

Memorandum

RECEIVED
FEB 21 2006
DEPARTMENT OF
WATER RESOURCES

To: Misty Mount

From: Marci Pape, P.E.

Date: 2/17/06

Re: Diversion Rate Analysis for Gardner Brown Right No. A02-04006B

I have completed the diversion rate analysis for Water Right 02-04006B and have attached the results. The total diversion rate requirement for the recommended 15.1 acres was determined to be **0.36 cfs**, or approximately 0.024 cfs/ac.

CALCULATIONS

According to the information submitted by Gardner Brown, the entire property is irrigated using sprinkler systems. He provided a detailed description of those systems. However, because the water right was originally developed as a surface system, my irrigation analysis was based on the use of a surface irrigation system. The report to the SRBA District Court entitled "Report Regarding Evaluation of Irrigation Diversion Rates", prepared by IDWR and dated January 14, 1999, explains the following:

"Sprinkler irrigation systems are typically more efficient than surface irrigation systems. Historically, many surface systems have been replaced by sprinkler systems. The decision to use a particular irrigation system may depend on factors beyond the control of the farmer (e.g. crop prices, energy costs). To overcome the variability of those factors, farmers should be allowed some flexibility to return to a surface system as necessary. In cases where a water right was originally developed as a surface system, the optimum FAE will be based on the surface system using acceptable irrigation practices as described earlier in this report."

Mr. Brown submitted a timeline describing the development of the irrigation systems on the property. In the timeline, he explained that the upper and lower pastures were originally "flooded". Because wild flooding is generally not considered by IDWR to be an acceptable irrigation practice, I based my analysis on corrugation systems.

The place of use described by Mr. Brown differs somewhat from that recommended by IDWR. It appears that IDWR has not recommended irrigation for the area Mr. Brown describes as horse and emu pasture, so I did not analyze that field. For the remaining place of use, I made a shapefile in ArcView to represent the area included by Mr. Brown. I then trimmed that area to include only the land that is within the boundaries of the POU shapefile you recently provided.

It was necessary to assume a furrow direction for the fields, since I was given only information related to the operation of sprinkler systems. For the larger field, Field A, I assumed that the furrows

would run in an approximate north-south direction, since an east-west direction would create excessively long furrows across most of the field. The field slope in the northwest-southeast direction was variable enough across the field to merit splitting it into three separate fields for analysis. I assumed a slope of 0.2 percent for Field A1, since the slope was too small to measure. For Field A2 and the small field, Field B, the furrow slope was excessive in the north-south direction, so it was assumed that those furrows would go in an approximate southwest-northeast direction. All of the field slopes were measured using the 1:24000 digital topographic maps in ArcView

I assumed the fields were irrigated using corrugations and furrows. Wherever possible, I based the row spacings on those given in Figure A-6 of the Evaluation Workbook for Irrigation Diversion Rates, prepared in 1991 by Hubble Engineering and Associated Earth Sciences, Inc. I used a spacing of 2 ft. for pasture, as recommended in the "Report Regarding Evaluation of Irrigation Diversion Rates", referenced above. Mr. Brown described the orchards in Field B as containing "various fruit trees and grape vines". The suggested furrow spacing for orchards depends on the type of plant/tree being grown.

The soil types were determined using the soils information from the USDA, NRCS for the Elmore Area, Idaho. The dominant soils on the property are Buko Fine Sandy Loam and Lankbush Sandy Loam.

The weather station nearest to this site is the Glenns Ferry. The 80th percentile monthly ET values from that weather station were used for my analysis.

All of Field A was analyzed as pasture, based on the information provided by Mr. Brown. Field B was analyzed using the following crops: orchard, truck garden (A, B, and C), and pasture. The rooting depths, percent available moisture, row spacing, and irrigation methods suggested in Figure A-6, referenced above, were used. The steep slope in Field B created a situation for furrows such that the maximum allowable inflow per furrow was less than the minimum allowable inflow per furrow. Because furrows, rather than corrugations, were suggested for truck gardens, truck gardens could not be analyzed for Field B, nor could furrows be used for orchards. In my limited research, it appeared that the minimum corrugation spacing for orchards is 6 feet, depending on the type of tree or vine. With that spacing and the existing conditions, an efficiency for corrugations could only be determined for one of the two soils present on the field. For all these reasons, I was only able to complete the analysis of Field B using pasture. I assumed that if the field were ever to be converted back to a surface irrigation system, the physical conditions would limit the use of the field and make pasture the most likely crop grown.

