage overflow weirs were added by determining the overflow threshold elevation and receiving node for each of the storage areas and adding a weir link. These pour points were determined using GIS tools to analyze the storage depressions. Weirs in the models are generally oversized (sharp-crested with a length of approximately 100 feet) to allow instantaneous transfer of water from one storage node to another.

Lastly, in XPSWMM model development, it is important to minimize the double counting of storage for any surface water. In cases where storage node volume overlaps surface channels, double counting of storage was eliminated by modifying the surface channel within the volume footprint.



## EXHIBIT F – OPINION OF PROBABLE COST

### REPAIR COST

Item	Item Description	Unit	Quantity	Unit Cost	Extension
1	MOBILIZATION	LUMP SUM	1	\$65,000.00	\$65,000.00
2	WATER CONTROL	LUMP SUM	1	\$25,000.00	\$25,000.00
3	6" TILE	LIN FT	1,012	\$15.00	\$15,180.00
4	8" TILE	LIN FT	9,113	\$20.00	\$182,260.00
5	10" TILE	LIN FT	8,707	\$21.00	\$182,847.00
6	12" TILE	LIN FT	3,936	\$22.00	\$86,592.00
7	15" TILE	LIN FT	891	\$24.00	\$21,384.00
8	18" TILE	LIN FT	3,900	\$30.00	\$117,000.00
9	24" TILE	LIN FT	3,932	\$42.00	\$165,144.00
10	30" TILE	LIN FT	10,060	\$60.00	\$603,600.00
11	HICKENBOTTOM SURFACE INLET	EACH	10	\$1,200.00	\$12,000.00
12	STANDARD SURFACE INLET	EACH	10	\$1,000.00	\$10,000.00
13	18" DROP INTAKE	EACH	10	\$1,500.00	\$15,000.00
14	4-8" - CONNECT TO EXISTING TILE	EACH	80	\$600.00	\$48,000.00
15	10-15" - CONNECT TO EXISTING TILE	EACH	20	\$1,200.00	\$24,000.00
16	TELEVISIONING	LIN FT	40,539	\$0.50	\$20,269.50
17	TRAFFIC CONTROL	LUMP SUM	1	\$5,000.00	\$5,000.00
18	OPEN CUT GRAVEL ROADWAY	EACH	10	\$4,000.00	\$40,000.00
19	JACK AND BORE 8" TILE	LIN FT	80	\$300.00	\$24,000.00
20	RIP RAP	CUBIC YARDS	10	\$100.00	\$1,000.00
21	SEEDING AND MULCH	ACRES	8	\$2,000.00	\$16,000.00
CONSTRUCTION ESTIMATE					\$1,679,276.50
CONTINGENCY				20%	\$335,900.00
CONSTRUCTION SUBTOTAL					\$2,015,176.50
Temporary Damages (acre)			95.4	\$625.00	\$59,617.48
Engineering (Reports and Specifications)				5%	\$83,963.83
Viewing				0.50%	\$8,396.38
Legal and Administrative				1%	\$16,792.77
Construction Management				11%	\$184,720.42
TOTAL					\$2,368,667.37





## IMPROVEMENT COST

Item	Item Description	Unit	Quantity	Unit Cost	Extension
1	MOBILIZATION	LUMP SUM	1	\$65,000.00	\$65,000.00
2	WATER CONTROL	LUMP SUM	1	\$25,000.00	\$25,000.00
3	6" TILE	LIN FT	6,072	\$15.00	\$91,080.00
4	8" TILE	LIN FT	1,768	\$20.00	\$35,360.00
5	10" TILE	LIN FT	1,049	\$21.00	\$22,029.00
6	12" TILE	LIN FT	7,714	\$22.00	\$169,708.00
7	15" TILE	LIN FT	5,613	\$24.00	\$134,712.00
8	18" TILE	LIN FT	1,427	\$30.00	\$42,810.00
9	24" TILE	LIN FT	3,294	\$42.00	\$138,348.00
10	30" TILE	LIN FT	1,522	\$60.00	\$91,320.00
11	36" TILE	LIN FT	3,112	\$72.00	\$224,064.00
12	42" TILE	LIN FT	8,582	\$100.00	\$858,200.00
13	HICKENBOTTOM SURFACE INLET	EACH	10	\$1,200.00	\$12,000.00
14	STANDARD SURFACE INLET	EACH	10	\$1,000.00	\$10,000.00
15	18" DROP INTAKE	EACH	10	\$1,500.00	\$15,000.00
16	4-8" - CONNECT TO EXISTING TILE	EACH	80	\$600.00	\$48,000.00
17	10-15" - CONNECT TO EXISTING TILE	EACH	20	\$1,200.00	\$24,000.00
18	TELEVISIONING	LIN FT	34,081	\$0.50	\$17,040.50
19	TRAFFIC CONTROL	LUMP SUM	1	\$5,000.00	\$5,000.00
20	OPEN CUT GRAVEL ROADWAY	EACH	10	\$4,000.00	\$40,000.00
21	JACK AND BORE 8" TILE	LIN FT	80	\$300.00	\$24,000.00
22	RIP RAP	CUBIC YARDS	10	\$100.00	\$1,000.00
23	SEEDING AND MULCH	ACRES	8	\$2,000.00	\$16,000.00
CONSTRUCTION ESTIMATE					\$2,109,671.50
CONTINGENCY				20%	\$421,900.00
CONSTRUCTION SUBTOTAL					\$2,531,571.50
Temporary Damages (acre)			92.2	\$625.00	\$57,611.63
Engineering (Reports and Specifications)				5%	\$105,483.58
Viewing				0.50%	\$10,548.36
Legal and Administrative				1%	\$21,096.72
Construction Management				11%	\$232,063.87
TOTAL					\$2,958,375.64





