Feasibility Study for the Julesburg Irrigation District Petersen Ditch Diversion Structure Replacement Project Division 1 Water District 64 Structure ID 504 Sedgwick County, Colorado

Sponsored by the
Julesburg Irrigation District
In Conjunction with the
Colorado Water Conservation Board

FEASIBILITY STUDY APPROVAL
Pursuant to Colorado Revised Statutes 37-60-121 &122, and in accordance with policies adopted by the Board, the CWCB staff has determined this Feasibility Study meets all applicable requirements for approval.

Signed

5/25/2018
Date

Prepared by
Gauthiere Engineering, Inc.
2157 Buena Vista Drive
Greeley, Colorado

March 30, 2018

Certificate of Engineer

I, John G. Gauthiere, P.E., a Registered Professional Engineer in the State of Colorado, hereby certify that the information presented in this Feasibility Study for the Julesburg Irrigation District Petersen Ditch Diversion Structure Replacement Project was prepared by me or was prepared under my direct supervision for the owners thereof.

Gauthiere Engineering, Inc.

John D. Gauthiere March 30, 2018

John G. Gauthiere, P.E.
Colorado P.E. No. 22136

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Acknowledgements

Gauthiere Engineering, Inc. would like to thank the Julesburg Irrigation District for the valuable assistance during the preparation of this report. Special thanks are offered to the following individuals of the company and other organizations:

Mr. Robert McClary, President
Mr. Mike McKinley, JID Member
Mr. Ricky Ornelas, JID Member
Mr. Larry Frame, Superintendent
Ms. Pamela Ornelas, Office Manager
Mr. Jonathan Hernandez, Colorado Water Conservation Board
Ms. Anna Maus, P.E., Colorado Water Conservation Board
Mr. Alan Krier, Concrete Specialties

Introduction and Need for Project

The Julesburg Irrigation District (JID), located in Logan County and Sedgwick County, Colorado operates the Petersen Ditch and Diversion Structure as well as other ditches and reservoirs for the benefit of the shareholders by providing direct flow irrigation water. The river check dam structure diverts water from the South Platte River, approximately 1.38 miles west of the Town of Sedgwick (See Location Map Figure 1). Water deliveries to the shareholders are made through the Petersen Ditch to an 8,925-acre service area.

The existing river diversion structure was built in 1956 out of wood and concrete. The existing concrete is eroded and needs replacement. The wooden check board diversion structure is difficult to operate and requires personnel to enter the river during flowing conditions to adjust flow thus creating a potentially dangerous condition for operations personnel.

The existing structure was built to operate during the normal irrigation season. In the last several years winter season operation has become necessary to satisfy winter augmentation flow requirements. Adjusting the existing river diversion structure during the winter is not practical or safe.

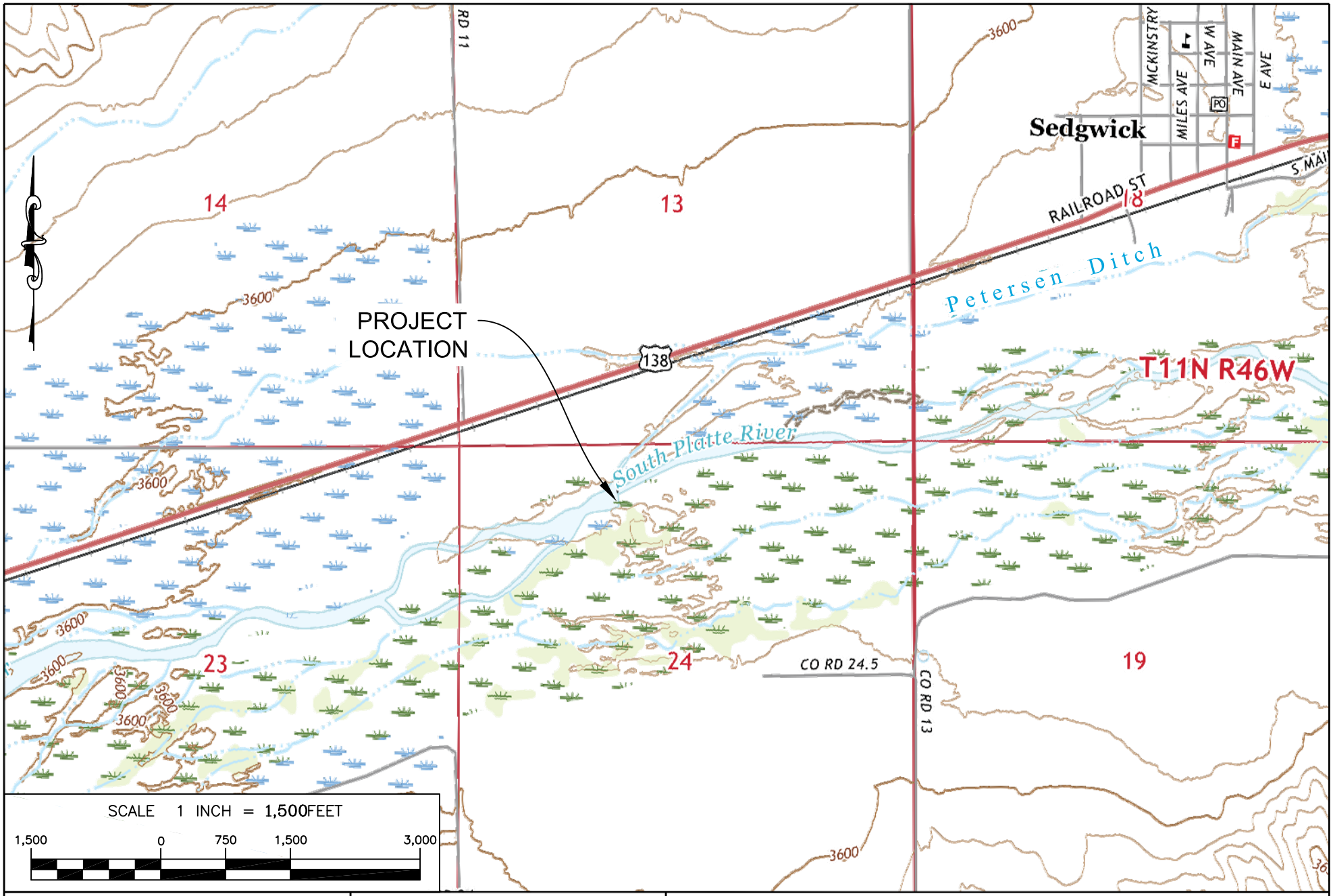
In addition to the expenses and difficulties in maintaining and operating the structure, which is nearing the end of its useful life, the existing design of the diversion dam promotes the accumulation of sand on the upstream side of the dam. This buildup of sand causes diversion problems and maintenance problems within the canal system. Replacement of the existing diversion dam provides the opportunity to utilize an improved design which would greatly alleviate the sand accumulation problem as well as greatly improve the safety and operability of the diversion structure and ditch gate.

The Julesburg Irrigation District wants to completely rebuild the diversion dam and ditch head gate during the 2018-2019 winter months prior to the 2019 irrigation season.

Project Sponsor

Julesburg Irrigation District(JID) is a special district in the State of Colorado governed by an elected three-member board. The Julesburg Irrigation District was organized in July of 1904 and contains 19,129 bonded acres (or shares) of excellent irrigated lands. There are 110 shareholders. Julesburg Irrigation District has the power to set annual assessments to be paid by the shareholders, the power to cut off water deliveries to shareholders that fail to pay their assessments, and the power to offer shares for sale to pay back assessments. The Julesburg Irrigation District operates under the Irrigation District Law of 1905 statute (CRS – Title 37 Article 41).

The District's Petersen diversion dam and ditch head gate facilities are located just south west of the Town of Sedgwick on the north side of the South Platte River (see Project Location Map Figure 1). The facilities to be replaced include a rollover type



GAUTHIERE ENGINEERING, INC. 2157 Buena Vista Drive Greeley, Colorado 80634 Phone: (970) 330-0855 E-mail: john@gauthiere-engineering.com	Scale: 1" =1,500'	JULESBURG IRRIGATION DISTRICT PETERSEN DITCH DIVERSION REPLACEMENT PROJECT NW $\frac{1}{4}$ OF THE NE $\frac{1}{4}$ OF THE NW $\frac{1}{4}$ SEC 24 T 11N R47 W OF THE 6TH PM
	Drawn By: JGG	
	File: JID	Date: JAN. 25, 2018 — FIGURE 1 - LOCATION MAP

diversion dam and head gate on the South Platte River located near the NW 1/4 of the NE 1/4 of the NW 1/4 SEC 24 T 11N R47 West of the Sixth Principal Meridian, Sedgwick County, Colorado (See Photographs of Existing Structures below:

PHOTO 1 – UPSTREAM VIEW OFEXISTING 320-FOOT DIVERSION DAM

PHOTO 2 – DOWNSTREAM VIEW OF 320-FOOT DIVERSION DAM

PHOTO 3 - RIGHT (SOUTH) ABUTMENT BLOWOUT

PHOTO 4 – DIVERSION STRUCTURE DETERIORATED CONCRETE

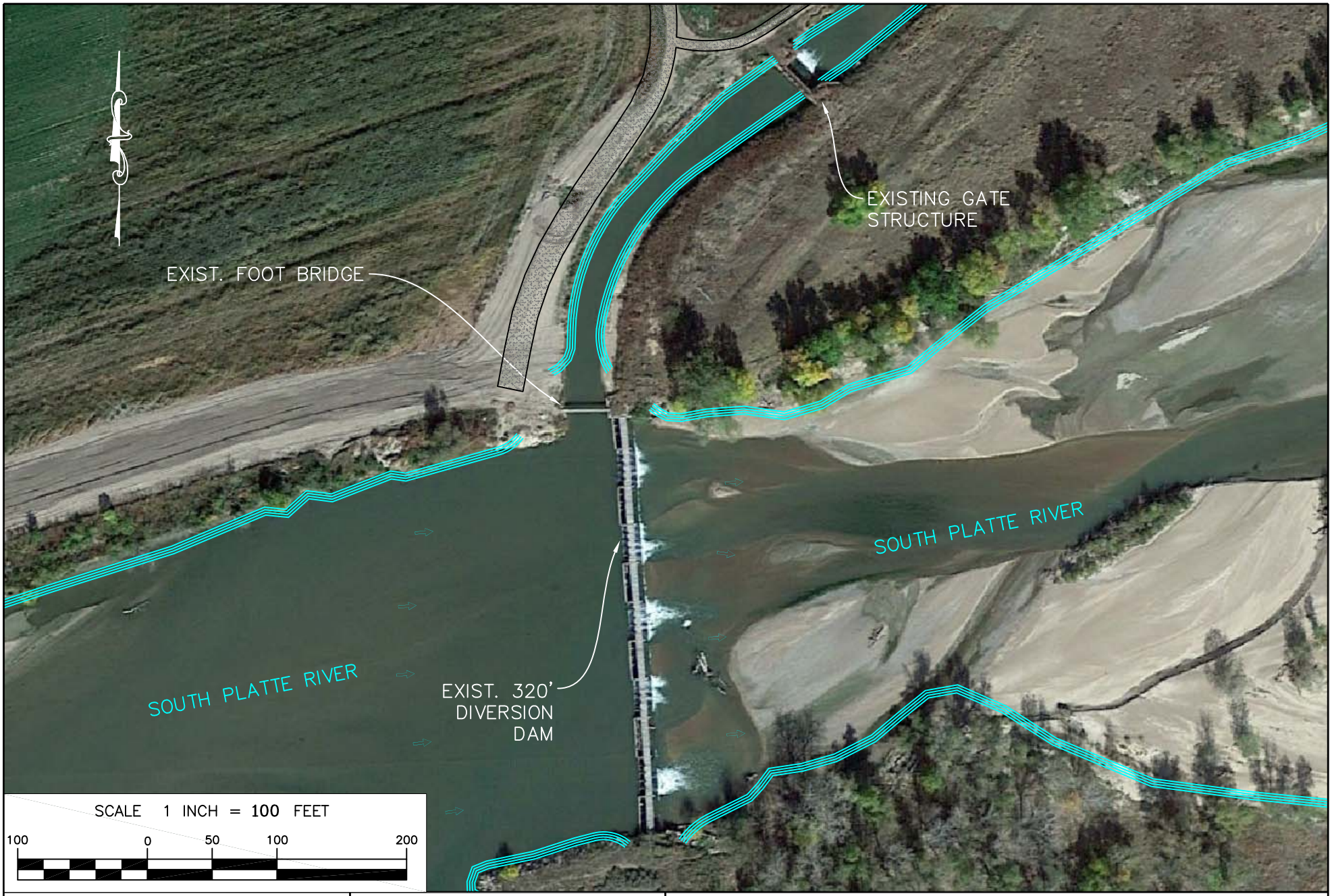
PHOTO 5 – DIVERSION STRUCTURE DURING WINTER OPERATIONS (CHECK BOARD REMOVED

PHOTO 6 DITCH GATE STRUCTURE DURING WINTER OPERATIONS

Project Service Area and Facilities

The District service area is comprised of approximately 19,129 acres located in northeastern Colorado in Logan County, Sedgwick County, Colorado, and southern Deuel County, Nebraska. The District's diversions from the South Platte River through the Petersen Ditch are normally 164 cubic feet per second from the South Platte River[1] providing water to 8,925.64 acres. Absolute water diversion rights associated with the Petersen Ditch owned by the District total 347.39 cubic feet per second. The diversion of water is accomplished with a concrete diversion dam across the South Platte and a canal regulating head gate structure. The diversion dam is approximately 320 feet wide and the head gate structure is approximately 30 feet wide (See Figure 2 Plan View of Existing Structure). The existing diversion structure was originally built in 1956. The diverted water is delivered to the shareholders through approximately 27.5 miles of canal. The water is typically used to irrigate corn, alfalfa, beans, sugar beets and wheat. The Petersen Ditch delivers irrigation water to 8,925.64 acres within the Julesburg Irrigation District. JID owns 80% of the Petersen Rights leaving 20% held by landowners both in Colorado and

[1] Estimated diversions are based on review of the State of Colorado's HydroBase data and conversations with Mr. Larry Frame, JID Superintendent



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Scale: 1" =100'

Drawn By: JGG

File: JID

JULESBURG IRRIGATION DISTRICT
EXISTING PETERSEN DITCH DIVERSION STRUCTIES

Date: JAN. 25, 2018

FIGURE 2 - PLAN VIEW

Nebraska. No JID water is delivered to Nebraska. JID manages and maintains the Petersen Ditch as the majority owner.

Hydrology and Water Rights

A review of the HydroBase files for the Petersen Ditch (Structure ID Number 504) indicates that the water rights associated with this structure are as shown in Table 1 below:

Table 1

Appropriation Date	Absolute CFS	Conditional CFS	Alternate Point Exchange CFS
1895-03-01	164.00	0	0
926-10-01	50.00	0	0
1989-05-02	35.00	30.00	0
1995-12-29	34.50	55.50	0
1998-06-30	0	184.00	0
2002-12-31	0	0	116.00
2003-04-30	29.39	80.61	30.00
2003-12-31	34.50	55.50	0
2006-01-26	0	0	90
Totals	347.39	405.61	236

(See Appendix B for the Structure Summary Report for a listing of all water rights data). The Julesburg Irrigation District Shareholders also have numerous other decrees relating to recharge, augmentation and storage water in Julesburg Reservoir and the Harmony Ditches.

The annual average diversion over the last four years for the Julesburg Irrigation District amounts to 54,421 acre-feet per year of which 10,647 acre-feet per year is diverted at the Petersen Diversion. This average is based on State of Colorado's HydroBase data for the years 1950 through 2012 (See Appendix B)

Considering the Company's available diversion rights, hydraulic design of the new structure will be based on a diversion capacity of not less than 400 cubic feet per second.

Project Description and Alternatives

The purpose of this project is to provide a means for the Julesburg Irrigation District to continue providing irrigation water to shareholders while minimizing the occurrence of future failures of their diversion structure. Three alternatives were considered:

1. The no-action alternative.

2. Alternate 2 involves the reconstruction of the river diversion dam using 320 feet of concrete weir with board slots. The canal head gate would be reconstructed with a new concrete structure and 30 feet of 3-foot high bladder gate. The estimated cost of this alternative is $ 2,700,000.