RESULTS

The **Total On-Farm Irrigation Requirement** for A02-04006B was determined to be **0.36 cfs for 15.1 acres, or 0.024 cfs per acre**. This determination was made using the crop with the highest irrigation requirement for each field. These are strictly the on-farm diversion requirements, with no allowances made for conveyance loss. It appears that pipes rather than ditches are used for the delivery of water to the fields, making a conveyance loss calculation unnecessary.

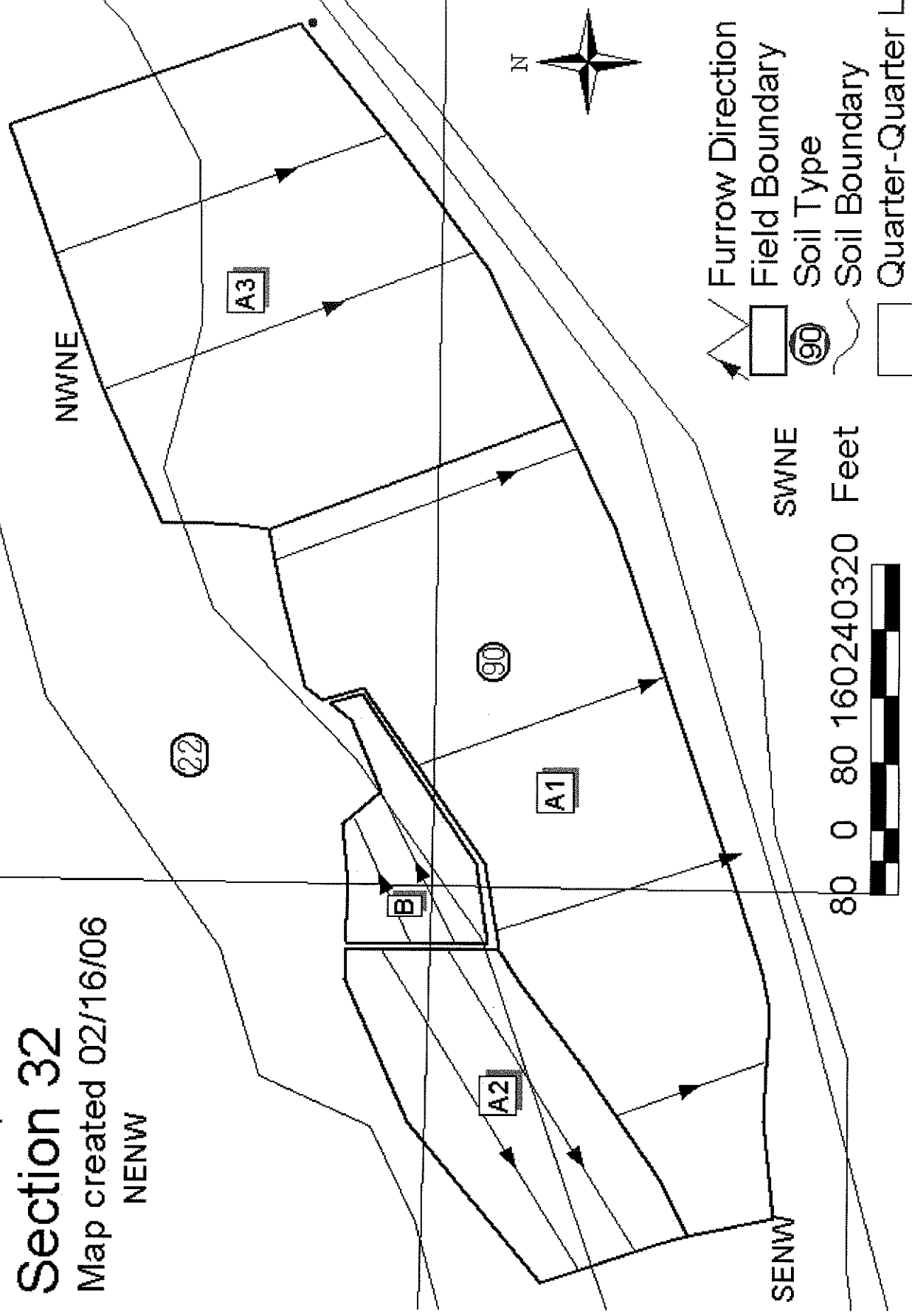
Water Right No. 02-04006B

T. 5 S., R. 10 E.

Section 32

Map created 02/16/06

NENW



IRRIGATION DIVERSION RATE ANALYSIS

FIELD ID NO: A1

FIELD SLOPE: 0.2 %

FURROW LENGTH: 300 FT

DATE OF ANALYSIS:

