

**Roseau West Interceptor
and
Wetland Restoration Project**
(RRWD Project Number 2003-1)

April 30, 2004

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature Michael A Bakken Printed Name Michael A Bakken
Date 4/30/04 Registration No. 42682

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Roseau West Interceptor and Wetland Restoration Project

Section 1 - Overview

1. INTRODUCTION

The West Interceptor Project is a multipurpose flood control and native prairie/wetland restoration project. This project provides flood relief for the City of Roseau and natural resource enhancements for the area.

The City of Roseau lies just east and downhill of a very steep glacial lake beach ridge. During flood events, water flows overland off the ridge and floods into the west side of the city (Figure 1). This creates flood fighting difficulty not only because of the flooding conditions caused along the waters flow path, but also because these flood waters enter the city's storm sewer system and increase flood damages throughout the entire portion of the city lying west of the Roseau River. Finally, these waters enter the Roseau River and increase flood conditions along the River.

2. PROJECT CONCEPT

The project is the construction of a new 7.5 mile channel from 2 miles south of US Highway 89/ MN Highway 11 to an outlet in the Roseau River approximately 5 miles northwest of Roseau. The project includes the conversion of approximately 750 acres of agriculture lands to prairie lands, grasslands, and wetlands. Appendix A is a plan showing the total project area.

The West Interceptor Project will be designed to carry these overland flows from the west directly north to the Roseau River. The Interceptor will outlet into the Roseau River just upstream from the old Roseau Lake Bed. This outlet location removes waters that contribute to flooding through Roseau and is a sufficient distance downstream of the City of Roseau that there would be no backwater effect on the river through the city. The Interceptor will be designed to handle the 100 year flood flows without causing any damage to lands along the Interceptor's length. The map (Figure 2) shows the proposed route of the Interceptor.

The prairie and wetland restoration is approximately 595 acres in section 33, T163N R40W, Jadis Addition (Figure 3). Field drainage in this area will be plugged at various locations and approximately 100 acres of Type 1 wetlands will develop. The uplands will be seeded with a native grass seed mixture.

3. PROJECT REVISION HISTORY

RRWD Project 2003-1 was previously called the West Interceptor and Mud Lake Restoration Project and a Preliminary Engineering Report with that title dated September 30, 2003 was filed for agency comments following a public meeting on the project which was advertised in the local paper. After that meeting, many land owners in the original Mud Lake area came forward and

stated that they did not hear about the meeting and asked to have the following points considered by the Roseau River Watershed District Board.

1. That they, the land owners, were opposed to the taking of their lands.
2. That they felt that the existing land conditions provided significant upland natural resource benefits which are in shorter supply than wetlands in that portion of the Roseau River basin.
3. That they were concerned that the replacement farmland drainage proposed for lands uphill from the Mud Lake Area would not work as adequately as their existing farmland drainage.
4. That they were concerned that the dikes to be constructed as part of the Mud Lake Restoration would impede flood flows on the south side of the river during major floods.

After many meetings, the Roseau River Watershed District Board directed that the Project scope be revised to maintain the principal flood damage reduction purpose of protecting the west side of the City of Roseau, but that the Natural Resource Enhancement Benefits be modified to drop the Mud lake restoration and replace same with a prairie and wetland restoration in Section 33 of Jadis Addition Township. The Revised Preliminary Project Report dated February 3, 2004 presented those changes.

Upon receiving comments from the Board of Soil and Water Resources, letter dated March 19, 2004 and the Minnesota Department of Natural Resources letter dated March 17, 2004 this Engineer's Report dated April 20, 2004 was prepared addressing those comments. Appendix B is a copy of those comments.

4. RECOMMENDATIONS

Figure 4 shows a 2003 aerial photo of the City of Roseau. Approximately one half of the city lies west of the Roseau River. This area includes the downtown business district as well as a number of commercial developments south of Highway 11 & 89. Near the center of the figure, the large building shown is Polaris' manufacturing plant and offices.

The proposed project provides needed flood relief to the City of Roseau. The project promotes public interest and welfare, is practical, and conforms with the Watershed District's Overall Plan. We recommend that the project be constructed as presented.