3. Alternate 3 involves the reconstruction of the river diversion dam using 100 feet of 5-foot high pneumatically actuated stainless-steel bladder gate and 220 feet of concrete weir. The pneumatically actuated gate would be installed on a monolithic reinforced concrete slab, which is founded on piling with seepage cutoff provided by steel sheet piling. The canal head gate would be reconstructed with a new concrete structure and a 30-foot wide by 3-foot high pneumatically actuated stainless-steel bladder gate. (See Figures 3 & 4.)

   The new ditch head gate structure will be equipped with a gated bypass that can be used during winter ice conditions. The design of the bypass will also consider the eventual opportunity to equip the conduit with low head hydroelectric equipment.

4. The estimated cost of this alternative is $**$3,308,250**. Preliminary details of the replacement structures are shown in Appendix G.

Alternative No. 1 was considered unacceptable because the existing diversion dam is at the end of its useful life and is no longer dependable nor is it reliably repairable. The Julesburg Irrigation District will be unable to fully divert water into the Petersen canal if the diversion dam is not replaced. This would amount to a loss of an average of 10,647 acre-feet and potentially up to 29,000 acre-feet of irrigation water per year, resulting in a major loss of crops under the JID system. The per acre value of the farm ground in the JID system could drop significantly. This alternative is not acceptable to The Julesburg Irrigation District.

Alternative No. 2 was ruled out because it does not provide the ease, efficiency and safety of operation that Alternate 3 does. This alternative does nothing to address the large accumulation of sand upstream of the dam and associated canal maintenance issues nor the operational difficulties experienced satisfying the winter augmentation demand.

Alternative No. 3 was selected, since it is considered to be the most reliable approach to efficient and safe diversion of water. An additional feature of this alternate is improved fish passage. The selected alternative involves construction of 320 feet of diversion dam composed of 100 feet of 5-foot high pneumatically actuated bladder gate and 220 feet of concrete weir. This combination weir structure will be installed on a monolithic steel reinforced concrete slab in the riverbed and have wing walls of steel reinforced concrete. Stability will be provided by a pile foundation and steel sheet piling will provide seepage cutoff and protection from erosion. The canal head gate would be replaced with a new concrete structure and 30 feet of 3-foot high pneumatically actuated bladder gate. A conceptual plan showing critical elevations is shown on Figure 3 & 4 and critical elevations to produce required flows were

determined using HEC-RAS. Excerpts from the HEC-RAS analysis and modeling are included in Appendix F. The estimated cost of the completed project is **$3,308,250**. The cost breakdown is summarized in Table 2 below:

TABLE 2

Item	Description	Qty.	Unit	Unit Price $	Amount $
1	Mobilization and Demobilization	1	LS	$70,000	$70,000
2	Control of Water & De-watering	1	LS	147,000	147,000
3	Demolition & Process Existing Concrete for Reuse as Riprap	550	CY	30	16,500
4	Excavation	2,250	CY	6	13,500
5	Structural Fill	2,500	CY	15	37,500
6	Low Flow Bypass and Gate	1	LS	45,000	45,000
7	Steel Sheet Piling	29,700	SF	19	564,300
8	Pipe Piling 8” OD	5,075	LF	35	177,625
9	Furnish Obermeyer Bladder Gate 100’ by 5’ Stainless Steel Complete with all Equipment, Embeds, Piping and Hardware	1	LS	360,390	360,390
10	Installation of Item #9	1	LS	45,000	45,000
11	Furnish Obermeyer Bladder Gate 30’ by 3’ Stainless Steel Complete with all Equipment, Embeds, Piping and Hardware	1	LS	79,110	79,110
12	Installation of Item #11	1	LS	25,000	25,000
13	Control Building 15’ by 15’	1	LS	60,000	60,000
14	Cast in Place Concrete	1,152	CY	850	979,200
15	New Electric Service Underground Electric Service from Meter Drop West of Diversion to Gate Control House (based on 900' of 1 awg copper in conduit with pull boxes to provide complete 480v 3Ph Service)	1	LS	75,000	75,000
16	Pedestrian Bridge and Upper Gate Seal Beam	1	LS	30,000	30,000
17	Erosion Control BMP	1	LS	3,000	3,000
18	Gravel Surfacing - Service Roads	1	LS	2,000	2,000
19	Concrete Washout Structure	1	LS	500	500
20	Final Cleanup and Restoration	1	LS	5,000	5,000
21	Hand Rail	250	LF	85	21,250
	Subtotal Estimated Construction Cost				**$2,756,875**
	Contingency @ 10%				**275,688**
	Total Estimated Construction Cost				**$3,032,563**
	Planning, Design and Legal @ 5%				137,844
	Project Management and Administration @ 5%				137,844
	Total Estimated Project Cost				**$3,308,250**

Implementation Schedule

The proposed implementation schedule anticipates a completed project by mid-March of 2019. The milestone dates are shown below.

Item	Date Completed
Feasibility Study Submitted to CWCB	April 1, 2018
Preliminary Design	April 30, 2018
Feasibility Study Review and Approval by CWCB	May 15, 2018
Order Gates and Sheet Piling (long lead time items)	May 15, 2018
Complete Final Design	June 30, 2018
State Reviews and Approvals	July 30, 2018
Biding and Contract Award	August 20, 2018
Notice to Proceed with Construction	September 10, 2018
Begin Construction September	September 15, 2018
Construction Complete	March 15, 2018

Permitting

An easement will need to be acquired for the electric service. All other easements and rights of way have been arranged for.
The Company expects to be exempt from 404 permitting by Statutory Exemption, 33 CFR Section 323.4 (a) 3.

Institutional Considerations

The Julesburg Irrigation District needs authorization to borrow 100 percent of the total estimated project cost of **$3,308,250** from the Colorado Water Conservation Board Construction Fund. The loan, if approved, from the CWCB will be contingent upon the successful negotiation of a contract between the CWCB and the JID. Any other costs of the project will be funded through assessment of the shareholders. Bidding and agreements with contractors will be finalized upon authorization of the CWCB Loan.

Financial Analysis

The District qualifies for the agricultural interest rate of 1.70% for a 30-year term. Table 3 provides a summary of the Project's financial aspects:

Table 3 Financial Summary

Project Cost	$3,308,250
Loan Amount (100% of Project Cost)	$3,308,250
CWCB Loan Payment amount, including 1% Service Fee	$3,341,333
New CWCB Loan Debt Service	$143,107
Number of Shareholders	110
Number of Shares of Stock or Bonded Acres	19,129
Current Assessment per Share	$23.50
Future Assessment per Share	$30.98
Annual Project Cost per acre-foot (Average annual District Diversions: 54,421 acre-feet.)	$2.63

All other funding for the project will be provided by JID. Operating and maintenance costs are expected to decrease with the new diversion structure, and can be accommodated by the JID's budget.

Credit Worthiness

The Julesburg Irrigation District has four existing loans with the CWCB, all in good standing:

Lender	Project	Original Balance	Current Balance	Annual Payment	Maturity Date	Collateral
CWCB C153827	Outlet Reconstruction	$510,469	$290,385.57	$28,631	2031	Assessment Covenant/Property
CWCB C150060A	Inlet Reconstruction	$100,000	$62,621.76	$5,437	2032	Assessment Covenant/Property
CWCB C153604	Lodgepole Petersen Structure	$372,951	$221,444.51	$20,278	2031	Assessment Covenant/Property
CWCB 90665	Reconstruction of the Harmony No 1 Measurement Structure	$203,616	$198,356.75	$8,720.72	2047	Assessment Covenant/Property
Totals		$1,187,036.00	$772,808.59	$63,066.72		

Table 4 shows the Financial Ratios for the Julesburg Irrigation District and indicates average to strong ability to repay with the project in place.

Table 4 Financial Ratios

Financial Ratio	Without the Project	With the Project & Assessment Increase
Operating Ratio (Rev/Exp.) (weak: <100%) (average: 100% - 120%) (strong: >120%)	92%	100%
Cash Reserves to Current Expense (weak: <50%) (average: 50% - 100%) (strong: >100%)	100%	100%
Annual Cost per acre-foot	$8.26	$10.89

Based on the 2017 financial statement, JID had cash reserves of $736,651 in excess of cash expenses. However, to fund the project debt service, JID will have to adjust their assessments from the current rate of $23.50 per share to $30.98 per share by 2019 if no other funding sources are found. Three years of financial statements are appended to this report.

Alternative Financing Considerations

No alternative financing options have been secured as of the date of this study.

Collateral

The JID can offer the following collateral for the CWCB loan.

1. The JID can offer as collateral, the project itself, if approved by a vote of the shareholders.

2. The JID can offer as collateral, a pledge of assessment revenues.

Economic Analysis

Although shareholders in JID will be impacted with increased assessments for construction and loan repayment, the project will have a long-term positive economic impact by assuring continued diversions into JID system.

If the diversion is not replaced with a dependable alternative a critical component to the value of nearly 8,925 acres will be lost.

Social and Physical Impacts

The project will have no significant social impacts.

Although shareholders in the Julesburg Irrigation District will be impacted with increased assessments for construction and loan repayment, the project will have a long-term positive economic impact by assuring continued diversion into the Petersen Ditch.

The project will have no significant physical impacts once construction is complete. The new diversion structures will occupy the same area as the existing structures.

Conclusions

1. The Julesburg Irrigation District is a Special District in the State of Colorado with the ability to enter into a contract with the CWCB for the purpose of obtaining a Construction Fund loan.

2. Rights-of Way easements are adequate for the construction of this diversion replacement project, however, an easement for the electric service will be needed prior to construction.

3. The project would provide for the continued delivery of irrigation water to shareholders.

4. The total estimated cost of the project is $3,308,250 and this will be funded, by an adjustment of the District's assessment. The Julesburg Irrigation District is applying for a $3,308,250 loan from the CWCB Construction Fund to cover 100% of the project cost.

5. The project is technically and financially feasible.

The selected alternative is technically and financially feasible. There are no known issues that would prevent the Julesburg Irrigation District from successfully completing this project.

Appendix A
District Formation Record

J U L E S B U R G , Monday, June 6, 1904.

PROCEEDINGS BEFORE THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF SEDGWICK AND STATE OF COLORADO.

The board of county commissioners of the county of Sedgwick and state of Colorado met in special session this sixth day of June, A.D.1904, pursuant to call duly made.

Present: C. W. White, chairman; P. B. Upson; John Hiatt, commissioners; C. H. McNew, clerk; W. H. Pound, county attorney.

The board was called to order by chairman White and the object of the metting stated to be the consideration of the matter of the formation of an irrigation district within the county of Sedgwick and state of Colorado.

Messrs. W. E. Vaughan, John L. Elhart and Albert E. Pfau, as a committee representing the petitioners for the formation of an irrigation district of a part of the county of Sedgwick and state of Colorado appeared before the board in person and by their attorney, James W. McCreery, Esq., and presented a petition together with the notice of the publication of the hearing thereof praying that an irrigation district be formed as in said petition set forth; and also presented a bond in the sum of $225 to provide for the payment of the expenses of the said proceeding signed by the persons constituting said committee and by others as provided by law.

That said notice and petition are in words and figures as follows:

"NOTICE OF PETITION.

Julesburg, Colorado, May 2,1904.

"TO WHOM IT MAY CONCERN:

Appendix B
Water Rights Summary

Structure Summary Report

Structure Name: PETERSON DITCH **Water District:** 64 **Structure ID Number:** 504

Source: South Platte River

Location:	Q10	Q40	Q160	Section	Twnshp	Range	PM
	NW	NE	NW	24	11N	47W	S

Distance From Section Lines: From N/S Line: From E/W Line:

UTM Coordinates (NAD 83): Northing (UTM y): 4533170 Easting (UTM x): 706360 Spotted from PLSS distances from section lines

Latitude/Longitude (decimal degrees): 40.923618 -102.549234

Water Rights Summary:						
Total Decreed Rate(s) (CFS):	Absolute: 347.3900	Conditional: 405.6100	AP/EX: 0.0000
Total Decreed Volume(s) (AF):	Absolute: 0.0000	Conditional: 0.0000	AP/EX: 0.0000

Water Rights -- Transactions

Case Number	Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority Number	Decreed Amount	Adjudication Type	Uses	Action Comment
CA0944	1907-10-26	1895-03-01	17846.16496	0		164.0000 C	S	1	205A-I COURT RECORD ASP B25124 JULESBURG
91CW0121	1911-01-05	1897-10-11	17846.17451	0		350.0000 C	S,AB	1	ABAN 01/06/1997
CA0944	1911-01-05	1897-10-11	17846.17451	0		350.0000 C	S	1	231, 205A-I COURT RECORD ASP B25124 JULESBURG
W7161	1972-12-31	1926-10-01	44559.28032	0		50.0000 C	S	4	GREAT WESTERN SUGAR
90CW0182	1990-12-31	1989-05-02	51134.50891	0		40.0000 C	S,C	12348AR	LOWER SO PLATTE RECHARGE PROJECT
90CW0182	1990-12-31	1989-05-02	51134.50891	0		25.0000 C	S	AR	LOWER SO PLATTE RECHARGE PROJECT
97CW0385	1990-12-31	1989-05-02	51134.50891	0		10.0000 C	S,CA	12348AR	MADE ABS 02/24/1999
15CW3155	1998-12-31	1995-12-29	54056.53323	0		34.5000 C	S,CA	R	MADE ABSOLUTE
95CW0283	1998-12-31	1995-12-29	54056.53323	0		90.0000 C	S,C	R	
98CW0295	1998-12-31	1998-06-30	54237.00000	0		184.0000 C	S,C	0	STORAGE IN OVID RES
02CW0320	2002-12-31	2002-12-31	55882.00000	0		116.0000 C	O,C,EX	12379RW	EXCH FM LOWER SOUTH PLATTE AUG REACH
03CW0209	2003-12-31	2003-04-30	56002.00000	0		87.8000 C	S,C	AR	
03CW0209	2003-12-31	2003-04-30	56002.00000	0		22.2000 C	S	AR	
03CW0209	2003-12-31	2003-04-30	56002.00000	0		30.0000 C	S,C,EX	12379AR	EXCH OF EXCESS REP WTR
11CW0245	2003-12-31	2003-04-30	56002.00000	0		7.1900 C	S,CA	AR	MADE ABSOLUTE
03CW0450	2003-12-31	2003-12-31	56247.00000	0		90.0000 C	S,C	R	
15CW3155	2003-12-31	2003-12-31	56247.00000	0		34.5000 C	S,CA	R	MADE ABSOLUTE
03CW0450	2006-12-31	2006-01-26	57004.00000	0		30.0000 C	S,C,EX	RW	EXCH FM JID IMPACT REACH 2
03CW0450	2006-12-31	2006-01-26	57004.00000	0		30.0000 C	S,C,EX	RW	EXCH FM JID IMPACT REACH 3
03CW0450	2006-12-31	2006-01-26	57004.00000	0		30.0000 C	S,C,EX	RW	EXCH FM JID IMPACT REACH 4

Water Rights -- Net Amounts

Adjudication Date	Appropriation Date	Administration Number	Order Number	Priority/Case Number	Rate (CFS)			Volume (Acre-Feet)		
					Absolute	Conditional	AP/EX	Absolute	Conditional	AP/EX
1907-10-26	1895-03-01	17846.16496	0	CA0944	164.0000	0	0			
1972-12-31	1926-10-01	44559.28032	0	W7161	50.0000	0	0			
1990-12-31	1989-05-02	51134.50891	0	97CW0385	35.0000	30.0000	0			
1998-12-31	1995-12-29	54056.53323	0	15CW3155	34.5000	55.5000	0			
1998-12-31	1998-06-30	54237.00000	0	98CW0295	0	184.0000	0			
2002-12-31	2002-12-31	55882.00000	0	02CW0320	0	0	116.0000			
2003-12-31	2003-04-30	56002.00000	0	11CW0245	29.3900	80.6100	30.0000			
2003-12-31	2003-12-31	56247.00000	0	15CW3155	34.5000	55.5000	0			
2006-12-31	2006-01-26	57004.00000	0	03CW0450	0	0	90.0000			