## IMPROVEMENT WITH STORAGE COST

Item	Item Description	Unit	Quantity	Unit Cost	Extension
1	MOBILIZATION	LUMP SUM	1	\$65,000.00	\$65,000.00
2	WATER CONTROL	LUMP SUM	1	\$25,000.00	\$25,000.00
3	6" TILE	LIN FT	6,072	\$15.00	\$91,080.00
4	8" TILE	LIN FT	1,768	\$20.00	\$35,360.00
5	10" TILE	LIN FT	1,049	\$21.00	\$22,029.00
6	12" TILE	LIN FT	7,714	\$22.00	\$169,708.00
7	15" TILE	LIN FT	4,874	\$24.00	\$116,976.00
8	18" TILE	LIN FT	1,427	\$30.00	\$42,810.00
9	24" TILE	LIN FT	3,294	\$42.00	\$138,348.00
10	30" TILE	LIN FT	1,522	\$60.00	\$91,320.00
11	36" TILE	LIN FT	9,192	\$72.00	\$661,824.00
12	42" TILE	LIN FT	2,502	\$100.00	\$250,200.00
13	HICKENBOTTOM SURFACE INLET	EACH	10	\$1,200.00	\$12,000.00
14	STANDARD SURFACE INLET	EACH	10	\$1,000.00	\$10,000.00
15	18" DROP INTAKE	EACH	10	\$1,500.00	\$15,000.00
16	4-8" - CONNECT TO EXISTING TILE	EACH	80	\$600.00	\$48,000.00
17	10-15" - CONNECT TO EXISTING TILE	EACH	20	\$1,200.00	\$24,000.00
18	TELEVISION	LIN FT	33342	\$0.50	\$16,671.00
19	TRAFFIC CONTROL	LUMP SUM	1	\$5,000.00	\$5,000.00
20	OPEN CUT GRAVEL ROADWAY	EACH	10	\$4,000.00	\$40,000.00
21	JACK AND BORE 8" TILE	LIN FT	80	\$300.00	\$24,000.00
22	RIP RAP	CUBIC YARDS	10	\$100.00	\$1,000.00
23	SEEDING AND MULCH	ACRES	8	\$2,000.00	\$16,000.00
CONSTRUCTION SUBTOTAL - TILE IMPROVEMENT					\$1,921,326.00
1	MOBILIZATION	LS	1	\$15,000.00	\$15,000.00
2	DEMOLITION AND CLEARING	LS	1	\$2,000.00	\$2,000.00
3	EXCAVATION/BORROW FOR EMBANKMENT (CV)	CY	5,722	\$5.00	\$28,610.00
4	EMBANKMENT CLAY CORE (BORROW) (CV)	CY	1,922	\$30.00	\$57,660.00
5	RIPRAP	CY	40	\$100.00	\$4,000.00
6	OUTLET STRUCTURE	LS	1	\$7,500.00	\$7,500.00
7	SEEDING AND MULCH	AC	5	\$2,000.00	\$10,000.00
CONSTRUCTION SUBTOTAL - STORAGE BASIN					\$124,770.00
CONSTRUCTION ESTIMATE					\$2,046,096.00