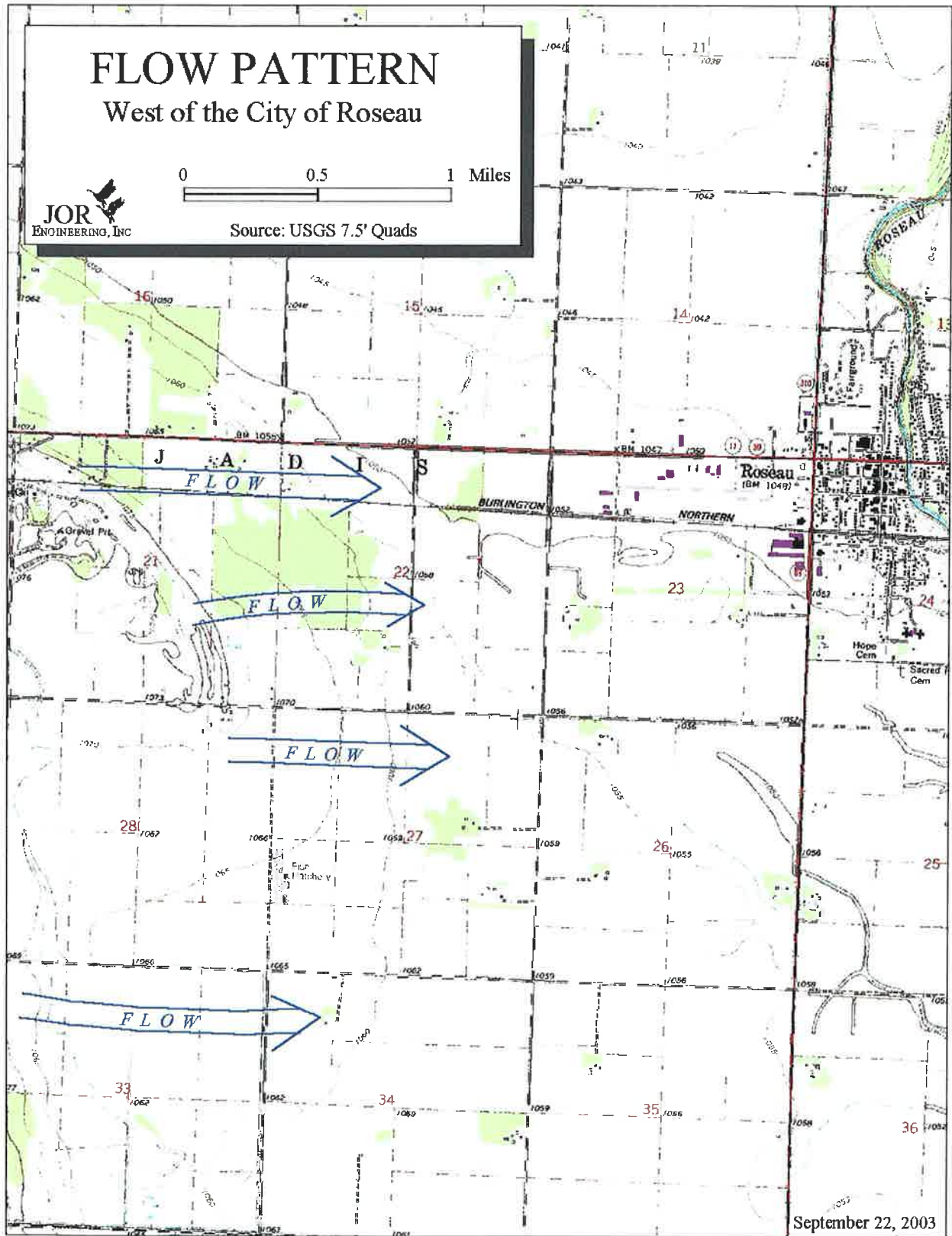


Figure 1. Existing Floodwater Flows from the West

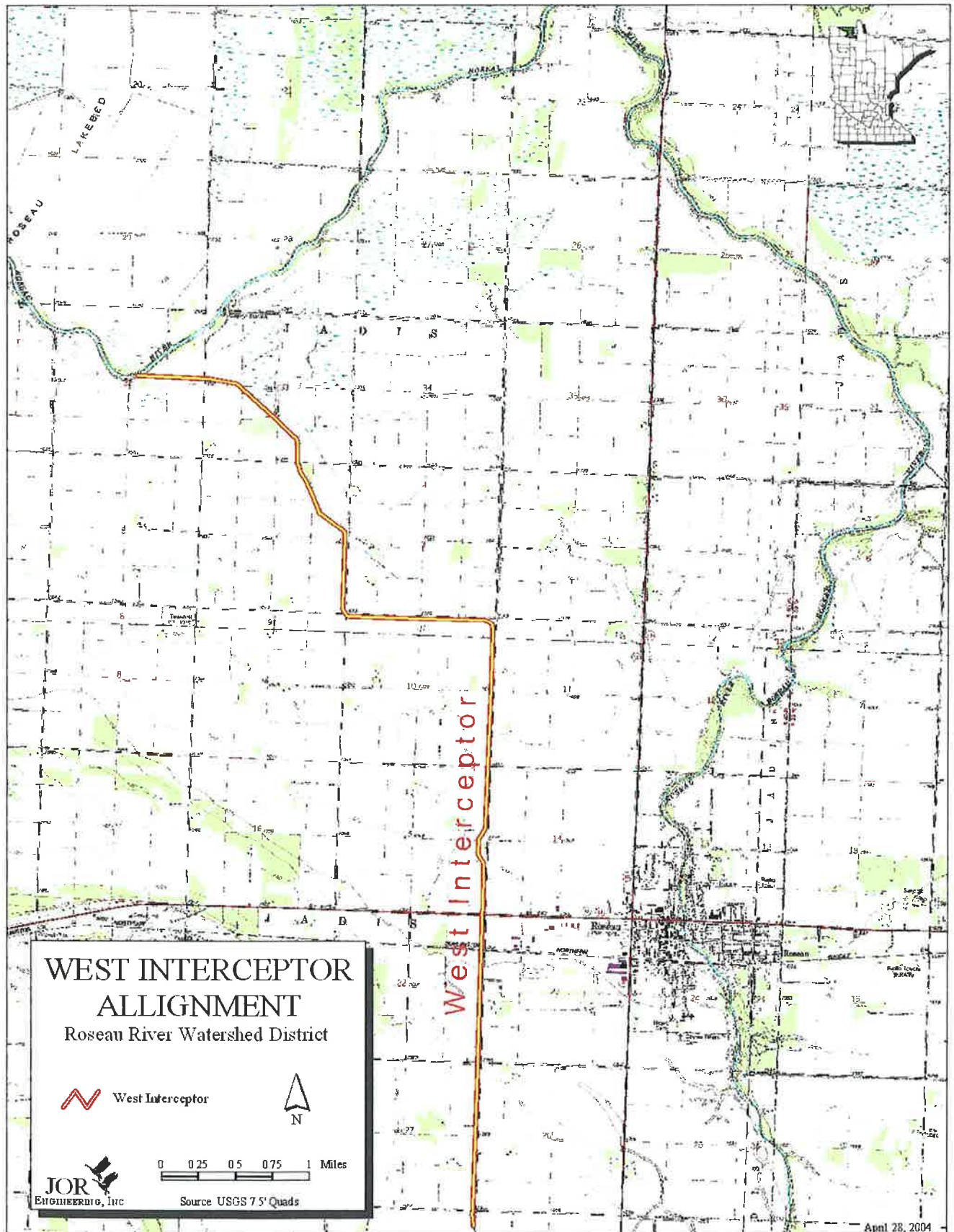


Figure 2. Route of Proposed Interceptor Channel

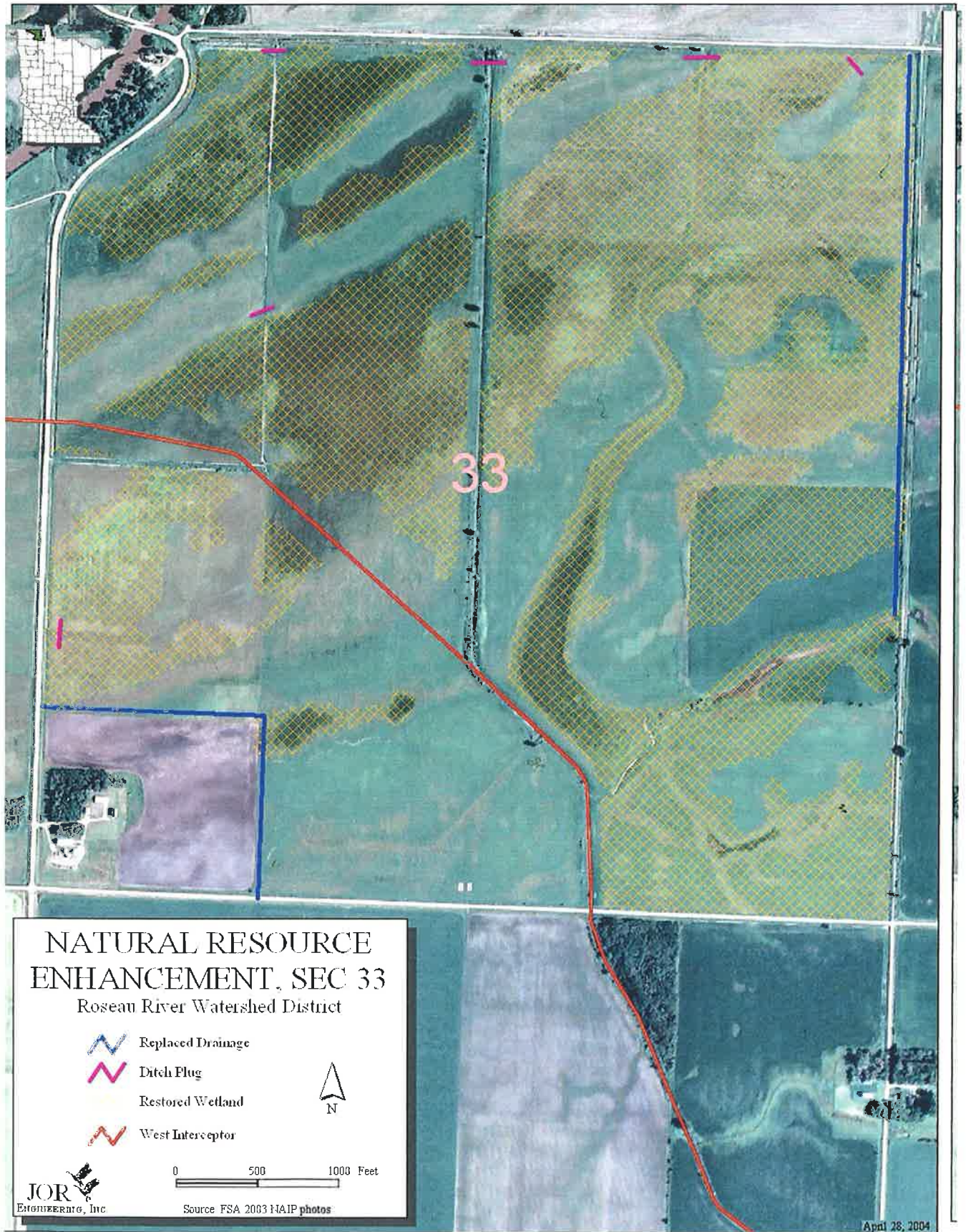


Figure 3. Prairie and Wetland Restoration Plan

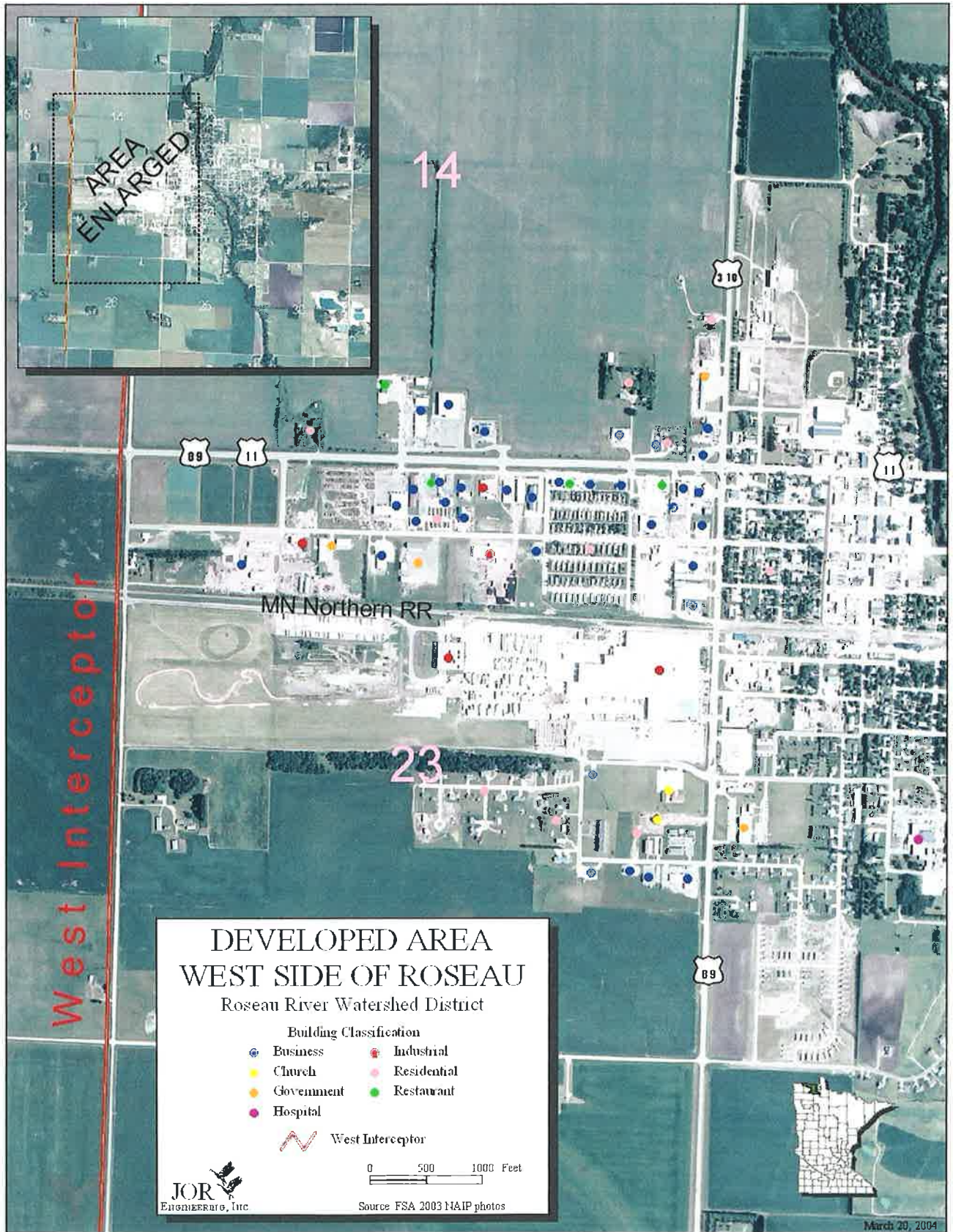


Figure 4. City of Roseau

Roseau West Interceptor and Wetland Restoration Project

Section 2 - Hydrology and Hydraulics

1. HYDROLOGY

The hydrology for this project was analyzed using the watershed model developed for the District as detailed in the report Roseau River HEC-1 Hydrologic Model, October 24, 2001. The model was converted to run using the HEC-HMS (developed by the US Army Corps of Engineers) a watershed modeling program to develop hydrographs for the 100 year 24 hour, 100 year 10 day rainfall events, and the 100 year spring runoff event. Table 1 shows calculated results for peak flows at Center Street Bridge in the City of Roseau.

Table 1 - ROSEAU RIVER FLOWS AT ROSEAU

	100 Year, 24 Hour	100 Year, 10 Day	100 Year, Spring Runoff
Precipitation (inches)	5	8.7	
Runoff (inches)	2.11	3.04	6.1
Existing Condition (cfs)	8344	8082	10657
With Proposed Project (cfs)	8043	7924	10464

As shown in Table 1, the proposed project will reduce flood flows on the Roseau River through the City of Roseau, with proportionally larger decreases for short intense storms than for longer storms and spring runoff.

The subwatershed hydrographs (Figure 5) computed in the HEC-HMS model were captured for use in the design of the West Interceptor.

The flood events listed in Table 2 were analyzed with existing conditions and with the proposed project to analyze the adequacy of the outlet. As shown in the table, there are minor variations in flow, but these variations are within the accuracy of the model and show no change to existing conditions. Therefore, in the opinion of this engineer, the outlet is adequate.

Table 2 - ROSEAU RIVER FLOWS AT ROSS

	Existing Conditions (cfs)	Proposed Project (cfs)	Percent Change
24 hr. Rainfall Events			
100 year	3064	3065	00.03
50 year	2715	2719	00.01
25 year	2411	2413	00.08
10 year	2069	2071	00.10
5 year	1628	1633	00.31
10 day Rainfall Events			
100 year	4207	4208	00.02

	Existing Conditions (cfs)	Proposed Project (cfs)	Percent Change
50 year	3632	3633	00.03
25 year	2909	2911	00.07
10 year	2301	2300	-00.04
5 Year	1751	1752	00.06
Spring Runoff Event			
100 year	9511	9504	-00.07
50 year	8305	8298	-00.08
25 year	7092	7085	-00.10
10 year	5164	5159	-00.10

2. HYDRAULICS

The HEC-HMS computed subwatershed hydrographs were then used as input for the US Army Corps of Engineers HEC-RAS computer program. This program allows dynamic routing of the flood flows through a channel.

The Interceptor Project will transport flood flows past lands and homesteads that have not had significant flood problems in the past. Therefore, it is critical that the Interceptor be designed to the criteria that insures these homes and farms are not adversely impacted. To this end, a design for the Interceptor cross sections and crossing culverts to pass 100 year flood flows at or below existing ground level is necessary. Table 3 shows flood flow results from the various 100 year design floods at various points along the Interceptor. Peak water elevations for the proposed design are shown in Figure 6, Figure 7, and Figure 8.

Table 3 - INTERCEPTOR FLOWS

	100 Year, 24 Hour (cfs)	100 Year, 10 Day (cfs)	100 Year, Spring Runoff (cfs)
South End	145	130	113
Highway #11	486	484	339
CR#16	761	496	419
Outlet to River	730	624	550

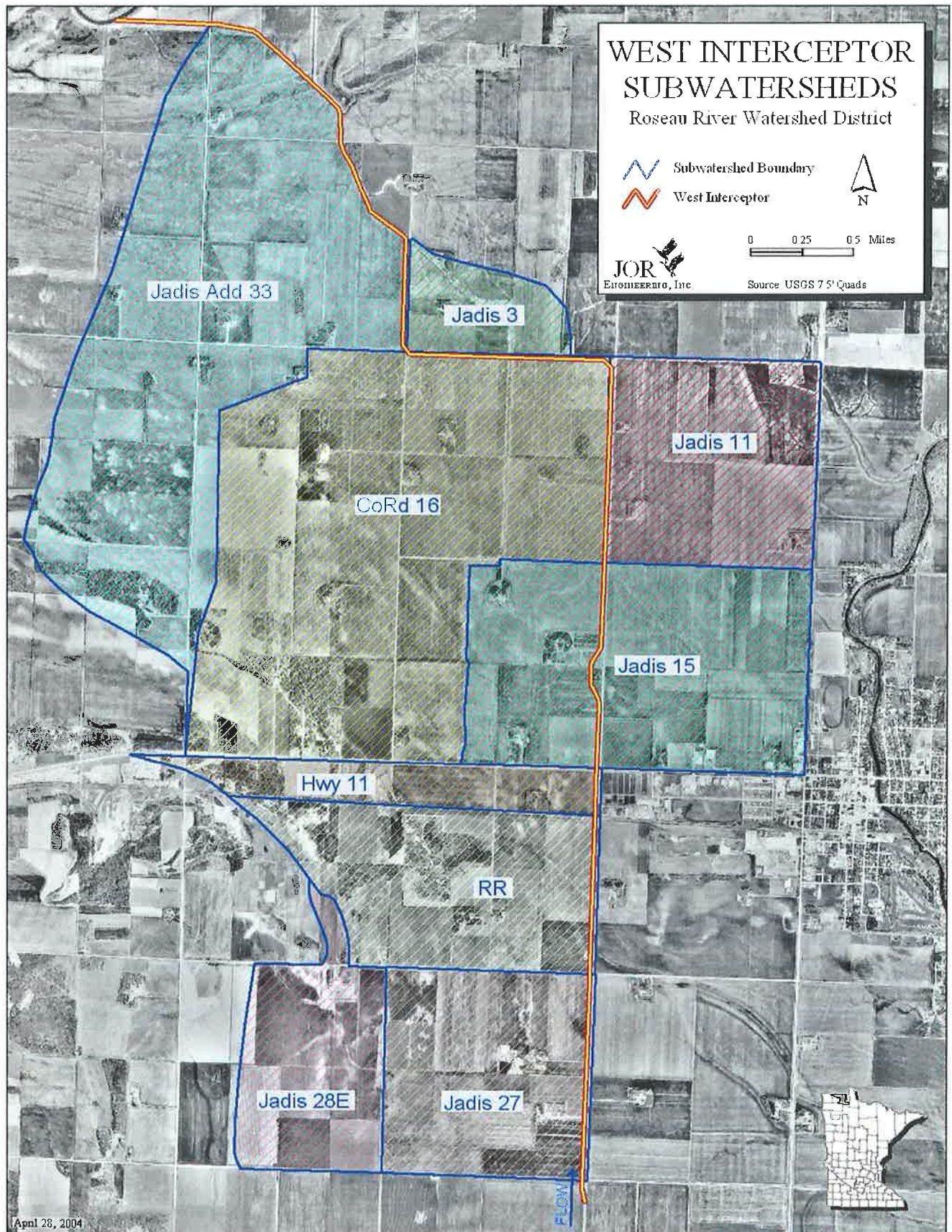


Figure 5. West Interceptor Subwatershed Areas

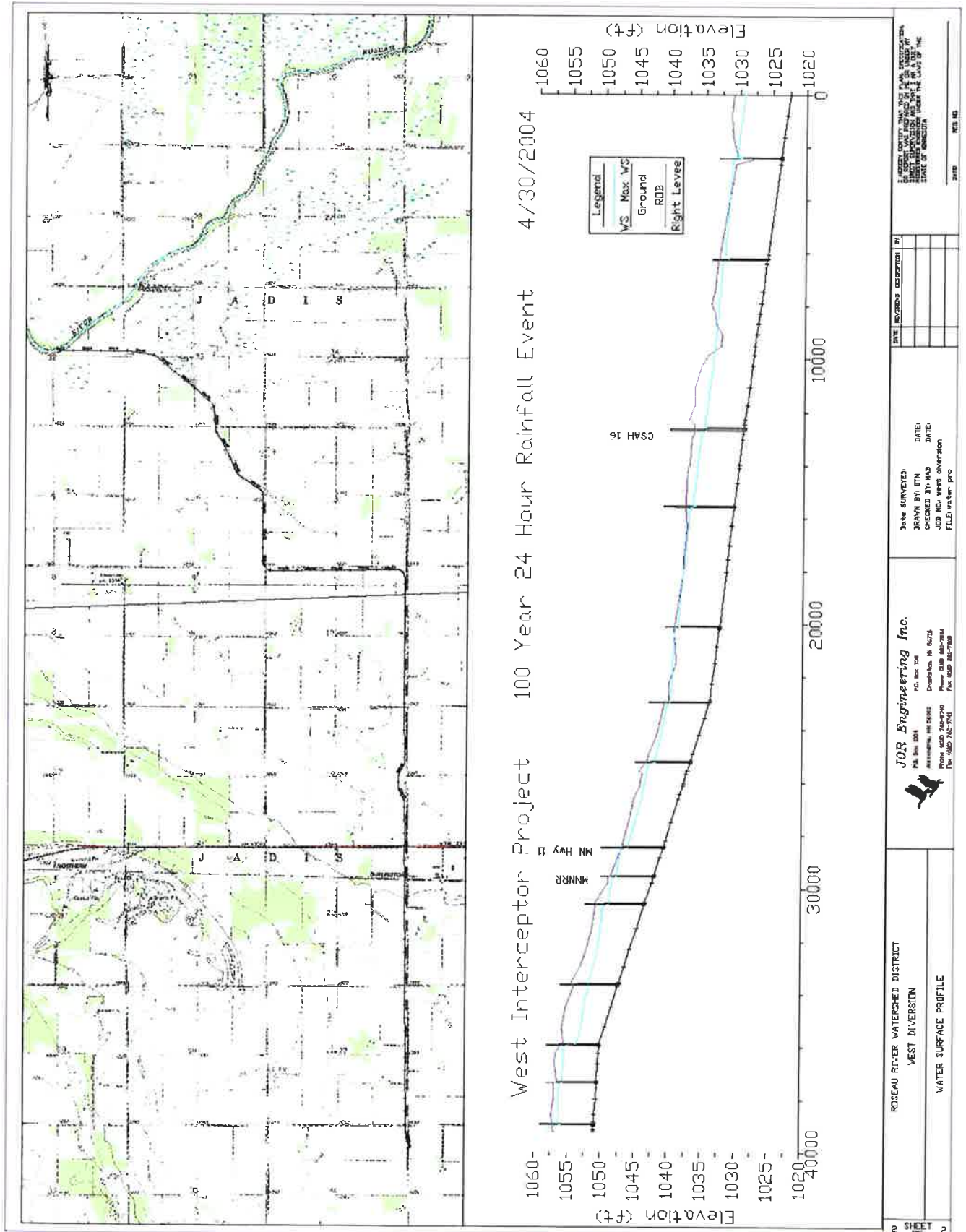


Figure 6. West Interceptor Max Water Surface Profile (100 yr, 24 hr Storm)