Irrigated Acres Summary -- Totals From Various Sources

GIS Total (Acres):	6784.063	Reported:	2010
Diversion Comments Total (Acres):	8648	Reported:	2007
Structure Total (Acres):		Reported:	

Irrigated Acres From GIS Data

Year	Land Use	Acres Flood	Acres Furrow	Acres Sprinkler	Acres Drip	Acres Groundwater	Acres Total
1956	***Year Total***	7004.35	0	0	0	4649.22	7004.35
1956	ALFALFA	718.29	0	0	0	441.40	718.29
1956	CORN	3449.37	0	0	0	2295.01	3449.37
1956	DRY_BEANS	298.85	0	0	0	140.62	298.85
1956	GRASS_PASTURE	330.40	0	0	0	157.87	330.40
1956	SMALL_GRAINS	19.60	0	0	0	0	19.60
1956	SUGAR_BEETS	2187.84	0	0	0	1614.32	2187.84
1976	***Year Total***	6660.82	0	181.83	0	5966.16	6842.65
1976	ALFALFA	717.13	0	0	0	578.53	717.13
1976	CORN	3328.83	0	48.51	0	3044.94	3377.34
1976	DRY_BEANS	217.79	0	0	0	178.50	217.79
1976	GRASS_PASTURE	322.96	0	0	0	160.55	322.96
1976	SMALL_GRAINS	19.60	0	0	0	19.60	19.60
1976	SUGAR_BEETS	2054.50	0	133.33	0	1984.04	2187.82
1987	***Year Total***	6447.09	0	112.11	0	5715.80	6559.20
1987	ALFALFA	64.62	0	0	0	28.44	64.62
1987	CORN	4575.15	0	112.11	0	4149.74	4687.26
1987	DRY_BEANS	1074.60	0	0	0	1000.81	1074.60
1987	GRASS_PASTURE	262.85	0	0	0	168.47	262.85
1987	SMALL_GRAINS	334.58	0	0	0	247.33	334.58
1987	SUGAR_BEETS	135.29	0	0	0	121.02	135.29
1997	***Year Total***	6523.95	0	142.51	0	5903.10	6666.46
1997	ALFALFA	160.12	0	0	0	133.88	160.12
1997	CORN	5981.32	0	142.51	0	5510.31	6123.83
1997	DRY_BEANS	58.09	0	0	0	0	58.09
1997	GRASS_PASTURE	279.26	0	0	0	222.46	279.26
1997	SUGAR_BEETS	45.16	0	0	0	36.46	45.16
2001	***Year Total***	6223.55	0	253.75	0	5810.17	6477.30
2001	ALFALFA	288.51	0	0	0	221.39	288.51
2001	CORN	5398.01	0	253.75	0	5192.39	5651.77
2001	DRY_BEANS	458.18	0	0	0	317.55	458.18
2001	SMALL_GRAINS	62.50	0	0	0	62.50	62.50
2001	SUGAR_BEETS	16.35	0	0	0	16.35	16.35
2005	***Year Total***	5092.59	0	1322.43	0	5289.16	6415.02
2005	ALFALFA	353.37	0	0	0	151.05	353.37
2005	CORN	3866.03	0	1192.90	0	4358.78	5058.92
2005	DRY_BEANS	405.27	0	64.04	0	287.93	469.31
2005	SMALL_GRAINS	373.00	0	0	0	330.98	373.00
2005	SUGAR_BEETS	94.92	0	65.50	0	160.42	160.42
2010	***Year Total***	3870.13	0	2913.93	0	5771.92	6784.06
2010	ALFALFA	119.03	0	73.69	0	141.79	192.72
2010	CORN	3047.42	0	2544.75	0	5011.30	5592.17
2010	GRASS_PASTURE	432.05	0	0	0	139.71	432.05
2010	WHEAT_FALL	271.63	0	295.49	0	479.12	567.12

Diversion Summary in Acre-Feet - Total Water Through Structure

Year	FDU	LDU	DWC	Maxq & Day	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Total
1950	1950-03-17	1950-10-07	179	103 06-22	0	0	0	0	1022	1922	2614	2787	2079	1500	2458	347	14727
1951	1950-11-07	1951-10-13	128	95 08-08	149	0	0	0	766	1519	496	0	895	3366	841	764	8795
1952	1952-05-02	1952-10-04	135	103 06-15	0	0	0	0	0	0	722	3243	1855	2045	2021	167	10052
1953	1953-04-22	1953-10-10	172	88 08-04	0	0	0	0	0	625	1712	1494	1795	2142	990	292	9049
1954	1954-04-07	1954-10-30	123	31 05-06	0	0	0	0	0	906	1230	397	0	0	319	702	3554
1955	1954-11-07	1955-10-31	143	36 04-18	415	0	0	0	270	1418	601	1093	387	0	0	952	5135
1956	1955-11-01	1956-10-31	136	81 08-05	248	0	0	0	278	1006	278	571	329	1196	0	599	4505
1957	1956-11-01	1957-10-05	154	95 07-30	173	0	0	99	692	504	760	1299	3080	3299	2344	117	12367
1958	1958-05-04	1958-09-26	110	74 07-31	0	0	0	0	0	0	789	1204	1496	1837	1194	0	6520
1959	1959-04-22	1959-10-03	127	47 06-15	0	0	0	0	0	575	1222	1583	797	248	448	65	4939
1960	1960-04-17	1960-10-15	107	48 07-06	0	0	0	0	0	902	1271	980	803	32	56	545	4590
1961	1961-04-28	1961-09-09	72	100 06-30	0	0	0	0	0	139	430	883	1837	1751	664	0	5705
1962	1962-04-24	1962-09-29	108	80 07-24	0	0	0	0	0	488	607	307	2531	1845	2269	0	8047
1963	1963-04-20	1963-10-10	115	42 05-05	0	0	0	0	0	672	994	458	12	313	746	284	3479
1964	1964-05-12	1964-10-31	41	30 06-04	0	0	0	0	0	0	343	454	79	0	0	63	940
1965	1964-11-01	1965-09-17	81	70 08-03	258	0	0	0	0	484	34	42	0	2339	1142	0	4298
1966	1966-05-01	1966-09-27	105	26 09-27	0	0	0	0	0	0	742	506	149	530	627	0	2553
1967	1967-03-26	1967-10-14	153	42 07-15	0	0	0	0	200	1025	474	0	1460	1882	1682	833	7557
1968	1968-04-10	1968-10-05	124	48 06-24	0	0	0	0	0	849	462	1238	79	492	700	99	3919
1969	1969-04-15	1969-09-24	115	60 07-08	0	0	0	0	0	444	99	103	2850	1390	655	0	5542
1970	1970-05-09	1970-10-09	129	59 05-09	0	0	0	0	0	0	1285	222	2344	1248	744	357	6200
1971	1971-06-10	1971-10-22	89	30 07-08	0	0	0	0	0	0	0	480	1277	38	397	208	2400
1972	1972-04-03	1972-09-29	117	37 08-29	0	0	0	0	0	1051	738	706	0	244	421	0	3160
1973	1973-06-18	1973-09-21	90	76 07-19	0	0	0	0	0	0	0	224	3749	2624	641	0	7238
1974	1974-04-29	1974-10-15	98	110 05-10	0	0	0	0	0	167	3666	1585	16	0	1267	278	6978
1975	1975-05-01	1975-08-25	75	70 05-13	0	0	0	0	0	0	2208	496	2398	538	0	0	5639
1976	1976-04-05	1976-09-27	57	28 06-15	0	0	0	0	0	109	373	549	0	0	109	0	1141
1977	1977-05-12	1977-09-27	102	50 07-30	0	0	0	0	0	0	807	1428	331	823	706	0	4096
1978	1978-04-08	1978-10-26	89	40 06-24	0	0	0	0	0	998	516	764	0	0	0	436	2713
1979	1979-04-23	1979-09-12	143	88 08-02	0	0	0	0	0	159	1216	1599	3412	4007	1603	0	11994
1980	1980-05-26	1980-10-31	152	94 07-02	0	0	0	0	0	0	428	2507	3658	1472	2598	1906	12569
1981	1980-11-01	1981-10-31	244	60 11-06	3451	2947	2521	1139	0	444	1434	1194	1443	1793	658	190	17215
1982	1981-11-01	1982-10-07	285	51 07-10	1904	1968	1230	754	0	377	1275	1200	1961	2113	1598	278	14657
1983	1983-06-01	1983-10-31	116	60 08-03	0	0	0	0	0	0	0	298	2525	3049	1573	1091	8535
1984	1983-11-01	1984-10-31	184	75 06-25	1031	0	0	0	0	0	387	1742	2467	3186	1765	1313	11891
1985	1984-11-01	1985-09-24	225	70 07-06	1309	1353	305	0	0	742	1367	2382	2356	2075	1486	0	13375
1986	1986-05-07	1986-09-30	147	88 07-08	0	0	0	0	0	0	1289	2339	4455	4151	2027	0	14261
1987	1987-04-28	1987-09-30	111	110 07-01	0	0	0	0	0	155	309	1755	4360	2932	1218	0	10730
1988	1988-05-10	1988-09-27	121	103 06-20	0	0	0	0	0	0	829	2482	3227	2355	2031	0	10924
1989	1989-04-28	1989-09-10	125	95 08-04	0	0	0	0	0	264	1930	2250	1802	2567	952	0	9764
1990	1990-05-14	1990-10-03	143	96 08-10	0	0	0	0	0	0	1166	1856	2086	3355	3566	119	12149
1991	1991-04-09	1991-10-07	143	75 08-14	0	0	0	0	0	257	1515	607	2599	2711	1765	278	9731
1992	1991-11-21	1992-10-31	226	85 07-12	201	180	1	64	335	68	1182	214	2993	2295	426	572	8532
1993	1993-05-12	1993-10-22	164	58	0	0	0	0	0	0	1163	2008	2510	2034	1331	835	9881
1994	1994-04-19	1994-10-31	191	42	0	0	0	0	0	323	817	1658	1118	912	587	786	6199
1995	1994-11-01	1995-10-16	185	101	181	0	0	0	0	76	503	301	3082	4228	2912	339	11623
1996	1996-02-23	1996-10-31	216	82 08-28	0	0	0	62	152	121	762	186	2122	2506	467	187	6565
1997	1996-11-01	1997-10-31	218	96 07-10	147	26	0	0	98	578	1341	181	2841	3574	2161	123	11070
1998	1997-11-01	1998-10-05	194	101 08-10	167	0	0	0	0	1485	1344	2039	3085	3550	974	34	12677
1999	1999-01-16	1999-10-15	263	88	0	0	157	262	232	571	1019	1153	3748	2214	1498	155	11010
2000	1999-11-23	2000-10-31	236	54 04-26	61	0	42	137	173	716	1486	1236	89	240	1117	1165	6462
2001	2000-11-01	2001-10-31	263	86	216	49	0	0	922	1842	2782	2438	3088	3006	2767	2765	19875
2002	2001-11-01	2002-10-31	258	65	1387	0	0	0	629	2361	1823	1407	2012	1695	900	1013	13225

2003	2002-11-01	2003-10-31	202	47	10-18	1833	1548	271	0	1559	390	995	1547	69	0	205	1688	10105
2004	2003-11-01	2004-10-31	283	79	10-15	1444	1056	0	443	1782	1470	968	1552	713	767	1320	1744	13258
2005	2004-12-01	2005-10-31	232	90	04-14	0	1095	0	714	1518	2281	2054	0	2169	1996	1807	1667	15303
2006	2005-11-01	2006-10-31	305	66	03-13	1930	717	2310	954	2926	2000	1728	867	0	221	1406	1867	16926
2007	2006-11-01	2007-10-31	291	71		1302	522	0	0	1568	1297	2293	2801	1896	2091	2225	2501	18497
2008	2007-11-01	2008-10-31	250	76		2925	1023	0	160	0	1502	1864	2086	0	2434	2295	3536	17824
2009	2008-11-01	2009-10-31	274	82	06-01	2938	0	0	465	2429	1549	3629	2376	2750	2523	2143	1648	22451
2010	2009-11-01	2010-10-31	339	69	03-29	2850	1259	988	241	2781	2940	2006	1416	2709	2948	3047	3048	26234
2011	2010-11-01	2011-10-31	298	76	08-09	2001	961	0	0	2838	3731	2912	1935	2487	3523	2704	2583	25674
2012	2011-11-01	2012-10-31	255	72	03-31	2269	28	0	0	2901	2970	2383	1691	624	184	686	1846	15582
2013	2012-11-01	2013-10-31	286	58	05-05	1563	545	0	468	1113	1519	1904	719	207	690	780	1958	11467
2014	2013-11-01	2014-10-31	343	84		3417	426	695	697	2382	4218	3129	2992	2817	3097	2217	2053	28139
2015	2014-11-01	2015-10-31	365	83	07-12	2123	1629	996	1782	3116	3486	2491	2470	2801	2903	2471	2750	29018
2016	2015-11-01	2016-10-31	366	61	05-03	2019	852	271	180	1470	2302	3255	2571	2067	1780	2464	2884	22115
		Minimum:	26			0	0	0	0	0	0	0	0	0	0	0	0	940
		Maximum:	110			3451	2947	2521	1782	3116	4218	3666	3243	4455	4228	3566	3536	29018
		Average:	71			596	271	146	129	510	866	1260	1271	1746	1775	1301	777	10647

67.00 years with diversion records

Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent Diversion Record. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comment
1950		8648	
1951		8648	
1952		8648	
1953		8648	
1954		8648	
1955		8640	
1956		8648	
1957		8648	
1958		8648	
1959		8648	
1960		8648	
1961		8648	
1962		8648	
1963		8648	
1964		8648	
1965		8648	
1966		8648	
1967		8648	
1968		8648	
1969		8648	
1970		8648	
1971		8648	
1972		8648	
1973		8648	
1974		8648	
1975		8648	
1976		8648	
1977		8648	
1978		8648	
1979		8648	
1980		8648	
1981		10003	
1982		8648	
1983		8448	
1984		8648	
1985		8648	
1986		8	
1987		8648	
1988		8648	
1989		8648	
1990		8648	
1991		8648	
1992	Water available, but not taken	8648	
1993	Water available, but not taken	8648	
1994		8648	
1995		8648	
1996		8648	
1997		8648	
1998		8648	
1999		8648	IRR
2000		8648	IRR

2001	8648	IRR
2002	8648	IRR
2003	8648	IRR
2004	8648	IRR
2005	8648	IRR
2006	8648	IRR
2007	8648	IRR

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

Appendix C
Financial Statements and Budgets

Appendix D
CWCB Loan Application

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Water Project Loan Program

Application Type

☐ Prequalification *(Attach 3 years of financial statements)* ☑ Loan Approval *(Attach Loan Feasibility Study)*

Agency/Company Information

Company / Borrower Name: ***Julesburg Irrigation District***

Authorized Agent &Title: ***Larry Frame, Superintendent***

Address: ***315 Cedar Street, Suite 150, Julesburg, Colorado 80737***

Phone: (***970***) ***474-3737*** | Email: ***supt.jid@pctelcom.coop***

Organization Type: ☐ Ditch Co, ☑ District, ☐ Municipality ☐ Other:_____ | Incorporated? ☐ YES ☑ NO

County: ***Sedgewick*** | Number of Shares/Taps: ***110 Shareholders***

Water District: ***Division 1, District 64*** | Avg. Water Diverted/Yr ***54,421*** acre-feet

Number of Shareholders/Customers Served: | Current Assessment per Share $ ***23.50*** (Ditch Co)

Federal ID Number: | Average monthly water bill $ ***N.A*** (Municipality)

Contact Information

Project Representative: ***Larry Frame***

Phone: (***970***) ***474 3737*** | Email: ***supt.jid@pctelcom.coop***

Engineer: ***John G. Gauthiere, P.E. - Gauthiere Engineering, Inc.***

Phone: (***970***) ***330 0855*** | Email: ***john@gauthiere-engineering.com***

Attorney: ***Dan Brown - Fischer, Brown, Bartlett & Gunn, P.C.***

Phone: (***970***) ***407 9000*** | Email: ***danbrown@fbgpc.com***

Project Information

Project Name:

Brief Description of Project: (Attach separate sheets if needed)

Replace 320' Petersen Ditch Diversion Structure and 30' Ditch Gate Structure - See Feasibility Study.

