# Figures

Barr Footer: Date: 7/11/2006 12:34:56 PM File: I:\Projects\23\19\972\Maps\Figures for Pipeline Routing Permit\Figure 1-2 proposed_Pipeline_Route.mxd User: dwj

Aerial Imagery: Markhurd April,2005

- Preferred Pipeline Route
- Preferred Route; +/- 500 yd Width
- US Highway
- State Highway
- County State Aid Highway
- Minor Road
- Perennial Stream
- MN designated trout streams
- County Boundary
- Municipal Boundary

**NWI - Circular 39 Classification**

- Type 1 - Seasonally Flooded
- Type 2 - Wet Meadow
- Type 3 - Shallow Marsh
- Type 4 - Deep Marsh
- Type 5 - Open Water
- Type 6 - Shrub Swamp
- Type 7 - Wooded Swamp
- Type 8 - Bog

N

Miles

0.5 0 0.5 1 1.5 2 2.5 3 3.5 4

Kilometers

1 0 1 2 3 4 5 6

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**Figure 1-2**
**PROPOSED PIPELINE ROUTE**

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Cannon Falls Gas Pipeline Routing
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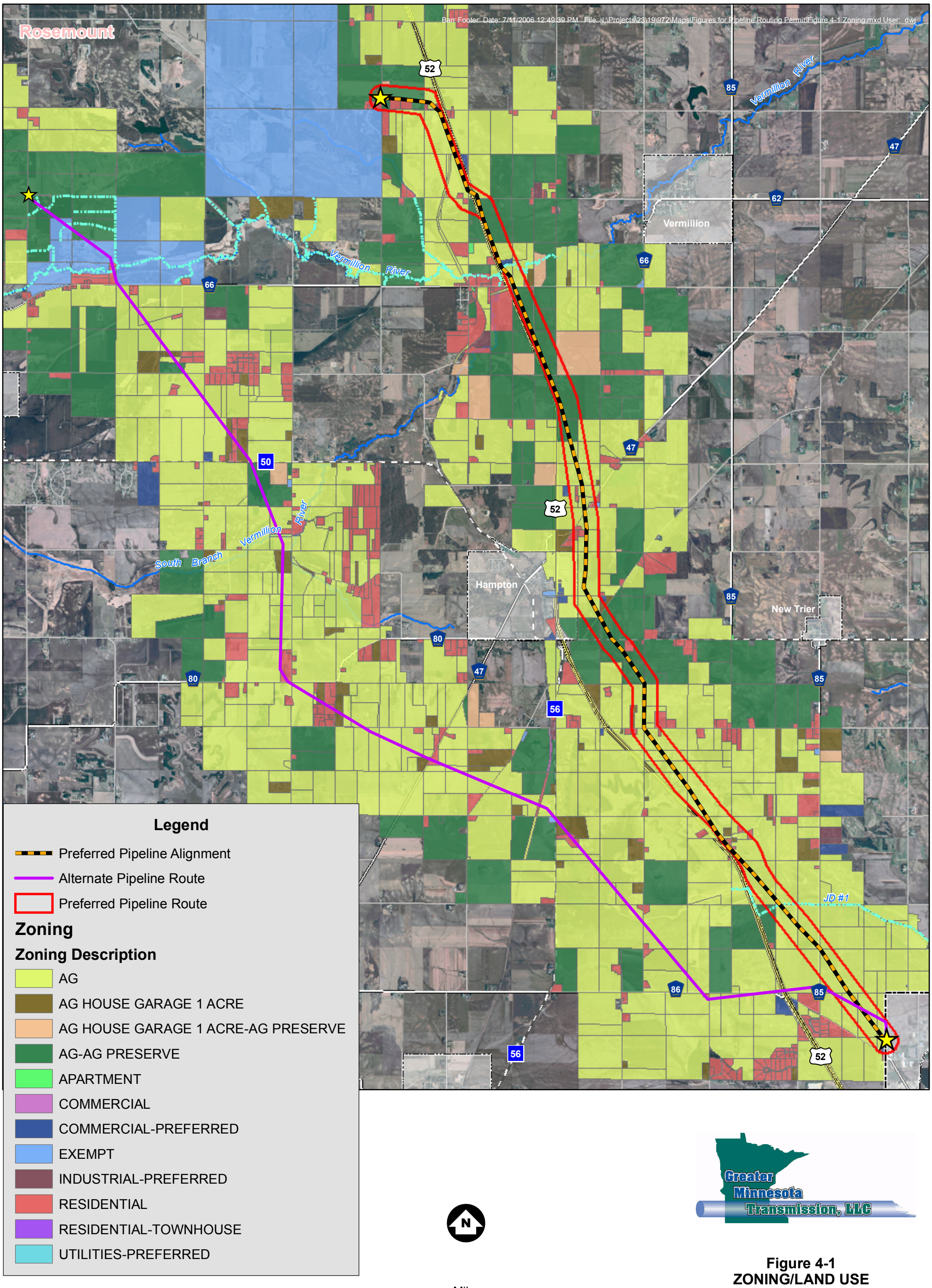