02/09/06

For corrugates: 10.0 gpm

For both: 3.0 gpm

For furrows: 50.0 gpm

[illegible]

TOTAL AC	TOTAL %
6.5	100

CFS/AC FOR
EACH CROP: 0.024

TOTAL CFS FOR FIELD: 0.15

FIELD ID NO: A2

TOTAL ACRES: 2.1 AC

FIELD SLOPE: 0.3 %

FURROW LENGTH: 450 FT

DATE OF ANALYSIS:

02/09/06

Q_{max} PER FURROW:

Qmin PER FURROW:

For corrugates: 10.0 gpm

For both: 3.0 gpm

[illegible]

TOTAL AC	TOTAL %
2.1	100

CFS/AC FOR
EACH CROP: 0.026

TOTAL CFS FOR FIELD: 0.06

0.03

Field A1: Soil 90, pasture, corrugations

FURROW

Auto

INTAKE FAMILY <If> = 0.70
 DESIGN APPLICATION <Fn> = 2.88 INCHES
 FURROW SLOPE <S> = 0.002 FEET/FOOT
 FURROW SPACING <W> = 2.00 FEET
 FURROW LENGTH <L> = 300 FEET
 INFLOW RATE <Q> = 3.0 GPM/FURROW
 APPLICATION TIME <Ti> = 12 HOURS

 ADVANCE TIME <Tt> = 351.8 MINUTES; OR 5.9 HOURS
 GROSS APPLICATION <Fg> = 5.77 INCHES
 NET APPLICATION <Fn> = 3.72 INCHES
 RUNOFF <Ro> = 0.15 INCHES
 DEEP PERCOLATION <Dp> = 2.74 INCHES
 EFFICIENCY <E> = 49.87 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.88 in
 Furrow Slope <2> 0.002 ft/ft
 Furrow Spacing <3> 2.00 ft
 Furrow Length <4> 300 ft
 Furrow Intake Family <5> 0.70
 Inflow Rate <6> 3.0 gpm/furrow
 Inflow Time <7> 12 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? _

Field A2: Soil 22, pasture, corrugations

FURROW

Auto

INTAKE FAMILY <If> = 0.55
 DESIGN APPLICATION <Fn> = 2.33 INCHES
 FURROW SLOPE <S> = 0.003 FEET/FOOT
 FURROW SPACING <W> = 2.00 FEET
 FURROW LENGTH <L> = 450 FEET
 INFLOW RATE <Q> = 3.5 GPM/FURROW
 APPLICATION TIME <Ti> = 12 HOURS

 ADVANCE TIME <Tt> = 371.9 MINUTES; OR 6.2 HOURS
 GROSS APPLICATION <Fg> = 4.49 INCHES
 NET APPLICATION <Fn> = 2.89 INCHES
 RUNOFF <Ro> = 0.04 INCHES
 DEEP PERCOLATION <Dp> = 2.12 INCHES
 EFFICIENCY <E> = 51.88 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.33 in
 Furrow Slope <2> 0.003 ft/ft
 Furrow Spacing <3> 2.00 ft
 Furrow Length <4> 450 ft
 Furrow Intake Family <5> 0.55
 Inflow Rate <6> 3.5 gpm/furrow
 Inflow Time <7> 12 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? _

Field A2: Soil 90, pasture, corrugations

FURROW

Auto

INTAKE FAMILY <If> = 0.70
 DESIGN APPLICATION <Fn> = 2.88 INCHES
 FURROW SLOPE <S> = 0.003 FEET/FOOT
 FURROW SPACING <W> = 2.00 FEET
 FURROW LENGTH <L> = 450 FEET
 INFLOW RATE <Q> = 5.0 GPM/FURROW
 APPLICATION TIME <Ti> = 12 HOURS

 ADVANCE TIME <Tt> = 210.4 MINUTES; OR 3.5 HOURS
 GROSS APPLICATION <Fg> = 6.42 INCHES
 NET APPLICATION <Fn> = 5.01 INCHES
 RUNOFF <Ro> = 0.31 INCHES
 DEEP PERCOLATION <Dp> = 3.23 INCHES
 EFFICIENCY <E> = 44.88 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.88 in
 Furrow Slope <2> 0.003 ft/ft
 Furrow Spacing <3> 2.00 ft
 Furrow Length <4> 450 ft
 Furrow Intake Family <5> 0.70
 Inflow Rate <6> 5.0 gpm/furrow
 Inflow Time <7> 12 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>?