(Other costs shown below are for project management, administration, quality control and testing.)

General Location: (Attach Map of Area)

Existing Structure is approximately 1.4 miles West of Sedgwick, Colorado (See Map)

Estimated Engineering Costs: ***$ 137,844*** | Estimated Construction Costs: ***$ 3,032,563***

Other Costs (Describe Above): ***$ 137,844*** | Estimated Total Project Costs: ***$3,308,250***

Requested Loan Amount: ***$3,308,250*** | Requested Loan Term (10, 20, or 30 years): ***30*** Years

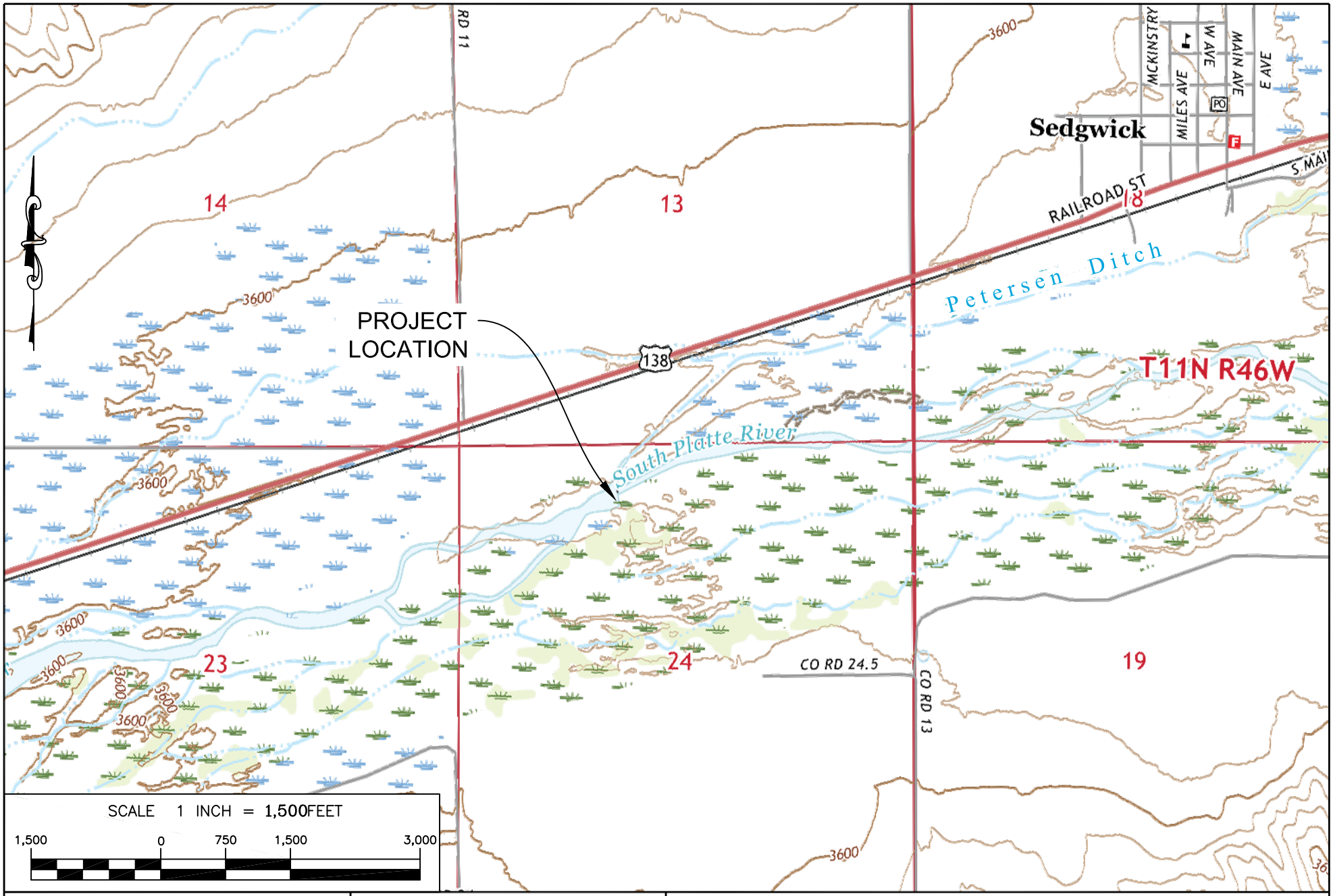
Project Start Date(s) Design: ***April 1, 2018*** Construction: ***September 1, 2018***

Signature

Supt 1-31-18

Signature / Title Date

Return to: Finance Section Attn: Anna Mauss
1313 Sherman St #718
Denver, CO 80203
Ph. 303/866.3449
e-mail: anna.mauss@state.co.us



GAUTHIERE ENGINEERING, INC. 2157 Buena Vista Drive Greeley, Colorado 80634 Phone: (970) 330-0855 E-mail: john@gauthiere-engineering.com	Scale: 1" =1,500'	JULESBURG IRRIGATION DISTRICT PETERSEN DITCH DIVERSION REPLACEMENT PROJECT NW $\frac{1}{4}$ OF THE NE $\frac{1}{4}$ OF THE NW $\frac{1}{4}$ SEC 24 T 11N R47 W OF THE 6TH PM
	Drawn By: JGG	
	File: JID	Date: JAN. 25, 2018 — FIGURE 1 - LOCATION MAP

Appendix E
Loan Amortization Schedule

Colorado Water Conservation Board
Construction Fund Loan Program

Repayment Schedule

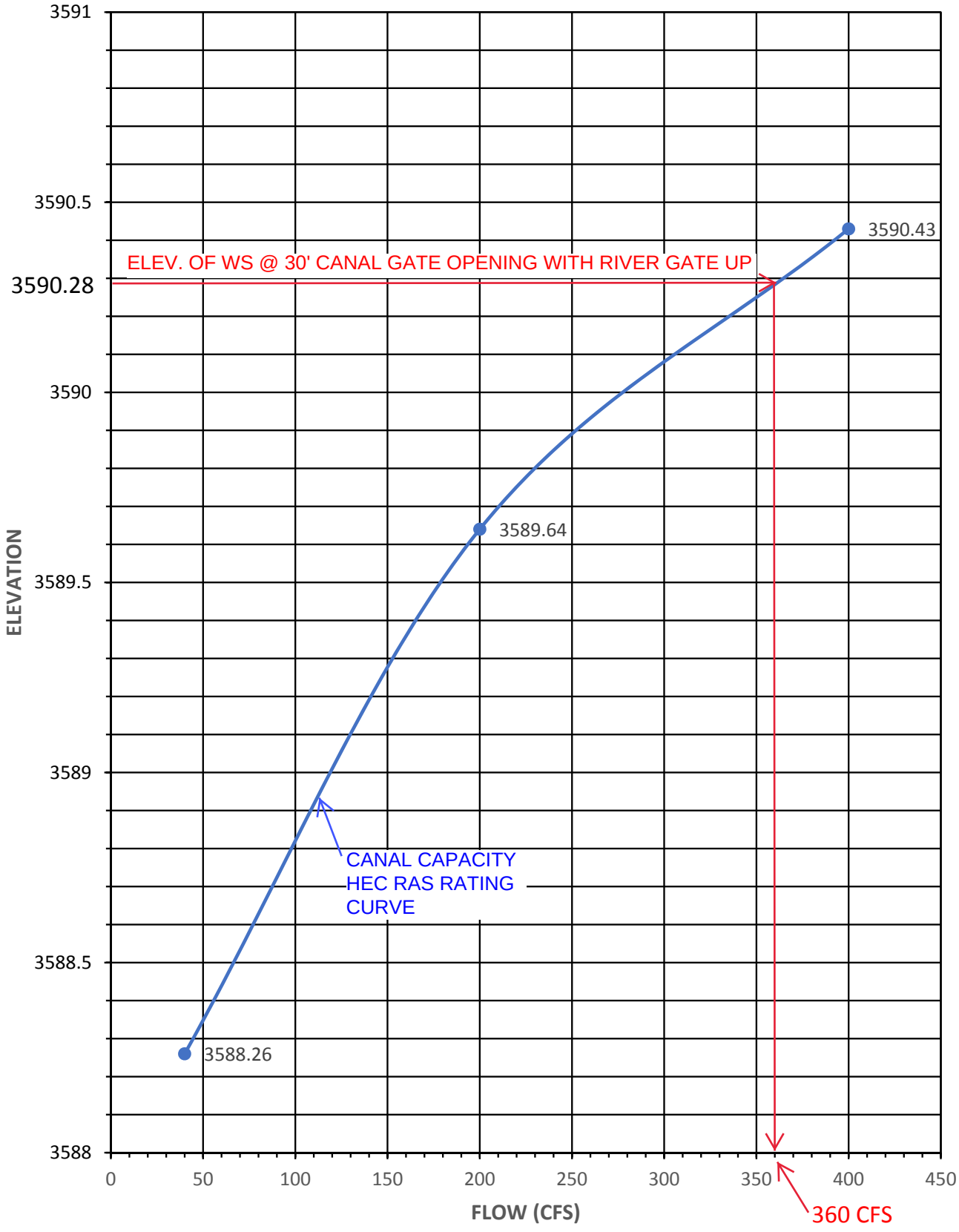
Contract #:
Borrower: Julesburg Irrigation District
Project: Petersen Ditch Diversion Structure Replacement Project
Principal: $3,341,333
Interest: 1.70%
Term: 30 years

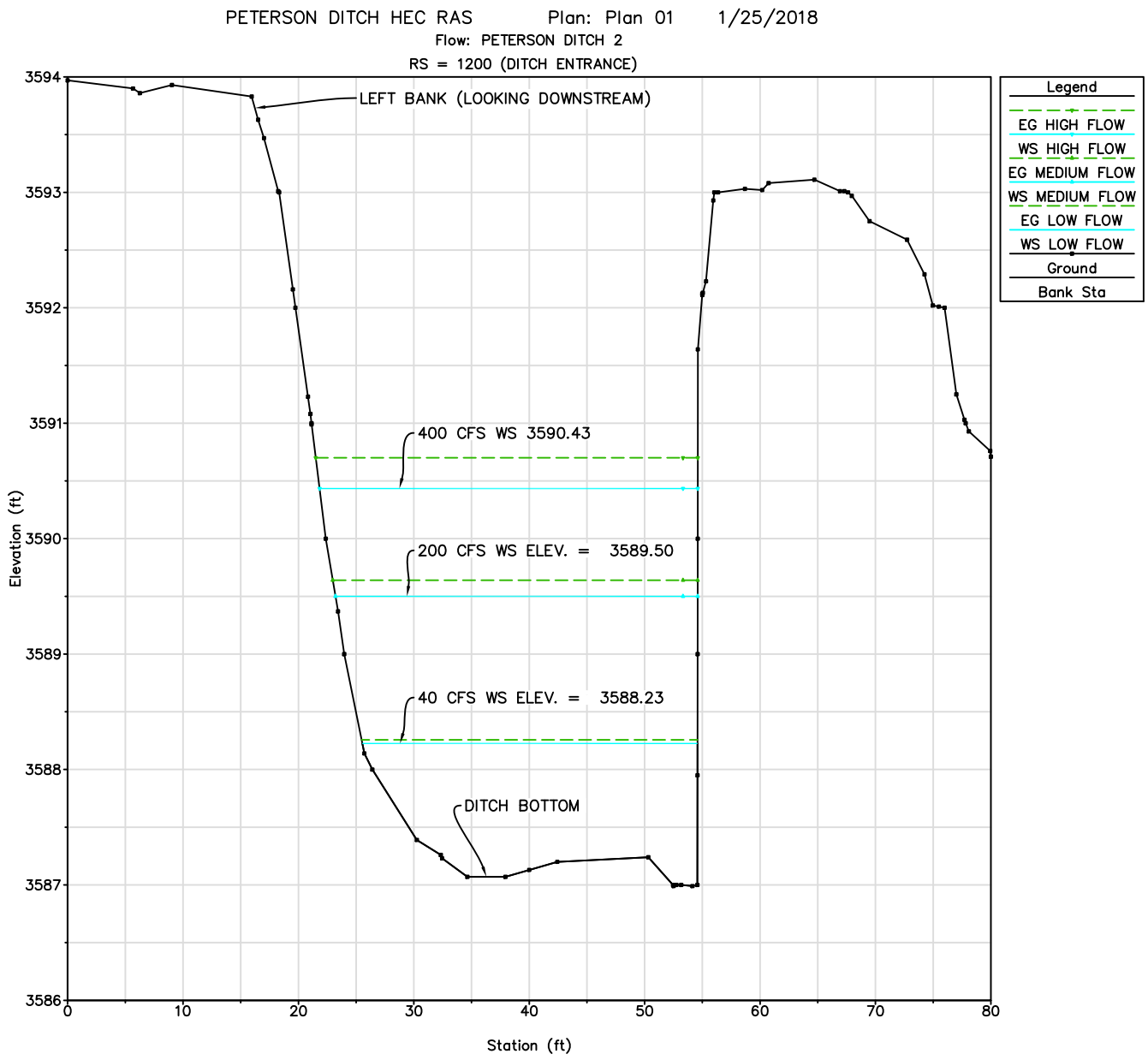
1st Payment Due $2,019.00
Annual Payment: $143,106.83
Total Loan Payout $4,293,204.88

Period	Year	Loan Balance	Annual Payment	Amount to Interest	Amount to Principal
1	2018	$3,341,333.00	143,106.83	$56,802.66	$86,304.17
2	2019	3,255,028.83	143,106.83	$55,335.49	$87,771.34
3	2020	3,167,257.49	143,106.83	$53,843.38	$89,263.45
4	2021	3,077,994.04	143,106.83	$52,325.90	$90,780.93
5	2022	2,987,213.11	143,106.83	$50,782.62	$92,324.21
6	2023	2,894,888.90	143,106.83	$49,213.11	$93,893.72
7	2024	2,800,995.18	143,106.83	$47,616.92	$95,489.91
8	2025	2,705,505.27	143,106.83	$45,993.59	$97,113.24
9	2026	2,608,392.03	143,106.83	$44,342.66	$98,764.17
10	2027	2,509,627.86	143,106.83	$42,663.67	$100,443.16
11	2028	2,409,184.70	143,106.83	$40,956.14	$102,150.69
12	2029	2,307,034.01	143,106.83	$39,219.58	$103,887.25
13	2030	2,203,146.76	143,106.83	$37,453.49	$105,653.34
14	2031	2,097,493.42	143,106.83	$35,657.39	$107,449.44
15	2032	1,990,043.98	143,106.83	$33,830.75	$109,276.08
16	2033	1,880,767.90	143,106.83	$31,973.05	$111,133.78
17	2034	1,769,634.12	143,106.83	$30,083.78	$113,023.05
18	2035	1,656,611.07	143,106.83	$28,162.39	$114,944.44
19	2036	1,541,666.63	143,106.83	$26,208.33	$116,898.50
20	2037	1,424,768.13	143,106.83	$24,221.06	$118,885.77
21	2038	1,305,882.36	143,106.83	$22,200.00	$120,906.83
22	2039	1,184,975.53	143,106.83	$20,144.58	$122,962.25
23	2040	1,062,013.28	143,106.83	$18,054.23	$125,052.60
24	2041	936,960.68	143,106.83	$15,928.33	$127,178.50
25	2042	809,782.18	143,106.83	$13,766.30	$129,340.53
26	2043	680,441.65	143,106.83	$11,567.51	$131,539.32
27	2044	548,902.33	143,106.83	$9,331.34	$133,775.49
28	2045	415,126.84	143,106.83	$7,057.16	$136,049.67
29	2046	279,077.17	143,106.83	$4,744.31	$138,362.52
30	2047	140,714.65	143,106.83	$2,392.15	$140,714.68
		Totals	$4,293,204.88	$951,871.87	$3,341,333.03

Appendix F
HEC-RAS Hydraulic Model Exhibits

PETERSEN DITCH CAPACITY
WS ELEV. VS. FLOW (CFS)