Source: Dakota County Office of Geographic Information Systems 2006

Aerial Imagery: Markhurd April,2005

**Figure 4-1**
**ZONING/LAND USE**

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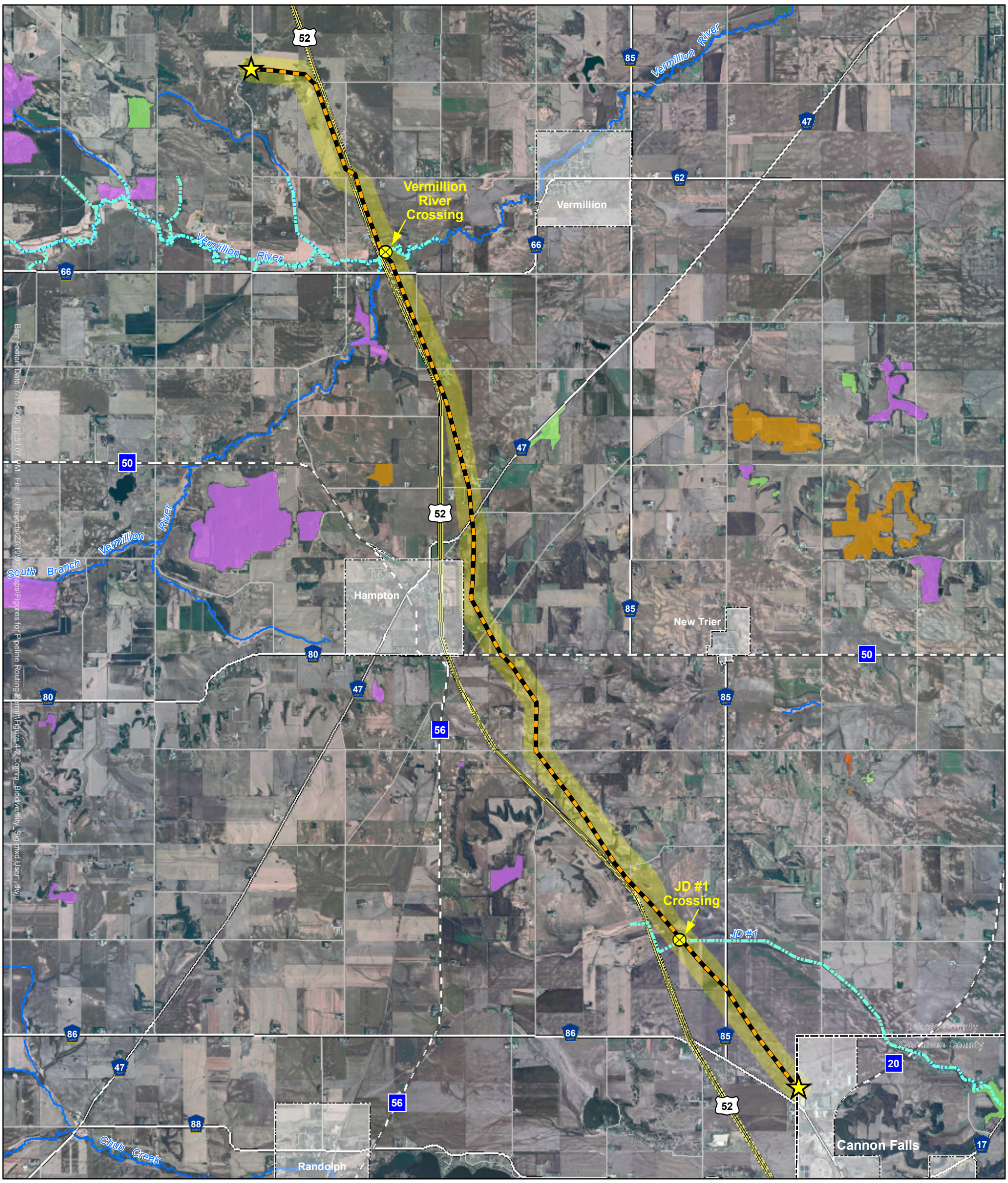