	CONTIGENCY	20%	\$409,200.00
	CONSTRUCTION SUBTOTAL		\$2,455,296.00
Temporary Damages (acre)	90.5	\$625.00	\$56,551.31
Land Acquisition / Permanent Damages for Storage	5.5	\$8250.00	\$45,375.00
Engineering (Reports and Specifications)		5%	\$102,304.80
	Viewing	0.50%	\$10,230.48
	Legal and Administrative	1%	\$20,460.96
	Construction Management	11%	\$225,070.56
	TOTAL		\$2,915,289.11

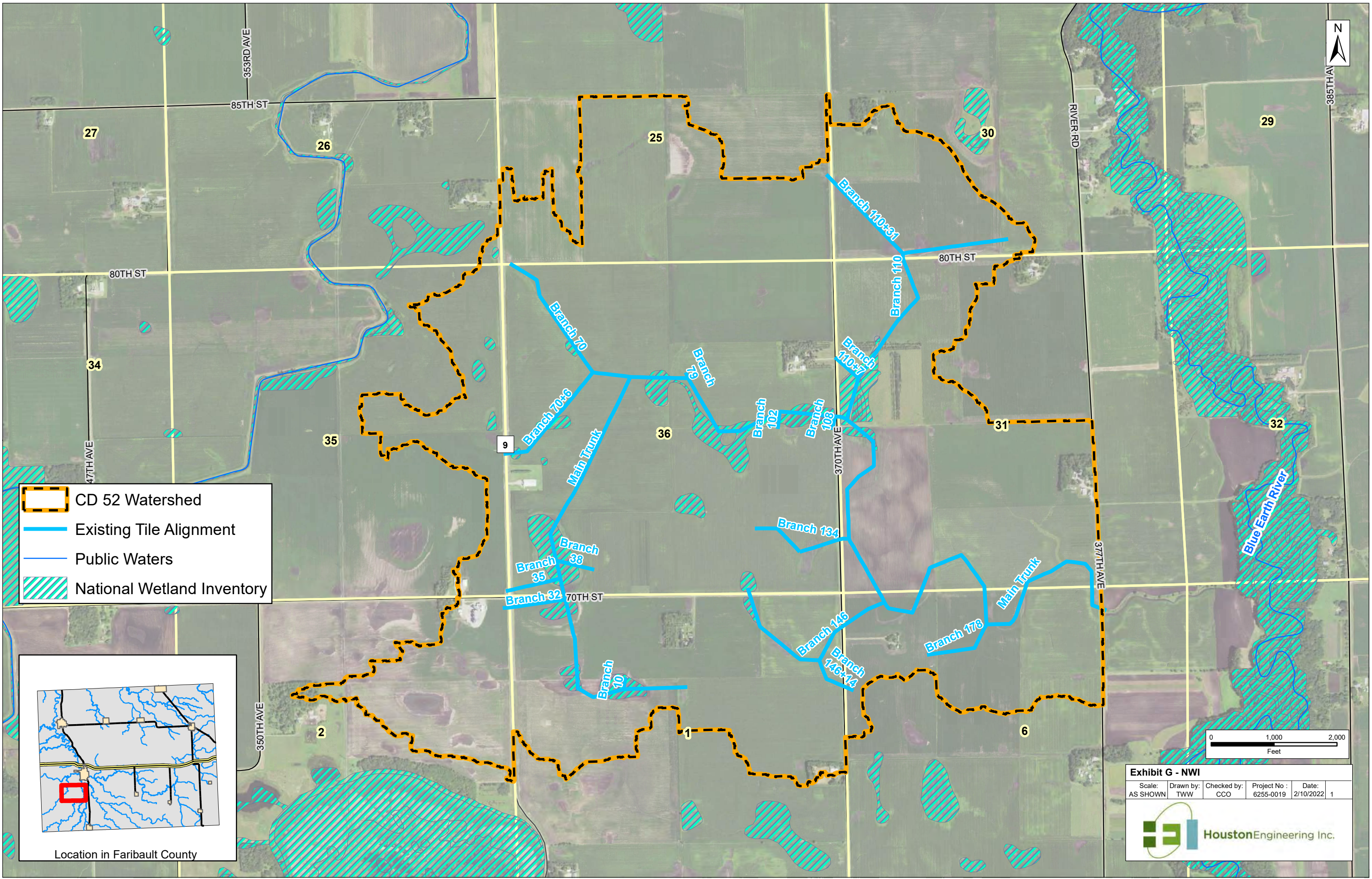




## EXHIBIT G – NATIONAL WETLAND INVENTORY







CD 52 Watershed

Existing Tile Alignment

Public Waters

National Wetland Inventory

Location in Faribault County

Exhibit G - NWI

Scale: AS SHOWN	Drawn by: TWW	Checked by: CCO	Project No : 6255-0019	Date: 2/10/2022	1
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HoustonEngineering Inc.



