

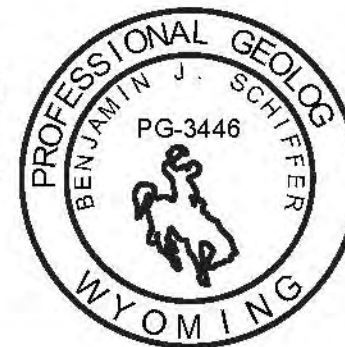
NOTES:
1. HOLES DRILLED BY OR LOCATED BY STRATA ARE INDICATED BY "SRV. EL."
2. STRATIGRAPHIC UNITS (i.e. LA, LB, etc.) ARE FROM TYPE LOG PRESENTED IN FIGURE 2.6-7.

LEGEND

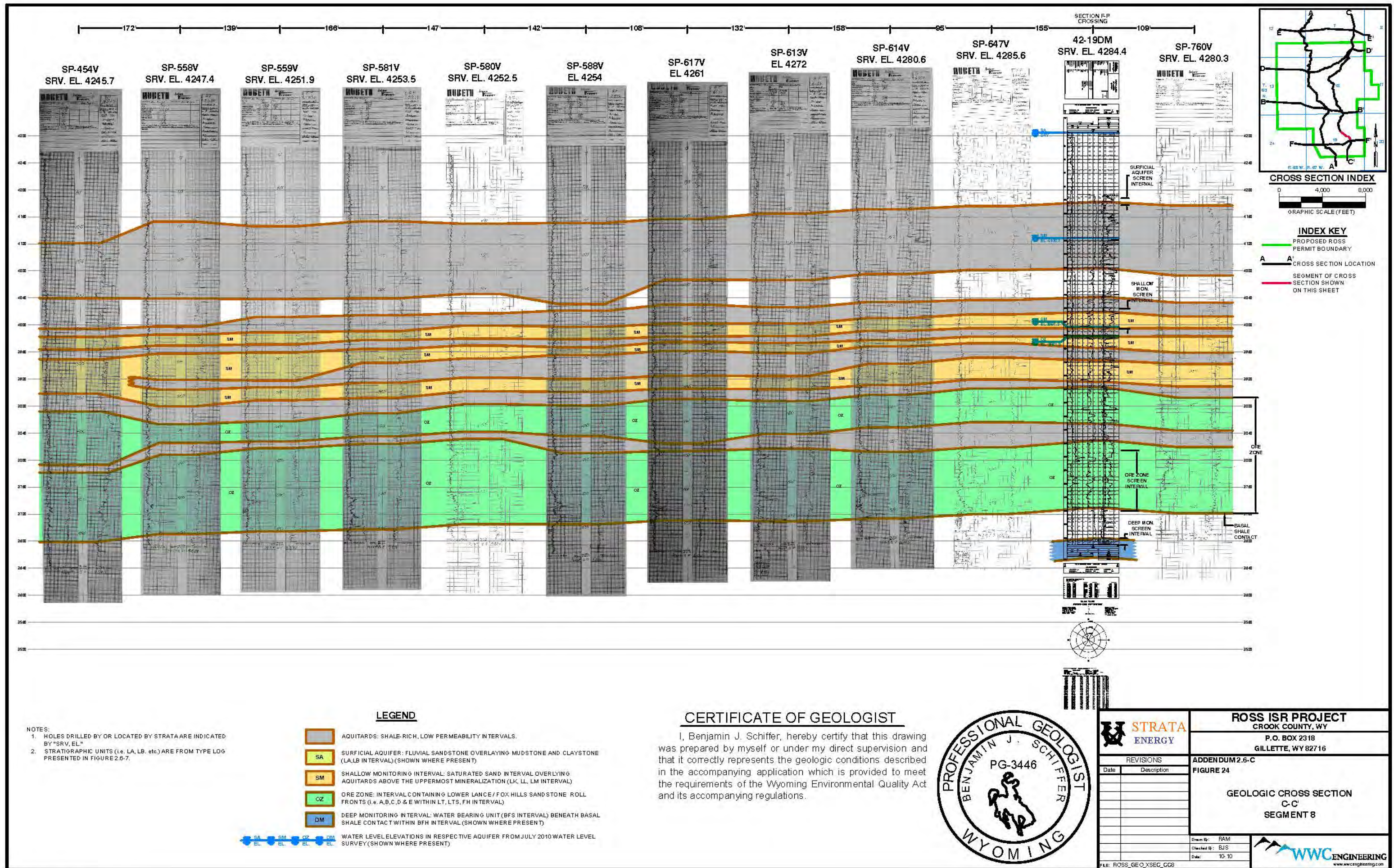
- AQUITARDS: SHALE-RICH, LOW PERMEABILITY INTERVALS.
 - SA SURFICIAL AQUIFER: FLUVIAL SANDSTONE OVERLAYING MUDSTONE AND CLAYSTONE (LA, LB INTERVAL) (SHOWN WHERE PRESENT)
 - SM SHALLOW MONITORING INTERVAL: SATURATED SAND INTERVAL OVERLYING AQUITARDS ABOVE THE UPPERMOST MINERALIZATION (LK, LL, LM INTERVAL)
 - OZ ORE ZONE: INTERVAL CONTAINING LOWER LANCE/FOX HILLS SANDSTONE ROLL FRONTS (i.e. A, B, C, D & E WITHIN LT, LTS, FH INTERVAL)
 - DM DEEP MONITORING INTERVAL: WATER BEARING UNIT (BFS INTERVAL) BENEATH BASAL SHALE CONTACT WITHIN BFH INTERVAL (SHOWN WHERE PRESENT)
- WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY (SHOWN WHERE PRESENT)

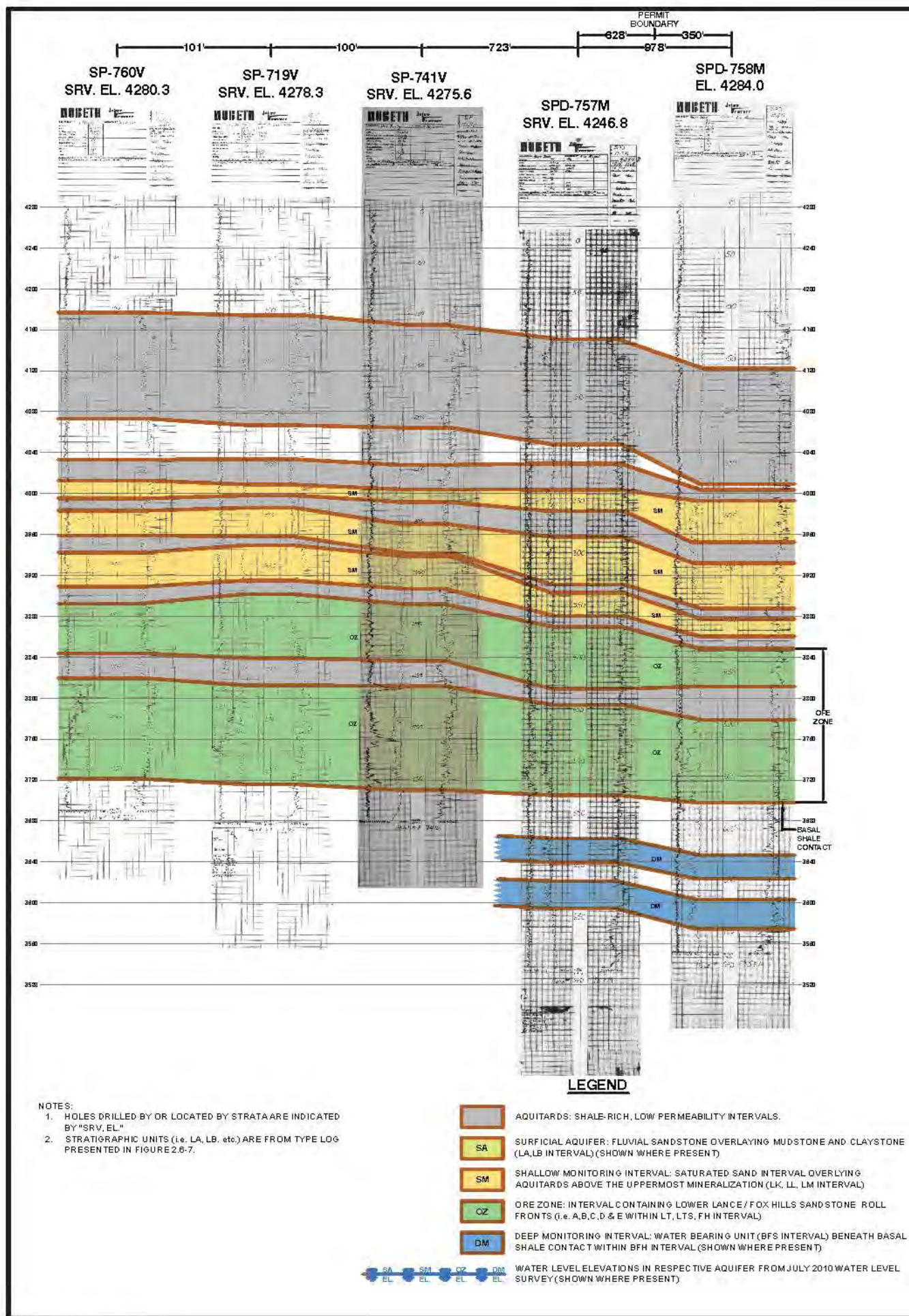
CERTIFICATE OF GEOLOGIST

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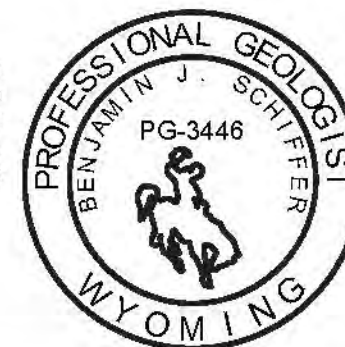
		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-C	
Date	Description	FIGURE 23	
		GEOLOGIC CROSS SECTION C-C' SEGMENT 7	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 10-10	
FILE: ROSS GEO XSEC.CC7			



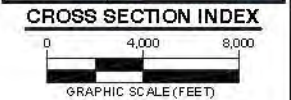
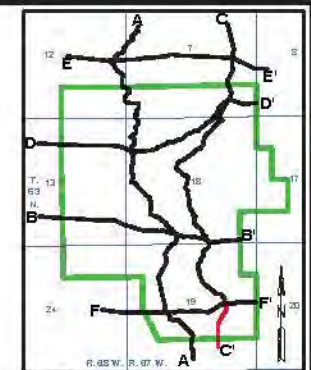


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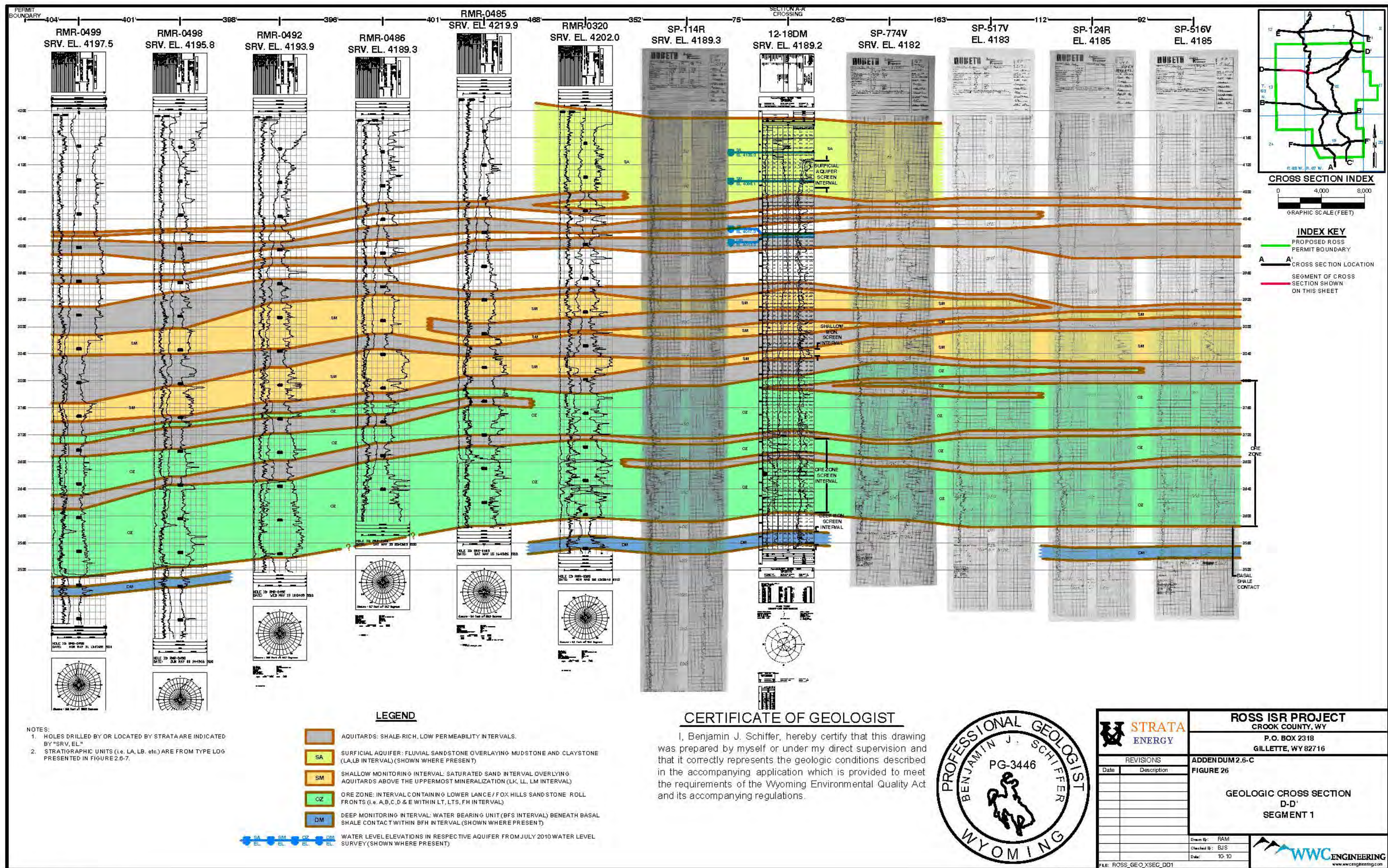