Aerial Imagery: Markhurd April,2005

**Communities of Biodiversity Significance**

- Outstanding
- High
- Moderate
- Below
- Preferred Pipeline Route
- Preferred Route; +/- 500 yd Width
- US Highway
- State Highway
- County State Aid Highway
- Minor Road
- Perennial Stream
- MN designated trout streams
- County Boundary
- Municipal Boundary

N

Miles

0.5 0 0.5 1 1.5 2 2.5 3 3.5 4

Kilometers

1 0 1 2 3 4 5 6

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**Figure 4-2**
**DNR Communities of Biodiversity Significance**

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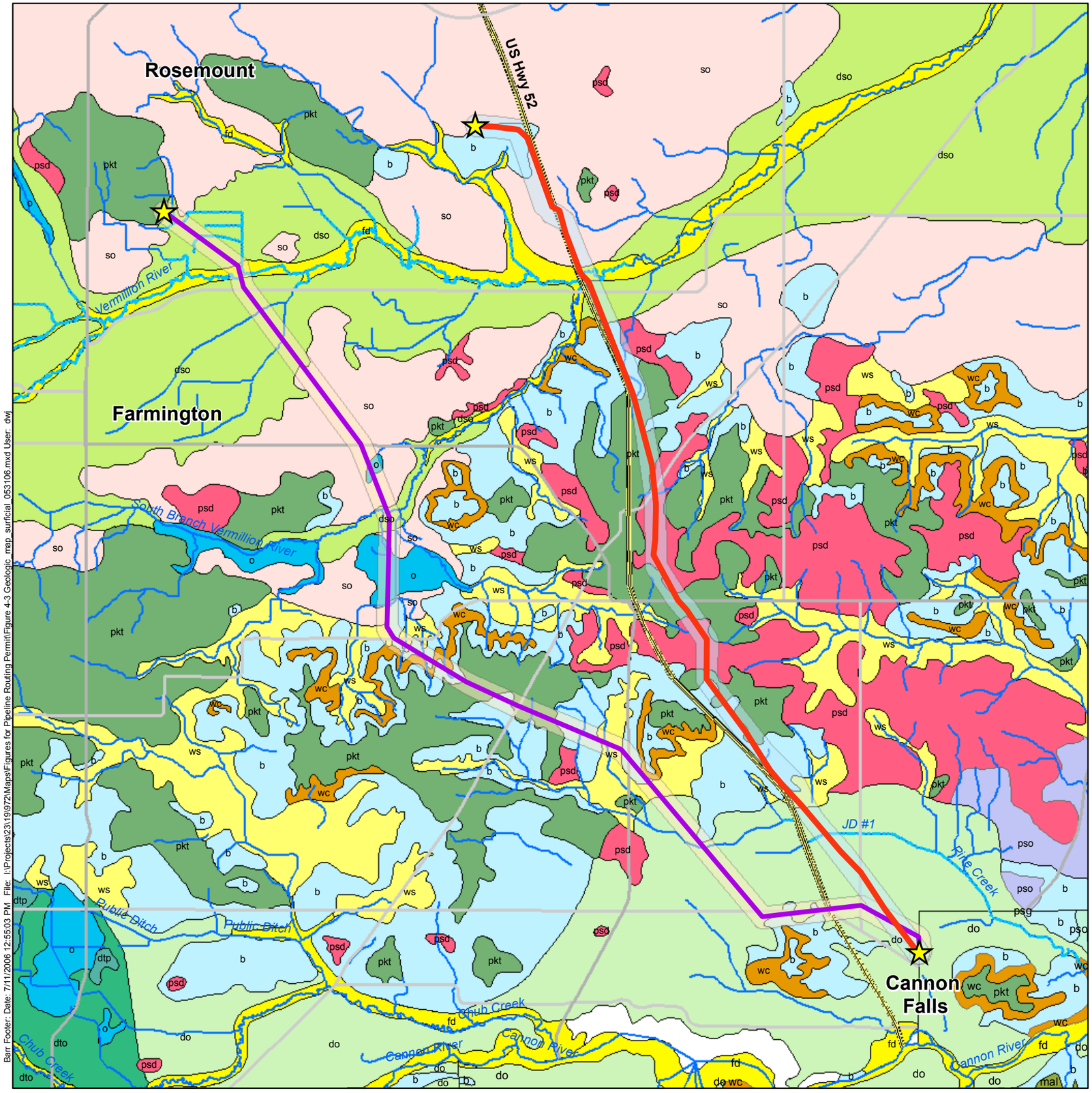
Barr Footer: Date: 7/11/2006 12:51:07 PM File: I:\Projects\23\19\72\Maps\Figures for Pipeline Routing Permit\Figure 4-2 Comm_Biodiversity_Sig.mxd User: dwj