## EXHIBIT H – REQUEST FOR EXTERNAL FUNDING





# Technical Memorandum

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**To:** Nate Carr  
SWCD Program Administrator

**From:** Joe Lewis, PE  
Houston Engineering, Inc.

**Cc:** Merissa Lore  
Drainage Inspector

**Subject:** County Ditch 52 Improvement

**Date:** December 9, 2021

## INTRODUCTION

This memorandum is regarding the potential improvement of the Faribault County Ditch 52 (CD 52) drainage system. The petitioned project will increase capacity of the drainage system allowing for increased utilization of lands within the drainage system's watershed. The location and extents of CD 52 are shown in **Figure 1**. The system is generally located 3 miles south and 1 mile west of the City of Blue Earth in portions of Jo Daviess, Blue Earth City, Pilot Grove and Elmore Townships. The watershed area of CD 52 is approximately 2,000 acres and outlets into an unnamed tributary to the Blue Earth River approximately ½ mile west of the river. The CD 52 system was originally established in 1916 and consists of tile for its entire length of approximately 7.7 miles. The Main Trunk is approximately 3.9 miles and the remaining 3.8 miles is on 12 laterals. The system currently provides an 1/8-inch drainage coefficient, and the proposed improvement is considering increasing it to ½-inch. The tile will also be deepened to provide additional cover over the pipe which is shallow in several areas.

In accordance with Minn. Stat. § 103E.015, Subd. 1a., the Engineer on behalf of the Faribault County Drainage Authority must investigate the potential use of external sources of funding to facilitate the purposes of Minn. Stat. § 103E.011, subd. 5., which are for wetland preservation or restoration, or creation of water quality improvements or flood control. This memorandum is part of the early coordination effort required in Minn. Stat. § 103E.015 for identification of potential external sources of funding and technical assistance from the SWCD.

## COORDINATION

As you know, incorporating measures would require voluntary landowner participation and be subject to the timing of the availability of the funding to coincide with a potential improvement project. As an initial step in coordination with the SWCD, the Drainage Authority is requesting that the SWCD consider providing responses on the following items:

- Are funds currently available to implement measures in the CD 52 watershed, for the purposes of wetland preservation or restoration, creation of water quality improvements or flood control?
- If so, is the SWCD interested in and able to obtain additional external funds to implement measures in the CD 52 watershed?