Field A3: Soil 22, pasture, corrugations

FURROW

Auto

INTAKE FAMILY <If> = 0.55
 DESIGN APPLICATION <Fn> = 2.33 INCHES
 FURROW SLOPE <S> = 0.048 FEET/FOOT
 FURROW SPACING <W> = 2.00 FEET
 FURROW LENGTH <L> = 450 FEET
 INFLOW RATE <Q> = 3.0 GPM/FURROW
 APPLICATION TIME <Ti> = 12 HOURS

 ADVANCE TIME <Tt> = 41.8 MINUTES; OR 0.7 HOURS
 GROSS APPLICATION <FG> = 3.05 INCHES
 NET APPLICATION <Fn> = 3.67 INCHES
 RUNOFF <RO> = 0.08 INCHES
 DEEP PERCOLATION <DP> = 1.64 INCHES
 EFFICIENCY <E> = 60.52 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.33 in
 Furrow Slope <2> 0.048 ft/ft
 Furrow Spacing <3> 2.00 ft
 Furrow Length <4> 450 ft
 Furrow Intake Family <5> 0.55
 Inflow Rate <6> 3.0 gpm/furrow
 Inflow Time <7> 12 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>?

Field A3: Soil 90, pasture, corrugations

FURROW

Auto

INTAKE FAMILY <If> = 0.70
 DESIGN APPLICATION <Fn> = 2.88 INCHES
 FURROW SLOPE <S> = 0.048 FEET/FOOT
 FURROW SPACING <W> = 2.00 FEET
 FURROW LENGTH <L> = 450 FEET
 INFLOW RATE <Q> = 4.0 GPM/FURROW
 APPLICATION TIME <Ti> = 12 HOURS

 ADVANCE TIME <Tt> = 36.5 MINUTES; OR 0.6 HOURS
 GROSS APPLICATION <FG> = 5.13 INCHES
 NET APPLICATION <Fn> = 4.74 INCHES
 RUNOFF <RO> = 0.27 INCHES
 DEEP PERCOLATION <DP> = 1.98 INCHES
 EFFICIENCY <E> = 56.11 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.88 in
 Furrow Slope <2> 0.048 ft/ft
 Furrow Spacing <3> 2.00 ft
 Furrow Length <4> 450 ft
 Furrow Intake Family <5> 0.70
 Inflow Rate <6> 4.0 gpm/furrow
 Inflow Time <7> 12 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>?

Field B: Soil 22, orchard, corrugations, 6 ft. corrugation spacings

FURROW

Auto

INTAKE FAMILY <If> = 0.55
 DESIGN APPLICATION <Fn> = 2.93 INCHES
 FURROW SLOPE <S> = 0.060 FEET/FOOT
 FURROW SPACING <W> = 6.00 FEET
 FURROW LENGTH <L> = 200 FEET
 INFLOW RATE <Q> = 4.5 GPM/FURROW
 APPLICATION TIME <Ti> = 36 HOURS

 ADVANCE TIME <Tt> = 9.6 MINUTES; OR 0.2 HOURS
 GROSS APPLICATION <FG> = 12.99 INCHES
 NET APPLICATION <Fn> = 2.96 INCHES
 RUNOFF <RO> = 10.03 INCHES
 DEEP PERCOLATION <DP> = 0.04 INCHES
 EFFICIENCY <E> = 22.55 %

TO CHANGE: PRESS (EXISTING)
 Design Application <1> 2.93 in
 Furrow Slope <2> 0.060 ft/ft
 Furrow Spacing <3> 6.00 ft
 Furrow Length <4> 200 ft
 Furrow Intake Family <5> 0.55
 Inflow Rate <6> 4.5 gpm/furrow
 Inflow Time <7> 36 hours <ANALYSIS MODE>

TO PRINT: DATA/WITH HEADING PRESS:<8/9>
 NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? _