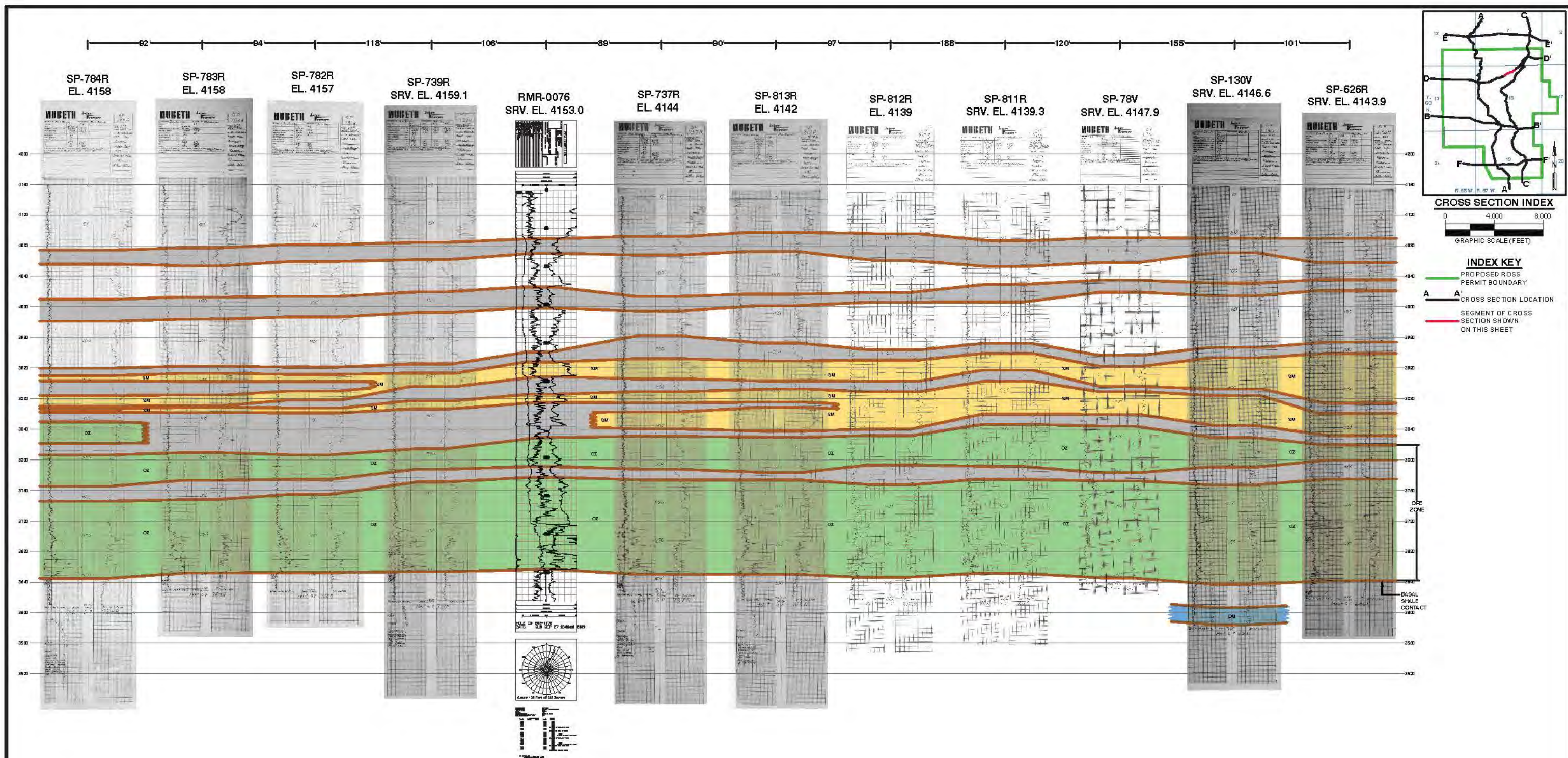
		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																					
		ADDENDUM 2.6-C FIGURE 25 GEOLOGIC CROSS SECTION C-C SEGMENT 9																					
REVISIONS <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		Date	Description																			Drawn By: RAM Checked By: BJS Date: 10-10	
Date	Description																						
FILE: ROSS GEO XSEC_C09																							



INDEX KEY

- PROPOSED ROSS
- PERMIT BOUNDARY
- CROSS SECTION LOCATION
- SEGMENT OF CROSS SECTION SHOWN ON THIS SHEET





- NOTES:
- HOLES DRILLED BY OR LOCATED BY STRATA ARE INDICATED BY "SRV. EL."
 - STRATIGRAPHIC UNITS (i.e. LA, LB, etc.) ARE FROM TYPE LOG PRESENTED IN FIGURE 2.6-7.

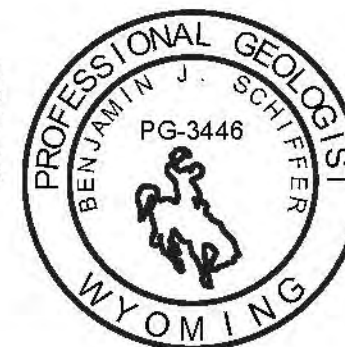
LEGEND

- AQUITARDS: SHALE-RICH, LOW PERMEABILITY INTERVALS.
- SA SURFICIAL AQUIFER: FLUVIAL SANDSTONE OVERLAYING MUDSTONE AND CLAYSTONE (LA, LB INTERVAL) (SHOWN WHERE PRESENT)
- SM SHALLOW MONITORING INTERVAL: SATURATED SAND INTERVAL OVERLYING AQUITARDS ABOVE THE UPPERMOST MINERALIZATION (LK, LL, LM INTERVAL)
- OZ ORE ZONE: INTERVAL CONTAINING LOWER LANCE/FOX HILLS SANDSTONE ROLL FRONTS (i.e. A, B, C, D & E WITHIN LT, LTS, FH INTERVAL)
- DM DEEP MONITORING INTERVAL: WATER BEARING UNIT (BFS INTERVAL) BENEATH BASAL SHALE CONTACT WITHIN BFS INTERVAL (SHOWN WHERE PRESENT)

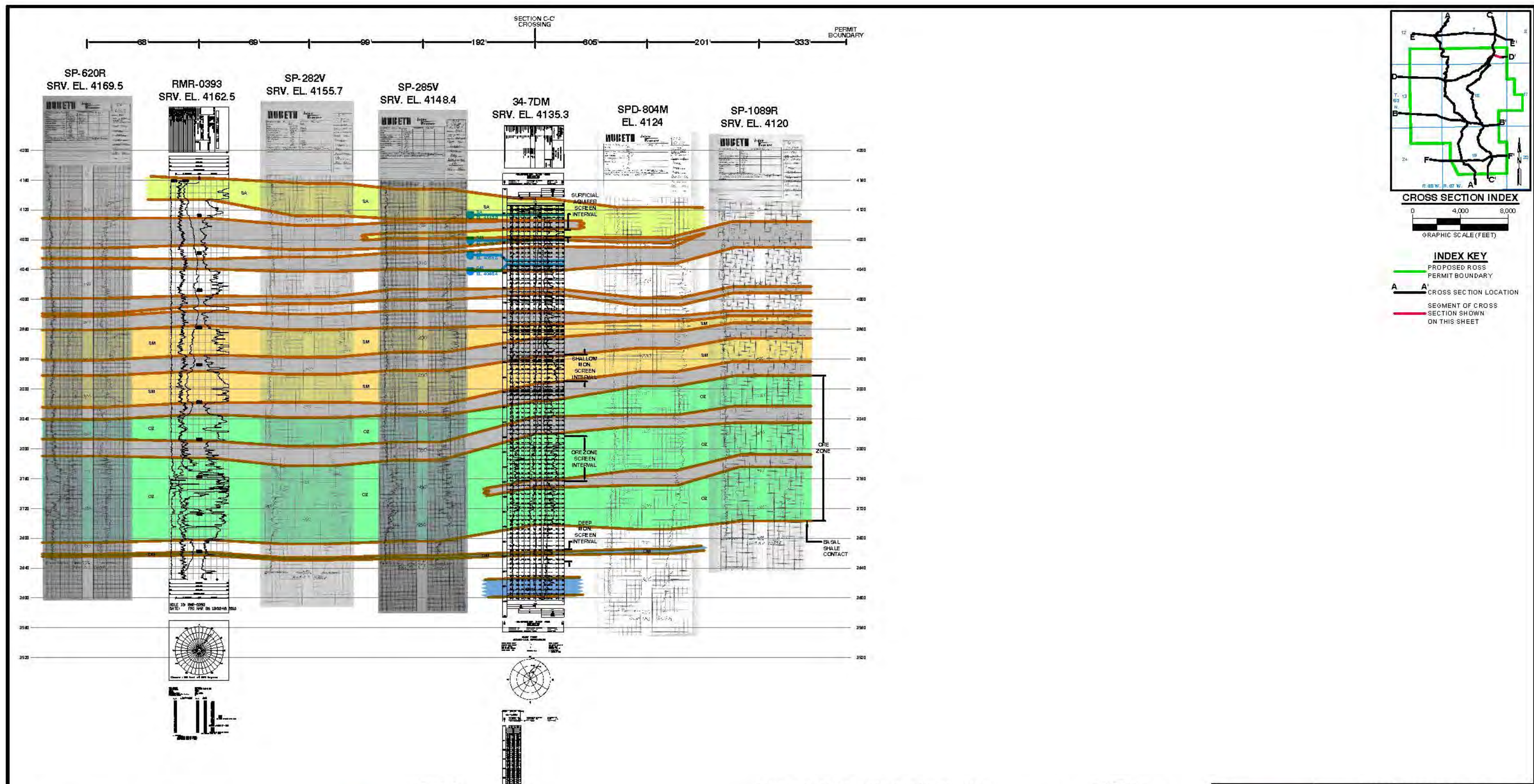
WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY (SHOWN WHERE PRESENT)

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STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-C FIGURE 28	
Date	Description	GEOLOGIC CROSS SECTION D-D' SEGMENT 3	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 10-10	
FILE: ROSS GEO XSEC DD3		WWC ENGINEERING www.wwcengineering.com	



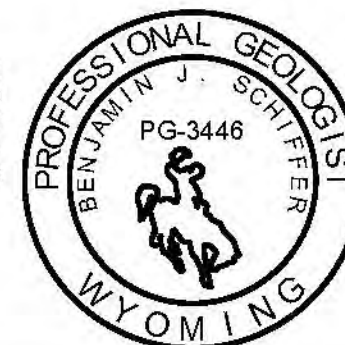
NOTES:
1. HOLES DRILLED BY OR LOCATED BY STRATA ARE INDICATED BY "SRV. EL."
2. STRATIGRAPHIC UNITS (i.e. LA, LB, etc.) ARE FROM TYPE LOG PRESENTED IN FIGURE 2.6-7.