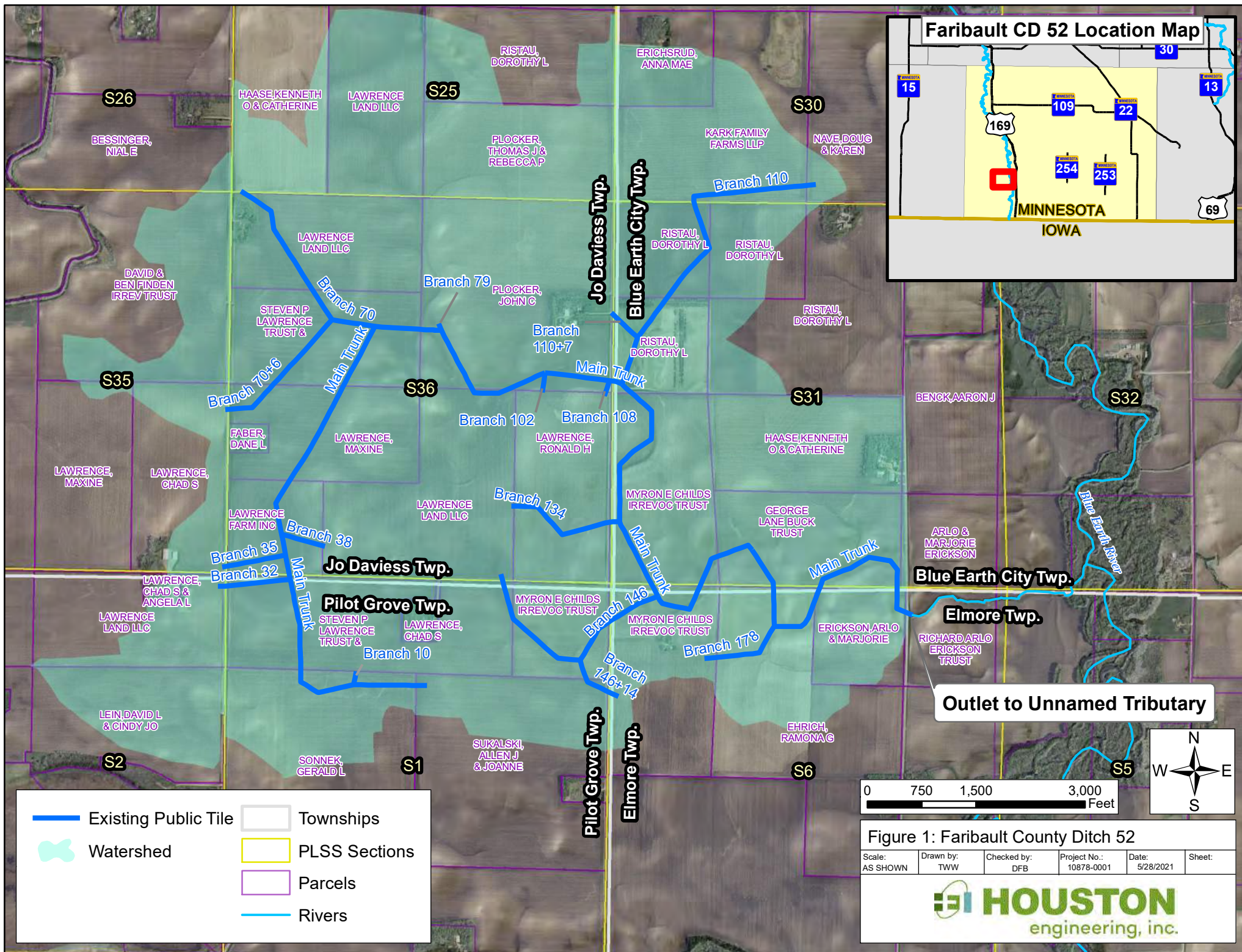
If funding is or will be available:

- Has the SWCD been engaged with landowners draining to this system regarding BMP implementation?
- What is the potential amount of external funding?
- What are the schedule constraints to acquire and expend external funding?
- What types of measures does the SWCD think are suitable and appropriate?
- Are there advantages to incorporating these measures into the CD 52 improvement rather than completing them independently.

As part of the development of a Preliminary Engineer's Report (PER), Houston Engineering Inc. (HEI) is currently evaluating the proposed improvement project's environmental effects on land use, flooding, wetlands, water quality, fish and wildlife resources, and groundwater as required by Minn. Stat. § 103E.015, Subd. 1. There may be measures incorporated into the improvement project for the purpose of mitigating adverse effects on any of the items.

Measures beyond those that mitigate adverse effects and are to preserve or restore wetlands, improve water quality or install flood control measures are not likely to show direct benefit to the benefiting landowners on the system and therefore cannot be included in the drainage system project unless external funding is provided. Project costs assessed to the drainage system landowners must benefit them. It is through this lens that the SWCD should consider this request for external funding.