GAUTHIERE ENGINEERING, INC.
2157 Buena Vista Drive Greeley, Colorado
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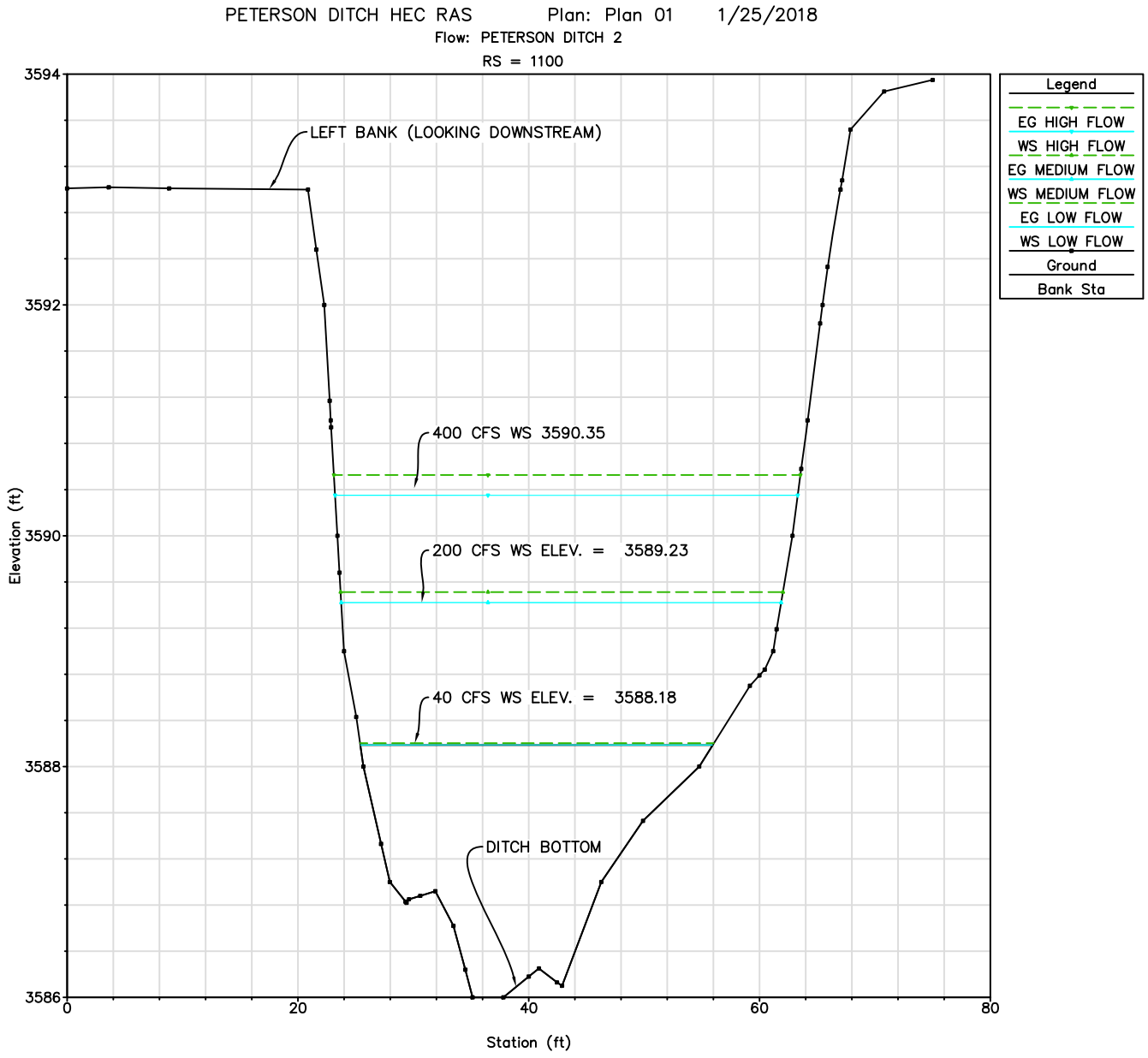
E-mail: john@gauthiere-engineering.com

JULESBURG IRRIGATION DISTRICT
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT
HEC-RAS FLOW STUDY STATION 12+00 (DITCH ENTRANCE)

SCALE: N.A.



GAUTHIERE ENGINEERING, INC.
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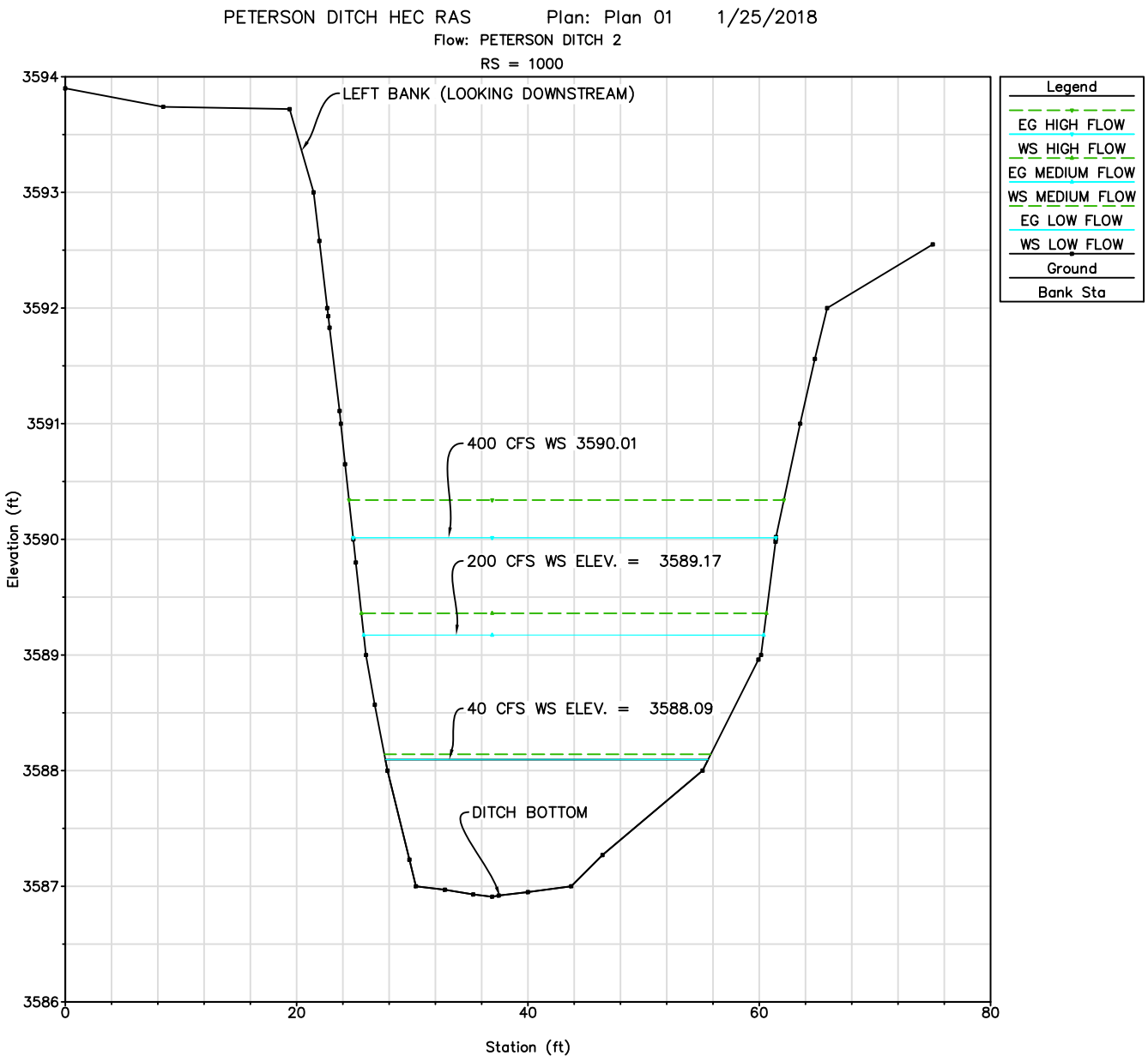
JULESBURG IRRIGATION DISTRICT
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT
HEC-RAS FLOW STUDY STATION 11+00

SCALE: N.A.



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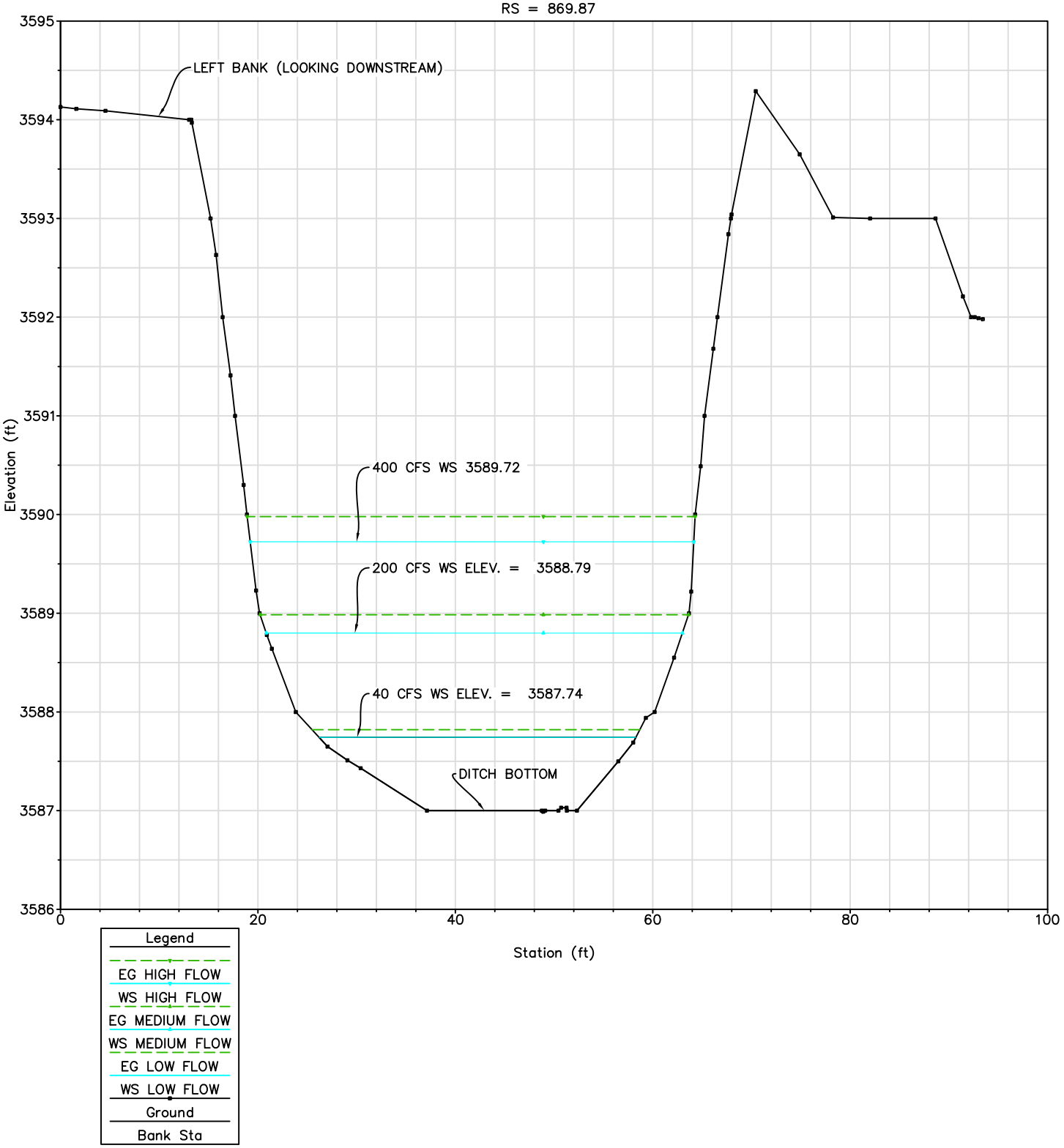
JULESBURG IRRIGATION DISTRICT
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT
HEC-RAS FLOW STUDY STATION 10+00

SCALE: N.A.

PETERSON DITCH HEC RAS Plan: Plan 01 1/25/2018

Flow: PETERSON DITCH 2

RS = 869.87



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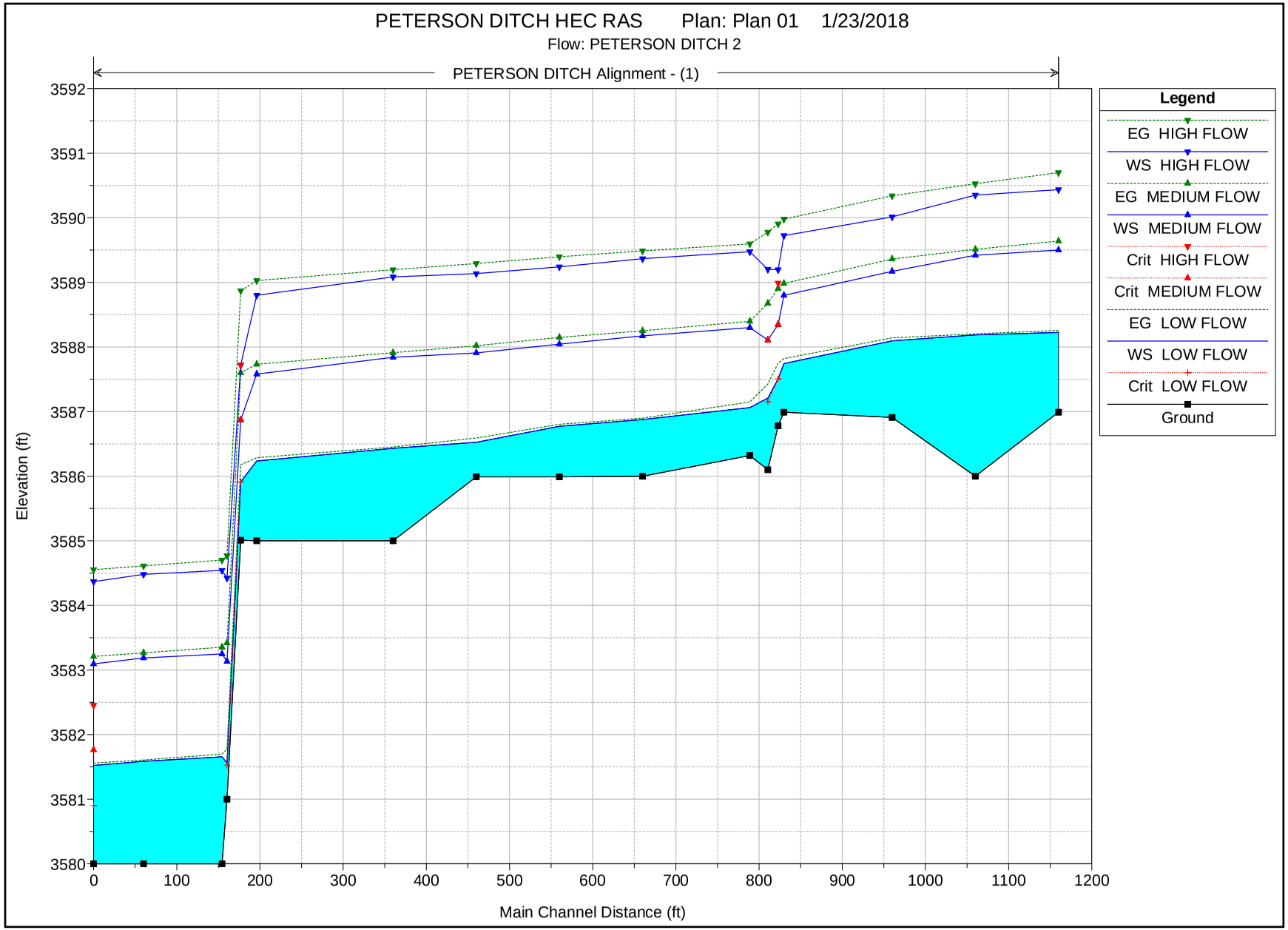
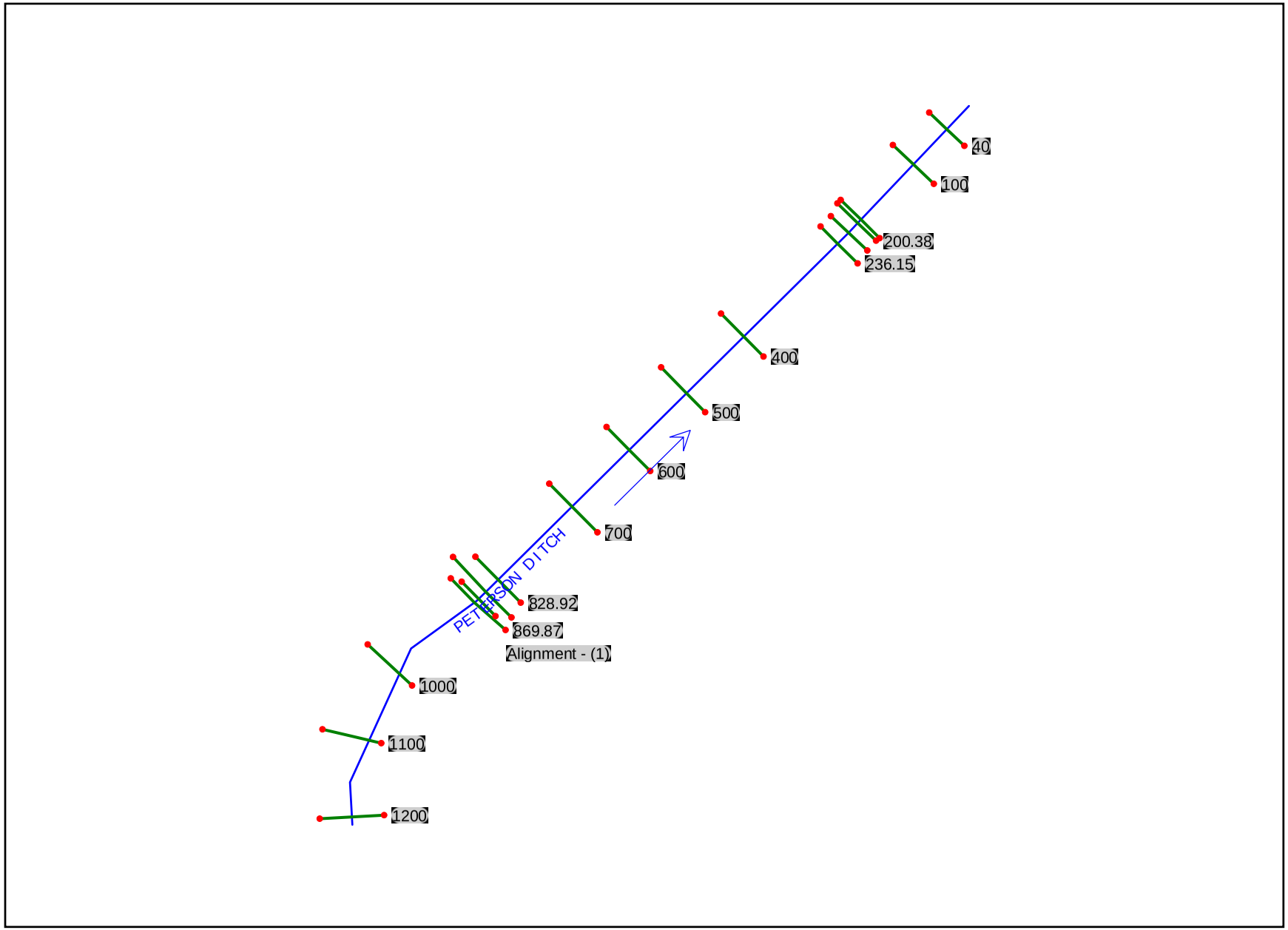
JULESBURG IRRIGATION DISTRICT