LEGEND

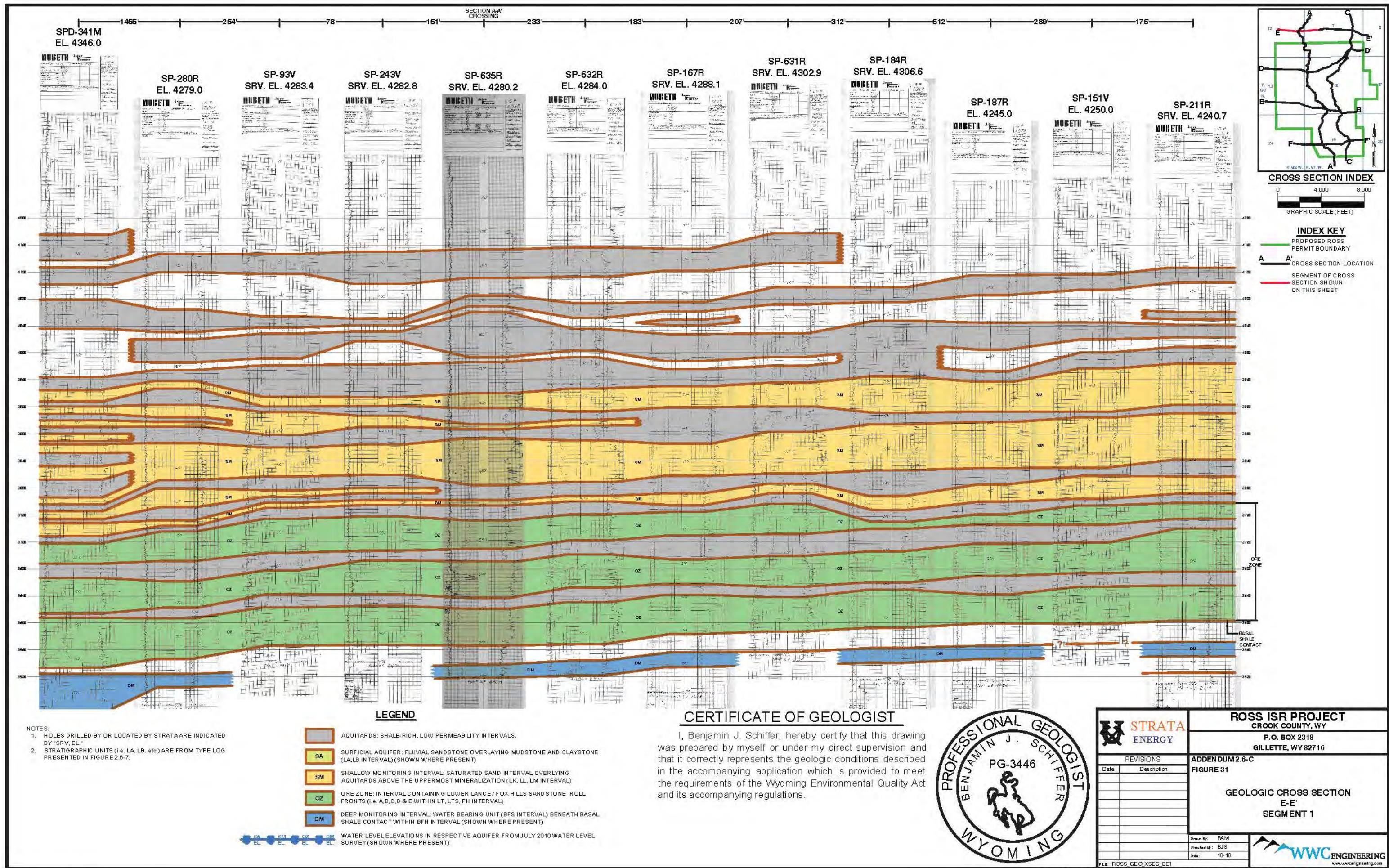
- AQUITARDS: SHALE-RICH, LOW PERMEABILITY INTERVALS.
- SA SURFICIAL AQUIFER: FLUVIAL SANDSTONE OVERLAYING MUDSTONE AND CLAYSTONE (LA, LB INTERVAL) (SHOWN WHERE PRESENT)
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- WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY (SHOWN WHERE PRESENT)

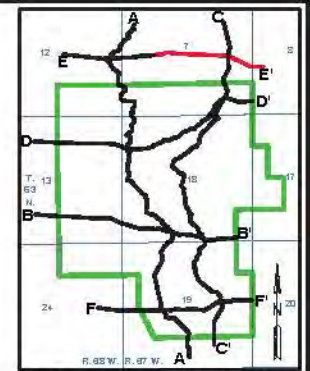
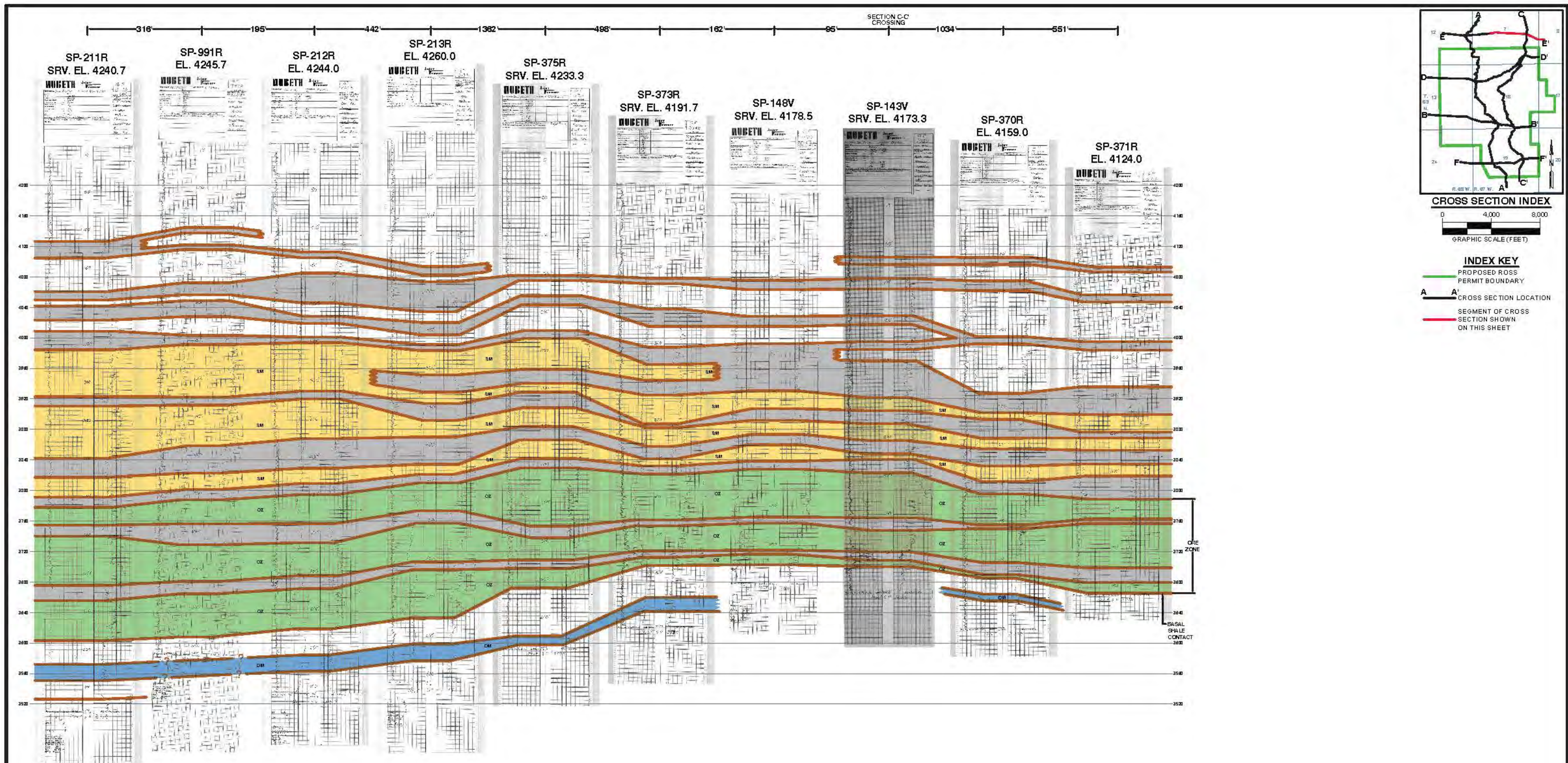
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		P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-C	
Date	Description	FIGURE 30	
		GEOLOGIC CROSS SECTION D-D' SEGMENT 5	
		Drawn By: RAM	 WWC ENGINEERING www.wwcengineering.com
		Checked By: BJS	
		Date: 10-10	
FILE: ROSS GEO XSEC.DDS			





CROSS SECTION INDEX

0 4,000 8,000
GRAPHIC SCALE (FEET)

INDEX KEY

PROPOSED CROSS
PERMIT BOUNDARY

A A' CROSS SECTION LOCATION

SEGMENT OF CROSS
SECTION SHOWN
ON THIS SHEET

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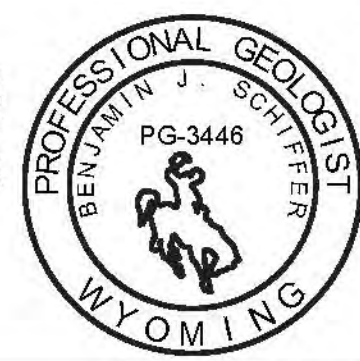
LEGEND

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- DM DEEP MONITORING INTERVAL: WATER BEARING UNIT (BFS INTERVAL) BENEATH BASAL SHALE CONTACT WITHIN BFH INTERVAL (SHOWN WHERE PRESENT)

WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY (SHOWN WHERE PRESENT)

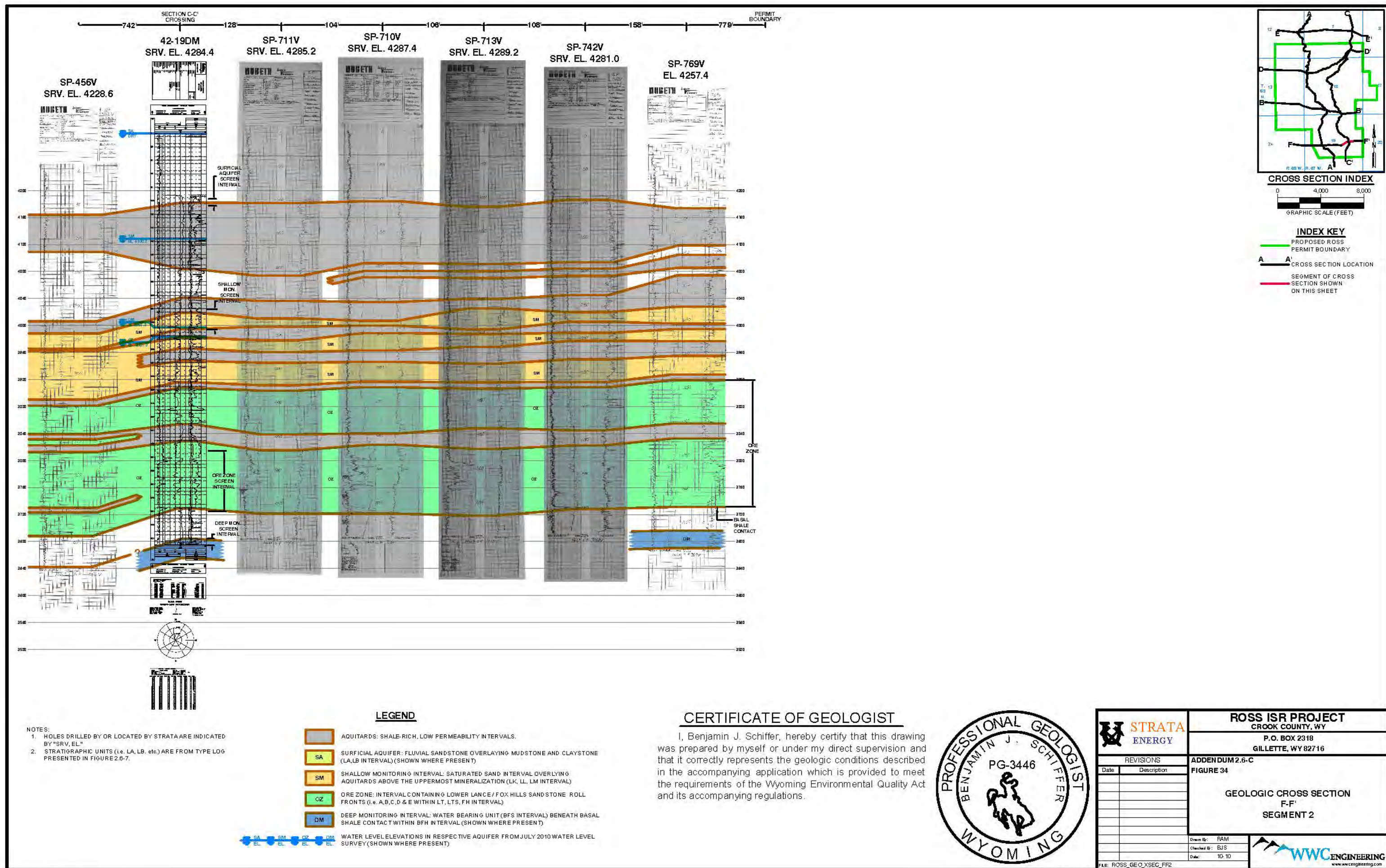
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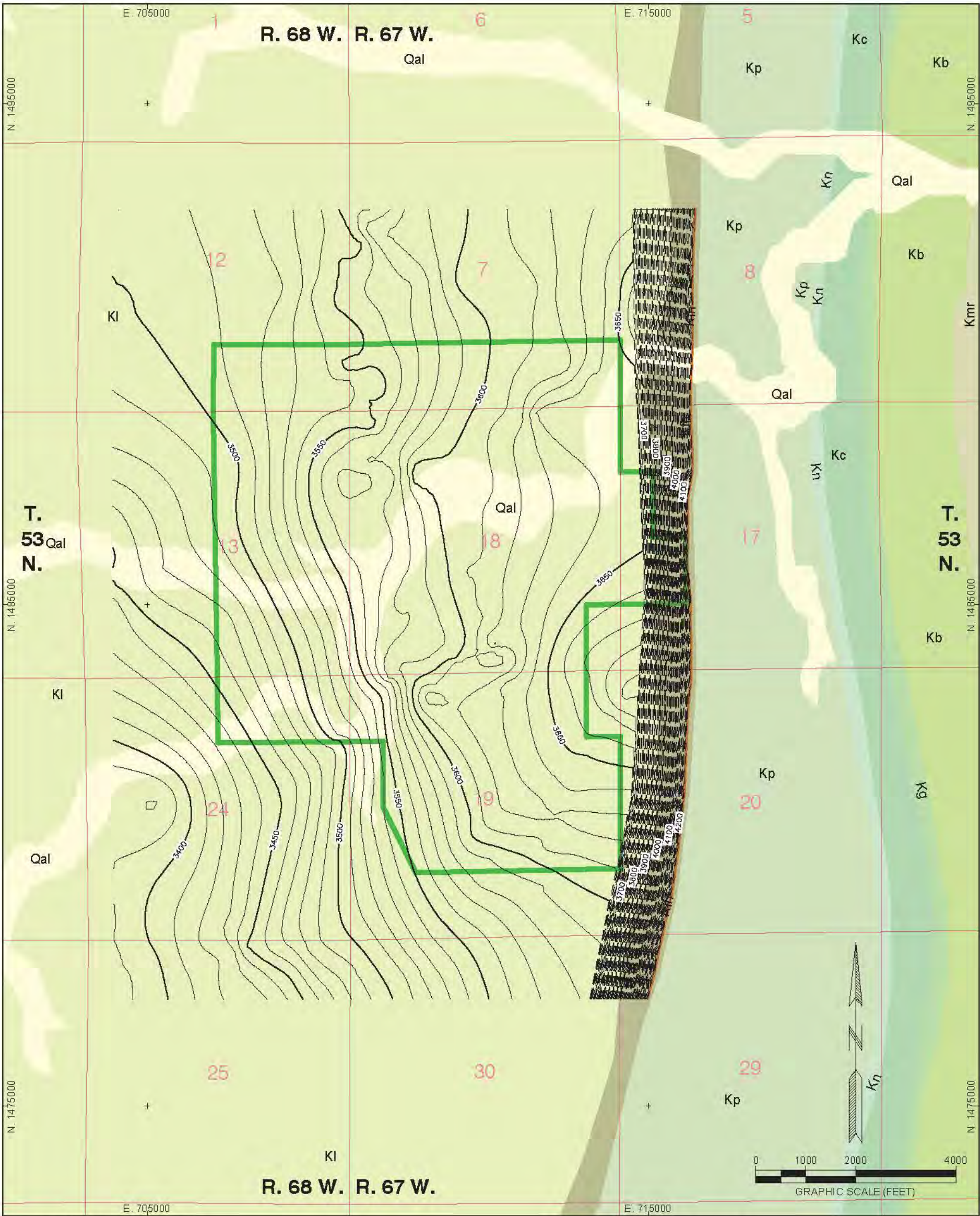


STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS Date Description		ADDENDUM 2.6-C FIGURE 32 GEOLOGIC CROSS SECTION E-E' SEGMENT 2	
Drawn By: RAM Checked By: BJS Date: 10-10		WWC ENGINEERING www.wwcengineering.com	





ADDENDUM 2.6-D
ISOPACHS AND STRUCTURE
CONTOUR MAPS



Drawing Coordinates: WY83EF

LEGEND

- PROPOSED ROSS PERMIT BOUNDARY
- TOP STRUCTURE ELEVATION (10' CONTOUR INTERVAL). CONTOUR LINES ARE DASHED WHERE ELEVATIONS WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.
- PROJECTED TOP OF DEEP MONITORING INTERVAL AT GROUND LEVEL

NOTES:

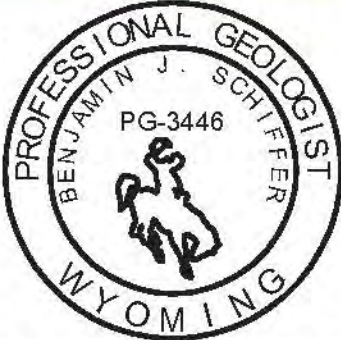
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
- SURFACES SHOWN DERIVED FROM GEMCOM GEMS@ SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

CONFINING UNIT
SM
CONFINING UNIT
OZ
CONFINING UNIT
DM

SURFACE
DEPICTED
THIS SHEET

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STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D FIGURE 1 STRUCTURE CONTOURS OF TOP OF DEEP MONITORING SURFACE	
Date	Description	Drawn By: RAM	
		Checked By: BJS	
		Date: 11-10	
FILE: ROSS_GEO_SURF_ISO.DWG		WWC ENGINEERING www.wwc-engineering.com	



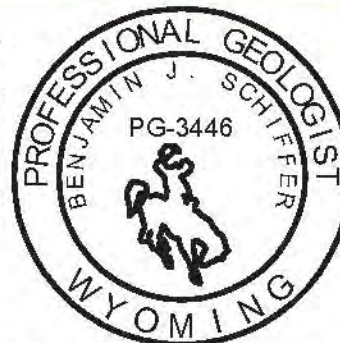
LEGEND


- NOTES:
1. SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS.
BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT
OF SITE SPECIFIC GROUNDWATER MODEL.

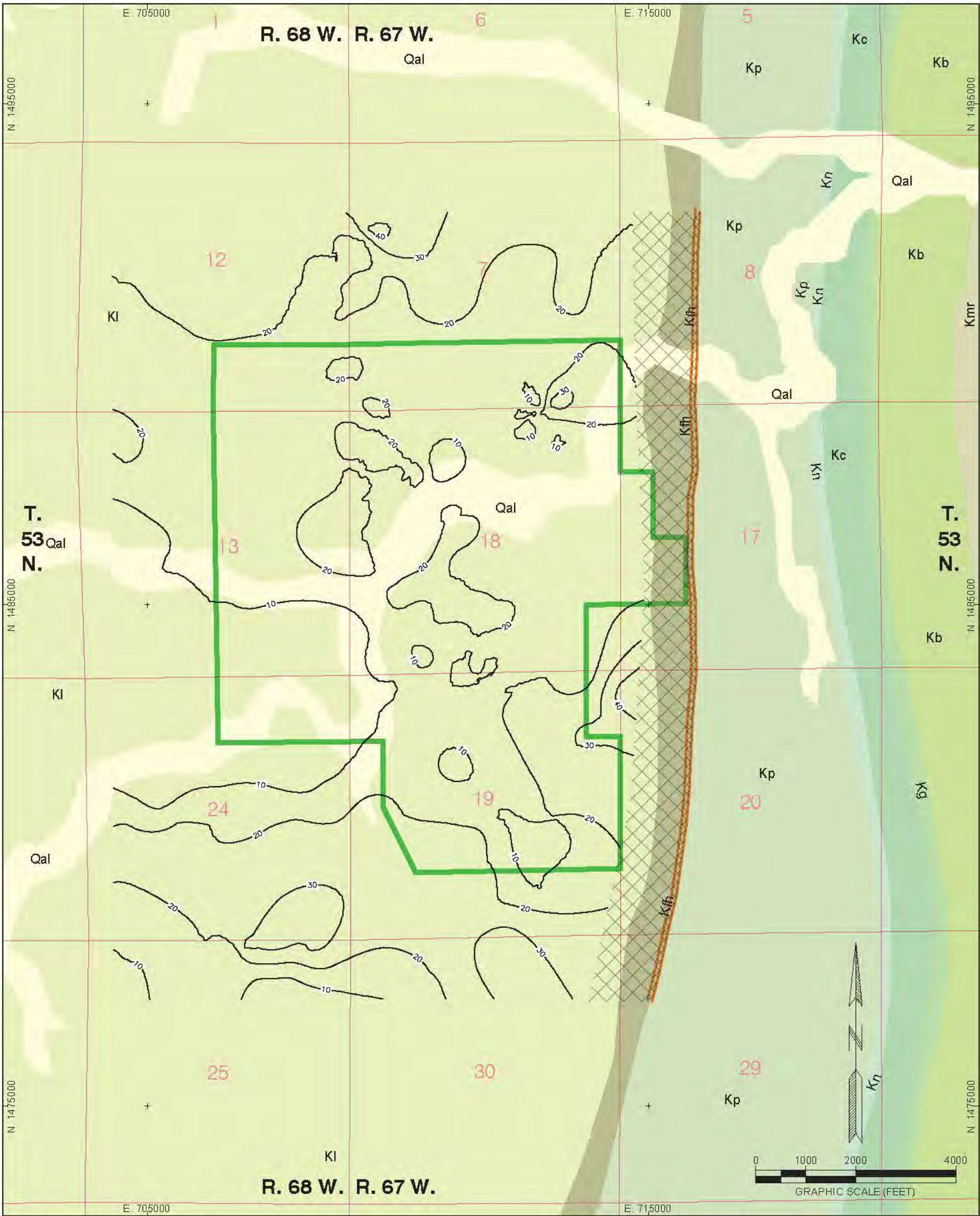
DM	CONFINING UNIT	QZ	CONFINING UNIT	SM	CONFINING UNIT
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SURFACE
DEPICTED
THIS SHEET

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 STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
	REVISIONS	
	Date	Description
	ADDENDUM 2.6-D FIGURE 2 STRUCTURE CONTOURS OF BOTTOM OF DEEP MONITORING SURFACE	
	Drawn By: RAM Checked By: BJS Date: 11-10	
FILE: ROSS GEO SURF ISO.DWG		



Drawing Coordinates: WY83EF

LEGEND

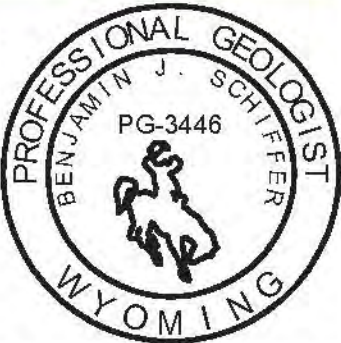
- PROPOSED ROSS PERMIT BOUNDARY
- ISOPACH LINE (10' CONTOUR INTERVAL)
- PROJECTED OUTCROP/SUBCROP OF DEEP MONITORING INTERVAL
- THICKNESS OF DEEP MONITORING INTERVAL UNDETERMINED DUE TO STEEPLY DIPPING BEDS


- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

CONFINING UNIT	
SM	
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	ISOPACH DEPICTED THIS SHEET

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	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
	ADDENDUM 2.6-D FIGURE 3 ISOPACH OF DEEP MONITORING INTERVAL	
REVISIONS		
Date	Description	



Drawing Coordinates: WY83EF

LEGEND

-  PROPOSED ROSS PERMIT BOUNDARY
-  ISOPACH LINE (10' CONTOUR INTERVAL)
-  PROJECTED OUTCROP/SUBCROP OF CONFINING UNIT BELOW ORE ZONE
-  THICKNESS OF CONFINING UNIT BELOW ORE ZONE UNDETERMINED DUE TO STEEPLY DIPPING BEDS

NOTES:

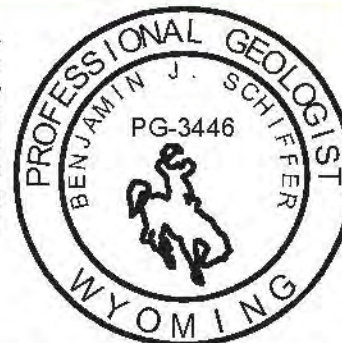
1. SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS.
BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT
OF SITE SPECIFIC GROUNDWATER MODEL.