Field B: Soil 90, orchard, corrugations, 6 ft. corrugation spacings

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M3 FURROW
Auto
YOU CANNOT HAVE AN OPPORTUNITY TIME GREATER THAN INFLOW TIME!!! INCREASE INFLOW
TIME(TI) OR 'Q'.
TO CHANGE: PRESS (EXISTING)
Design Application <1> 4.44 in
Furrow Slope <2> 0.060 ft/ft
Furrow Spacing <3> 6.00 ft
Furrow Length <4> 200 ft
Furrow Intake Family <5> 0.70
Inflow Rate <6> 6.5 gpm/furrow
Inflow Time <7> 24 hours <ANALYSIS MODE>
TO PRINT: DATA/WITH HEADING PRESS:<8/9>
NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? 7
INFLOW TIME? 36
YOU CANNOT HAVE AN OPPORTUNITY TIME GREATER THAN INFLOW TIME!!! INCREASE INFLOW
TIME(TI) OR 'Q'.
TO CHANGE: PRESS (EXISTING)
Design Application <1> 4.44 in
Furrow Slope <2> 0.060 ft/ft
Furrow Spacing <3> 6.00 ft
Furrow Length <4> 200 ft
Furrow Intake Family <5> 0.70
Inflow Rate <6> 6.5 gpm/furrow
Inflow Time <7> 36 hours <ANALYSIS MODE>
TO PRINT: DATA/WITH HEADING PRESS:<8/9>
NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>?

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Field B: Soil 22, pasture, corrugations

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M3 FURROW
Auto
INTAKE FAMILY <IF> = 0.55
DESIGN APPLICATION <Fn> = 2.33 INCHES
FURROW SLOPE <S> = 0.060 FEET/FOOT
FURROW SPACING <W> = 2.00 FEET
FURROW LENGTH <L> = 200 FEET
INFLOW RATE <Q> = 3.0 GPM/FURROW
APPLICATION TIME <Ti> = 12 HOURS
*****
ADVANCE TIME <Ti> = 10.8 MINUTES; OR 0.2 HOURS
GROSS APPLICATION <FG> = 8.66 INCHES
NET APPLICATION <Fn> = 3.74 INCHES
RUNOFF <RO> = 4.90 INCHES
DEEP PERCOLATION <DP> = 1.44 INCHES
EFFICIENCY <E> = 26.90 %
TO CHANGE: PRESS (EXISTING)
Design Application <1> 2.33 in
Furrow Slope <2> 0.060 ft/ft
Furrow Spacing <3> 2.00 ft
Furrow Length <4> 200 ft
Furrow Intake Family <5> 0.55
Inflow Rate <6> 3.0 gpm/furrow
Inflow Time <7> 12 hours <ANALYSIS MODE>
TO PRINT: DATA/WITH HEADING PRESS:<8/9>
NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? _

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Field B: Soil 90, pasture, corrugations

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M3 FURROW
Auto
INTAKE FAMILY <IF> = 0.70
DESIGN APPLICATION <Fn> = 2.88 INCHES
FURROW SLOPE <S> = 0.060 FEET/FOOT
FURROW SPACING <W> = 2.00 FEET
FURROW LENGTH <L> = 200 FEET
INFLOW RATE <Q> = 3.0 GPM/FURROW
APPLICATION TIME <Ti> = 12 HOURS
*****
ADVANCE TIME <Ti> = 11.2 MINUTES; OR 0.2 HOURS
GROSS APPLICATION <FG> = 8.66 INCHES
NET APPLICATION <Fn> = 4.63 INCHES
RUNOFF <RO> = 4.00 INCHES
DEEP PERCOLATION <DP> = 1.78 INCHES
EFFICIENCY <E> = 33.25 %
TO CHANGE: PRESS (EXISTING)
Design Application <1> 2.88 in
Furrow Slope <2> 0.060 ft/ft
Furrow Spacing <3> 2.00 ft
Furrow Length <4> 200 ft
Furrow Intake Family <5> 0.70
Inflow Rate <6> 3.0 gpm/furrow
Inflow Time <7> 12 hours <ANALYSIS MODE>
TO PRINT: DATA/WITH HEADING PRESS:<8/9>
NEW DESIGN PRESS <10>, NEW ANALYSIS PRESS <11>, QUIT PRESS <12>? _

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FIELD IRRIGATION REQUIREMENT

initials: MP Claimant = Brown - Field Al
 date: 02/08/06 Weather Station = Glenns Ferry

crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)								AVE IR season (mm/yr)		net irrig. app. (in)	ET ratio	irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)								season (mm/yr)
				mar	apr	may	jun	jul	aug	sep	oct	oct	sep				oct	mar	apr	may	jun	jul	aug	sep	
past	6.5	cor	50		3.04	5.27	6.56	6.59	5.37	4.15	3.06	2.88	1.09	10.2	6.63	11.49	14.30	14.37	11.71	9.05	6.67				
summary				6.5											6.63	11.49	14.30	14.37	11.71	9.05	6.67				