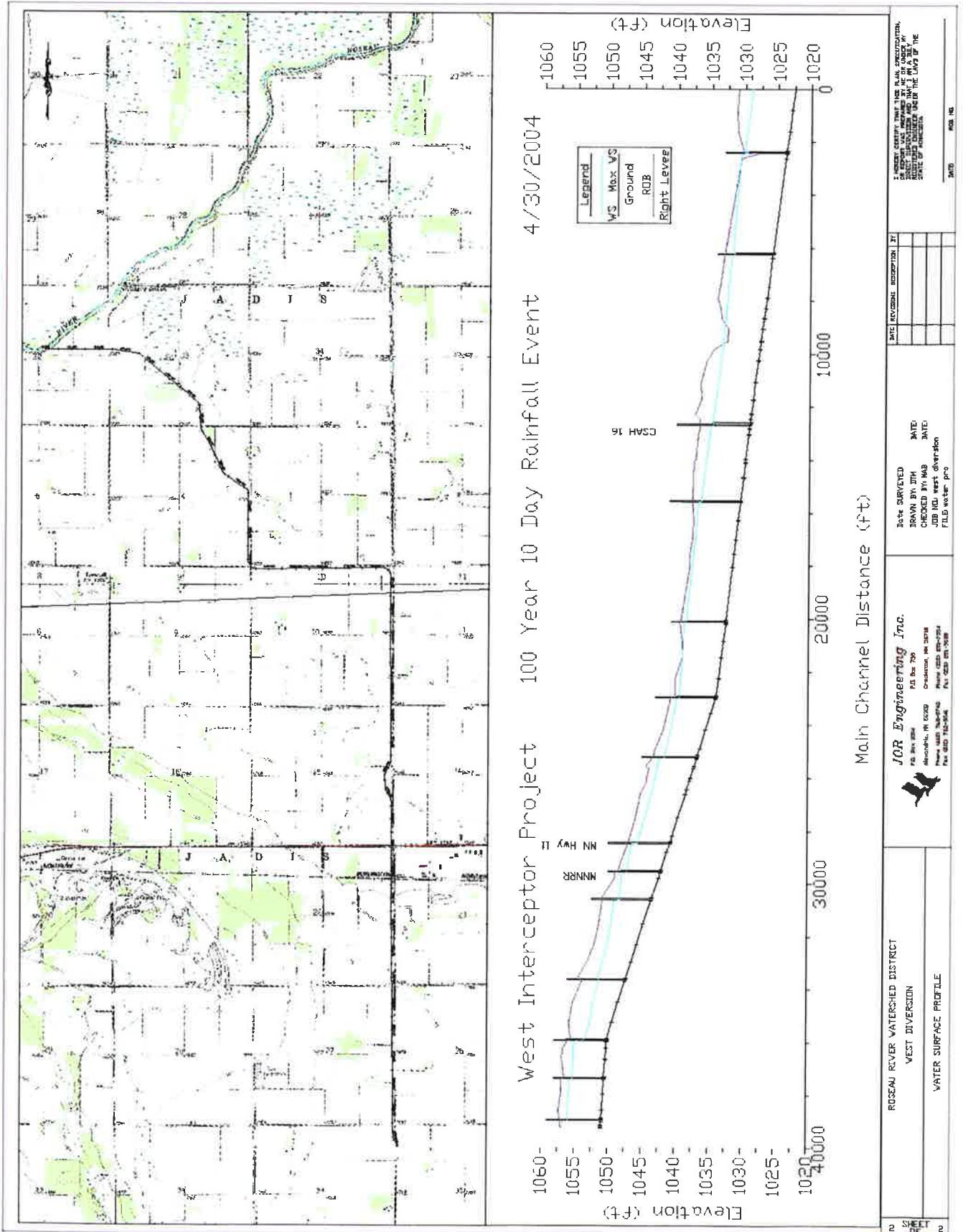


Figure 7. West Interceptor Max Water Surface Profile (100 yr, 10 day Storm)

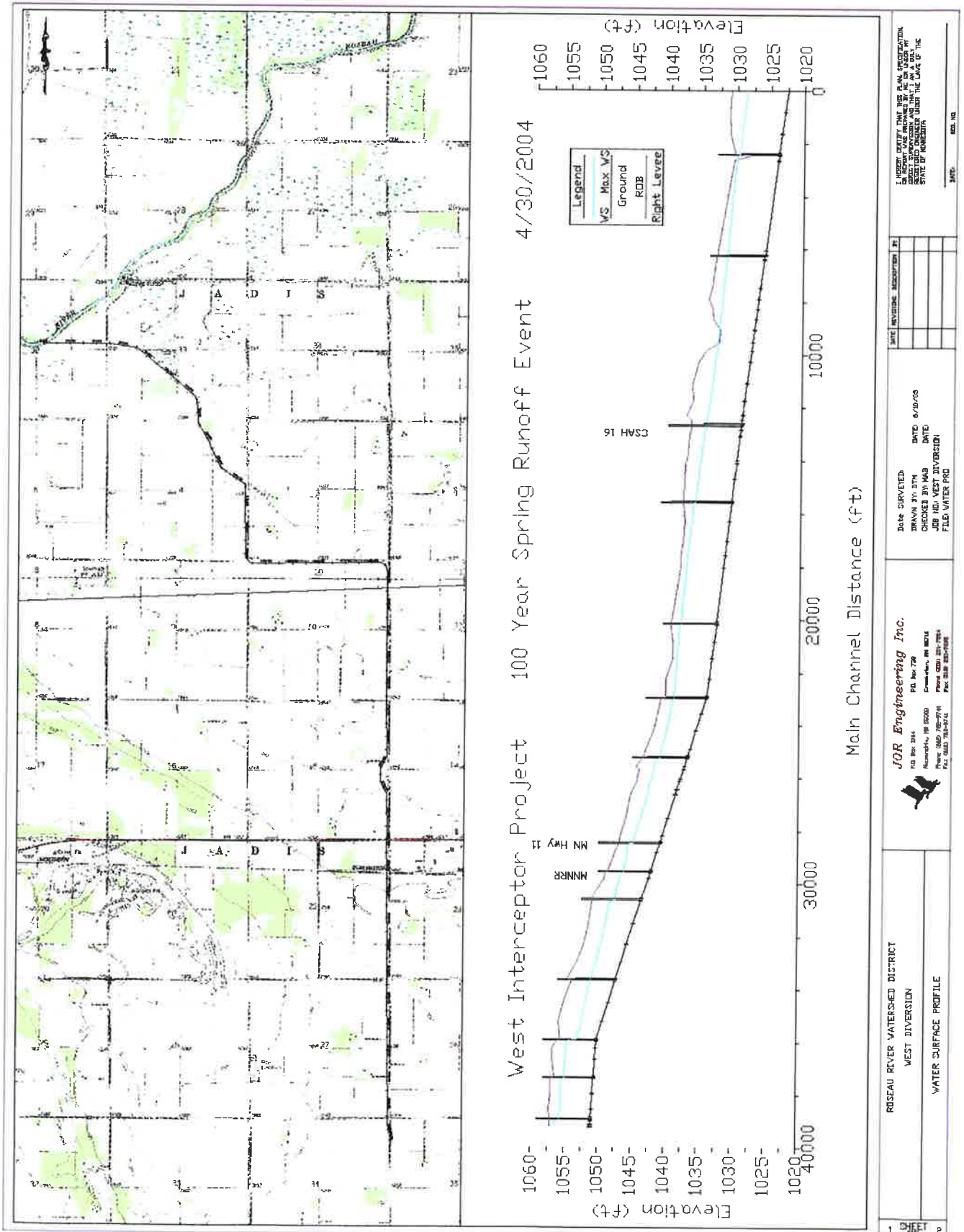


Figure 8. West Interceptor Max Water Surface Profile (100 yr, Spring Runoff)

Roseau West Interceptor and Wetland Restoration Project

Section 3 - Project Features

1. WEST INTERCEPTOR

Interceptor Alignment

The alignment of the Interceptor was chosen to gain control of the flood waters entering the City of Roseau from the west end and route them to the Roseau River in the area of the Roseau Lake by the shortest distance without unduly cutting up existing farm fields or destroying homesteads.

In the NE1/4 of Section 4 Jadis Township, the alignment follows an existing ditch and natural swale through the quarter. Through Section 33 Jadis addition, the alignment follows the existing ditch for a short way but leaves the old ditch to outlet into the Roseau River downstream of the bridge in the northwest corner of section 3.

It must also be noted that the alignment bends around an existing seasonal homestead in Section 15, Jadis Township. The original concept was to purchase that property but a detailed analysis showed that the least cost solution was to go around that property.

The final proposed alignment was shown in Figure 2, earlier in this report.

Interceptor Cross Sections

As stated in Section 2, the Interceptor design criteria was for the 100 year flood flows to be contained at or below natural ground. This resulted in a typical interceptor design in the 6 foot depth range with a bottom width of 10 feet south of the MN Northern Railroad Tracks and a 20 foot bottom width, north of same. After crossing CSAH 16 the bottom width is 25 feet.

A 16.5 foot (one rod) grass strip is provided on both the field and road sides of the Interceptor. The grass strips on both sides of the channel provide necessary flow area for floods in excess of the 100 year design floods. Further, these grass strips, combined with field inlet culverts, will minimize erosion into the Interceptor. Finally, the road side grass strip also serves to collect snow blowing over the road, thereby substantially decreasing spring ditch blockages from snow dams.

North of Minnesota Highway 11 the land is flat to the west of the Interceptor. Therefore, to contain the flood flows in the Interceptor during extreme flood events (such as June 2002), the spoil from the Interceptor will be used to construct a low dike on the field side (s) of the channel. The low dike combined with the road or dike on the other side will provide capacity for extreme events without flooding adjacent lands.

Additionally, temporary right-of-way will be required to spread the dirt excavated from the Interceptor.

These considerations result in the Interceptor design illustrated by two typical cross sections shown in Figure 9. Cross sections along the entire Interceptor length are provided as Appendix C.

Interceptor Bottom Slopes

Another desired design criteria is for low water velocities in the Interceptor in order to minimize the potential for erosion. (See Figure 10 for the velocity profile for the worst case 100 year flood flows). This was achieved by the cross section design generally following the existing natural ground slopes.

Interceptor Start

The extreme south end of the project extends 200 feet into Section 34, Jadis Township. This distance will allow the interceptor to transition to the existing north south road ditch. The purpose of this is to provide an outlet for waters in Section 34 to prevent flood waters in that section from flowing north and east out of the section in an uncontrolled fashion, either into the Interceptor or into the southwest of Roseau. The flow out of Section 34 into the Interceptor will be limited by a 5 foot diameter pipe under the township road crossing. A small drop structure, not shown in this report, will be provided at the Interceptor's start to minimize the potential for erosion from Section 34 into the Interceptor.

Interceptor Crossings

The goal is always to minimize crossings in an Interceptor designed to transport flood flows. Nevertheless, a number of crossings are required, most significantly a railroad crossing, a crossing under Minnesota Highway 11, and a crossing under County Roads 16 and 123. Additionally, crossings at township roads, the City's Industrial Park site, and into existing homesteads will be provided. The proposed crossing locations are shown on Figure 11.

As mentioned, at the Interceptor's start, a 5 foot diameter pipe will be installed in the crossing, from there north the first two private crossings proposed are 6 x 6 foot box culverts and then an 8 foot wide by 6 foot high box culvert for the township road and the industrial park crossing. The railroad, Highway 11, and the next private crossing are proposed to use 2 lines of 8 foot wide by 6 foot high box culverts.

The next three crossings and the County Road 16 crossing consist of 2 lines of 10 foot wide by 6 foot high box culverts. The two crossings, furthest north, are proposed as 2 lines of 12 foot wide by 6 foot high box culverts.