	DM	CONFINING UNIT	OZ	CONFINING UNIT	SM	CONFINING UNIT
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ISOPACH
DEPICTED
THIS SHEET

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 STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																									
	REVISIONS	ADDENDUM 2.6-D FIGURE 4																								
<table><thead><tr><th>Date</th><th>Description</th></tr></thead><tbody><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></tbody></table>	Date	Description																							ISOPACH OF CONFINING UNIT BELOW ORE ZONE	
Date	Description																									
Drawn By: RAM Checked By: BJS Date: 11-10		 WWC ENGINEERING www.wwcengineers.com																								
P.L.S.: ROSS, GEO. SURE ISOPACH																										



Drawing Coordinates: WY83EF

LEGEND

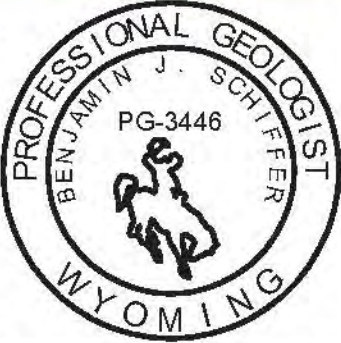
- PROPOSED ROSS PERMIT BOUNDARY
- TOP STRUCTURE ELEVATION (10' CONTOUR INTERVAL). CONTOUR LINES ARE DASHED WHERE ELEVATIONS WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.
- PROJECTED TOP OF ORE ZONE AT GROUND LEVEL



- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS[®] SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

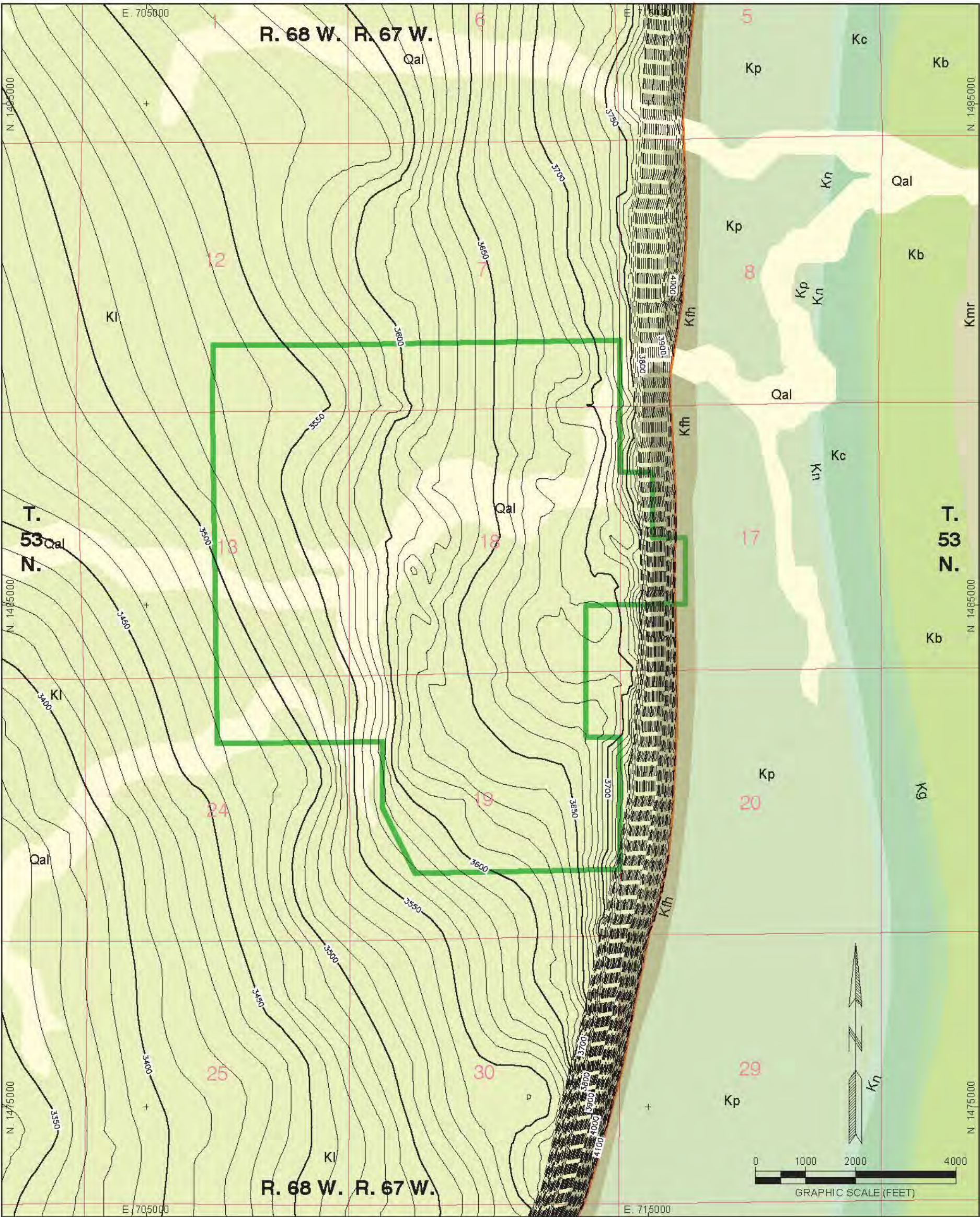
CONFINING UNIT	SM	CONFINING UNIT	OZ	SURFACE DEPICTED THIS SHEET
CONFINING UNIT	DM			

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 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D	
Date	Description	FIGURE 5	
		STRUCTURE CONTOURS OF TOP OF ORE ZONE SURFACE	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 11-10	
FILE: ROSS_GEO_SURF_ISO.DWG			



Drawing Coordinates: WY83EF

LEGEND

- PROPOSED ROSS PERMIT BOUNDARY
- BOTTOM STRUCTURE ELEVATION (10' CONTOUR INTERVAL). CONTOUR LINES ARE DASHED WHERE ELEVATIONS WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.
- PROJECTED BOTTOM OF ORE ZONE AT GROUND LEVEL

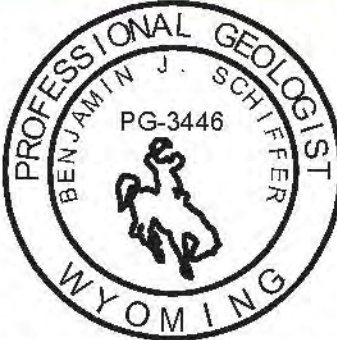
- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

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CONFINING UNIT
OZ
CONFINING UNIT
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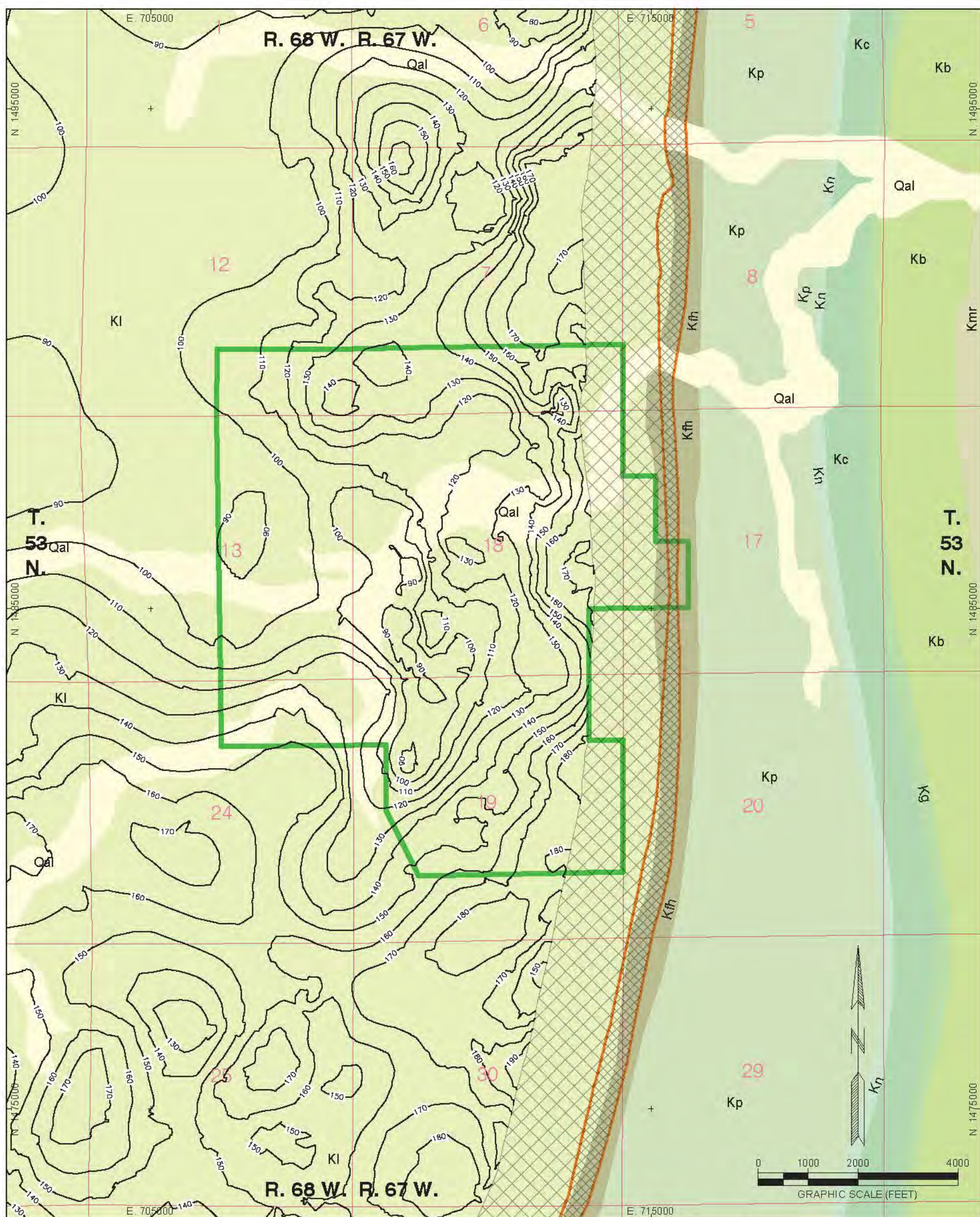
SURFACE
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THIS SHEET

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STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D FIGURE 6	
Date	Description	STRUCTURE CONTOURS OF BOTTOM OF ORE ZONE SURFACE	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 11-10	
FILE: ROSS_GEO_SURF_ISO.DWG		WWC ENGINEERING www.wwc-engineering.com	



Drawing Coordinates: WY83EF

LEGEND

-  PROPOSED ROSS PERMIT BOUNDARY
-  ISOPACH LINE (10' CONTOUR INTERVAL)
-  PROJECTED OUTCROP/SUBCROP OF ORE ZONE
-  THICKNESS OF ORE ZONE UNDETERMINED DUE TO STEEPLY DIPPING BEDS

NOTES:

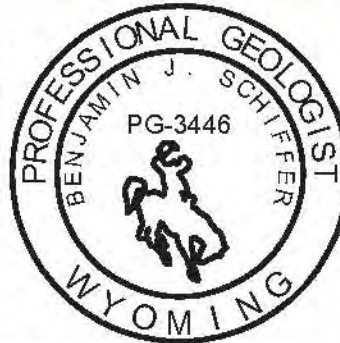
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2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
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	CONFINING UNIT	SM	
	CONFINING UNIT	OZ	
	CONFINING UNIT	DM	

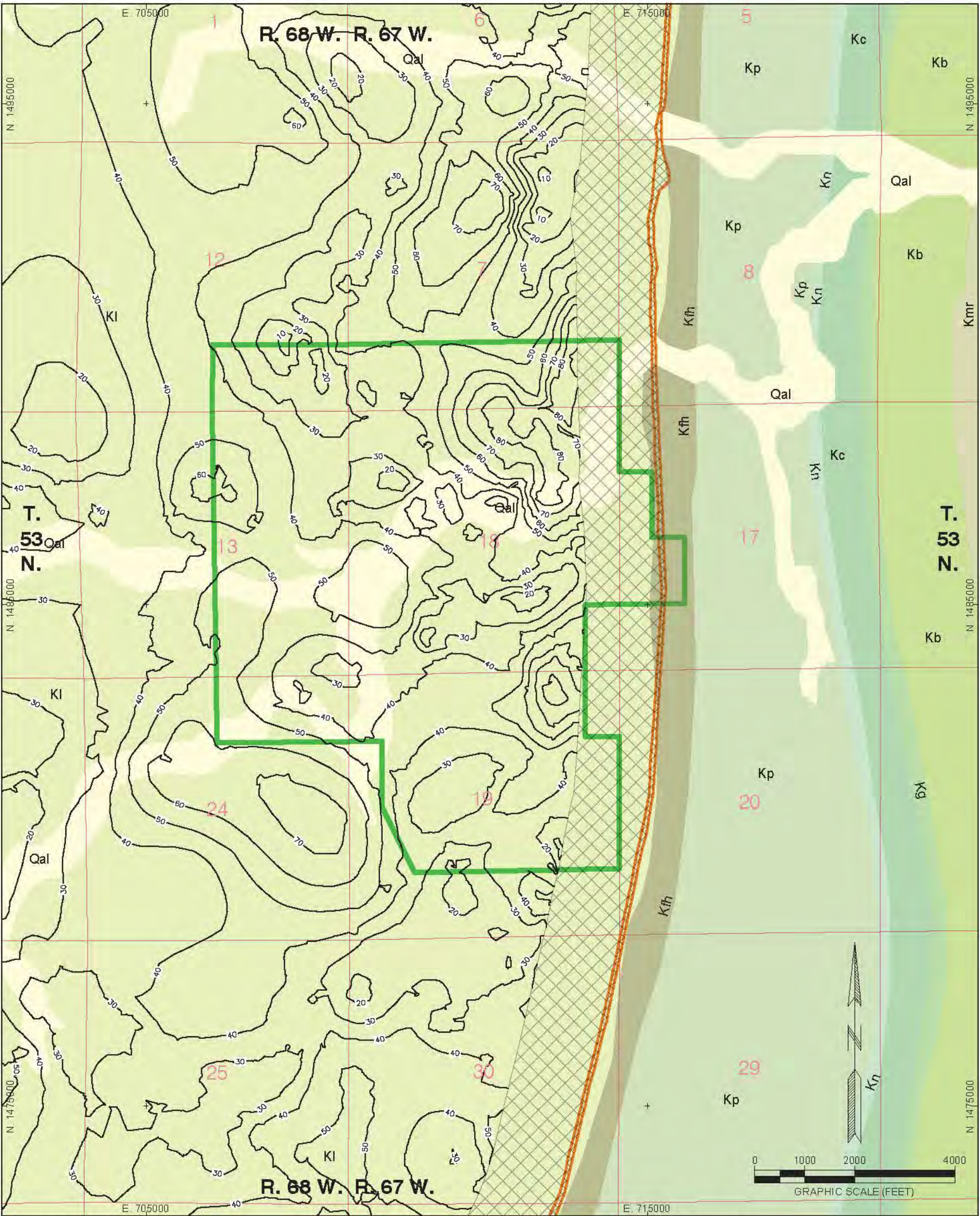
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 STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
	ADDENDUM 2.6-D FIGURE 7 ISOPACH OF ORE ZONE	
REVISIONS		
Date	Description	