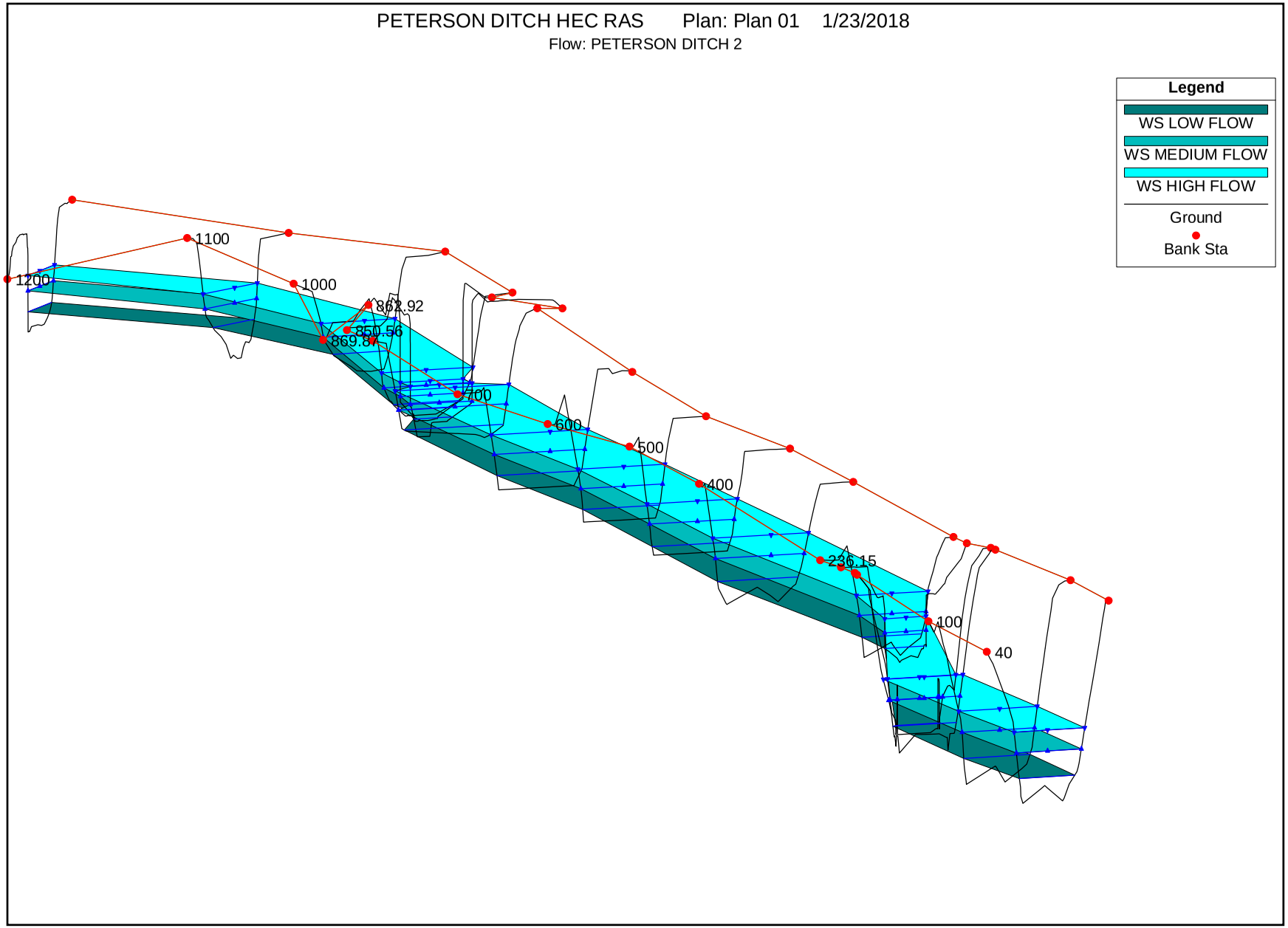
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT

HEC-RAS FLOW STUDY STATION 10+00

SCALE: N.A.


PETERSON DITCH HEC RAS Plan: Plan 01 1/23/2018
Flow: PETERSON DITCH 2
PETERSON DITCH Alignment - (1)
Elevation (ft)
Main Channel Distance (ft)
3592
3591
3590
3589
3588
3587
3586
3585
3584
3583
3582
3581
3580
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
Legend
EG HIGH FLOW
WS HIGH FLOW
EG MEDIUM FLOW
WS MEDIUM FLOW
Crit HIGH FLOW
Crit MEDIUM FLOW
EG LOW FLOW
WS LOW FLOW
Crit LOW FLOW
Ground


40
100
200.38
236.15
400
500
600
700
PETERSON DITCH
828.92
869.87
Alignment - (1)
1000
1100
1200


PETERSON DITCH HEC RAS Plan: Plan 01 1/23/2018
Flow: PETERSON DITCH 2
Legend
WS LOW FLOW
WS MEDIUM FLOW
WS HIGH FLOW
Ground
Bank Sta
1200
1100
1000
862.92
850.56
869.87
700
600
500
400
236.15
100
40

HEC-RAS Plan: Plan 01 River: PETERSON DITCH Reach: Alignment - (1)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Alignment - (1)	1200	LOW FLOW	40.00	3586.99	3588.23		3588.26	0.000916	1.42	28.10	29.05	0.26
Alignment - (1)	1200	MEDIUM FLOW	200.00	3586.99	3589.50		3589.64	0.001509	3.00	66.72	31.38	0.36
Alignment - (1)	1200	HIGH FLOW	400.00	3586.99	3590.43		3590.70	0.001929	4.14	96.73	32.77	0.42
Alignment - (1)	1100	LOW FLOW	40.00	3586.00	3588.19		3588.20	0.000310	1.02	39.32	30.54	0.16
Alignment - (1)	1100	MEDIUM FLOW	200.00	3586.00	3589.42		3589.51	0.000887	2.42	82.70	38.12	0.29
Alignment - (1)	1100	HIGH FLOW	400.00	3586.00	3590.35		3590.53	0.001152	3.36	119.12	40.10	0.34
Alignment - (1)	1000	LOW FLOW	40.00	3586.91	3588.10		3588.14	0.001531	1.71	23.38	27.90	0.33
Alignment - (1)	1000	MEDIUM FLOW	200.00	3586.91	3589.17		3589.36	0.002594	3.49	57.35	34.57	0.48
Alignment - (1)	1000	HIGH FLOW	400.00	3586.91	3590.01		3590.34	0.002812	4.58	87.30	36.55	0.52
Alignment - (1)	869.87	LOW FLOW	40.00	3586.99	3587.74		3587.82	0.004502	2.24	17.84	32.09	0.53
Alignment - (1)	869.87	MEDIUM FLOW	200.00	3586.99	3588.80		3588.99	0.003200	3.45	58.01	42.16	0.52
Alignment - (1)	869.87	HIGH FLOW	400.00	3586.99	3589.72		3589.98	0.002421	4.05	98.65	44.93	0.48
Alignment - (1)	862.92	LOW FLOW	40.00	3586.78	3587.51	3587.51	3587.75	0.017091	3.96	10.10	20.92	1.00
Alignment - (1)	862.92	MEDIUM FLOW	200.00	3586.78	3588.35	3588.35	3588.91	0.013571	6.00	33.32	30.46	1.01
Alignment - (1)	862.92	HIGH FLOW	400.00	3586.78	3589.20	3588.99	3589.91	0.008564	6.76	59.21	30.48	0.85
Alignment - (1)	850.56	LOW FLOW	40.00	3586.10	3587.21	3587.15	3587.43	0.012960	3.76	10.65	18.95	0.88
Alignment - (1)	850.56	MEDIUM FLOW	200.00	3586.10	3588.11	3588.11	3588.68	0.013698	6.05	33.03	29.90	1.02
Alignment - (1)	850.56	HIGH FLOW	400.00	3586.10	3589.20		3589.78	0.006028	6.08	65.82	29.92	0.72
Alignment - (1)	828.92	LOW FLOW	40.00	3586.32	3587.06		3587.15	0.009448	2.38	16.79	48.17	0.71
Alignment - (1)	828.92	MEDIUM FLOW	200.00	3586.32	3588.30		3588.40	0.001503	2.51	79.66	52.40	0.36
Alignment - (1)	828.92	HIGH FLOW	400.00	3586.32	3589.48		3589.60	0.000939	2.80	142.86	55.26	0.31
Alignment - (1)	700	LOW FLOW	40.00	3586.00	3586.88		3586.90	0.000736	1.18	33.96	40.93	0.23
Alignment - (1)	700	MEDIUM FLOW	200.00	3586.00	3588.17		3588.25	0.000835	2.24	89.26	44.10	0.28
Alignment - (1)	700	HIGH FLOW	400.00	3586.00	3589.37		3589.49	0.000759	2.79	143.60	46.91	0.28
Alignment - (1)	600	LOW FLOW	40.00	3585.99	3586.77		3586.80	0.001235	1.42	28.07	37.27	0.29
Alignment - (1)	600	MEDIUM FLOW	200.00	3585.99	3588.05		3588.15	0.001195	2.59	77.24	39.75	0.33
Alignment - (1)	600	HIGH FLOW	400.00	3585.99	3589.24		3589.40	0.001035	3.17	126.33	42.41	0.32
Alignment - (1)	500	LOW FLOW	40.00	3585.99	3586.53		3586.59	0.004152	2.05	19.55	37.78	0.50
Alignment - (1)	500	MEDIUM FLOW	200.00	3585.99	3587.91		3588.02	0.001389	2.68	74.51	41.13	0.35
Alignment - (1)	500	HIGH FLOW	400.00	3585.99	3589.14		3589.29	0.001061	3.16	126.64	43.92	0.33
Alignment - (1)	400	LOW FLOW	40.00	3585.00	3586.43		3586.45	0.000596	1.13	35.54	39.05	0.21
Alignment - (1)	400	MEDIUM FLOW	200.00	3585.00	3587.84		3587.91	0.000691	2.13	93.75	43.19	0.26
Alignment - (1)	400	HIGH FLOW	400.00	3585.00	3589.09		3589.20	0.000658	2.67	149.54	46.59	0.26