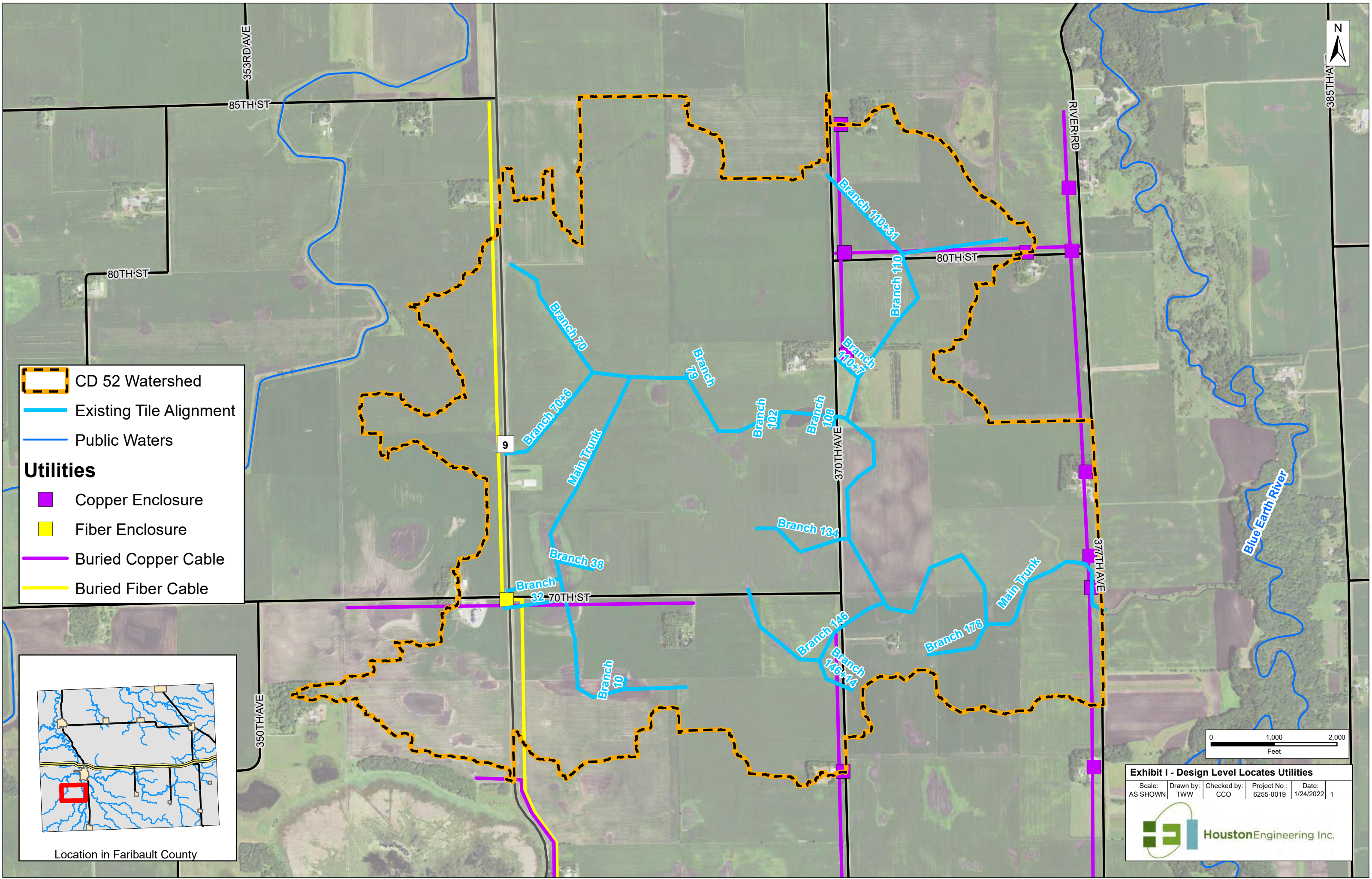
The PER is expected to be completed in early 2022 followed by a Public Hearing. Should a Final Engineers Report (FER) be ordered, it will likely be completed in mid-2022 and again be followed by a Public Hearing. The SWCD is welcome to attend either hearing to provide information on the availability of external funding or technical assistance. We are also available for meeting to review and discuss the project in more detail. We will follow-up with a phone call to discuss with you in greater detail.



## EXHIBIT I – DESIGN LEVEL LOCATES REQUEST FOR UTILITIES







CD 52 Watershed

Existing Tile Alignment

Public Waters

**Utilities**

Copper Enclosure

Fiber Enclosure

Buried Copper Cable

Buried Fiber Cable

Location in Faribault County

**Exhibit I - Design Level Locates Utilities**

Scale: AS SHOWN	Drawn by: TWW	Checked by: CCO	Project No : 6255-0019	Date: 1/24/2022	1
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HoustonEngineering Inc.