Barr Footer: Date: 7/11/2006 12:55:03 PM File: I:\Projects\23\19\972\Maps\Figures for Pipeline Routing Permit\Figure 4-3 Geologic map surficial 053106.mxd User: dwj

| | |
|---|---|
| o | Organic Deposits - Peat and organic-rich silt and clay; includes small bodies of open water. Largely drained and filled where built over water. |
| fd | Floodplain Alluvium - Poorly bedded, moderately well sorted sediments deposited by modern streams during flood stage. Typically interbedded with organic-rich layers and buried soil. |
| wc | Colluvium - Hillslope deposits derived from bedrock and loess upslope. Typically consists of two units- a rocky lower unit of angular carbonate clasts in a silty to sandy matrix, and an upper unit primarily of silt, which contains a few carbonate clasts. Typically thickest at the bottom of the slope, and thin and patchy near the top. |
| ws | Slopewash Sand - Unbedded to poorly bedded sand deposited in valleys and on gently sloping plains above the level of Wisconsinan outwash. Derived from glacial drift and St. Peter Sandstone. Unit is gradational with outwash and the boundaries on the map are therefore arbitrary. |
| do | Des Moines Lobe Outwash - Sand, loamy sand, and gravel. Typical Des Moines lobe stone assemblage. |
| dso | Des Moines Lobe Mixed Outwash - Sand, loamy sand, and gravel; coarser texture near the edge of the lobe. |
| dtp | Des Moines Lobe Thin-Mantled Till - Thin Des Moines lobe over pre-Wisconinan drift. Composition is similar to that of dst for the region shown on this map. |
| dto | Des Moines Lobe Thin-Mantled Outwash - Des Moines lobe outwash mantled by thin Des Moines lobe till. Composition of the till mantle is similar to dt; the underlying outwash is do. |
| so | Superior Lobe Outwash - Gravel and sand. More cobbles and undrained depressions near the ice margin (the boundary with unit st). |
| psd | Pre-late Wisconsinan: Drift of the River Falls Formation of Baker and Others (1983) - Outwash, ice-contact stratified drift, and till, undivided. Typically reddish brouwn to yellowish red. Deeply leached- most exposures noncalcareous. Predominantly stratified- where till is present, it is generally one or more layers a few feet |
| pkt | Pre-late Wisconsinan: "Old Gray" Till - Gray calcareous till which is leached and oxidized to yellowish brown near the surface. Consists of at least two tills, undivided. The upper till is friable loam to fine sandy loam; the lower one is firm loam to clay loam. |
| mal | Alluvium of Michigan Subepisode - Deposited by braided streams and sheetfloods in valleys. Predominantly sand, but unit includes some gravel, finer sediment. Unit forms terraces above the modern floodplain levels to over 100 feet higher. Unit also underlies modern alluvium in many places. |
| b | Bedrock - Outcrops and thinly covered bedrock; mapped where bedrock is generally within 5 feet of the surface, exclusive of loess. Small areas of thicker sediment occur in areas mapped bedrock, but even in these, sediment is generally less than 10 feet thick. |