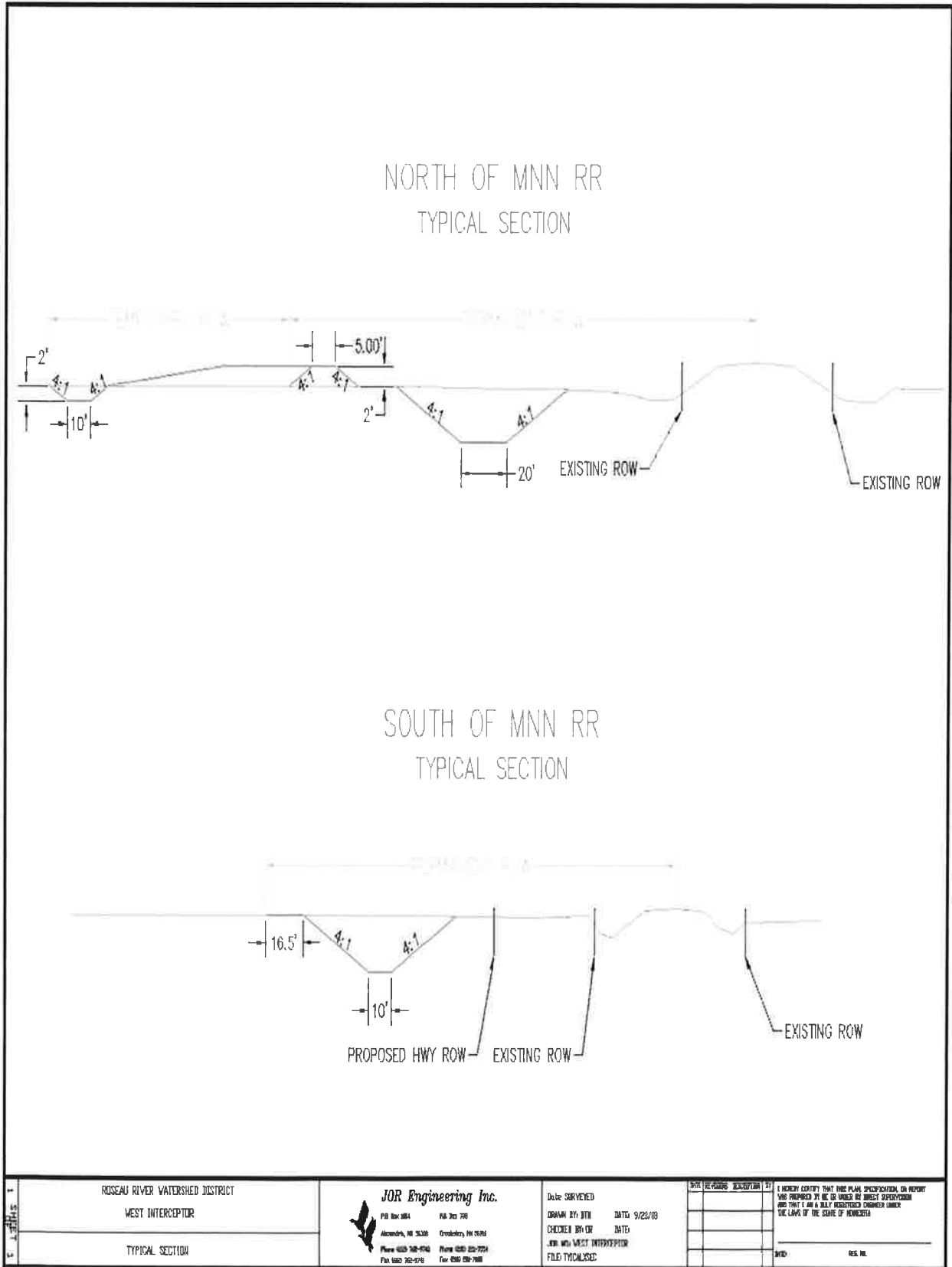


Figure 9. Two Typical West Interceptor Cross Sections

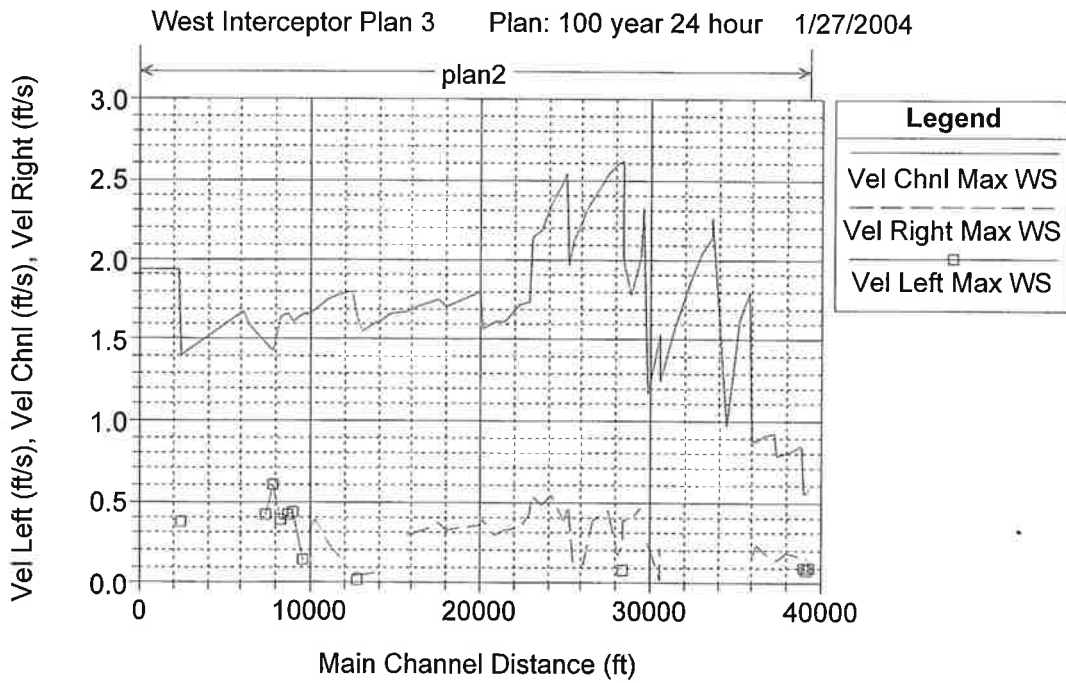
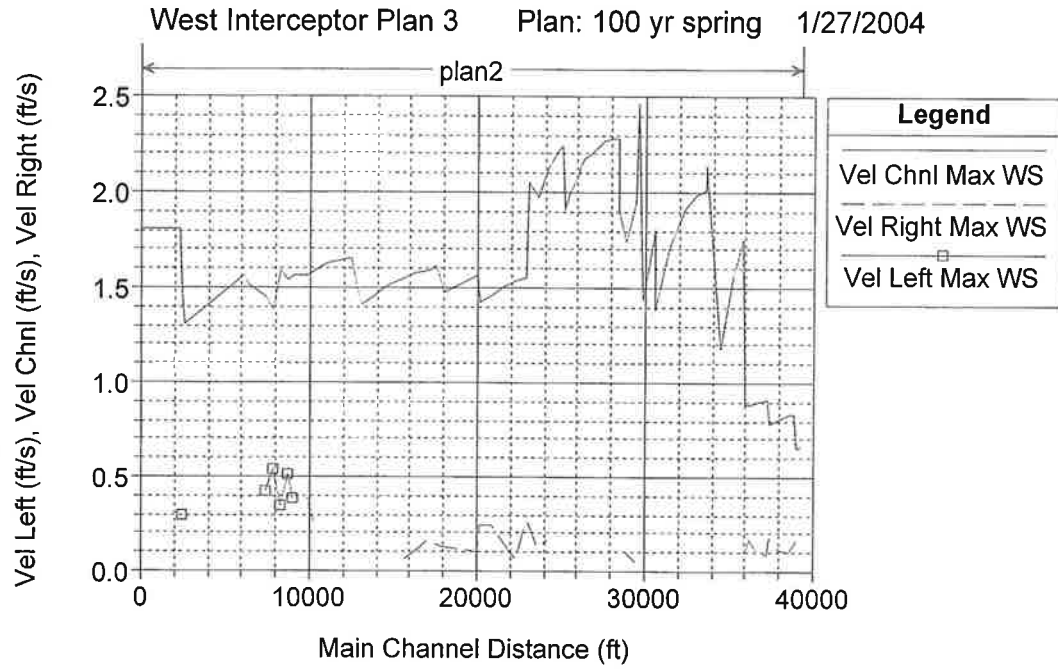


Figure 10. West Interceptor Velocities

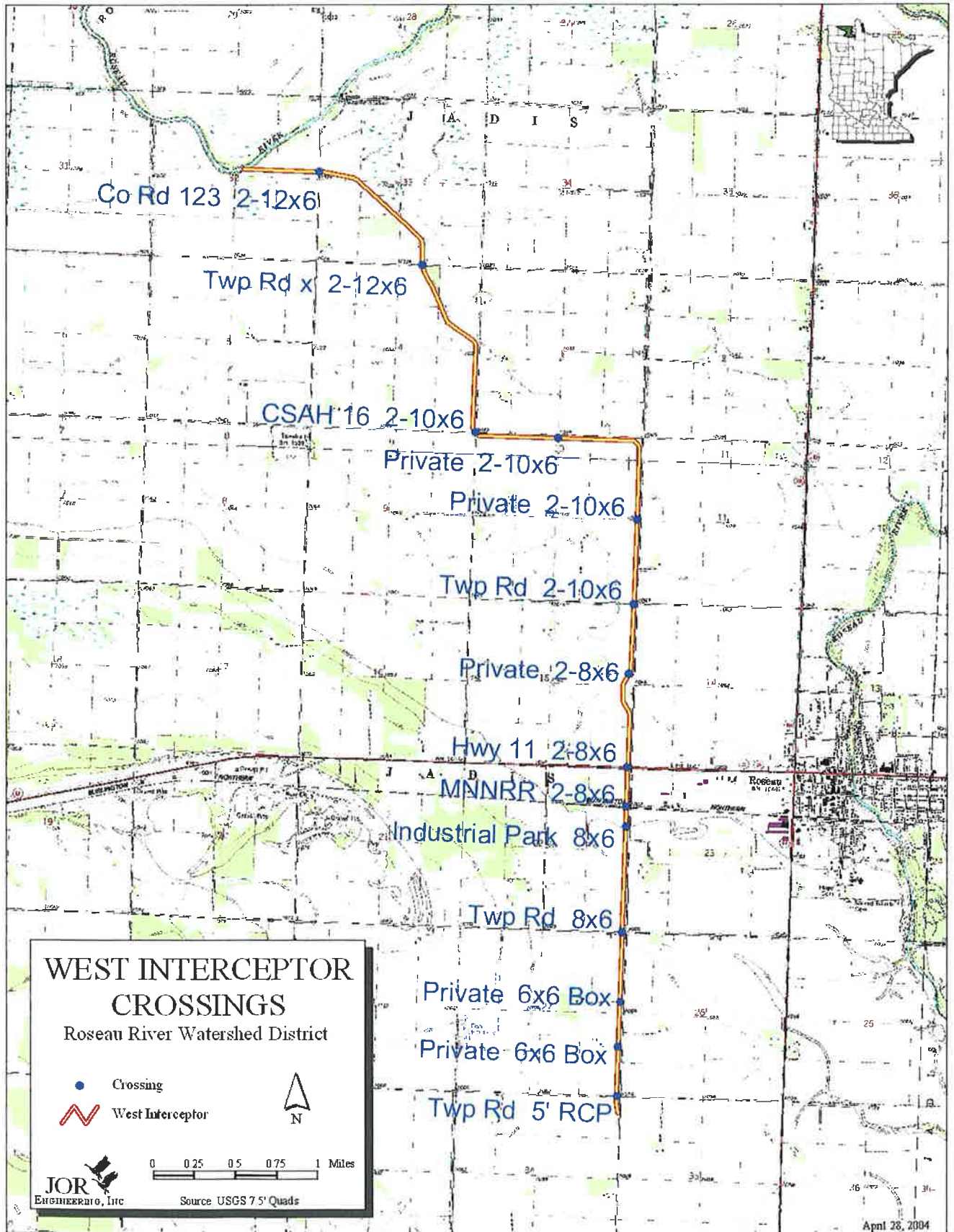


Figure 11. West Interceptor Crossings Map

Figure 12 provides the proposed design for the township and homestead crossings. Figure 13 shows the proposed design for the County Road 16 culverts which cross said road diagonally. The railroad and MN State Highway crossings are not shown in this report as those organizations' standard designs will be used.

Interceptor Inlets

Along the Interceptor road ditches and field drains will flow into the Interceptor through standard design agricultural drop inlet pipes sized according to their respective drainage areas.

Inlets entering from agricultural fields will have a grass buffer on the upstream side. Figure 2 shows a typical side inlet. All side inlets will be trapped which will prevent waters during extreme floods from exiting the Interceptor.

Outlet Structure

The outlet structure will consist of two 12 foot wide by 6 foot high broken back concrete box culverts. The proposed structure is a typical precast concrete culvert with precast bend sections. A sketch of the proposed structure is shown in Figure 14.

2. PRAIRIE/WETLAND RESTORATION

Concept

A prairie and wetland restoration is proposed in section 33 T163N R40W. This would consist of seeding the high area to native prairie grass seeds and plugging the existing field drains in the section. Most of this section is in the CRP program. Figure 3 shows the location of proposed ditch plugs. It is expected that Type 1, seasonally flooded wetlands would develop at these locations.

Replacement Drainage

A drainage ditch will be constructed along the east side of the section to provide an outlet for the lands in section 34 that would have drained to the group ditch. The alignment for this ditch is shown in Figure 15 and typical cross sections in Figure 16. The ditch will be approximately 4 feet deep with 3:1 side slopes and an 8 foot bottom width.

A drainage ditch will also be constructed along the east and north sides of the SW1/4 of the SW1/4, Section 33 to reduce drainage for the SW1/4. This ditch is proposed as a 2-3 foot ditch with an 8 foot bottom width and 3:1 side slopes.