## EXHIBIT J – PTMAPP STRUCTURAL AND MANAGEMENT PRACTICES



## Additional Practice Information





**Farm Pond/Wetland:** Areas where water could be impounded by constructing an embankment and/or by excavating a dugout.

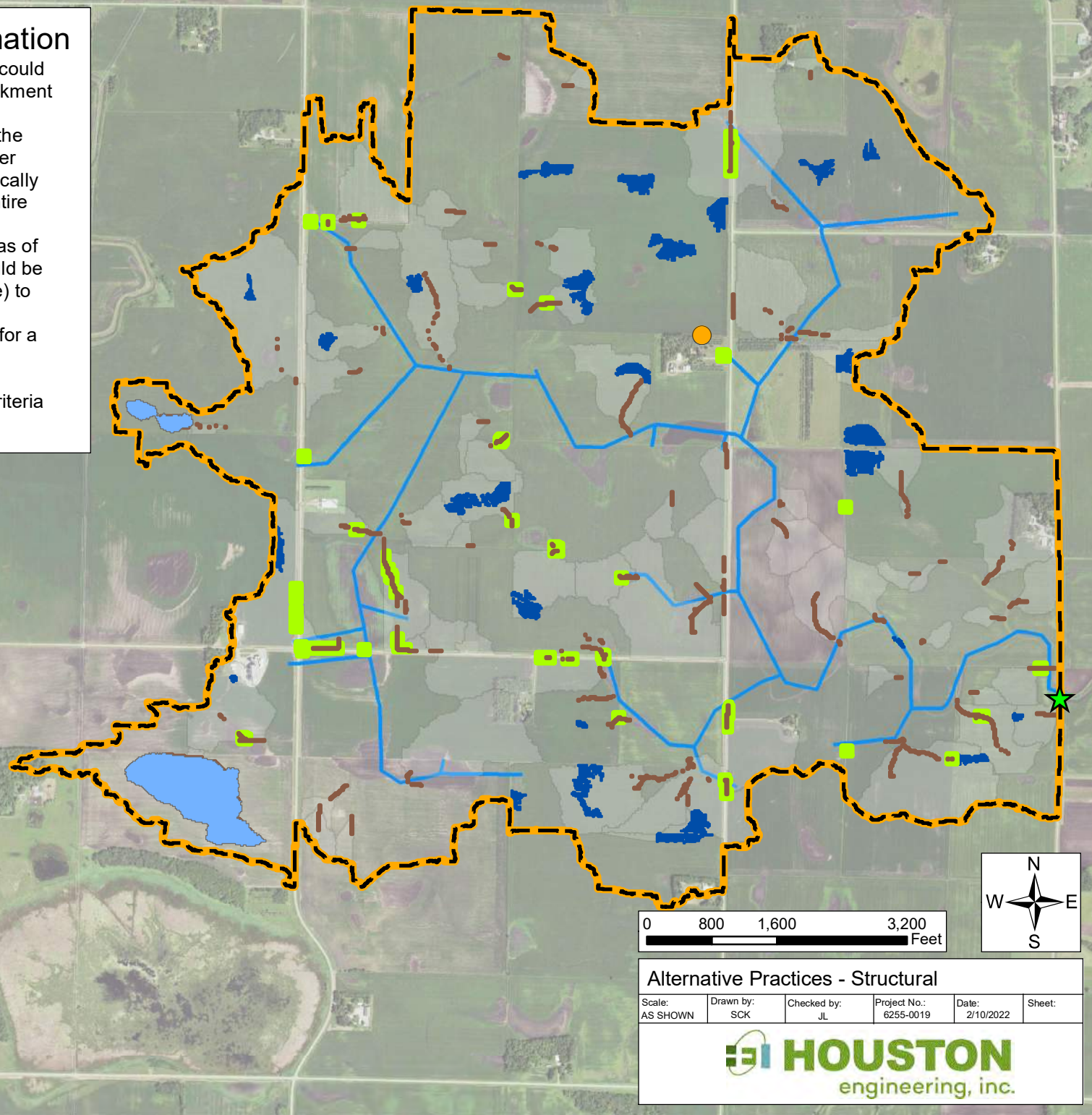
**Drainage Water Management:** Areas on the landscape that can support drainage water management. Mapped locations are typically expanded to include major portions or entire fields.

**WASCOB:** Linear features represent areas of accumulated flow where a WASCOB could be constructed (perpendicular to the flowline) to impound water.

**Denitrifying Bioreactor:** Suitable location for a denitrifying bioreactor.

For additional information on suitability criteria see Table 2 in Section 4.11.3

-  CD52 Watershed
-  Watershed Outlet
-  Existing Public Tile
-  Farm Pond/Wetland
-  Drainage Water Management
-  WASCOB
-  WASCOB drainage area
-  Grassed Waterway
-  Denitrifying Bioreactor



0 800 1,600 3,200  
Feet



### Alternative Practices - Structural

Scale: AS SHOWN	Drawn by: SCK	Checked by: JL	Project No.: 6255-0019	Date: 2/10/2022	Sheet:
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 **HOUSTON**  
engineering, inc.








