

## 3 PURPOSE AND NEED FOR ACTION (REVIEW POINT NO. 2A)

### 3.1 PURPOSE:

The purpose of this project is to provide flood damage reduction to agricultural lands due to a 10-year 24-hour rainfall event and to reduce flood damage to public and private infrastructure in the Judicial Ditch #19 sub-watershed.

### 3.2 NEED:

There is a need for 10-year 24-hour flood damage reduction for agricultural land and reduction in public and private infrastructure flood damages in the Judicial Ditch #19 sub-watershed.

### 3.3 ADDITIONAL NEED INFORMATION:

- The JD 19 system was originally designed for a 2-5-year rainfall event. Hydraulic modeling efforts have shown that the ditch system has less capacity in the upstream reaches, performing more consistent with the 2-year event, while the downstream reaches were originally designed with greater slope, so they perform more consistent with the 5-year event. Minimal maintenance has been performed on the system causing channel restrictions. Improved agricultural drainage since the system was built has caused runoff to enter the system more efficiently.
- Reduce flood damages within the JD 19 sub-watershed associated with spring snow melt and rains.
- Flooding also results in damages to some rural transportation systems and other public drainage systems. Based on information from the Minnesota Disaster Declaration, Counties, Townships, and watershed district data, road and culvert damages occurred in multiple locations within the JD 19 sub-watershed during floods in 1996, 1997, 1999, 2000, 2001, 2006, 2009, and 2011.
- Lack of aquatic and riparian habitat along JD 19.
- Lack of drainage water Best Management Practices (BMPs) for surface and subsurface drainage systems.
- Channel erosion and degradation is a recognized problem by the Minnesota Department of Natural Resources along many areas of the JD 19 ditch system. The downstream portion of JD 19, starting at the Nelson Slough outlet structure has unstable channels caused by steep ditch grades/side slopes and erosive soils.
- Operation of Nelson Slough can cause downstream flow during freezing conditions and immediate upstream flooding to private property. In years past the water level within Nelson Slough has remained at a height where water continues to flow over the outlet weir during the fall and into winter, causing flow downstream within JD 19 during freezing conditions. Upstream flooding conditions are also an issue when water levels at Nelson Slough are high during the growing season and the site lacks capacity when upstream runoff events occur, causing backwater effects that inundate upstream private property.
- Flooding in the watershed results in damages to crop land due to channel erosion, delayed planting, prevented planting, and prolonged inundation. Total inundated acres and associated agricultural damages are estimated for various synthetic rainfall events and shown in [Table 1](#) below.

**Table 1 – Inundated Lands Summary**

<b>Return Period</b>	<b>24-Hour* Rainfall (in.)</b>	<b>Total Inundated Acres</b>	<b>Agriculture** Inundated Acres</b>
<b>2 – year</b>	<b>2.4</b>	<b>14,675</b>	<b>2,140</b>
<b>5 – year</b>	<b>3.0</b>	<b>20,858</b>	<b>3,258</b>
<b>10 – year</b>	<b>3.6</b>	<b>25,636</b>	<b>4,240</b>
<b>25 – year</b>	<b>4.5</b>	<b>31,553</b>	<b>5,561</b>
<b>50 – year</b>	<b>5.2</b>	<b>35,465</b>	<b>6,543</b>
<b>100 – year</b>	<b>6.0</b>	<b>38,949</b>	<b>7,468</b>

*\*NOAA Atlas 14 Rainfall Depths*

*\*\*Estimated from National Agricultural Statistics Service 2016 Dataset GIS data layer*