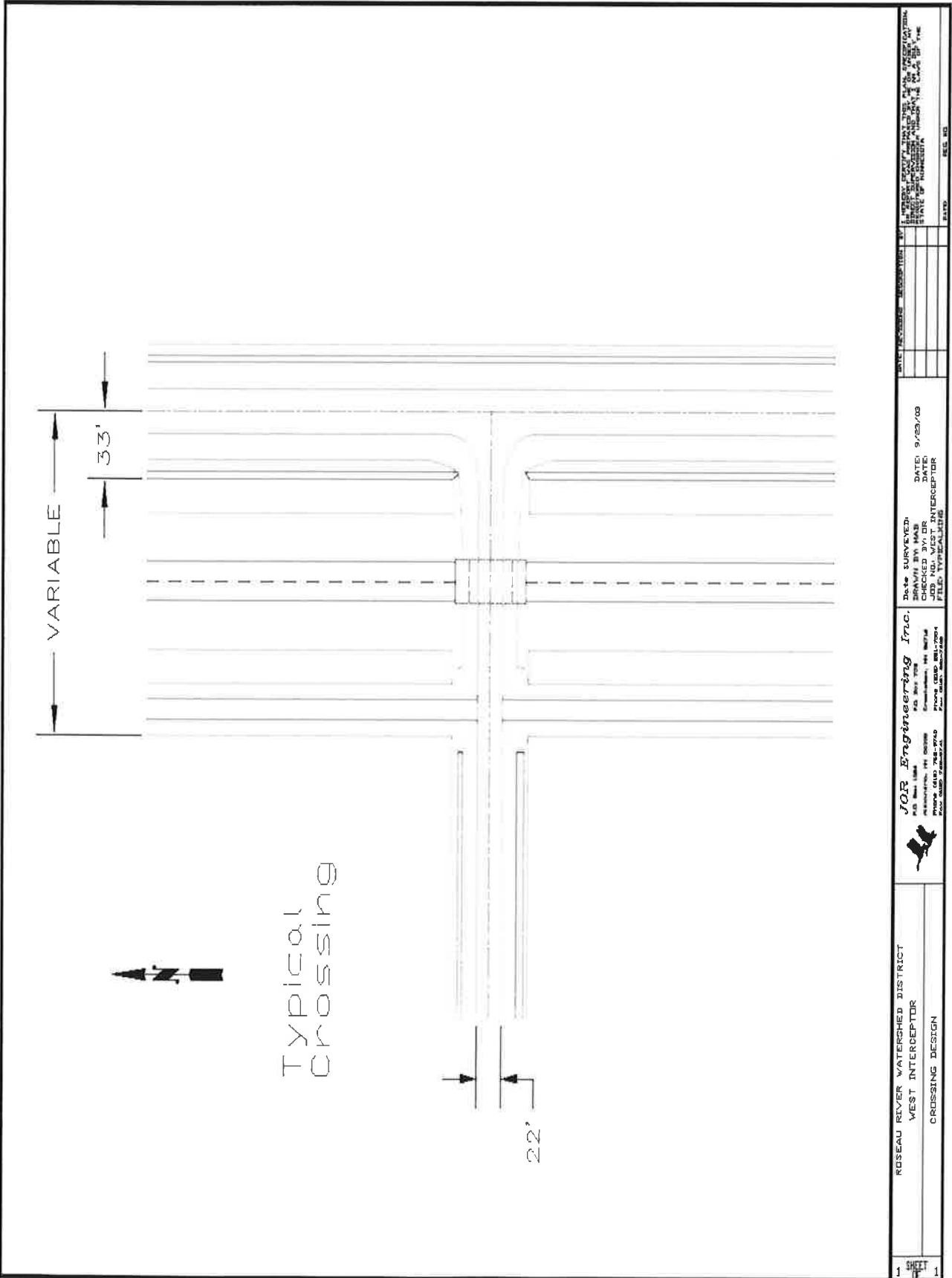
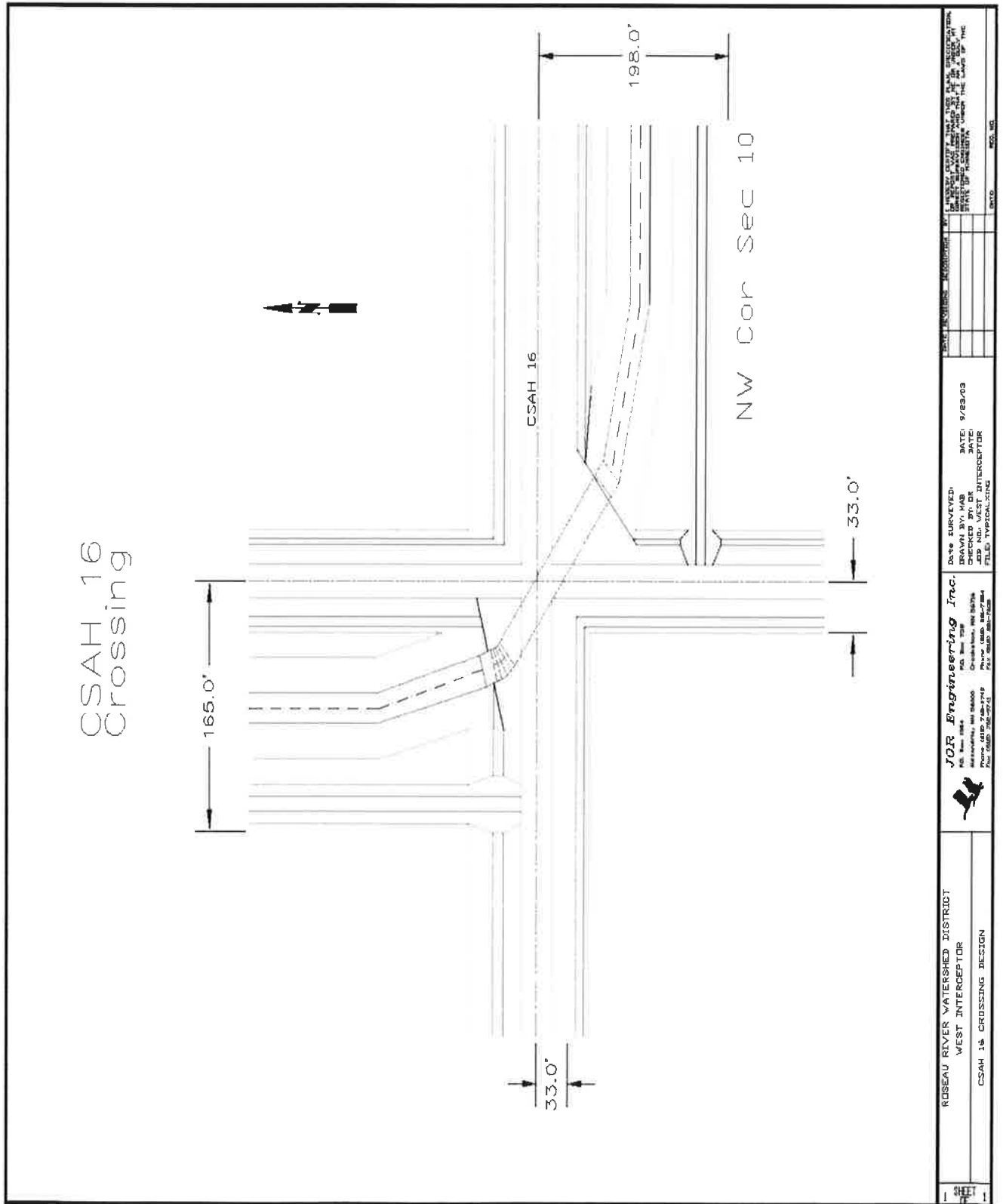


Figure 12. Crossing Design



CSAH 16
Crossing

CSAH 16

NW Cor Sec 10

165.0'

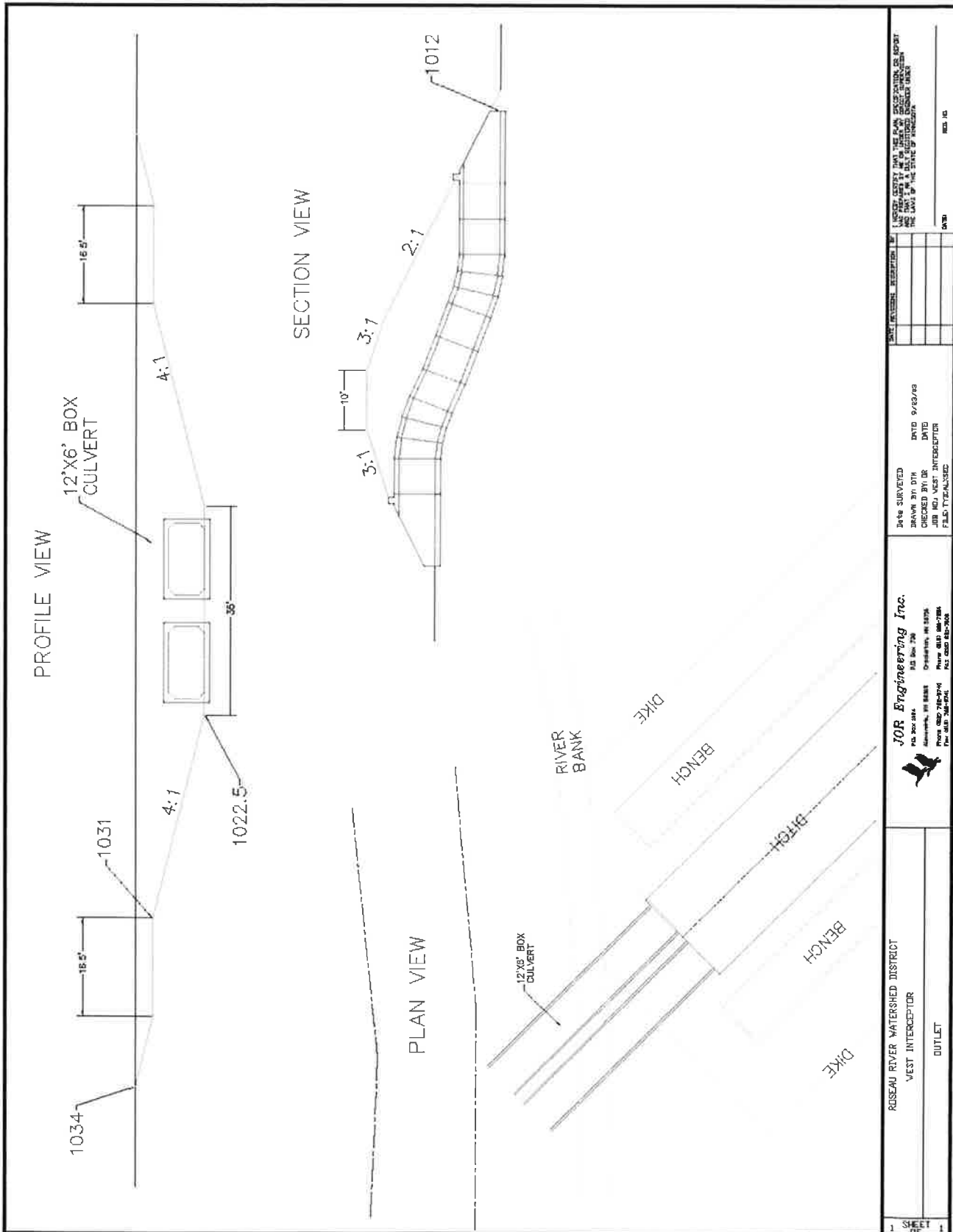
33.0'

198.0'

33.0'

ROSEAU RIVER WATERSHED DISTRICT WEST INTERCEPTOR CSAH 16 CROSSING DESIGN		 JOR Engineering Inc. REG. ENG. 10848 REG. SURV. 109 1000 UNIVERSITY AVE. SW FARGO, ND 58103-1000 PHONE: 701-785-7711 FAX: 701-785-7708		DATE SURVEYED: DRAWN BY: MAB CHECKED BY: JED FILED: TYPED/ALZING	DATE: 9/23/03 PROJECT: WEST INTERCEPTOR DRAWING NO.:	I hereby certify that this work was prepared by me or under my direct supervision and that I am a duly licensed professional engineer in the State of North Dakota. I am not providing my services under the laws of the State of North Dakota.
					NO. 10	

Figure 13. County Road 16 Crossing Design



RIBSAU RIVER WATERSHED DISTRICT VEST INTERCEPTOR SHEET NO. 1	JOR Engineering Inc. 303 So. 2nd Alexandria, LA 71303 Phone: 504-746-7774 Fax: 504-746-7766	DATE SURVEYED DRAWN BY CHECKED BY DATE PROJECT DESCRIPTION FIELD TECHNIQUES	DATE INTERCEPTOR 9/23/2013	DATE 	DATE 	DATE
			DATE 	DATE 	DATE 	DATE

I, **JOR**, CERTIFY THAT THE PLAN, SPECIFICATION, OR REPORT PREPARED BY ME OR UNDER MY SUPERVISION AND SEAL AND THE DATE OF THE STATE OF MISSISSIPPI.