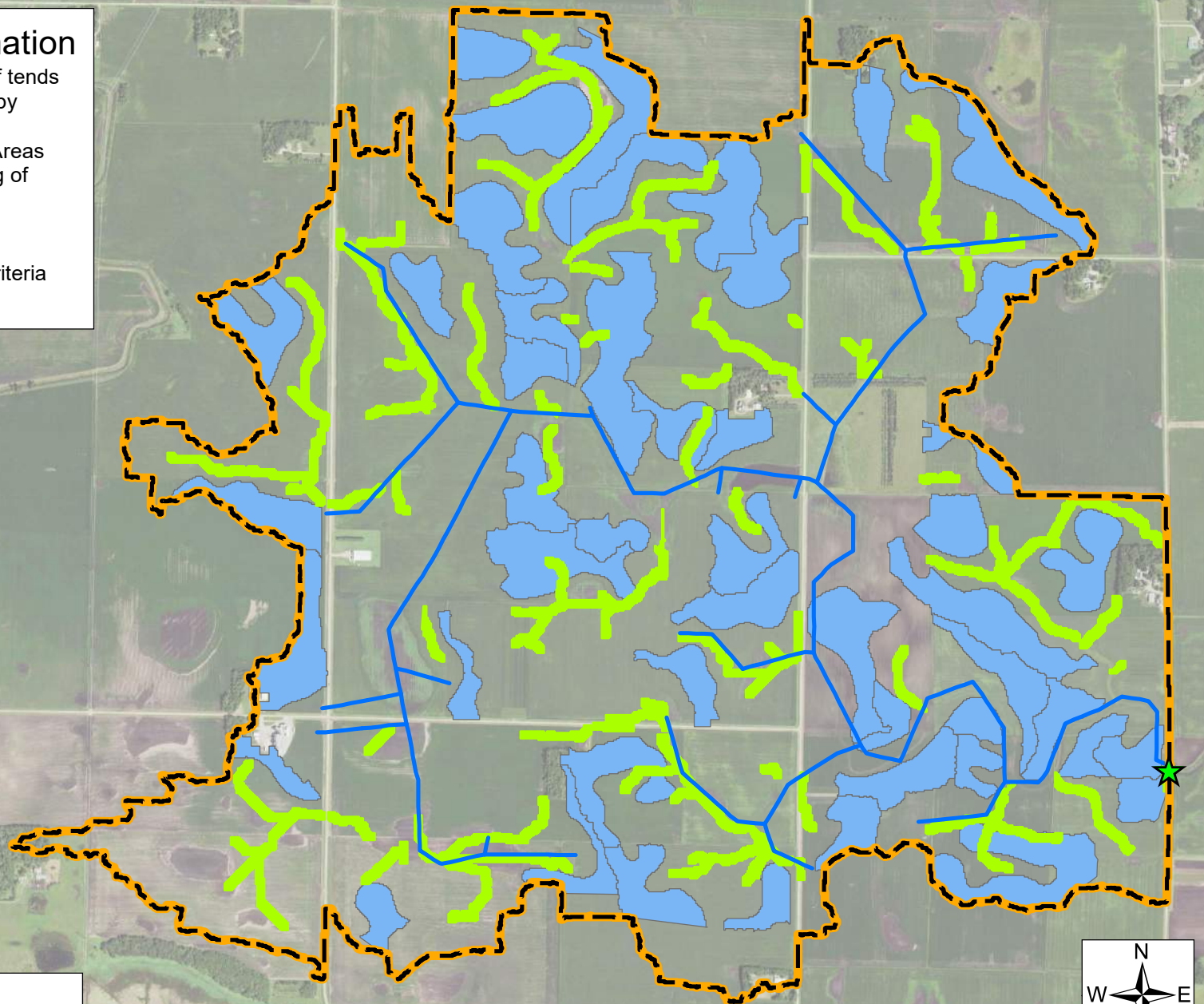
## Additional Practice Information

**Critical Area Planting:** Areas where runoff tends to accumulate. Erosion may be reduced by strategic planting.

**Nutrient Management for Groundwater:** Areas where the amount, placement, and timing of nutrients (particularly nitrogen) should be carefully managed.

For additional information on suitability criteria see Table 2 in Section 4.11.3

-  CD52 Watershed
-  Watershed Outlet
-  Existing Public Tile
-  Critical Area Planting
-  Nutrient Management for Groundwater



0 800 1,600 3,200  
Feet



### Alternative Practices - Management

Scale: AS SHOWN	Drawn by: SCK	Checked by: JL	Project No.: 6255-0019	Date: 2/10/2022	Sheet:
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