**Preferred route**

**Alternate route**

**Preferred route; +/- 500 yd width**

**Alternate route; +/- 500 yd width**

**Streams**

**MN designated trout streams**

1 0 1 2
Miles

**Figure 4-3**

**Surficial Geologic Features**
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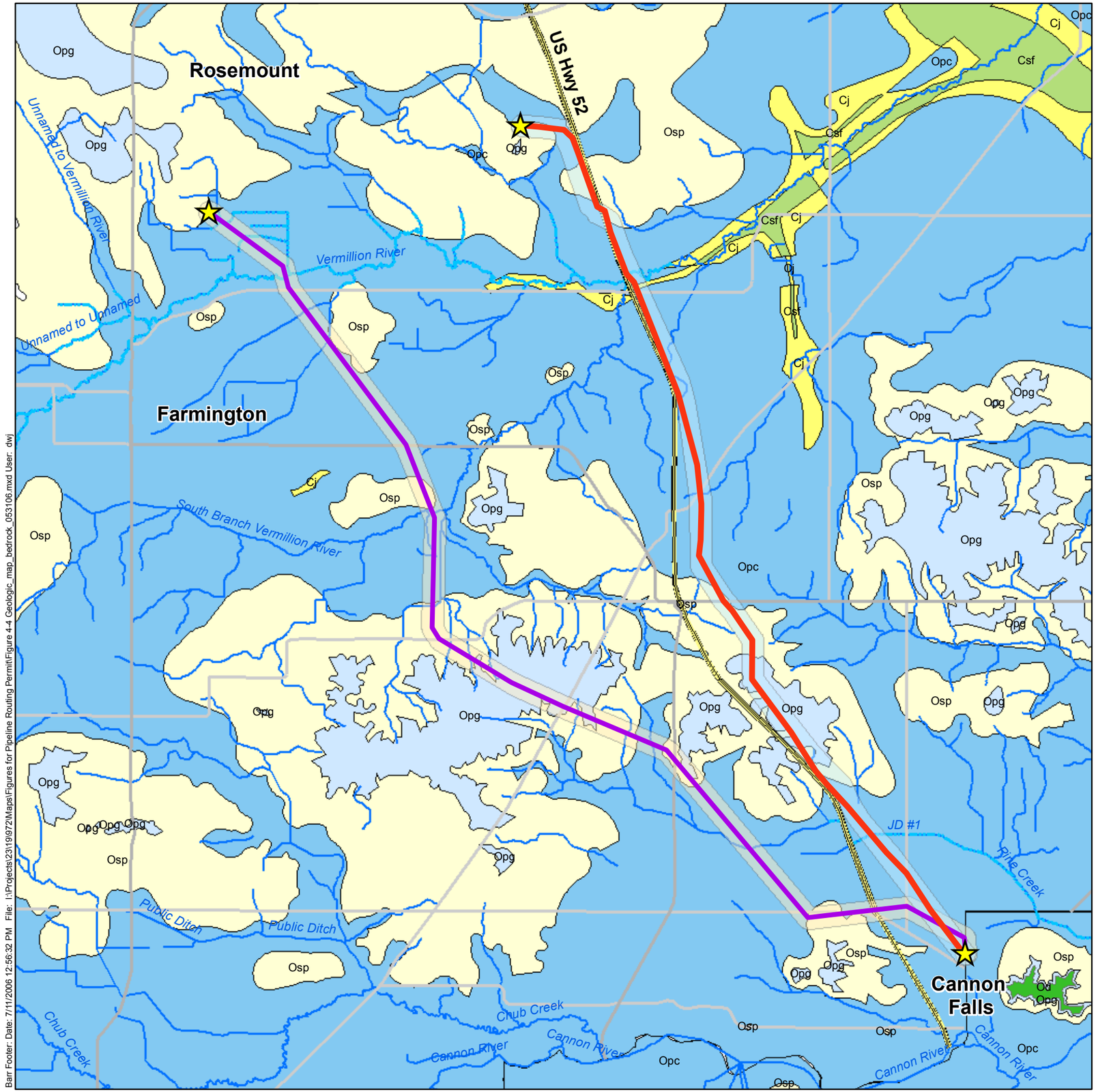


**Od** Decorah Shale - Green, calcareous shale with thin interbeds of limestone.

**Opg** Platteville and Glenwood Formations - Fine-grained dolostone and limestone of the Platteveille Formation is underlain by green, sandy shale of the Glenwood Formation. They underlie the Decorah Shale.

**Osp** St. Peter Sandstone - Upper half to two thirds is fine- to medium-grained quartzose sandstone that generally is massive to very thick bedded. The lower part contains multicolored beds of sandstone, siltstone, and shale with interbeds of very coarse sandstone.

**Opc** Prairie du Chien Group - Dolostone of the Shakopee Formation forms the upper two thirds to half. It is commonly thin bedded and sandy or oolitic, and contains thin beds of sandstone and chert. Dolostone in the lower part- the Oneota Dolomite- is commonly massive to thick bedded, and generally is not oolitic or sandy, except for a transitional zone just above the Jordan Sandstone. Dolostone of both formations is karsted, and the upper part, where the overlying formations may have been removed by erosion, may be rubbly.

**Cj** Jordan Sandstone - The upper part is medium- to coarse-grained, friable, quartzose sandstone that is trough cross-bedded. The lower part is primarily fine grained sandstone that commonly is feldspathic, massively bedded, and bioturbated. The upper contact with the overlying Prairie du Chien Group is sharp.