Peak Gross Irrigation Application (mm/day) = 14.37
 On-Farm Irrigation Requirement (cfs/acre) = 0.024
 Total On-Farm Irrigation Requirement (cfs) = 0.15
 Irrigation Diversion Volume (ft/yr) = 0.00
 Total Irrigation Diversion Volume (ac-ft/yr) = 0

initials: MP
date: 02/08/06
Claimant = Brown - Field A2
Weather Station = Glenns Ferry

crop	acres	irrig. eff. (%)	Monthly ET (mm/day)												irrig. system	cor	ave IR season (mm/yr)	net irrig. app. (in)	ET ratio	irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)										season (mm/yr)
			mar	apr	may	jun	jul	aug	sep	oct	ave IR season (mm/yr)	net irrig. app. (in)	ET ratio	irrig. freq. (days)							mar	apr	may	jun	jul	aug	sep	oct			
past	2.1	45		3.04	5.27	6.56	6.59	5.37	4.15	3.06		2.88	1.09	10.2		7.36	12.77	15.89	15.96	13.01	10.05	7.41									
Summary	2.1															7.36	12.77	15.89	15.96	13.01	10.05	7.41									

Peak Gross Irrigation Application (mm/day)	=	15.96
On-Farm Irrigation Requirement (cfs/acre)	=	0.026
Total On-Farm Irrigation Requirement (cfs)	=	0.06
Irrigation Diversion Volume (ft ³ /yr)	=	0.00
Total Irrigation Diversion Volume (ac-ft/yr)	=	0

FIELD IRRIGATION REQUIREMENT

initials: MP Claimant = Brown - Field A3
date: 02/08/06 Weather Station = Glenns Ferry

crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)					AVE IR season (mm/yr)		net irrig. app. (in)	ET ratio	irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)										season (mm/yr)
				mar	apr	may	jun	jul	aug	sep				oct	mar	apr	may	jun	jul	aug	sep	oct		
past	5.8	cor	56		3.04	5.27	6.56	6.59	5.37	4.15	3.06	2.88	1.09	10.2	5.92	10.26	12.77	12.83	10.45	8.08	5.96			

Summary 5.8

Peak Gross Irrigation Application (mm/day) = 12.83
On-Farm Irrigation Requirement (cfs/acre) = 0.021
Total On-Farm Irrigation Requirement (cfs) = 0.12
Irrigation Diversion Volume (ft/yr) = 0.00
Total Irrigation Diversion Volume (ac-ft/yr) = 0

5.92 10.26 12.77 12.83 10.45 8.08 5.96

FIELD IRRIGATION REQUIREMENT

initials: MP Claimant = Brown - Field B
 date: 02/14/06 Weather Station = Glens Ferry

crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)												net irrig. app. (in)	ET ratio	irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)												season (mm/yr)
				cor	27	mar	apr	may	jun	jul	aug	sep	oct	AVE IR season (mm/yr)	mar				apr	may	jun	jul	aug	sep	oct						
past	0.7					3.04	5.27	6.56	6.59	5.37	4.15	3.06		2.33	1.10	8.2				12.39	21.47	26.73	26.85	21.88	16.91	12.47					
Summary																															
0.7																															
Peak Gross Irrigation Application (mm/day) = 26.85																															
On-Farm Irrigation Requirement (cfs/acre) = 0.044																															
Total On-Farm Irrigation Requirement (cfs) = 0.03																															
Irrigation Diversion Volume (ft/yr) = 0.00																															
Total Irrigation Diversion Volume (ac-ft/yr) = 0																															

Summary 0.7

Peak Gross Irrigation Application (mm/day) = 26.85
 On-Farm Irrigation Requirement (cfs/acre) = 0.044
 Total On-Farm Irrigation Requirement (cfs) = 0.03
 Irrigation Diversion Volume (ft/yr) = 0.00
 Total Irrigation Diversion Volume (ac-ft/yr) = 0

12.39 21.47 26.73 26.85 21.88 16.91 12.47

80th Percentile Values of Monthly ET (mm/day)