Drawing Coordinates: WY83EF

LEGEND

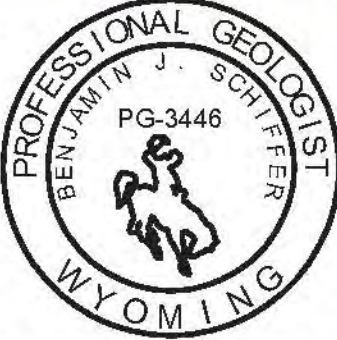
- PROPOSED ROSS PERMIT BOUNDARY
- ISOPACH LINE (10' CONTOUR INTERVAL)
- PROJECTED OUTCROP/SUBCROP OF CONFINING UNIT ABOVE ORE ZONE
- THICKNESS OF CONFINING UNIT ABOVE ORE ZONE UNDETERMINED DUE TO STEEPLY DIPPING BEDS

- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS[®] SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

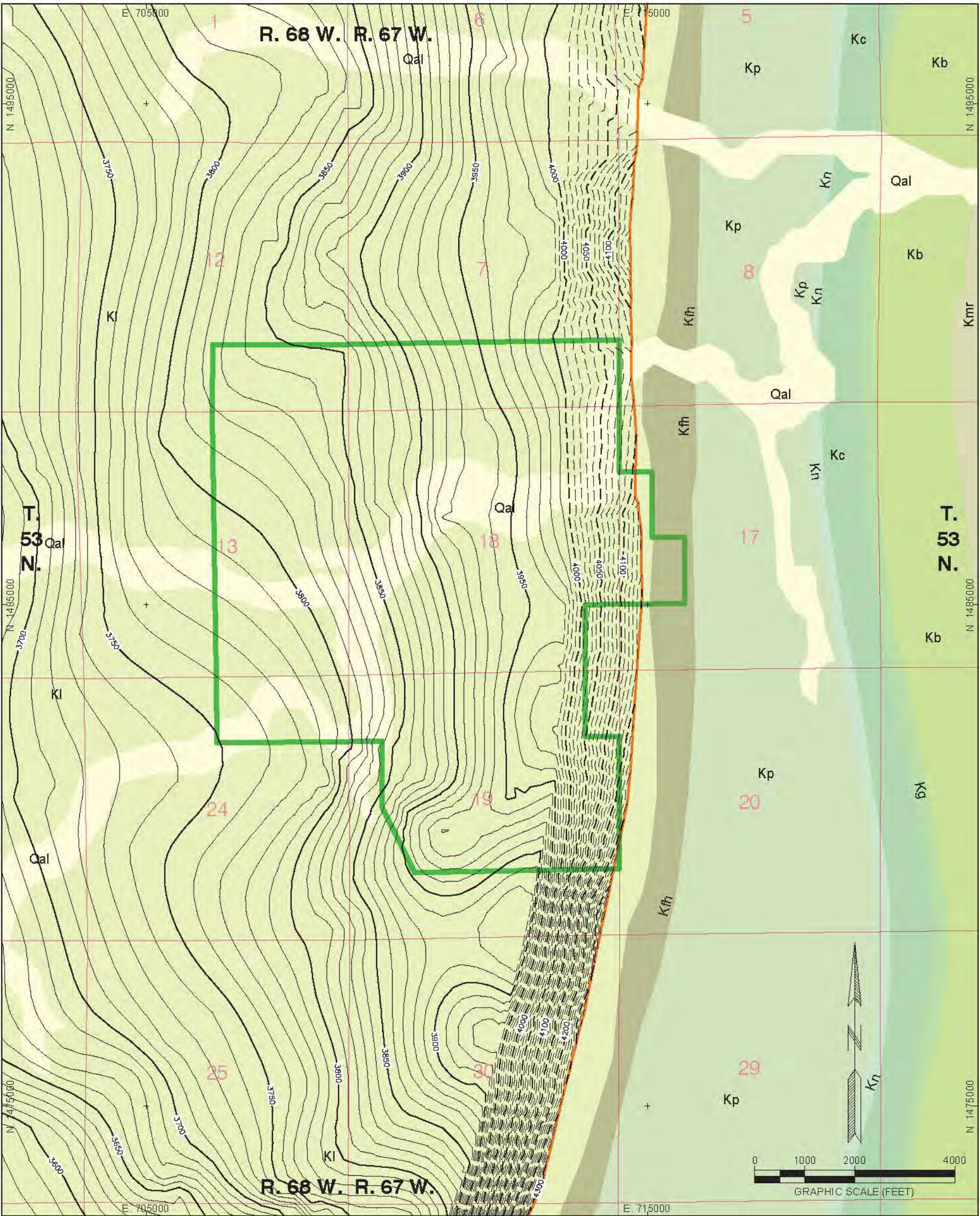
CONFINING UNIT	
SM	
CONFINING UNIT	
OZ	
CONFINING UNIT	
DM	

CERTIFICATE OF GEOLOGIST

I, Benjamin J. Schiffer, hereby certify that this drawing was prepared by myself or under my direct supervision and that it correctly represents the geologic conditions described in the accompanying application which is provided to meet the requirements of the Wyoming Environmental Quality Act and its accompanying regulations.



STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D FIGURE 8	
Date	Description	ISOPACH OF CONFINING UNIT ABOVE ORE ZONE	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 11-10	
FILE: ROSS_GEO_SURF_ISO.DWG		WWC ENGINEERING www.wwc-engineering.com	



Drawing Coordinates: WY83EF

LEGEND

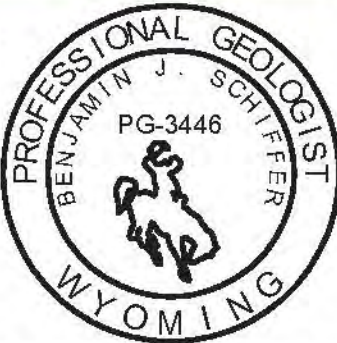
- PROPOSED ROSS PERMIT BOUNDARY
- TOP STRUCTURE ELEVATION (10' CONTOUR INTERVAL). CONTOUR LINES ARE DASHED WHERE ELEVATIONS WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.
- PROJECTED TOP OF SHALLOW MONITORING INTERVAL AT GROUND LEVEL

- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

CONFINING UNIT	SM
CONFINING UNIT	OZ
CONFINING UNIT	DM

CERTIFICATE OF GEOLOGIST

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STRATA ENERGY

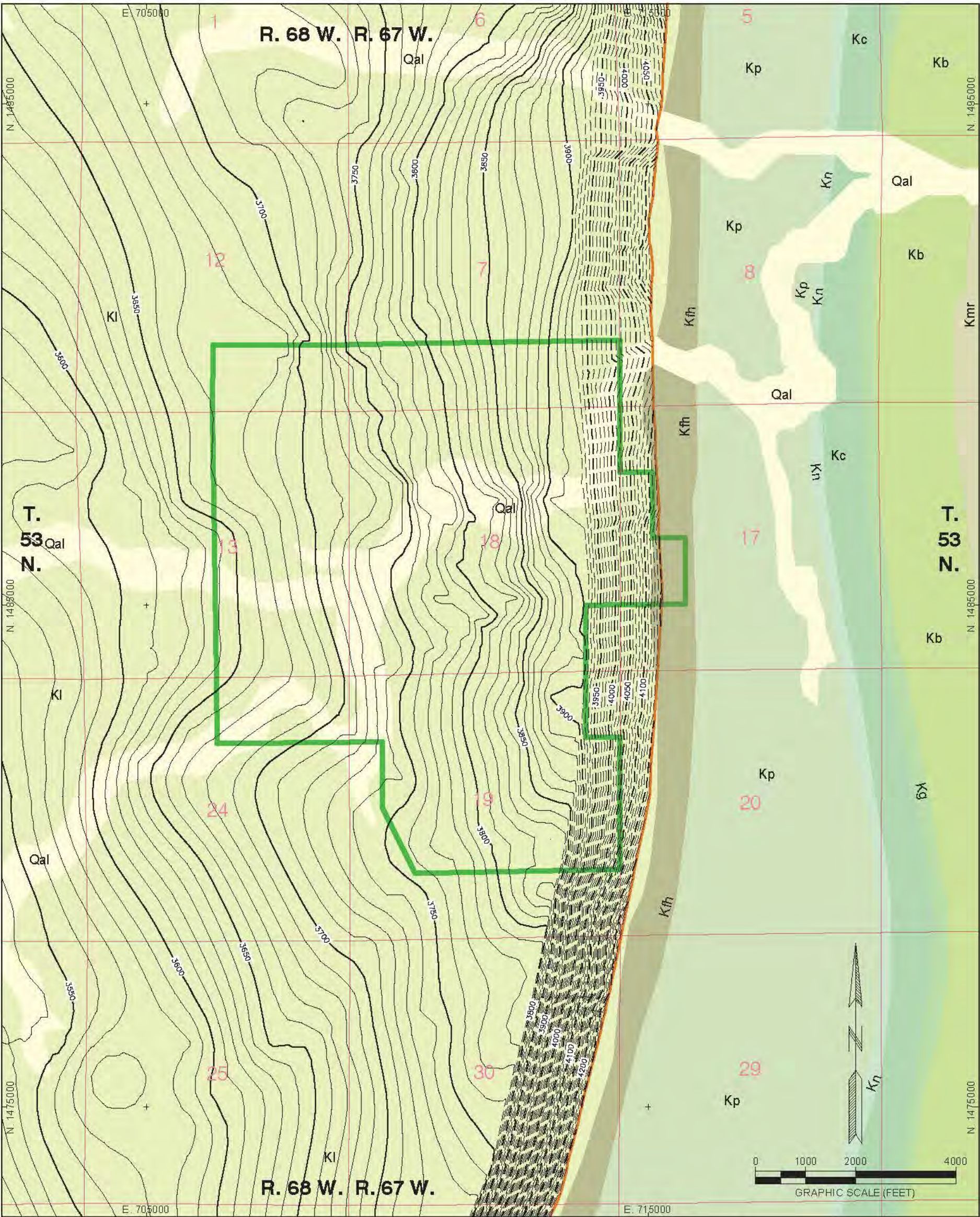
ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

ADDENDUM 2.6-D
FIGURE 9
STRUCTURE CONTOURS OF
TOP OF SHALLOW
MONITORING INTERVAL

Drawn By: RAM
Checked By: BJS
Date: 11-10

WWC ENGINEERING
www.wwcengineering.com

FILE: ROSS_GEO_SURF_ISO.DWG



Drawing Coordinates: WY83EF

LEGEND

- PROPOSED ROSS PERMIT BOUNDARY
- BOTTOM STRUCTURE ELEVATION (10' CONTOUR INTERVAL). CONTOUR LINES ARE DASHED WHERE ELEVATIONS WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.
- PROJECTED BOTTOM OF SHALLOW MONITORING INTERVAL AT GROUND LEVEL

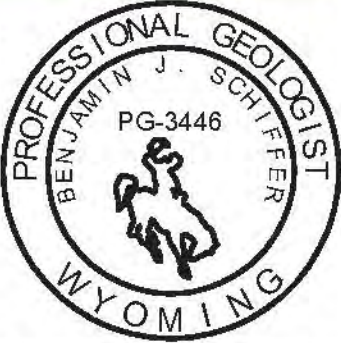
- NOTES:
- SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS. BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 - SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL.

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CONFINING UNIT	
OZ	
CONFINING UNIT	
DM	

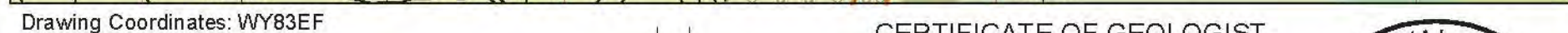
SURFACE
DEPICTED
THIS SHEET

CERTIFICATE OF GEOLOGIST

I, Benjamin J. Schiffer, hereby certify that this drawing was prepared by myself or under my direct supervision and that it correctly represents the geologic conditions described in the accompanying application which is provided to meet the requirements of the Wyoming Environmental Quality Act and its accompanying regulations.




STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D FIGURE 10	
Date	Description	STRUCTURE CONTOURS OF BOTTOM OF SHALLOW MONITORING INTERVAL	
		Drawn By: RAM	
		Checked By: BJS	
		Date: 11-10	
FILE: ROSS_GEO_SURF_ISO.DWG		WWC ENGINEERING www.wwcengineering.com	

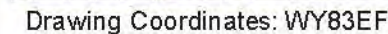


LEGEND


- NOTES:
1. SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS.
BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT
OF SITE SPECIFIC GROUNDWATER MODEL.

CERTIFICATE OF GEOLOGIST

 STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
	ADDENDUM 2.6-D FIGURE 11 ISOPACH OF SHALLOW MONITORING INTERVAL	
REVISIONS		
Date	Description	
	</	



PROPOSED ROSS PERMIT BOUNDARY


 TOP STRUCTURE ELEVATION (10' CONTOUR INTERVAL).
 CONTOUR LINES ARE DASHED WHERE ELEVATIONS
 WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE
 FLEXURE.

PROJECTED TOP OF CONFINING UNIT ABOVE SHALLOW
MONITORING INTERVAL AT GROUND LEVEL

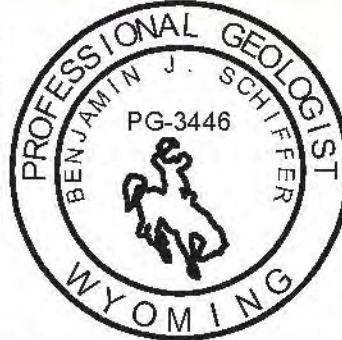
NOTES:



1. SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS.
BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT
OF SITE SPECIFIC GROUNDWATER MODEL.

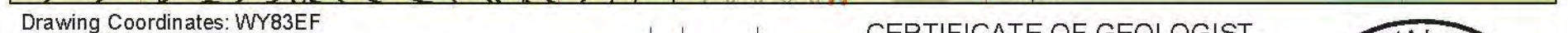
CONFINING UNIT		SURFACE DEPICTED THIS SHEET
SM		
CONFINING UNIT		
OZ		
CONFINING UNIT		
DM		

CERTIFICATE OF GEOLOGIST

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 STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY	
	P.O. BOX 2318 GILLETTE, WY 82716	
	ADDENDUM 2.6-D FIGURE 12 STRUCTURE CONTOURS OF TOP OF CONFINING UNIT ABOVE SHALLOW MONITORING INTERVAL	
REVISIONS		
Date	Description	
Drawn By: RAM Checked By: BJS Date: 11-10		 WWC ENGINEERING www.wwcengineering.com
FILE: ROSS_GEO_SURF_ISO.DWG		





LEGEND

- NOTES:
1. SEE FIGURE D5-4 LEGEND FOR BEDROCK GEOLOGY MAP UNITS.
BEDROCK GEOLOGY MAPPING ADAPTED FROM SUTHERLAND (2008).
 2. SURFACES SHOWN DERIVED FROM GEMCOM GEMS® SOFTWARE
CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT
OF SITE SPECIFIC GROUNDWATER MODEL.

CONFINING UNIT	ISOPACH DEPICTED THIS SHEET
SM	
CONFINING UNIT	
OZ	
CONFINING UNIT	
DM	

I, Benjamin J. Schiffer, hereby certify that this drawing was prepared by myself or under my direct supervision and that it correctly represents the geologic conditions described in the accompanying application which is provided to meet the requirements of the Wyoming Environmental Quality Act and its accompanying regulations.



 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-D	
Date	Description	FIGURE 13	
		ISOPACH OF CONFINING UNIT ABOVE SHALLOW MONITORING INTERVAL	
Drawn By: RAM		 WWC ENGINEERING 830 W. 2nd Street Gillette, WY 82701 307.682.1234 www.wwcengineering.com	
Checked By: BJS			
Date: 11-30			
8.5: ROSS_GEO_SURE_ISOPACH			

ADDENDUM 2.6-E
PLUGGING OF DRILL HOLES AND REPAIR, AND
ABANDONMENT OF WELLS

Addendum 2.6 – E

Plugging of Drill Holes and Repair and Abandonment of Wells

Introduction

This addendum discusses the final disposition of boreholes and wells within the project area, and includes boreholes and wells installed by previous mineral owners at the Ross Property and the boreholes and wells installed by Strata. Historical and recent boreholes are tabulated in Addendum 2.6-B. Borehole locations are depicted on Exhibit 1 of this Addendum. Hole plugging and sealing and well abandonment and repair will be conducted in accordance with Chapter 11 of the Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) Rules and Regulations.

Borehole Abandonment

The Ross Project area was extensively explored in the 1970's by the Nubeth Joint Venture. Based on Strata's drill hole inventory, some 1,682 holes were drilled by Nubeth on and within ½ mile of the Ross Permit Boundary (Table 1). Documentation on the abandonment practices of the majority of the Nubeth boreholes was not available. It is Strata's intent to locate each of the Nubeth boreholes within the proposed Ross Permit Boundary and plug them from bottom to top, in accordance with WDEQ/LQD Chapter 11 Section 6, part (c).

Hole plugging procedures include locating the hole, entering the drill hole with bit and drill pipe, which is washed to bottom, then Type I cement (14.8 to 15.0 lb/gal with 2% bentonite) is pumped through the drill pipe as the pipe is removed from the hole. The hole is topped off with cement and a metal ID tag is placed at the surface. As discussed in Addendum 2.7 F. (Aquifer Test Report), some 55 holes in the vicinity of the 12-18 well cluster were located, re-entered and plugged in this fashion. It is Strata's intent to locate the remainder of the Nubeth boreholes and abandon them in a similar fashion.

Strata began confirmation and exploration drilling for the Ross ISR Project in September 2008. As of October 2010, Strata had completed 540 delineation holes on or within a ½-mile radius of the proposed permit area (Table 1). Of the 540 drill holes completed by Strata, 333 holes were plugged with cement while 208 were sealed with plug gel. Strata continues exploration drilling and the ultimate number of holes will be based on the number needed to define the ore body. Plugging/abandonment procedures will follow those described above.

Table 1. Drill Hole Survey Summary

Statistic	Number Within Permit Area	Within ¹/₂ Mile Buffer	Total
Total Number of Holes Drilled ¹	1,952	270	2,222
Number of Nubeth Exploration Holes	1,483	199	1682
Number of Nubeth Exploratory Holes Found	625	134	759
Number of Nubeth Exploratory Holes to be Found	858	65	923
Number of Delineation Holes (Strata)	467	73	540
Number of Holes Plugged with Cement (Strata & Nubeth)	341	57	398
Number of Holes Plugged with Plug Gel (Strata & Nubeth)	192	16	208
Number of Holes Plugged Unknown (All Nubeth)	1,419	197	1,616

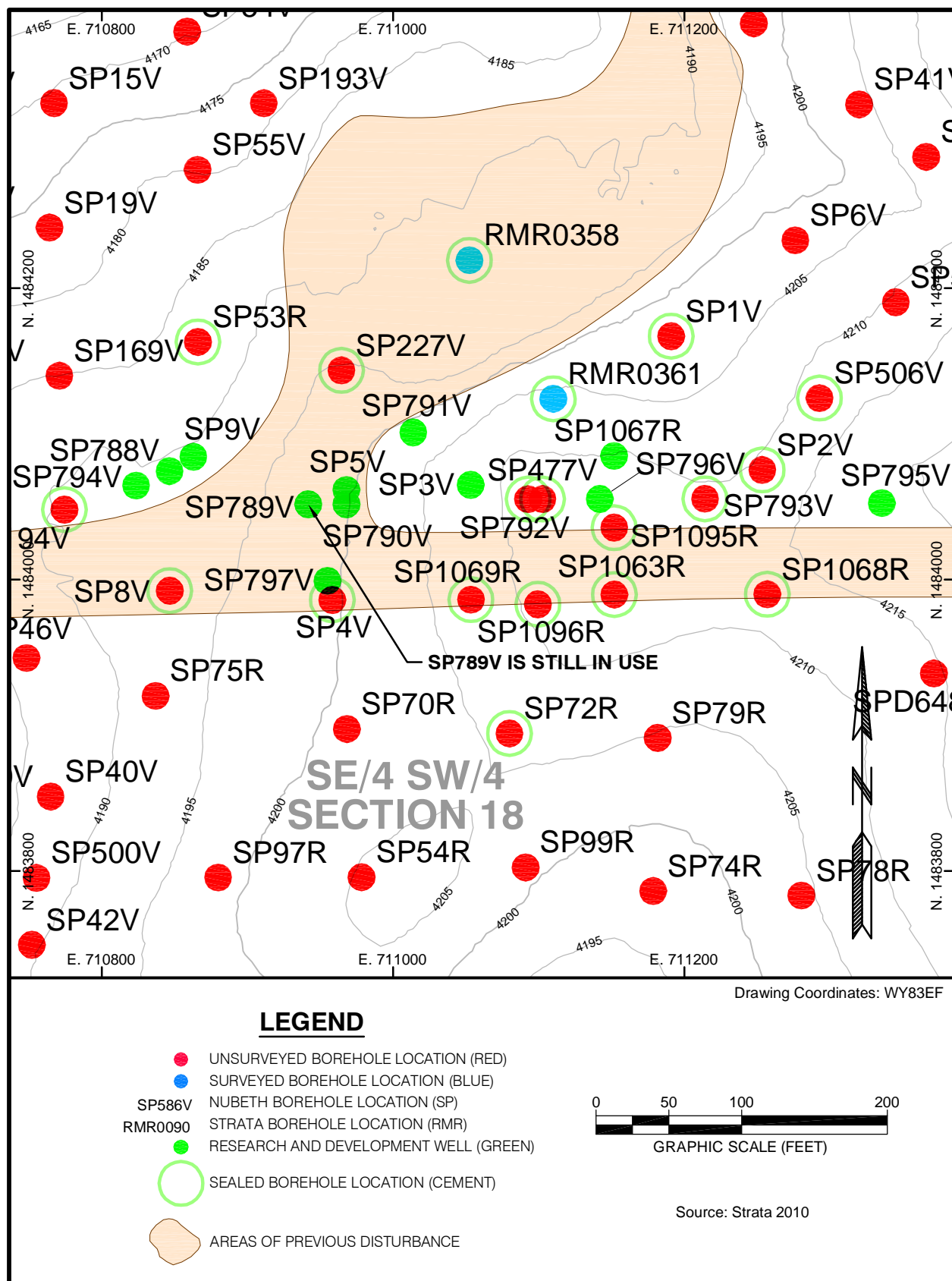
¹ Includes Exploration and Delineation Holes Note: Statistics are based on information as of October 2010

Well Abandonment

Nubeth installed 47 wells during the course of its R&D activities at the Ross Site. The Nubeth well locations are depicted on Exhibit 1. Figures 1, 2, and 3 provide detail on the various Nubeth hydrologic test sites. The ownership of three wells was transferred from Nubeth. Two wells were converted to source wells for oil field water flood operations and are still in operation. The third well was transferred to a local rancher. The remaining 44 Nubeth wells were plugged and abandoned in accordance with standard practices of the day.

Wells installed by Strata for recovery and monitoring will be properly abandoned to ensure that the exempted aquifer remains isolated from aquifers above and below. After wells have been taken out of service, plugging and abandonment will be conducted in accordance with WDEQ/LQD Chapter 11, Section 6, using the steps outlined below.