**Csf** St. Lawrence and Franconia Formations - The St. Lawrence consists of dolomitic shale and siltstone that is generally thin bedded. The contact between it and overlying Jordan Sandstone is gradational. The Franconia is copmosed of thin-bedded, very fine grained glauconitic sandstone and minor shale. Some sandstone beds are massive and bioturbated; others are cross bedded.

**Preferred route**

**Alternate route**

**Preferred route; +/- 500 yd width**

**Alternate route; +/- 500 yd width**

**Streams**

**MN designated trout streams**

N

1 0 1 2

Miles

**Figure 4-4**

**Bedrock Geologic Features**

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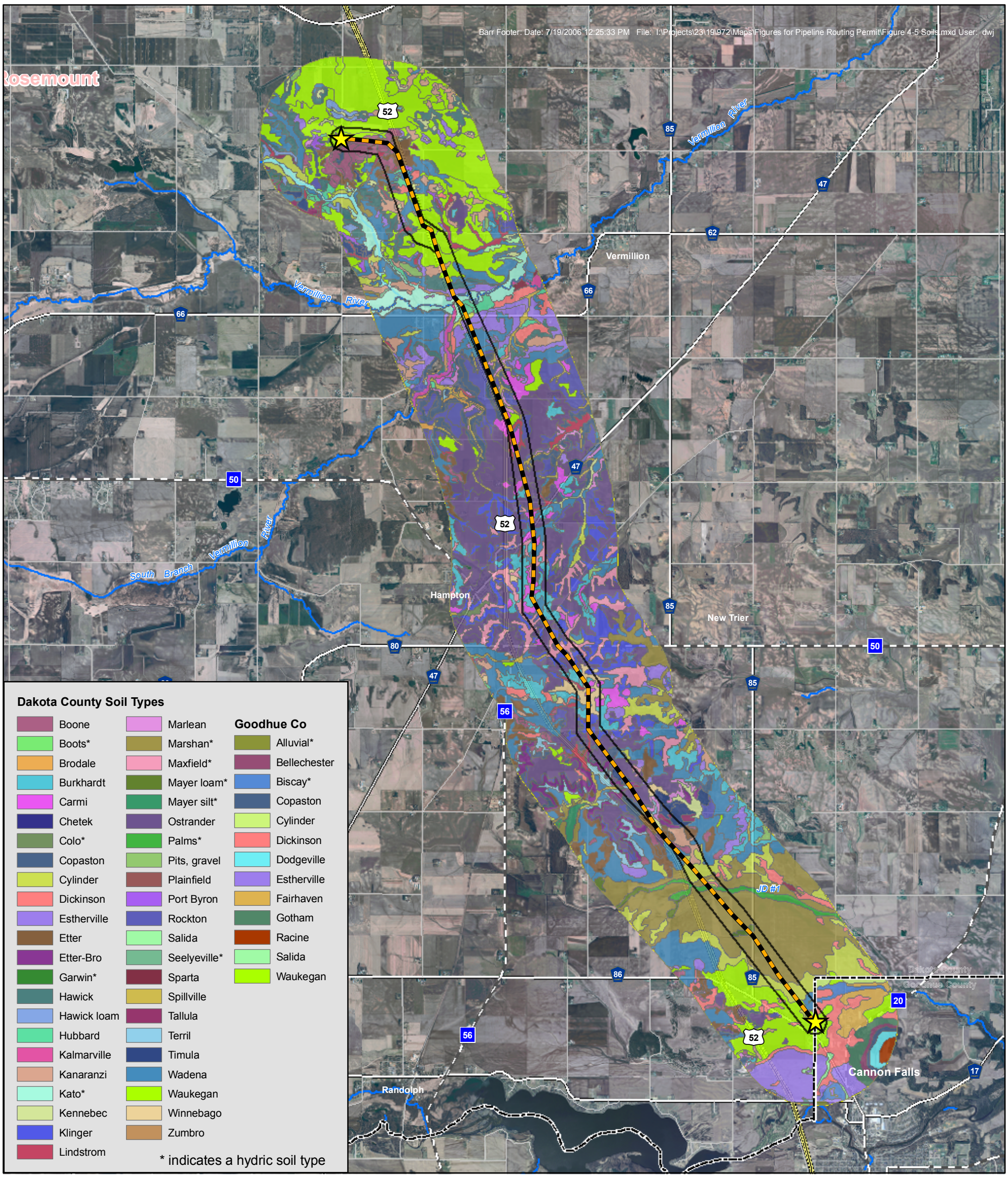
Barr Footer: Date: 7/11/2006 12:56:32 PM File: I:\Projects\23\19\972\Maps\Figures for Pipeline Routing Permit\Figure 4-4 Geologic_map_bedrock_053106.mxd User: dwj