Station: Glens Ferry

	ETR	ALFH	ALFS	BEANS	F CRN	SILGE	S CRN	PEAS	POTAT	SBEET	SGRAN	WGRAN	PAST	ORCHD	VEGES	ONION	HOPS
March	2.47		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	1.31	0.00	0.00	0.00	0.00	0.00
March	0.35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.18	0.00	0.00	0.00	0.00	0.00
March	2.76	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	1.46	0.00	0.00	0.00	0.00	0.00
April	4.94	S															
April	0.44	E	3.24	0.00	0.00	0.00	0.00	0.00	1.48	1.48	1.75	4.69	2.83	2.15	0.00	0.00	0.00
April	5.31		0.29	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.15	0.41	0.25	0.19	0.00	0.00	0.00
May	6.43	E	3.48	0.00	0.00	0.00	0.00	0.00	1.59	1.59	1.88	5.04	3.04	2.31	0.00	0.00	0.00
May	0.49	T	5.78	1.93	1.93	1.93	1.93	0.00	2.53	1.96	5.66	6.43	4.95	4.23	2.04	0.00	0.00
May	6.84	R	0.44	0.15	0.15	0.15	0.15	0.00	0.19	0.15	0.43	0.49	0.38	0.32	0.16	0.00	0.00
June	8.11	F	6.15	2.06	2.06	2.06	2.06	0.00	2.69	2.09	6.02	6.84	5.27	4.50	2.17	0.00	0.00
June	0.48	O	7.12	4.31	3.53	3.53	3.53	0.00	6.27	4.73	8.11	8.11	6.25	6.71	4.67	0.00	0.00
June	8.51	R	0.42	0.25	0.21	0.21	0.21	0.00	0.37	0.28	0.48	0.48	0.37	0.40	0.28	0.00	0.00
July	8.32	A	6.00	7.68	7.48	7.48	7.39	0.00	6.91	8.26	5.40	5.46	6.40	7.07	6.54	0.00	0.00
July	0.30	L	0.22	0.28	0.27	0.27	0.27	0.00	0.25	0.30	0.20	0.20	0.23	0.26	0.24	0.00	0.00
July	8.57	F	6.19	7.92	7.71	7.71	7.62	0.00	7.12	8.51	5.57	5.63	6.59	7.29	6.74	0.00	0.00
August	6.66	A	3.02	3.07	6.14	6.14	5.86	0.00	4.96	6.43	1.08	1.06	5.13	5.66	5.25	0.00	0.00
August	0.36	L	0.16	0.17	0.33	0.33	0.32	0.00	0.27	0.35	0.06	0.06	0.28	0.31	0.28	0.00	0.00
August	6.96	F	3.15	3.21	6.42	6.42	6.13	0.00	5.19	6.72	1.13	1.11	5.37	5.92	5.49	0.00	0.00
September	5.10	A	1.58	0.00	3.81	3.81	0.00	0.00	2.51	4.25	0.00	0.00	3.92	4.18	3.31	0.00	0.00
September	0.35	H	0.11	0.00	0.26	0.26	0.00	0.00	0.17	0.29	0.00	0.00	0.27	0.29	0.23	0.00	0.00
September	5.39	A	1.67	0.00	4.03	4.03	0.00	0.00	2.65	4.49	0.00	0.00	4.15	4.42	3.50	0.00	0.00
October	3.71	Y	0.59	0.00	1.03	0.00	0.00	0.00	0.00	2.20	0.00	0.00	2.85	2.26	0.00	0.00	0.00
October	0.33		0.05	0.00	0.09	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.25	0.20	0.00	0.00	0.00
October	3.99		0.63	0.00	1.11	0.00	0.00	0.00	0.00	2.36	0.00	0.00	3.06	2.43	0.00	0.00	0.00

ET and standard deviation data (AVE ET and STDD ET) taken from Appendix E (unpublished) of Brockway, C.E., and R.G. Allen, 1983, Estimating Consumptive Irrigation Requirements for Crops in Idaho, Idaho Water and Energy Resources Research Institute.

80th Percentile ET values (80PCT ET) calculated based on Walpole, R.E., and R.H. Meyers, 1985, third edition, PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS, New York: Macmillan Publishing Company, pp. 132-144 and 574.

SOIL CHARACTERISTICS

initials: mp date: 01/30/06

Soil Type = Buko (22)
Source of Soils Data = NRCS website

soil depth (inches)		AWC (in/in)		PH		organic (%)		soil depth (ft)	AWC (inches)	intake family	
lower	upper	lower	upper	lower	upper	lower	upper			flood	furrow
0	7	0.1	0.14	7.4	8.4	1	2	1	1.79	2	0.55
7	24	0.18	0.2					2	4.07		
24	28	0.03	0.06					3	4.65		
28	60	0.03	0.07					4	5.25	alternate	
								5	5.85	method	
										2	0.55