Figure 14. Outlet Structure

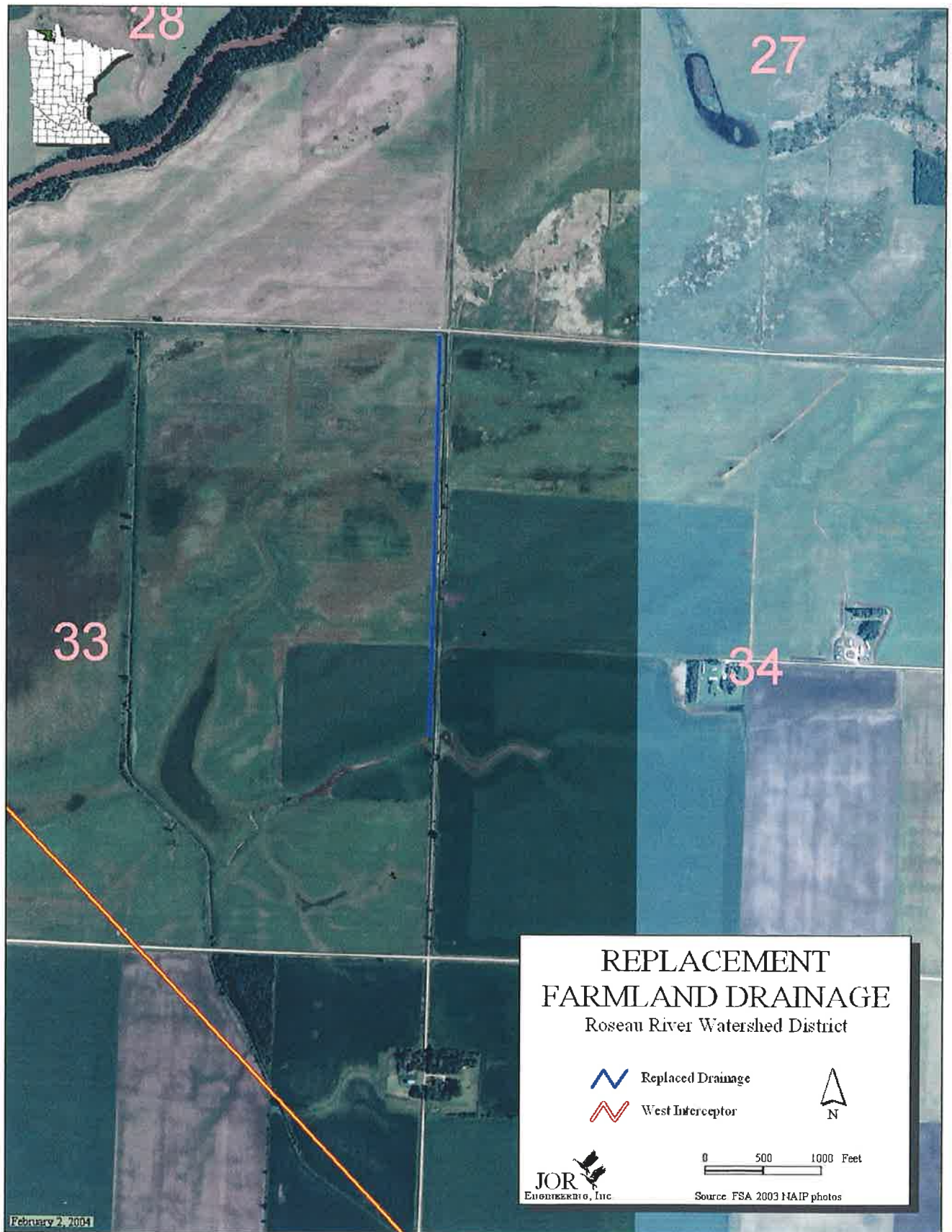
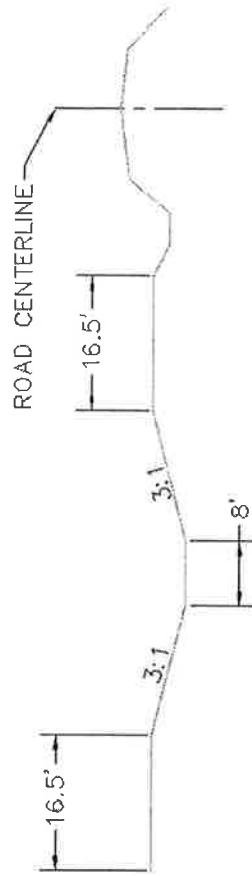


Figure 15. Replacement Farmland Drainage

Typical Section Replacement Drainage



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DATE	DESCRIPTION	APPROVED BY

DATE: 9/23/03
 DRAWN BY: JQR
 CHECKED BY: JQR
 JOB NO.: WEST INTERCEPTOR
 FILE NO.: OUTLET

JQR Engineering Inc.
 P.O. Box 739
 Southport, ME 04288
 Phone: 603-764-9344 Fax: 603-764-9344
 For: 603-764-9344

ROUSEAU RIVER WATERSHED DISTRICT
 WEST INTERCEPTOR
 LOCAL DRAIN, TYPICAL SECTION

Figure 16. Replacement Drainage Cross Section

Roseau West Interceptor and Wetland Restoration Project
Section 4 - Environmental and
Permitting Considerations

1. WETLANDS

Based on the Wetland Impact Determination Report, there will be no Wetland Conservation Act wetlands affected by this project.

However, the Roseau River classified as public waters will be affected with the installation of the outlet structure. The area impacted by this will be kept to a minimum.

The Prairie/Wetland Restoration should mitigate this with approximately 100 acres of Type 1 wetlands that should develop with plugging of the agricultural drainage.

2. AGRICULTURAL LANDS

The project will remove approximately 732 acres from agricultural production. Of these lands, approximately 595 acres are within the Prairie/Wetland Restoration area which is subject to frequent flooding. In reviewing records for the US Geological gaging station at Ross between Aug.1, 1928 through Sept. 30, 2002, flows have exceeded 1,600 Cubic Feet per Second (cfs) forty eight times. This corresponds with an approximate elevation of 1031. Of those 48 times, 15 occurred between May 20th and August 30th with an average of 13 days of flows exceeding 1600 cfs and another 15 spring floods that averaged 13 days past the 20th. There were two years in the record in which multiple floods occurred throughout the growing season. There was 31 times that the flow exceeded 2,000 cfs and 21 times exceeding 2500 cfs, approximately elevation 1032.25 and 1033.5 respectively.

Using frequency charts developed by the US Army Corps of Engineers, Flood Control Roseau River, Minnesota General Design Memorandum, October 1971, 1,600 cfs has an exceedence frequency of 45%, 2,000 cfs - 33% and 2,500 cfs - 22%. Said inundation frequencies are generally considered too frequent for efficient farm operations, although it must be said, there are farm operations in the area that willingly assume the farming risks of such a flooding history.

3. WILDLIFE

Minnesota's Endangered Flora and Fauna was consulted for species that could possibly be found in the area. The following is a list of species that could be affected:

Endangered

Cyroruoedium Arietinum (Ram's Head Lady's-Slipper)
Subularia Aquatica (Awlwort)
Charadrius Melodus (Piping Plover)

Threatened

Allium Cernuum (Wild Onion)
Arabis Holboelli (Holboell's Rock-Cress)
Carex Practicola (Prairie Sedge)
Carex Sterilis (Sterile Sedge)
Drosera Anglica (English Sundew)
Drosera Linearis (Linear-Leaved Sundew)
Nymphaea Tetragona (Small White Water-Lily)
Rhynchospora Capillacea (Hair-Like Beak-Rush)
Haliaeetus Leucocephalus (Bald Eagle)
Lanius Ludovicianus (Loggerhead Shrike)
Canis Lupus (Gray Wolf)

As discussed elsewhere in this report, the majority of the land affected by this project is currently in agriculture production and therefore no adverse impact should occur. Restoration of prairie wetland should provide a diverse area of grassland and wetlands for wildlife habitat.

4. PERMITS

A protected waters permit, from the Minnesota Department of Natural Resources (MNDNR) will be required for the outlet structure into the Roseau River.

Under rules adopted by the Minnesota Pollution Control Agency (MPCA), a permit is required from the MPCA for construction activity which will disturb 1 or more acres. This permit basically requires that a stormwater management plan be prepared along with the construction plan. This stormwater management plan is to incorporate "best management practices" to minimize the erosion and sedimentation due to the disturbances on the construction site and is to be implemented along with the construction of the project. An MPCA Stormwater Management Permit will be jointly applied for by the District and the contractor.

A permit is required from the US Army Corps of Engineers (Corps) under section 404 of the "Clean Water Act".

A permit from the Minnesota Department of Transportation for the Highway 11/89 crossing will be needed.

Permission from the Minnesota Northern Railroad for the culvert installed at the railroad crossing will need to be obtained.

Permission from the Roseau County Highway Department for the County State Aid Road 16 and County Road 123 crossings will be needed.

5. HISTORICAL

The project has been reviewed by the Minnesota Historical Society and a copy of the letter is included as Appendix B.

6. MAINTENANCE

The principal annual maintenance activity required is mowing of the dikes and grass strips after wildlife nesting season is over. An annual visual inspection for siltation problems is also needed to arrange spot cleaning of the Interceptor or Local Drain as required. The other project features; culvert, structures, and dikes must also be inspected annually and maintained as necessary.

The prairie wetland restoration will require periodic burning and possible spot mowing during the first three years for weed control.

Roseau West Interceptor and Wetland Restoration Project

Section 5 – Project Details

1. FLOOD CHANNEL

- 7.4 miles of channel constructed to a 100 year flood flow design
- 1 mile of replacement drainage
- 170 acres of permanent channel right of way
- 153 acres of temporary right of way for spoil disposal
- One Railroad Crossing
- One State Highway 11 crossing
- One County Road 16 crossing
- One County Road 123 crossing
- Four township road crossings
- Five private road crossings
- One Industrial Park crossing
- One channel outlet into Roseau River

2. PRAIRIE/WETLAND RESTORATION

- 561 acres of land acquisition
- 1/2 mile of dike construction
- Construct Drainage Plugs
- Prairie Seeding

3. PHASING AND COSTS

It is critically important that mitigation of Roseau’s recurrent flood damages commence as soon as possible. Therefore, it is proposed to begin planning, design, and land acquisition in 2003 with a first subproject letting date in late spring 2004. Construction to begin in the summer of 2004. The total cost of the project is estimated at 4 million dollars (see Table 4, Preliminary Cost Estimate).

4. PROPOSED FUNDING SOURCES

• USA - Economic Development Agency	\$1,000,000
• MNDNR, Flood Damage Reduction Grant	1,800,000
• City of Roseau	800,000
• Roseau River Watershed District	<u>57,000</u>
TOTAL	\$3,657,000

Roseau West Interceptor and Wetland Restoration Project

Table 4 - PRELIMINARY COST ESTIMATE

4-30-04

Item Description	Quantity	Units	Unit Price	Amount	Contingencies	Total Amount
Construction						
Mobilization	1	Job	\$50,000.00	\$50,000.00	30%	\$65,000.00
Stripping	113740	CY	\$0.50	\$56,870.00	30%	\$73,931.00
Excavation	398000	CY	\$1.20	\$477,600	30%	\$620,880.00
Topsoil	161300	CY	\$0.50	\$80,650.00	30%	\$104,845.00
Seeding/Fertilizing/Mulching	141	Acre	\$460.00	\$64,860.00	5%	\$68,103.00
Box Culvert	752	LF	\$450.00	\$338,400.00	30%	\$439,920.00
Railroad Xing	1	Job	\$75,000.00	\$75,000.00	30%	\$97,500.00
Hwy 11 Xing	1	Job	\$200,000.00	\$200,000.00	30%	\$260,000.00
CR 16 Xing	1	Job	\$81,000.00	\$81,000.00	30%	\$105,300.00
Inlet Culverts	1	Lot	\$45,000.00	\$45,000.00	30%	\$58,500.00
South Inlet Drop Structure	1	Lot	\$20,000.00	\$20,000.00	30%	\$26,000.00
Outlet to River	1	Lot	\$259,000.00	\$259,000.00	30%	\$336,700.00
Deep Tillage	153	Acre	\$100.00	\$15,300.00	30%	\$15,345.90
Kveen Dike	2800	CY	\$1.50	\$4,200.00	30%	\$5,460.00
Ditch plugs	14	Each	\$450.00	\$6,300.00	30%	\$8,190.00
Prairie Seeding	250	Acre	\$350.00	\$87,500.00	5%	\$91,875.00
Total Construction				\$1,861,680.00		\$2,377,549.90
Land R/W & Purchase				\$525,000.00	20%	\$630,000.00
Contract Admin	1	% Const	5%	\$130,000.00	20%	\$156,000.00
Construction Inspect	1	% Const	7%	\$161,095.77	20%	\$193,314.92
Engineering	1	Lot	\$250,000.00	\$250,000.00	20%	\$300,000.00
Total Project Cost Estimate				\$2,927,775.75		\$3,656,864.82

5. CONSTRUCTION PHASING

Given the reality that the Interceptor can not be excavated until there is some place for the water to go and that farmland drainage must be maintained throughout the entire construction cycle, it is necessary that the project be completed in three phases.

Phase 1 Activities:

1. Construct Outlet Structure.
2. Construct Replacement Drainage and Ditch Plugs.
3. Construct Railroad, Minnesota Highway 11, and CSAH 16 crossings and temporarily plug culverts by boarding them up.

Phase 2 Activity

Excavate Interceptor and install regular crossings with construction commencing at northern end and proceeding south, unplugging crossings in Item 3 above as construction passes said location.

Phase 3 Activity

Deep tillage of the temporary right-of-way to mitigate compaction caused by earthmoving equipment.

6. LANDS

The lands that will be required for this project are as listed in Table 5 by 40 acre parcels.