Aerial Imagery: Markhurd April,2005

## Legend

**Preferred Pipeline Alignment**

Preferred Pipeline Route

N

Miles

0.5 0 0.5 1 1.5 2 2.5 3 3.5 4

Kilometers

1 0 1 2 3 4 5 6

**Figure 4-5**
**SOILS WITHIN**
**ONE MILE OF ROUTE**

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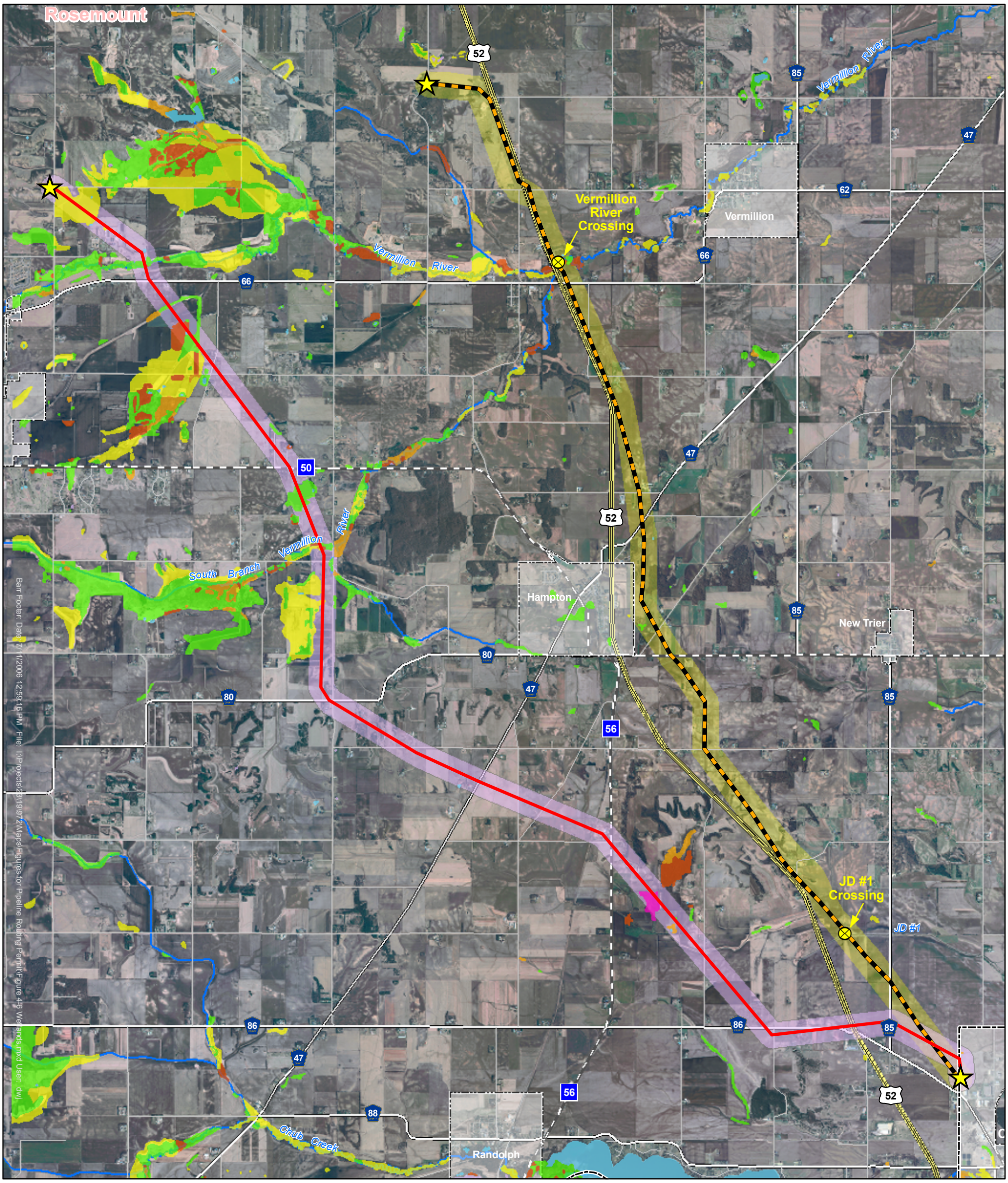