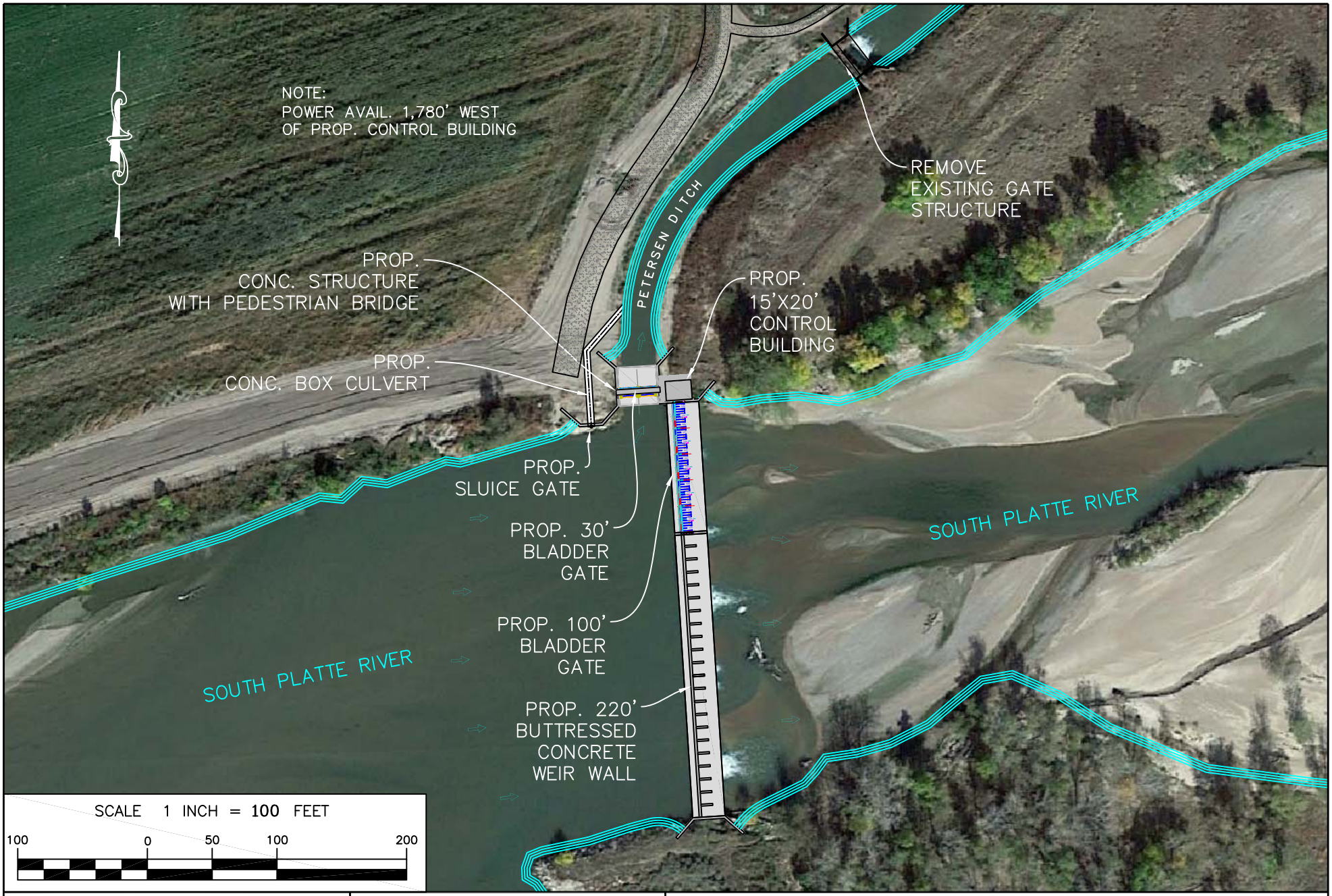
HEC-RAS Plan: Plan 01 River: PETERSON DITCH Reach: Alignment - (1) (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Alignment - (1)	236.15	LOW FLOW	40.00	3585.00	3586.24		3586.29	0.002001	1.81	22.09	29.08	0.37
Alignment - (1)	236.15	MEDIUM FLOW	200.00	3585.00	3587.58		3587.73	0.001748	3.13	63.85	32.50	0.39
Alignment - (1)	236.15	HIGH FLOW	400.00	3585.00	3588.80		3589.03	0.001519	3.81	104.87	34.86	0.39
Alignment - (1)	216.94	LOW FLOW	40.00	3585.01	3585.91	3585.91	3586.18	0.017730	4.12	9.70	19.33	1.03
Alignment - (1)	216.94	MEDIUM FLOW	200.00	3585.01	3586.87	3586.87	3587.60	0.013664	6.86	29.17	20.40	1.01
Alignment - (1)	216.94	HIGH FLOW	400.00	3585.01	3587.72	3587.72	3588.87	0.012711	8.60	46.51	20.42	1.00
Alignment - (1)	200.38	LOW FLOW	40.00	3581.00	3581.56	3581.53	3581.78	0.015422	3.73	10.73	20.33	0.91
Alignment - (1)	200.38	MEDIUM FLOW	200.00	3581.00	3583.13		3583.42	0.005137	4.31	46.42	25.00	0.56
Alignment - (1)	200.38	HIGH FLOW	400.00	3581.00	3584.42		3584.77	0.004256	4.71	84.86	33.60	0.52
Alignment - (1)	194.44	LOW FLOW	40.00	3580.00	3581.66		3581.70	0.001645	1.63	24.60	31.04	0.32
Alignment - (1)	194.44	MEDIUM FLOW	200.00	3580.00	3583.25		3583.35	0.001108	2.60	76.93	34.95	0.31
Alignment - (1)	194.44	HIGH FLOW	400.00	3580.00	3584.54		3584.70	0.001033	3.21	124.72	38.91	0.32
Alignment - (1)	100	LOW FLOW	40.00	3580.00	3581.59		3581.61	0.000563	1.18	33.88	32.56	0.20
Alignment - (1)	100	MEDIUM FLOW	200.00	3580.00	3583.19		3583.27	0.000673	2.25	88.81	35.68	0.25
Alignment - (1)	100	HIGH FLOW	400.00	3580.00	3584.48		3584.61	0.000730	2.93	136.67	38.65	0.27
Alignment - (1)	40	LOW FLOW	40.00	3580.00	3581.52	3580.90	3581.56	0.001102	1.55	25.85	27.29	0.28
Alignment - (1)	40	MEDIUM FLOW	200.00	3580.00	3583.09	3581.77	3583.21	0.001101	2.73	73.17	32.00	0.32
Alignment - (1)	40	HIGH FLOW	400.00	3580.00	3584.37	3582.45	3584.55	0.001100	3.46	115.67	34.72	0.33

HEC-RAS Plan: Plan 01 River: PETERSON DITCH Reach: Alignment - (1) Profile: HIGH FLOW

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Alignment - (1)	1200	HIGH FLOW	400.00	3586.99	3590.43		3590.70	0.001929	4.14	96.73	32.77	0.42
Alignment - (1)	1100	HIGH FLOW	400.00	3586.00	3590.35		3590.53	0.001152	3.36	119.12	40.10	0.34
Alignment - (1)	1000	HIGH FLOW	400.00	3586.91	3590.01		3590.34	0.002812	4.58	87.30	36.55	0.52
Alignment - (1)	869.87	HIGH FLOW	400.00	3586.99	3589.72		3589.98	0.002421	4.05	98.65	44.93	0.48
Alignment - (1)	862.92	HIGH FLOW	400.00	3586.78	3589.20	3588.99	3589.91	0.008564	6.76	59.21	30.48	0.85
Alignment - (1)	850.56	HIGH FLOW	400.00	3586.10	3589.20		3589.78	0.006028	6.08	65.82	29.92	0.72
Alignment - (1)	828.92	HIGH FLOW	400.00	3586.32	3589.48		3589.60	0.000939	2.80	142.86	55.26	0.31
Alignment - (1)	700	HIGH FLOW	400.00	3586.00	3589.37		3589.49	0.000759	2.79	143.60	46.91	0.28
Alignment - (1)	600	HIGH FLOW	400.00	3585.99	3589.24		3589.40	0.001035	3.17	126.33	42.41	0.32
Alignment - (1)	500	HIGH FLOW	400.00	3585.99	3589.14		3589.29	0.001061	3.16	126.64	43.92	0.33
Alignment - (1)	400	HIGH FLOW	400.00	3585.00	3589.09		3589.20	0.000658	2.67	149.54	46.59	0.26
Alignment - (1)	236.15	HIGH FLOW	400.00	3585.00	3588.80		3589.03	0.001519	3.81	104.87	34.86	0.39
Alignment - (1)	216.94	HIGH FLOW	400.00	3585.01	3587.72	3587.72	3588.87	0.012711	8.60	46.51	20.42	1.00
Alignment - (1)	200.38	HIGH FLOW	400.00	3581.00	3584.42		3584.77	0.004256	4.71	84.86	33.60	0.52
Alignment - (1)	194.44	HIGH FLOW	400.00	3580.00	3584.54		3584.70	0.001033	3.21	124.72	38.91	0.32
Alignment - (1)	100	HIGH FLOW	400.00	3580.00	3584.48		3584.61	0.000730	2.93	136.67	38.65	0.27
Alignment - (1)	40	HIGH FLOW	400.00	3580.00	3584.37	3582.45	3584.55	0.001100	3.46	115.67	34.72	0.33

Appendix G
Replacement Structure Details



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Scale: 1" =100'

Drawn By: JGG

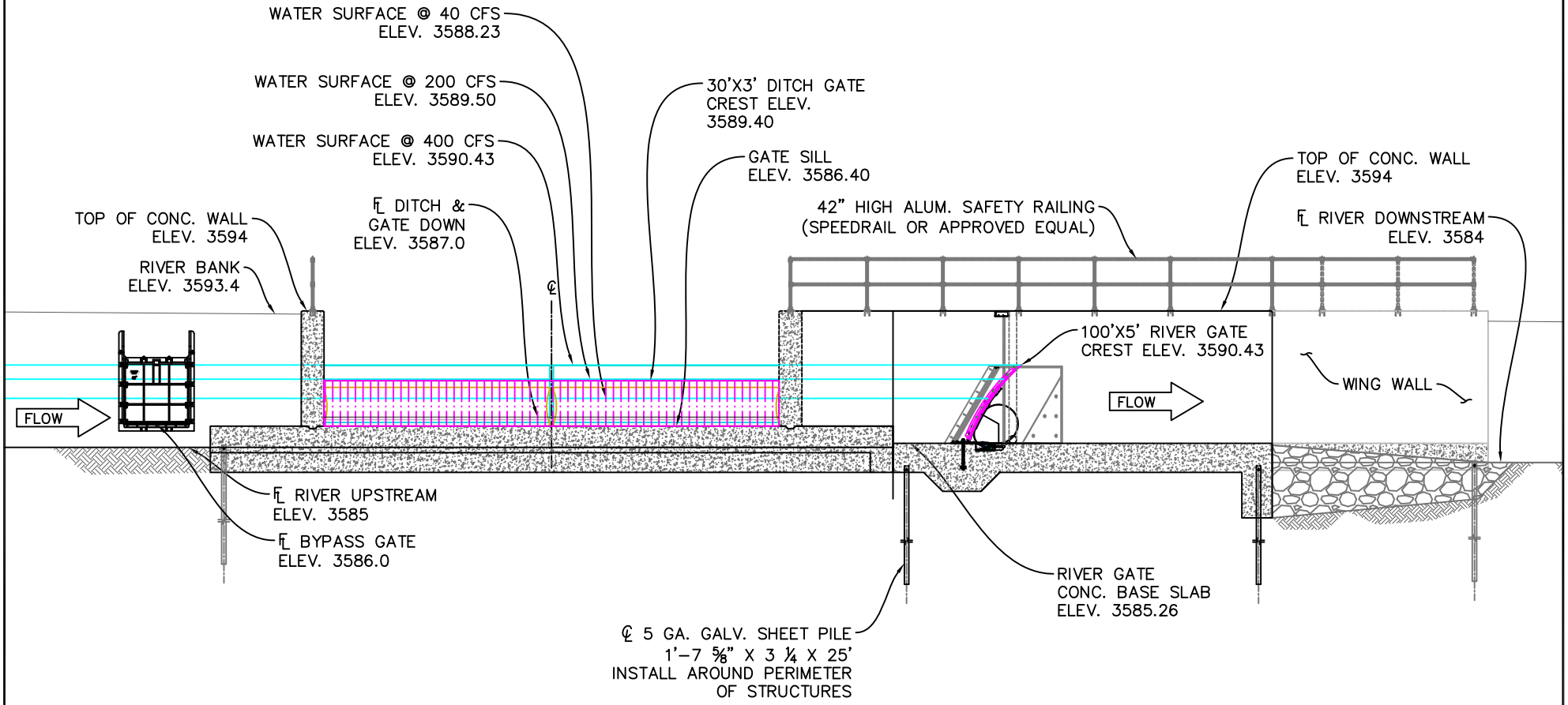
File: JID

JULESBURG IRRIGATION DISTRICT
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT

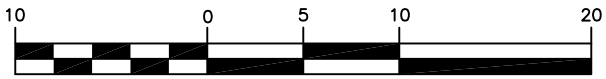
Date: JAN. 25, 2018

FIGURE 3 - PLAN VIEW

NOTE:
1. DITCH GATE SEAL BEAM AND PED BRIDGE NOT SHOW FOR CLARITY
2. FOUNDATION FRICTION PILES NOT SHOWN.



SCALE 1 INCH = 10 FEET



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Scale: 1" =10'

Drawn By: JGG

File: JID

JULESBURG IRRIGATION DISTRICT
PETERSEN DITCH DIVERSION REPLACEMENT PROJECT

Date: JAN. 25, 2018

FIGURE 4 - CRITICAL ELEVATIONS

rectors, the "remaining members" who are authorized to fill it must act as a board. Two members constitute a quorum. There can be no valid meeting of a board without a quorum. One member of a board consisting of three members cannot constitute himself a quorum when the other two are absent. Kepley v. People ex rel. Everson, 76 Colo. 233, 230 P. 804 (1924).

A vacancy can be filled only where there are two remaining members. The use of the singular "vacancy" indicates that the filling by the board of "a vacancy" in the board can be done only where there are two "remaining members" qualified to act. The board, therefore, is unable to fill a vacancy if there is only one Everson, 76 Colo. 233, 230 P. 804 (1924).

In the event of more than one vacancy, or where there are two vacancies in a board consisting of three members, only the board of county commissioners is competent to fill them. The language itself clearly indicates this where it says that the county commissioners shall fill "such vacancy or vacancies", which means that where there is more than one vacancy, only the county board can fill them, and the county board may also fill one vacancy, when the irrigation board fails or is unable to act within 30 days. Kepley v. People ex rel. Everson, 76 Colo. 233, 230 P. 804 (1924).

37-41-113. Board of directors - duties - contracts. (1) The directors, having duly qualified, shall organize as a board, elect a president from their number, and appoint a secretary. The board has power and it is its duty to adopt a seal, manage and conduct the affairs and business of the district, make and execute all necessary contracts, employ such agents, attorneys, officers, and employees as may be required and prescribe their duties, and establish equitable rules and regulations for the distribution and use of water among the owners of said land. The board shall generally perform all such acts as shall be necessary to fully carry out the purposes of this article.

(2) Said board may also enter into any obligation or contract with the United States for the construction or operation and maintenance of the necessary works for the delivery and distribution of water therefrom, or for drainage of district lands, or for the assumption, as principal or guarantor, of indebtedness to the United States on account of district lands, or for the temporary rental of water under the provisions of the federal reclamation act and all acts amendatory thereof or supplementary thereto or any other federal laws which do not conflict with the constitution and laws of the state of Colorado and the rules and regulations established thereunder, or the board may contract with the United States for a water supply under any act of congress providing for or permitting such contract and may convey to the United States as partial or full consideration therefor water rights or other property of the district. In case contract has been made with the United States, bonds of the district may be deposited with the United States at ninety-five percent of their par value, to the amount to be paid by the district to the United States under any such contract, the interest on said bonds, if bearing interest, to be provided for by assessment and levy, as in the case of other bonds of the district, and regularly paid to the United States to be applied as provided in such contract, and, if bonds of the district are not so deposited, it is the duty of the board of directors to include, as part of any levy or assessment now provided for by law, an amount sufficient to meet each year all payments accruing under the terms of any such contract. Districts cooperating with the United States may rent or lease water to private lands, entrymen, or municipalities in the neighborhood of the district in pursuance of contract with the United States and under terms and conditions not inconsistent with the laws of Colorado.

(3) Such board has the power, in addition to the means to supply water to said district proposed by the petition submitted for the formation of said district, to construct, acquire, purchase, or condemn any canals, ditches, reservoirs, reservoir sites, water, water rights, rights-of-way, or other property necessary for the use of the district or to acquire by condemnation, or otherwise, the right to enlarge any ditch, canal, or reservoir already constructed or partly constructed. In case of the purchase of any property by said district, when it shall be proposed by the board of directors to purchase a system of irrigation already constructed, or partially constructed, and to enlarge and complete the same adequate to the needs of the district, the board in such case may embody in one contract the matter of the purchase, the enlargement, and the completion of such irrigation system without

(4) No contract involving a consideration exceeding two hundred fifty thousand dollars and not exceeding four hundred thousand dollars shall be binding unless such contract has been authorized and ratified in writing by not less than one-third of the legal electors of said district according to the number of votes cast at the last district election; nor shall any contract in excess of four hundred thousand dollars be binding until such contract has been authorized and ratified at an election in the manner provided for the issue of bonds.

(5) Where the compensation to be paid by the district to the owner of any property which the board of directors of an irrigation district is authorized to take by proceedings in eminent domain has been finally determined to be in excess of twenty-five thousand dollars, sufficient time shall be given by the courts for the submission to and determination by the electors of the district, at a regularly called election in the district, of the question of whether the district shall pay said compensation or shall abandon such condemnation proceedings. If the electors shall authorize the payment of such compensation, the necessary additional time shall be given the district to pay such compensation, either by levy and collection of assessments against the lands of the district, or by the issue and sale of bonds of the district, or by both such methods as may be determined at a district election. Where the compensation to be paid shall be more than ten thousand dollars and less than twenty-five thousand dollars, the district board may elect to pay such compensation or abandon such condemnation proceedings upon authorization in writing by not less than one-third of the legal electors of said district according to the number of votes cast at the last district election.