Table 5 - REQUIRED PROJECT LANDS

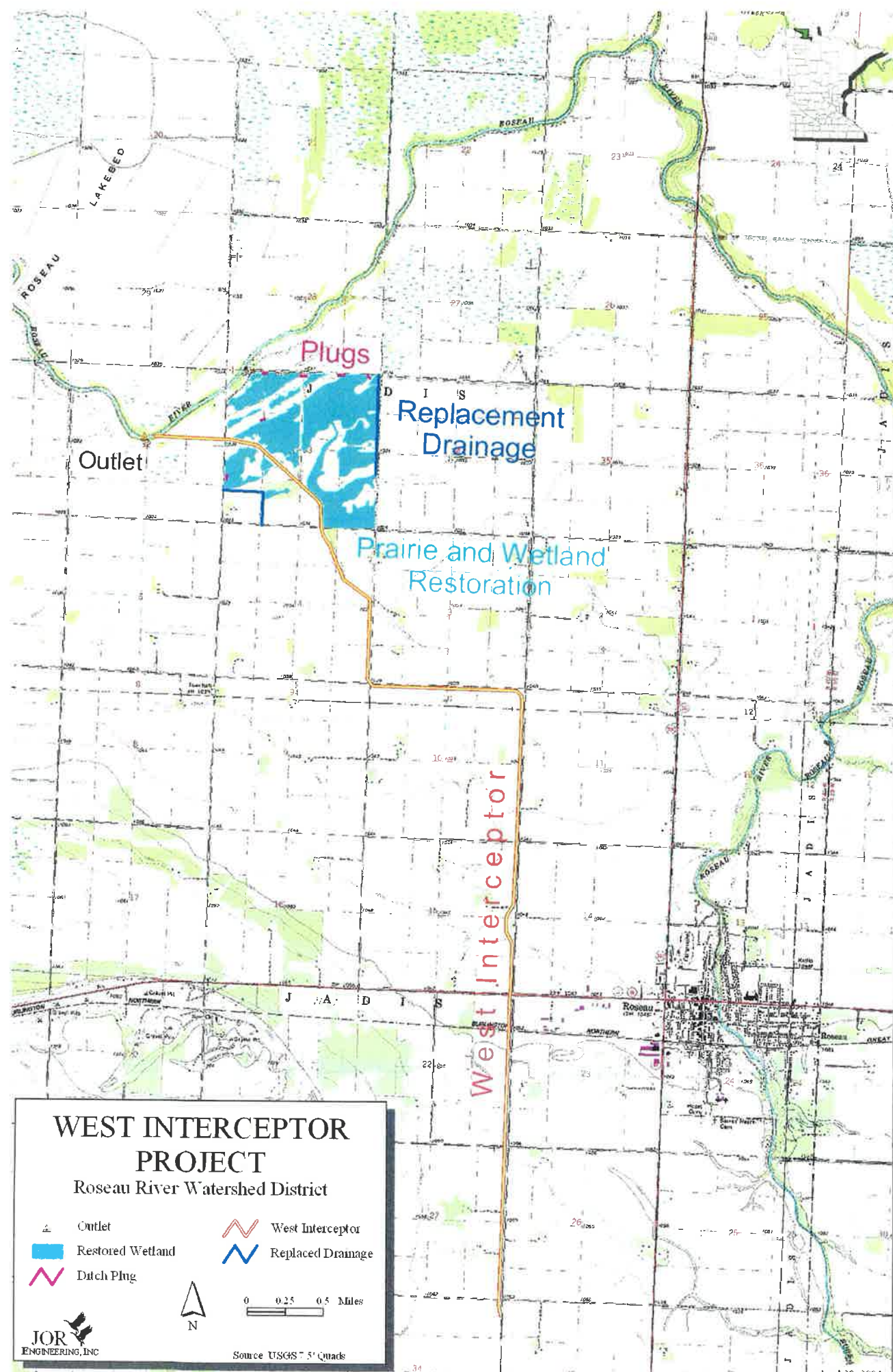
West Interceptor						4/27/2004
		Required Project Lands *Note				
Jadis	T162N R40W				Permanent	Temporary
			Permanent	Temporary	Sum by	Sum by
Section	Description	Land Owner	Acres	Acres	Section	Section
10	NWNW	Marsha Yates, et al	6.08	6.58		
10	NENW	Marsha Yates, et al	5.84	5.35		
10	NWNE	Luverne G. Vistad	6.30	6.20		
10	NENE	Luverne G. Vistad	10.86	9.49		
10	SENE	Luverne G. Vistad	3.21	2.55		
10	Tract SENE	Jan Vistad	2.54	1.99		
10	NESE	Richard, Robert & John Magnusson	5.14	5.04		
10	SESE	Richard, Robert & John Magnusson	5.04	5.55	45.01	42.75
15	NENE	Richard, Robert & John Magnusson	4.97	6.47		
15	SENE	Richard, Robert & John Magnusson	1.89	3.02		
15	Tract SENE	Bruce A. Barmgartner	4.40	3.98		
15	NESE	Peggy Magnusson, et al	6.99	5.51		
15	SESE	Holdahl Partnership L.L.P.	5.05	7.43	23.30	26.41
22	NENE	Holdahl Partnership L.L.P.	5.12	3.72		
22	NENE	Roseau County Highway	1.07	0.00		
22	SENE	Curtis Skrutvold, et ux	5.63	5.63		
22	SENE	Roseau County Highway	1.18	0.00		
22	NESE	Curtis Skrutvold, et ux	5.11	5.63		
22	NESE	Roseau County Highway	1.33	0.00		
22	SESE	George U. Larson, et ux	2.73	2.90		
22	SESE	Roseau County Highway	0.77	0.00		
22	Tract SESE	Earl O. Anderson & Dale D. Smedsmo	2.76	0.00		
22	Tract SESE	Roseau County Highway	0.80		26.50	17.87
27	NENE	Harry B. Jensen, et ux	4.95	7.43		
27	SENE	Harry B. Jensen, et ux	4.46	7.92		
27	NESE	Lloyd P. Fugleberg, et ux	4.64	8.58		
27	SESE	Lloyd P. Fugleberg, et ux	4.64	8.58	18.69	32.50
34	NENE	Rachael Erickson	1.66	2.30	1.66	2.30
4	SESE	Ardell E. Magnusson, et ux	5.90	9.18		
4	Gov't Lot 2	Ardell E. Magnusson, et ux	5.38	0.00		
4	NESE	Lola M. Grafstrom, et al	6.00	7.99		
4	SENE	Lola M. Grafstrom, et al	7.43	3.35		
4	Gov't Lot 1	Lola M. Grafstrom, et al	0.63	0.00	25.33	20.52
		Total T162NR40W			140.49	142.35

REQUIRED PROJECT LANDS (Continued)

West Interceptor							4/27/2004
Jadis Addition T163N R40W						Permanent	Temporary
			Permanent	Temporary	Sum by	Sum by	
Section	Description	Land Owner	Acres	Acres	Section	Section	
32	SWNE	DNR Real Estate Mgmt.	9.29	0.00			
32	SENE	Terry Kveen	12.09	0.00	21.38	0.00	
33	NENE	Howard Currence Trust	40				
33	SENE	Howard Currence Trust	40				
33	SWNE	Howard Currence Trust	40				
33	NWNE	Howard Currence Trust	40				
33	SESE	Howard Currence Trust	40				
33	SWSE	Howard Currence Trust	40				
33	NWSE	Howard Currence Trust	40				
33	NESW	Howard Currence Trust	40				
33	SESW	Howard Currence Trust	40				
33	NENW	Howard Currence Trust	40				
33	SENW	Howard Currence Trust	40				
33	NWSW	Terry Kveen	40				
33	SWNW	Terry Kveen	40				
33	NWNW	Terry Kveen	35				
33	NESE	Sharlene Peterson	40		595.00	0.00	
		Total T163NR40W			616.38	0.00	
		Project Totals			756.87	142.35	






APPENDIX A

West Interceptor Project Area



WEST INTERCEPTOR PROJECT

Roseau River Watershed District

-  Outlet
-  Restored Wetland
-  Ditch Plug
-  West Interceptor
-  Replaced Drainage



0 0.25 0.5 Miles

Source USGS 7.5' Quads



APPENDIX B

Correspondence



March 19, 2004

Board of Managers
Roseau River Watershed District
P.O. Box 26
Roseau, MN 56751

Michael Bakken
Project Engineer
JOR Engineering, Inc.
P.O. Box 738
Crookston, MN 56716-0738

Re: Advisory Review of Revised West Interceptor Preliminary Engineering Report

Dear Managers and Project Engineer,

On behalf of the Board of Water and Soil Resources, I offer this advisory report in accordance with Minnesota Statutes, Section 103D.711, Subdivision 5. As indicated in Subdivision 5, the BWSR report shall include:

- 1) a statement about the completeness of the report in relation to statutory requirements;
- 2) a statement as to whether or not the report presents a practical plan;
- 3) recommendations for changes, if considered advisable, and
- 4) a recommendation as to whether a soil survey appears advisable.

The revised Preliminary Engineer's Report appears to present a practical plan and to substantially fulfill the applicable requirements of Minnesota Statutes, Section 103D.711 and 103E.021, subject to the following comments. As previously indicated, a soil survey does not appear necessary.

Section 1. INTRODUCTION: For the record related to project need and economic justification, it might be good to indicate that the Roseau Industrial Park, where Polaris, Inc., a primary business in Roseau is located, is in the current path of runoff from the beach ridge west of Roseau, and that routing and pumping of "interior" flood water to, and over, a levee along the Roseau River would be difficult and expensive.

Figure 2. Route of Proposed Interceptor Channel, and Figure 14. Replacement of Farmland Drainage: The proposed channel alignment crosses an existing drainage ditch twice in Section 4, T162N, R40W. It's not clear how the drainage in the existing ditch will be handled. Might it be best to realign the interceptor channel somewhat to avoid crossing the existing drainage ditch?

Table 2 – Interceptor Flows: Suggest adding units (i.e. "cfs") to the title.

RRWD Revised West Interceptor Project AR 3-19-04.doc

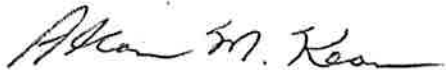
<i>Bemidji</i>	<i>Brainerd</i>	<i>Duluth</i>	<i>Fergus Falls</i>	<i>Marshall</i>	<i>New Ulm</i>	<i>Rochester</i>	<i>Saint Paul</i>
3217 Bemidji Avenue N. Bemidji, MN 56601 phone (218) 755-4235 fax (218) 755-4201	217 S. 7th Street Suite 202 Brainerd, MN 56401 phone (218) 828-2383 fax (218) 828-6036	394 S. Lake Avenue Room 403 Duluth, MN 55802 phone (218) 723-4752 fax (218) 723-4794	413 W. Stanton Avenue Fergus Falls, MN 56537 phone (218) 736-5445 fax (218) 736-7215	1400 E. Lyon Street Box 267 Marshall, MN 56258 phone (507) 537-6060 fax (507) 537-6368	261 Highway 15 S. New Ulm, MN 56073 phone (507) 359-6074 fax (507) 359-6018	40 16th Street S.E. Suite A Rochester, MN 55904 phone (507) 285-7458 fax (507) 280-2875	One West Water Street Suite 250 Saint Paul, MN 55107 phone (651) 282-9969 fax (651) 284-0000

Figures 5, 6 and 7: The legends on these figures are difficult to interpret and do not include a definition of the channel bottom profile. As mentioned in the previous BWSR advisory report for this project, the very small scale of these drawings make them difficult to read.

Figure 13. Outlet Structure and associated report text: It's not clear if the intent for the broken-back design is to custom cast the conduit sections, or depend on incremental flexure at joints of standard sections to achieve the desired profile. If the latter is intended, I wonder if the resulting pressure on joints might cause breakage of the joints, particularly if there is differential settlement. Although I don't have experience with the proposed design, I'd also expect construction of the desired profile to be difficult. Might a cast in place concrete drop structure, or weir, with an armored stilling basin, be more reliable and reasonably cost-effective? Is a deeper and steeper channel, without a drop structure at the end, less cost-effective? The current design doesn't indicate any erosion control at the outlets of the proposed conduits, which could jeopardize the end sections via erosion.

Section 4. PERMITS: This section does not reflect the current NPDES Phase 2 permit requirements for construction projects that disturb more than 1 acre, including the associated Storm Water Pollution Prevention Plan.

Sincerely,



Allan M. Kean, P.E.
Chief Engineer, BWSR

cc: Ron Harnack, Executive Director
Doug Thomas, Assistant Director
Ron Shelito, North Region Supervisor
Brian Dwight, Watershed Specialist
Bill Best, Board Conservationist
Larry Kramka, Region 1 Hydrologist, DNR



Minnesota Department of Natural Resources

DNR WATERS
2115 BIRCHMONT BEACH ROAD N.E.
BEMIDJI, MN 56601
218-755-3637

March 17, 2004

Rob Sando, Administrator
Roseau River Watershed District
PO Box 26
Roseau, MN 56751

Dear Mr. Sando:

DIRECTOR'S ADVISORY REPORT; REVISED WEST INTERCEPTOR PRELIMINARY ENGINEERING REPORT

We have completed our review of the Preliminary Engineers Report for the Revised West Interceptor, Project 2003-1. This letter constitutes the Director's Preliminary Advisory Report pursuant to MN Statutes 103D.711, Subd. 5. Please submit this letter into the hearing record.

The project, as proposed, appears to conform to the general requirements of Minnesota Statutes 103D. However, there are portions of Minnesota Statutes 103D.711, Subd. 2, that appears to be missing. The following items should be addressed in order for the report to be considered complete.

1. The adequacy of the outlet of the proposed project needs to be determined. This evaluation of the receiving water should consider typical flows with and without the project, for standard events such as the 5, 10, 25, and 50 year and not solely the 100-year event. This is important since it is designed to except flows within this range.
2. The engineers report does not appear to provide any statement regarding the feasibility or practicability of the proposed project.
3. The project incorporates one rod buffer strips and field inlet culverts into the design. We applaud the use of methods to reduce erosion along the channel. We also encourage the project consider additional buffer areas around the inlets to reduce the transport of sediment into the inlets. Additionally, the buffer strips should be sized to a minimum of one rod and be expanded in any areas where this buffer might be determined as insufficient to address site specific erosion concerns.

The project is considered a practical plan and there does not appear to be a need for additional soil survey information. The report also indicates, correctly, that the project will require a Public Waters permit from this office prior to construction of the outlet facilities at the Roseau River

DNR Information: 651-296-6157 • 1-888-646-6367 • TTY: 651-296-5484 • 1-800-657-3929

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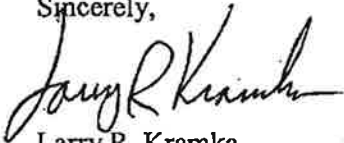
Rob Sando
March 17, 2004
Page 2

I would also note that the report indicates proposed funding for the initial construction. However, there was no discussion of where funding for future maintenance of the project would come from. These activities are described in Section 4, item 6 of the report. This note is informational only, since I am sure the Board has already addressed this elsewhere in the project proposal.

Thank you for the opportunity to review the preliminary engineers report. The engineers report is not complete at this time and should be revised to address the items noted. Please forward the final engineers report to this office upon its completion.

Please feel to contact me or project team member Dan Thul at 218-755-3973 if you have any questions related to this Director's Report.

Sincerely,



Larry R. Kramka
Regional Hydrologist

c: Project Engineer
Bruce Gerbig, St. Paul Waters
Area Wildlife Supervisor
Area Fisheries Supervisor
Regional Ecologist
County SWCD
Al Kean, BWSR



MINNESOTA HISTORICAL SOCIETY
STATE HISTORIC PRESERVATION OFFICE

January 16, 2004

Mr. John Wynne
Wynne Consulting
PO Box 33
Wannaska, MN 56761

RE: Construction of a flood water interceptor channel
Jadis Twp., Roseau County
SHPO Number: 2004-0797

Dear Mr. Wynne:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

Based on available information, we conclude that no historic properties eligible for or listed on the National Register of Historic Places will be affected by this project.

Please contact Dennis Gimmestad at (651) 296-5462 if you have any questions regarding our review of this project.