Aerial Imagery: Markhurd April,2005

# NWI wetlands

**NWI - Circular 39 classification**

- 1- Seasonally Flooded
- 2- Wet Meadow
- 3- Shallow Marsh
- 4- Deep Marsh
- 5- Open Water
- 6- Shrub Swamp
- 7- Wooded Swamp
- Preferred Pipeline Route
- Alternate Pipeline Route

N

Miles

0.5 0 0.5 1 1.5 2 2.5

Kilometers

1 0 1 2 3

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**Figure 4-6**
**WETLANDS**

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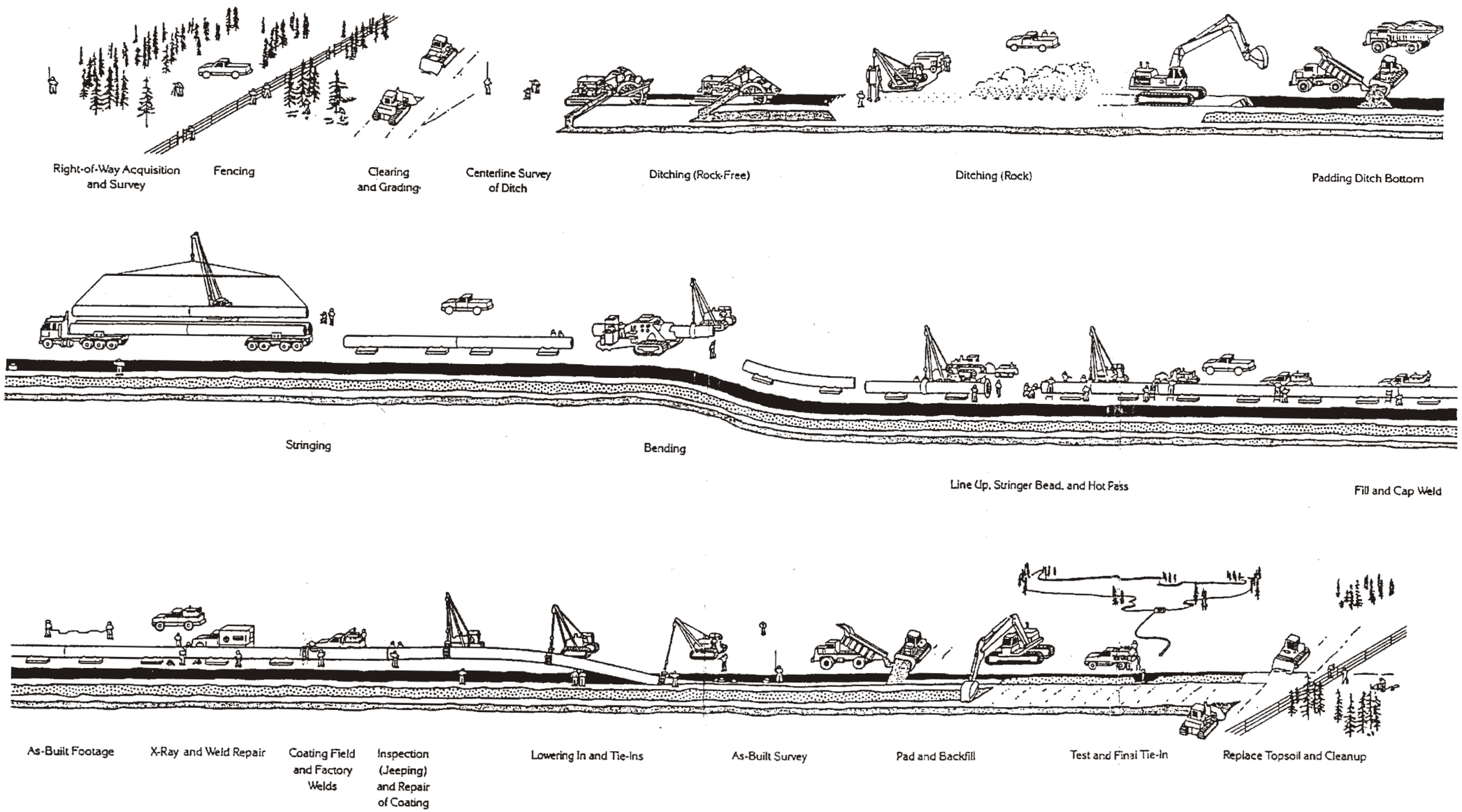


Figure 5-1

GAS PIPELINE CONSTRUCTION SEQUENCE
Gas Pipeline Routing Permit Application
Greater Minnesota Transmission, LLC
July 2006

P:23\19\972\Maps & Figures\GasPipelineConstructionSeq.CDR RLG 06-20-06