(6) The rules and regulations shall be printed in convenient form, as soon as the same are adopted, for distribution in the district. All waters distributed shall be apportioned to each landowner pro rata to the lands assessed under this article within such district. But all water which has been acquired by the district by virtue of the laws of Colorado may be distributed and apportioned according to the terms of any contract entered into between the district and the United States, until the obligation due the United States is paid or the obligation to pay is discharged in any manner. Nothing in this article shall be deemed or construed to grant or relinquish to the United States any of the sovereign rights of the state of Colorado in and to the waters within its borders, or its exclusive authority over and jurisdiction and control of said waters, and the diversion, appropriation, and use thereof nor in any manner change the methods of appropriation thereof.

(7) The board of directors has power to lease or rent the use of water, or contract for the delivery thereof, to occupants of other lands within or without the said district at such prices and on such terms as it deems best, but the rental shall not be less than one and one-half times the amount of the district tax for which said land would be liable if held as a freehold. No vested prescriptive right to the use of such water shall attach to said land by virtue of such lease or such rental; except that any landowner in said district, with the consent of the board of directors, may assign the right to the whole or any portion of the water so apportioned to him for any one year where practicable to any other bona fide landowner, to be used in said district for use on his land for said year, but such owner shall have paid all amounts due on assessments upon all such lands.

(8) The board of directors further has power to lease or rent the use of water, or to contract for the delivery thereof, to settlers upon or occupants of the public domain, whose entries shall not have been subordinated to the district through compliance with the act of congress approved August 11, 1916, on the terms as provided in this section; except that, in such case, the board of directors has the further power to make a contract on behalf of the district with such settler or occupant to the effect that such settler or occupant, upon receiving full title to his lands and upon the payment of his proportionate share of the bond assessments as provided in section 37-41-136, shall include his lands within said district and, upon such inclusion, shall be entitled to all the rights and privileges of a member of said district. Before the execution of such contract the board of directors shall cause notice of such contract to be given substantially as provided in section 37-41-134, with such changes in the form of the notice as may be necessary, and a hearing upon said contract and all objections thereto shall be had as provided in section 37-41-135. If upon said hearing the

for the planting of crops. The term does not include the redistribution of soil, rock, sand, or other surficial materials in a manner which changes any area of the waters of the United States to dry land. For example, the redistribution of surface materials by blading, grading, or other means to fill in wetland areas is not plowing. Rock crushing activities which result in the loss of natural drainage characteristics, the reduction of water storage and recharge capabilities, or the overburden of natural water filtration capacities do not constitute plowing. Plowing as described above will never involve a discharge of dredged or fill material.

(E) ***Seeding*** means the sowing of seed and placement of seedlings to produce farm, ranch, or forest crops and includes the placement of soil beds for seeds or seedlings on established farm and forest lands.

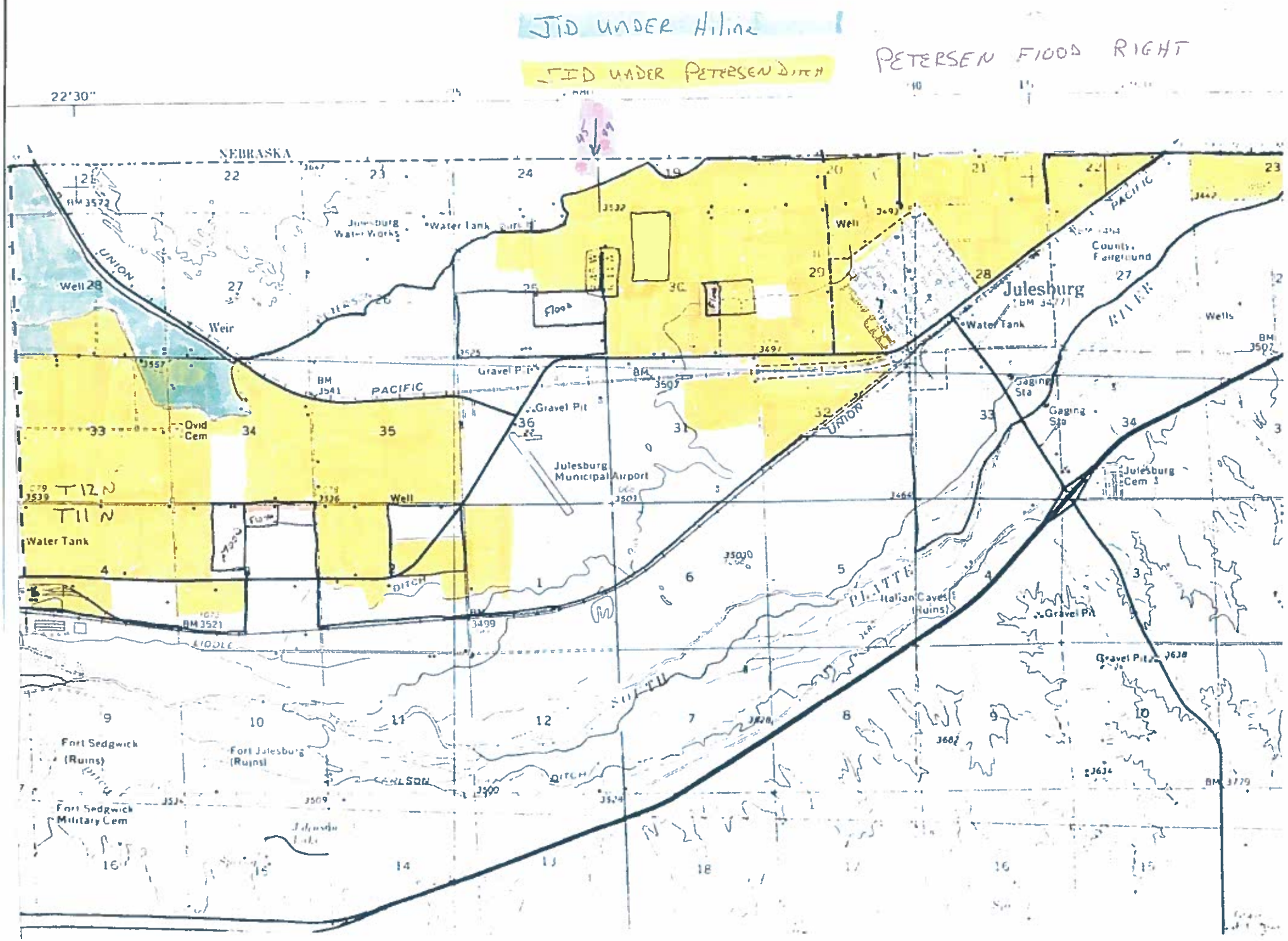
(2) Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption.

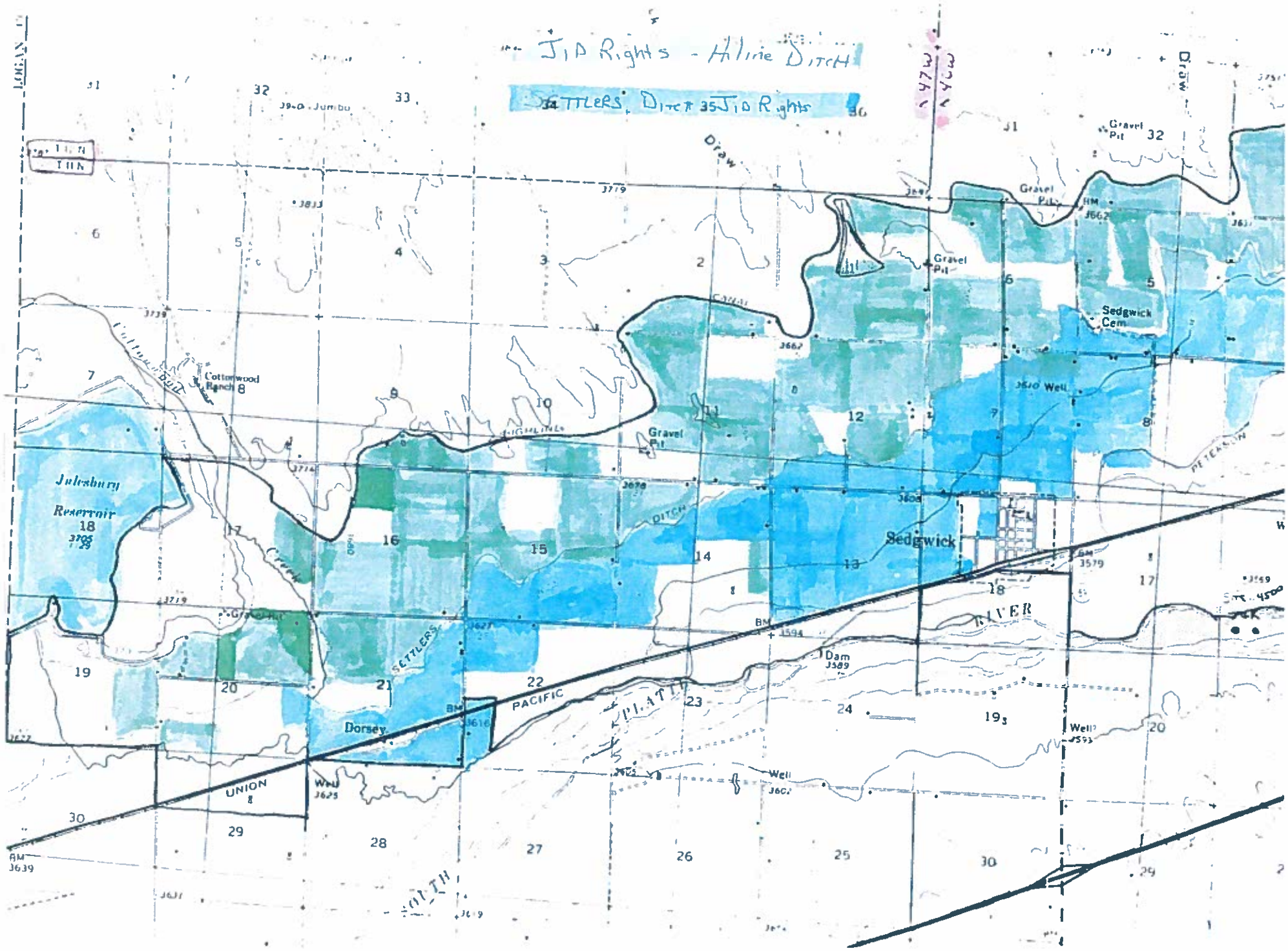
(3) Construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance (but not construction) of drainage ditches. Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.

(4) Construction of temporary sedimentation basins on a construction site which does not include placement of fill material into waters of the U.S. The term "construction site" refers to any site involving the erection of buildings, roads, and other discrete structures and the installation of support facilities necessary for construction and utilization of such structures. The term also includes any other land areas which involve land-disturbing excavation activities, including quarrying or other mining activities, where an increase in the runoff of sediment is controlled through the use of temporary sedimentation basins.

(5) Any activity with respect to which a State has an approved program under section 208(b)(4) of the CWA which meets the requirements of sections 208(b)(4) (B) and (C).

(6) Construction or maintenance of farm roads, forest roads, or temporary roads for moving mining equipment, where such roads are constructed and maintained in accordance with best management practices (BMPs) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized. These BMPs which must be applied to satisfy this provision shall include those detailed BMPs described in the State's approved program description pursuant to the requirements of 40 CFR 233.22(i), and shall also include the following baseline provisions:


TID UNDER Hiline
TID UNDER PETERSEN DITCH
PETERSEN FLOOD RIGHT
22'30"
NEBRASKA
UNION PACIFIC
Julesburg Water Works
Water Tank
Well
Julesburg
County Fairground
Wells
Weir
Flood
Gravel Pit
BM 3541
BM 3503
Gaging Sta
Ovid Cem
Julesburg Municipal Airport
Julesburg Cem
T12N
T11N
Water Tank
Well
DITCH
BM 3521
BM 3499
Italian Caves (Ruins)
PLATTE
RIVER
SOUTH
Fort Sedgwick (Ruins)
Fort Julesburg (Ruins)
CARLSON
Fort Sedgwick Military Cem

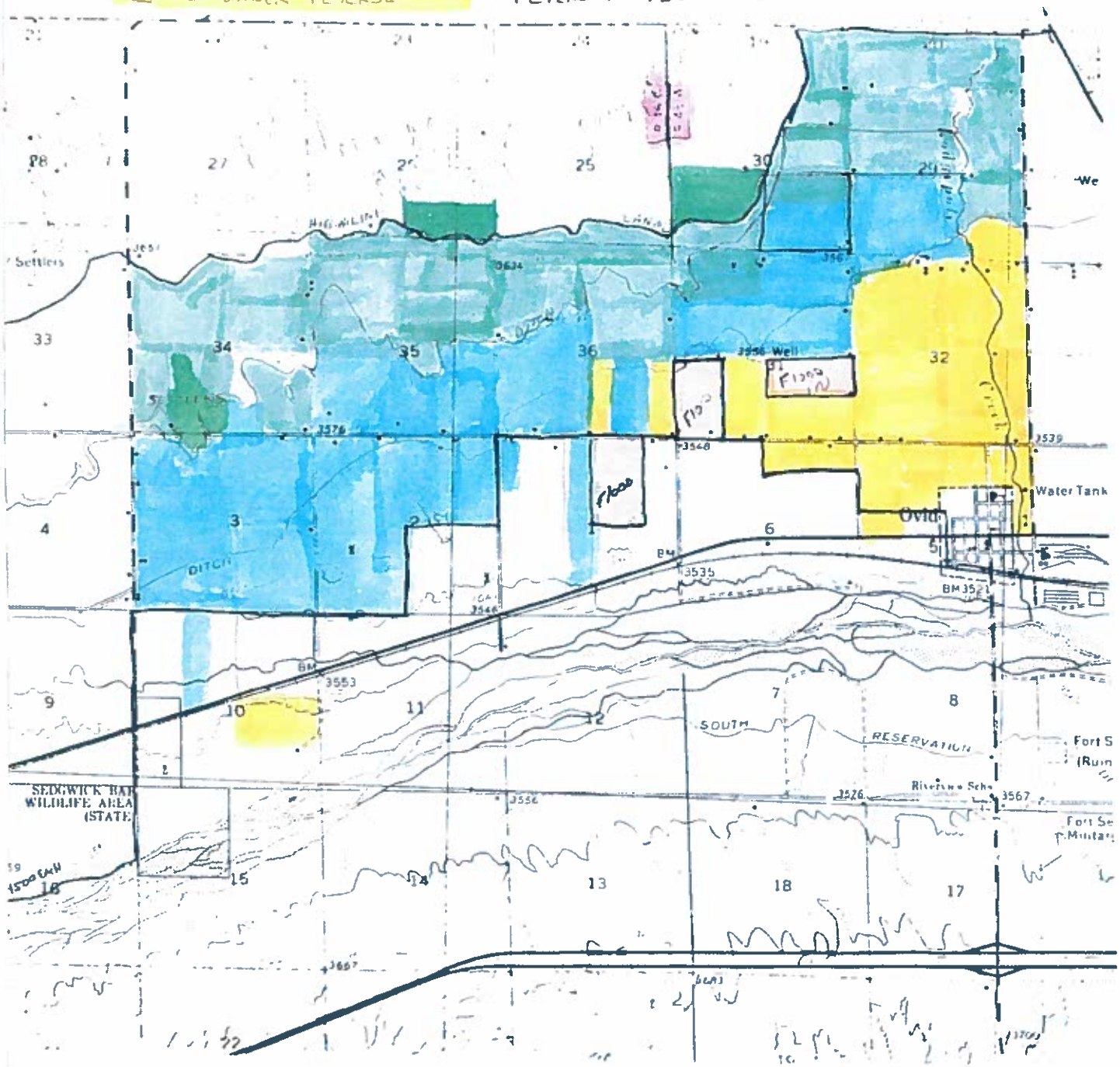

JID Rights - Hilrie Ditch
SETTLERS DITCH 35 JID Rights
Julesburg Reservoir
Cottonwood Ranch
Gravel Pit
Sedgwick Cem
Sedgwick
Dorsey
PACIFIC
UNION
PLATTE
RIVER
SETTLERS DITCH
Dam
Well
Draw

JID Rights under 1st line

JID Rights under Settlers

JID UNDER PETERSEN

PETERSEN FLOOD RIGHT



JID

Division 1, District 64