Sincerely,

Britta L. Bloomberg
Deputy State Historic Preservation Officer

cc: Sheila Mahoney, EDA

Town of Jadis

33911 State Highway 310
Roseau, Minnesota 56751

March 9, 2004

Roseau River Watershed District
% Board of Watershed Managers
Farrell Erickson, Chairman
120 2nd Avenue Southwest
Roseau, Minnesota 56751

**Re: West Interceptor Channel
Section 4 North**

Dear Sirs,

The town of Jadis Board of Directors moved unanimously at the March 9, 2004 annual meeting to support following the original "community" (coulee) ditch line in Section 4 North for the proposed West Interceptor Channel. Also to support eliminating the Jadis Township culvert that crosses the township road on 340th Street.

If you should have any questions regarding this, please contact Greg Halverson, Chairman of Jadis Township at 463-1486

Your immediate attention on this matter will be appreciated.

Sincerely,

Town of Jadis Board of Directors 

Greg Halverson, Chairman
33911 State Highway 310
Roseau, Minnesota 56751

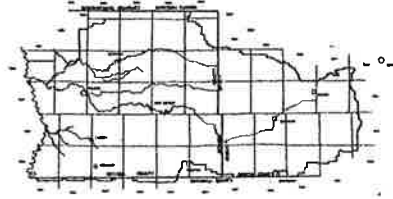
Jerome Ziska, Supervisor
36839 300th
Roseau, Minnesota 56751

David Drown, Supervisor
31556 County Road 123
Roseau, Minnesota 56751

/cmp

Cc: Ardell Magnusson

Two Rivers Watershed District



In Roseau, Kittson, & Marshall Counties

Board of Managers:

Donald Craigmilo, Lawrence Lind, John Younggren, Roger Anderson, O'Neil Larson, Richard Nussach, Jim Kubowski

410 5th Street S., Suite 112, Hallock, MN 56728 - Phone (218) 843-3333 - Fax (218) 843-2020 - Email: dln@mn.nrcs.usda.gov

March 30, 2004

Board of Managers
Roseau River Watershed District
P.O. Box 26
Roseau, MN 56751

Dear Board of Managers:

This letter is in regard to the issue of water transfer between our two Districts in the vicinity of the "big swamp" area. We have recently been contacted by several concerned citizens, landowners, and one Roseau County Commissioner regarding the overflow area, projects you are currently contemplating, and how these projects will affect downstream lands.

When overflows occur, the overflow situation as it currently exists is the cause of overland flooding and resulting major damages to roads and public infrastructure and agricultural land on a very large scale. Damages occur along State Ditch #72, State Ditch #85, and the North Branch Two Rivers, which flows through the population center of Lancaster. Also, the State Ditch #95, State Ditch #50, Kittson County Ditch #15, and Middle Branch Two Rivers are affected heavily. During the last event, a 3 mile long section of Roseau County Road #7 was washed out. Damages to this road in the past have been considerable and costly. Prolonged flooding has an affect on the City of Hallock and its system of dikes. Repairs to the dikes and streambank stabilization measures cost the City \$200,000 from the 2002 event.

Numerous township and county roads are also affected. In one area along the Middle Branch Two Rivers, the high flows cause the river to break out of its banks, causing damages to public infrastructure and cropland in an area approximately 3 square miles in length. Hundreds of thousands of dollars, if not millions, have been expended over the years in repairing damages each time this overflow occurs.

The District's recently updated Overall Plan identifies the overflow problems and lays out a strategy that identifies the need to work with the Roseau River Watershed District & Canada to identify and implement possible solutions such as impoundments, diversions, and dike building.

The aforementioned citizens and public officials that have met with the Two Rivers Watershed District have expressed concerns over the proposed "west intercept" project and the potential impact that it will have downstream within the Two Rivers Watershed District. We thank you for supplying the updated engineer's report and inviting us to the recent Project Work Team meeting regarding the project. However, we do have several questions regarding the project, as follows:

- What is the project timeline related to funding, permits, and construction?
- Is an environmental assessment worksheet required, and if so, please

put the Two Rivers Watershed District on the mailing list to receive any public notices and comments.

- Will the project be built in a manner that will not damage downstream lands any further than they are now being damaged **under all possible circumstances and runoff scenarios?**

Discussions have also taken place with the citizen group regarding the possible construction of a dike across this overflow area. The dike as proposed to the Two Rivers Watershed District by the citizens would be six miles long running east – west and would have culverts through it located at each mile line to allow water to pass through in a controlled fashion. We have reviewed the Roseau River Watershed District's "Comprehensive Water Management Plan" and note that it includes a dike in the same vicinity.

We believe that if our two District's pool our resources, we can make the dike component of your plan a reality much faster than either of us could do on our own. Also, the Two Rivers Watershed District is of the opinion that this diking **must** be installed **in conjunction** with the West Intercept as one of the first components of your Comprehensive Plan, not the last. Our reasoning is that other components of the plan, while designed to reduce flooding, could actually be detrimental to lands within the Two Rivers WD. Therefore we are advocating the diking be done first and that it be a joint project between the two Districts. We understand the urgency for the West Intercept from the point of view of the City of Roseau, but at the same time realize that it cannot come at the expense of the downstream residents of Roseau and Kittson Counties.

Thank you for this opportunity to discuss and provide comment on your flood control initiatives. We look forward to your reply to our questions and to further discussions with you regarding these issues. Please let me know if you would like to set up a meeting to discuss this issue.

Sincerely,

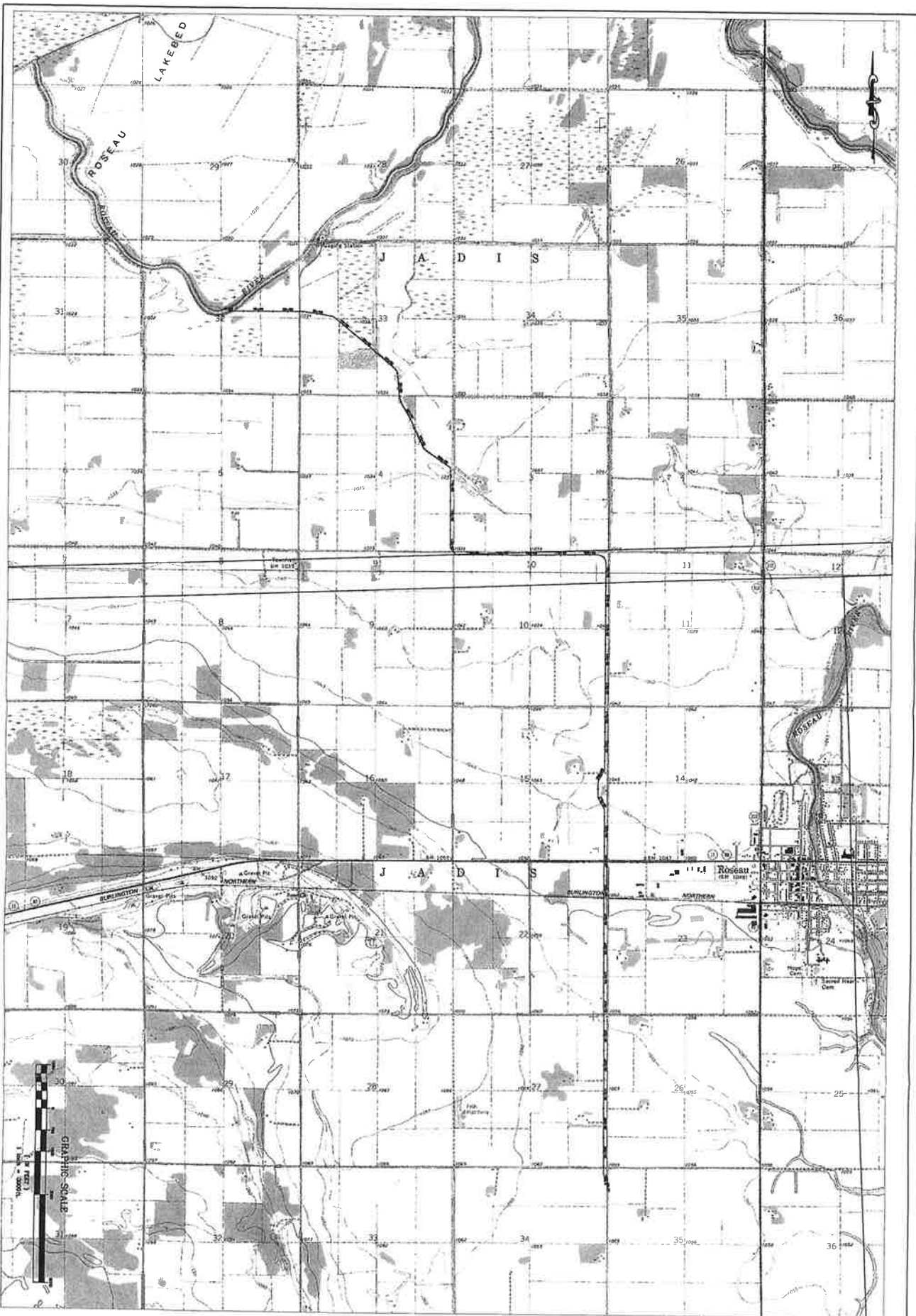


Dan Money
District Administrator

CC: Rodney Sikorski
Mel Wang
Mark Foldesi
Maxine Penas
LeRoy Stumpf

APPENDIX C

West Interceptor Cross Sections



ROSEAU RIVER WATERSHED DISTRICT
WEST DIVISION
DIVERSION MAP

JOR Engineering Inc.
P.O. Box 1884 P.O. Box 728
Amarillo, TX 79106 Crockett, TX 76726
Phone (817) 762-9746 Phone (817) 891-7294
Fax (817) 762-9741 Fax (817) 891-7428

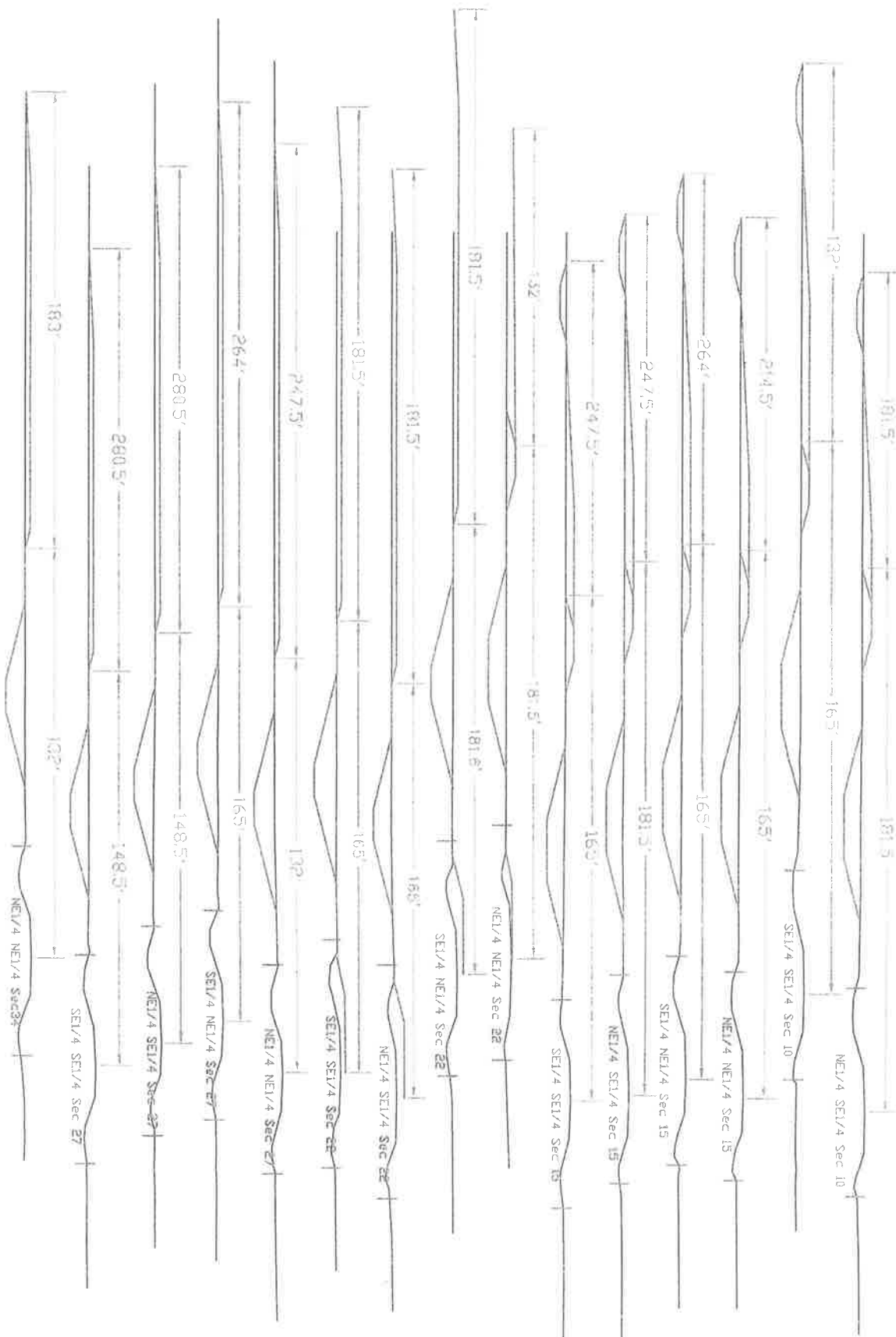
Date SURVEYED: 4/03
SURVEYED BY: GAB
DRAWN BY: DTH DATE: 6/5/03
CHECKED BY: MAB DATE:
JOB NO.: MALING
FILE: WATER PRO

DATE	REVISIONS	DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

DATE: _____ REG. NO. _____

1
SHEET
3



Roseau River Watershed District
West Interceptor
Typical Cross Sections

JOR Engineering Inc.
 P.O. Box 1284
 Alexandria, MN 56208
 Phone (507) 332-9142
 Fax (507) 332-9141

JOR Engineering Inc.
 P.O. Box 730
 Crookston, MN 56116
 Phone (507) 283-7394
 Fax (507) 283-7400

DATE SURVEYED 2003
 SURVEYED BY: GAB
 DRAWN BY: MAR
 CHECKED BY: DR
 JOB NO: West Interceptor
 FILE: typic01sec

DATE 9/17/03

DATE	REVISIONS	DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLANS, SPECIFICATIONS, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A duly LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

DATE: _____ REG. NO: _____