Management Allowed Deficit (MAD)

crop	root depth (ft)	stress point	MAD (inches)	
			lower	upper
alfalfa (hay or seed)	5	0.5	2.93	
corn (field or silage)	4	0.5	2.63	
grain (winter or spring)	4	0.5	2.63	
pasture (or grass hay)	3	0.5	2.33	
other (enter below)				
orchard	5	0.5	2.93	
Truck garden (A) 2 ft spacing	1	0.35	0.63	
Truck garden (B) 3 ft spacing	2	0.35	1.42	
Truck garden (C) 2 ft spacing	3	0.5	2.33	

Physical Soil Properties

Elmore Area, Idaho, Parts of Elmore, Owyhee and Ada Counties

[Entries under "Erosion Factors--T" apply to the entire profile. Entries under "Wind Erodibility Group" and "Wind Erodibility Index" apply only to the surface layer. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth In	Sand Pct	Silt Pct	Clay Pct	Moist bulk density g/cc	Saturated hydraulic conductivity micro m/sec	Available water capacity In/In	Linear extensi- bility Pct	Organic matter Pct			Erosion factors			Wind erodi- bility group	Wind erodi- bility index
												Kw	Kf	T		
22:																
Buko	0-7	--	--	4-18	1.45-1.50	14.11-42.34	0.10-0.14	0.0-2.9	1.0-2.0	.20	.24	3	3			86
	7-24	--	--	18-30	1.50-1.60	1.41-4.23	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43					
	24-28	--	--	4-10	1.55-1.65	141.14	0.03-0.06	0.0-2.9	0.0-0.3	.05	.20					
	28-60	--	--	0-10	1.60-1.70	42.34-141.14	0.03-0.07	0.0-2.9	0.0-0.5	.10	.20					
90:																
Lankbush	0-8	--	--	12-18	1.45-1.60	14.11-42.34	0.11-0.13	0.0-2.9	1.0-2.0	.28	.32	5	3			86
	8-12	--	--	12-18	1.45-1.60	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.32					
	12-50	--	--	20-30	1.45-1.60	1.41-4.23	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37					
	50-60	--	--	0-8	1.55-1.65	14.11-42.34	0.04-0.08	0.0-2.9	0.0-0.5	.28	.32					

Buko Fine Sandy Loam 4-12%
Lankbush sandy loam 0-4%

Chemical Soil Properties

Elmore Area, Idaho, Parts of Elmore, Owyhee and Ada Counties

[Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
22:								
Buko	0-7	2.0-15	---	7.4-8.4	0-5	0	0.0-2.0	0-5
	7-24	10-25	---	7.9-8.4	0	0	0.0-2.0	0-5
	24-28	2.0-8.0	---	7.4-8.4	5-10	0	2.0-4.0	2-10
	28-60	1.0-8.0	---	7.9-8.4	0-10	0	0.0-2.0	0-5
90:								
Lankbush	0-8	10-20	---	6.6-7.3	0	0	0.0	0
	8-12	10-15	---	7.4-8.4	0-5	0	0.0-2.0	0-5
	12-50	15-25	---	7.4-8.4	0-5	0	0.0-2.0	0-5
	50-60	0.0-5.0	---	7.4-9.0	0-5	0	0.0-2.0	0-5

Engineering Properties

Elmore Area, Idaho, Parts of Elmore, Owyhee and Ada Counties

[Absence of an entry indicates that the data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
<i>In</i>												
<i>Pct</i>												
22:												
Buko	0-7	Fine sandy loam	SM	A-4	0	0	100	85-95	60-85	35-50	17-33	1-12
	7-24	Clay loam, Loam, Silt loam	CL	A-6	0	0	100	95-100	85-95	60-85	30-43	12-21
	24-28	Cemented very gravelly sand	GP, GP-GM, SP, SP-SM	A-1	0	0-25	40-60	35-50	20-40	0-10	15-23	1-6
	28-60	Extremely cobbly sand, Very gravelly loamy sand, Very gravelly sand	GM, GP, GP-GM	A-1	0	5-60	40-50	25-50	15-35	0-15	0-23	NP-6
90:												
Lankbush	0-8	Sandy loam	SC	A-2, A-4	0	0	85-100	85-100	45-65	25-40	24-33	7-12
	8-12	Coarse sandy loam, Sandy loam	SC	A-2, A-4	0	0	85-100	85-100	45-65	25-40	22-30	7-12
	12-50	Clay loam, Loam, Sandy clay loam	CL	A-6	0	0	85-100	85-100	70-100	30-80	31-42	13-21
	50-60	Loamy coarse sand, Sand, Sandy loam	SM, SP-SM	A-1, A-2, A-3	0	0	85-100	85-100	45-70	5-30	0-21	NP-4