1. Mobilize to well with a drill rig or service unit.



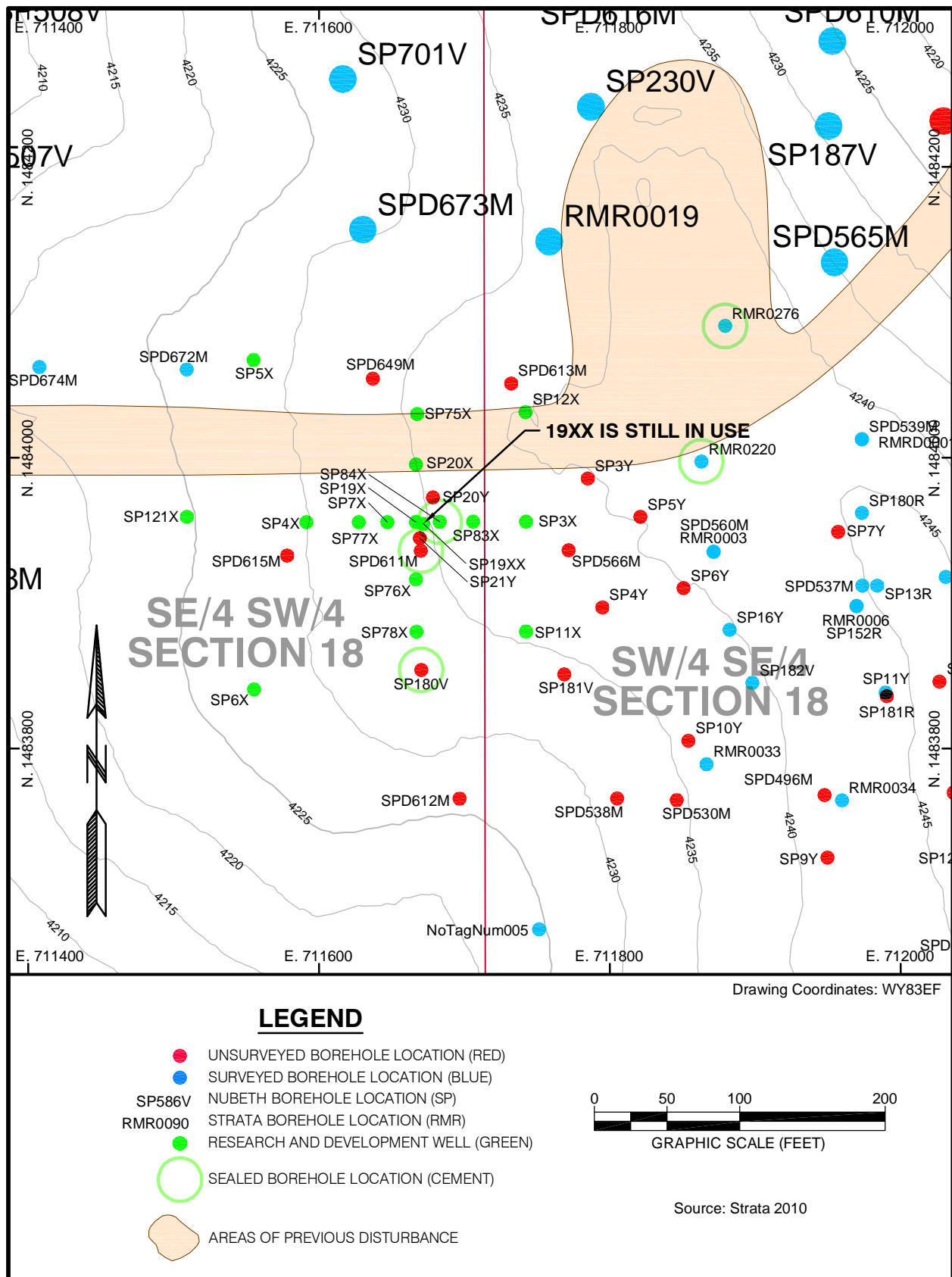


Figure 2. Phase I Research and Development Area

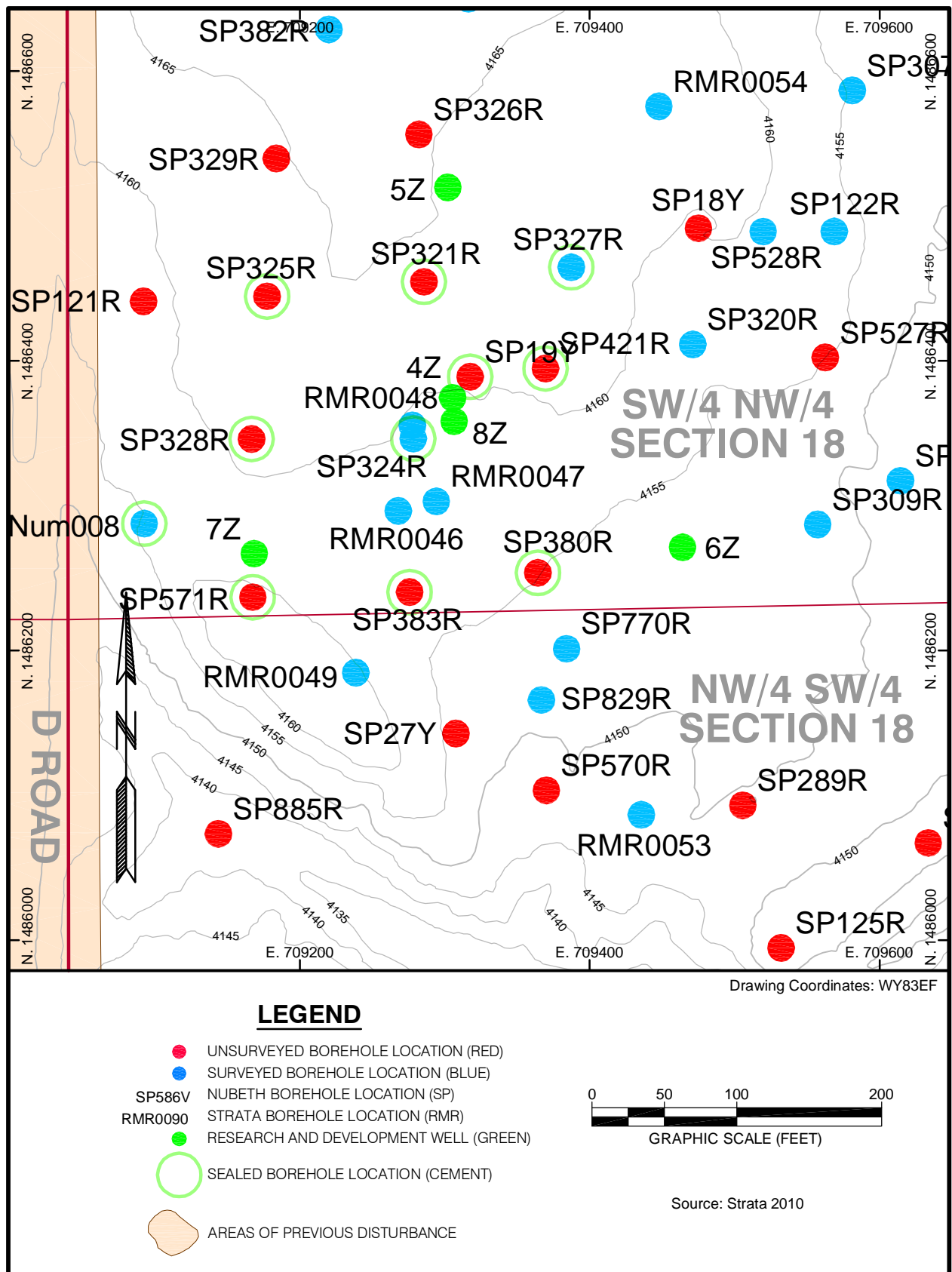


Figure 3. Phase II Research and Development Area

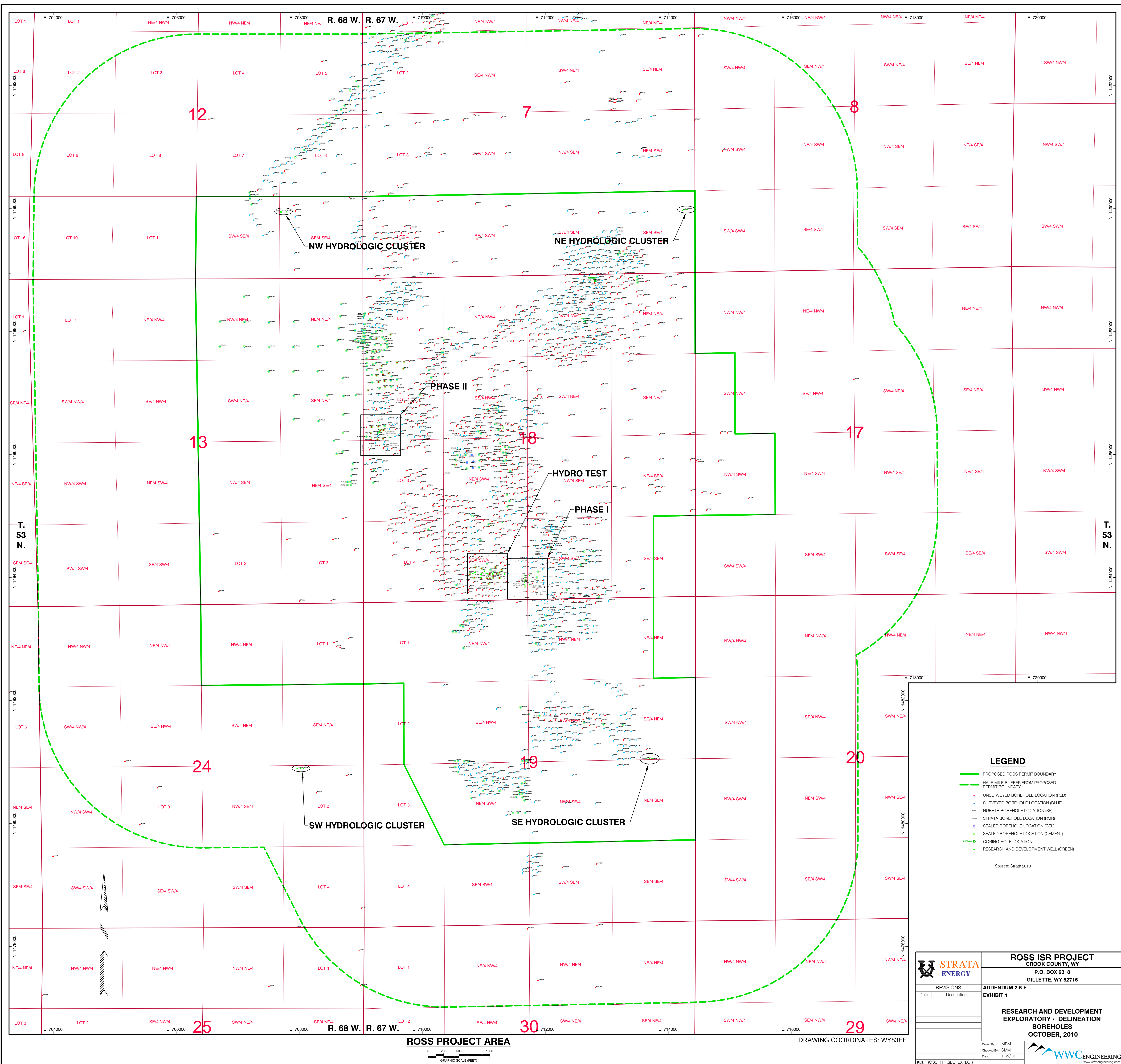
2. Remove tubing, packers and surface equipment.
3. Run tubing to total depth (under reamed wells) or to top of screened interval in screened wells.
4. Pump Type 1 15 lb/gallon cement from the total depth of the well (or from the top of the screened interval) to the surface.
5. Cut casing a minimum of two feet below ground surface, and embed a metal identification tag in the cement. The identification tag will include the well's permit number, well identification number, and date of plugging. All marking devices shall be installed at a minimum depth of two feet below the land surface. Abandonment records including the volume of cement placed in the well will be furnished to LQD in annual reports.
6. To the extent possible, the vegetative cover will be reestablished by seeding, planting, transplanting, or by other adequate methods in a manner consistent with Chapter 3, Section 2(d), Land Quality Rules and Regulations

Well Repair

The need for well repairs will be based on the results of routine mechanical integrity testing (MIT). Mechanical integrity testing will be conducted in accordance with WDEQ/LQD Chapter 11, Section 7(a). In the event a well fails an integrity test, it will immediately be taken out of service, WDEQ/LQD notified, and remediation attempted using the following procedure.

1. The initial step in troubleshooting will consist of isolating the site of the failure in the wellbore. This can be accomplished in one of several way, depending on the situation. Investigative methods could include wireline logging (including camera logging) and packer testing,
2. After isolating the portion of the well requiring repair, the decision will be made to repair, or if the repair appears infeasible, to abandon the well.
3. Repair techniques will be specific to the mode of failure, although the most likely problem would be casing failure. Depending on the situation, a number repair techniques could be applicable, including:
 - a. Recementing the annulus between the casing and wellbore (commonly referred to as a squeeze job);
 - b. Installing a liner in portion of the failed casing;
 - c. Under reaming and cementing the failed casing (See Section X.X for a discussion of under reaming); and
 - d. If the problem area is close to the surface, it may be possible to excavate to the depth of failure and make the repair from above.

Following repair, retesting of the well, in accordance with the requirements of Section 7(a)(ii) of Chapter 11, would be completed within 120 days after the repair is completed. The well undergoing repair would remain out of service until receipt of notification from WDEQ/LQD that the mechanical integrity of the well has been restored.



ADDENDUM 2.7-A
HEC-HMS SURFACE WATER
HYDROLOGIC MODEL

HEC-HMS RESULTS

2yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	234.6	11May2010, 01:13	70.7
B1	2.18	189.7	11May2010, 01:07	51.7
J1	5.7	423	11May2010, 01:13	122.4
R1	5.7	420.3	11May2010, 01:49	122.6
B3	2.07	164.2	11May2010, 00:49	38.1
B7	0.19	9.1	11May2010, 00:13	1.7
J2	7.96	501.7	11May2010, 01:43	162.4
R2	7.96	500.6	11May2010, 01:49	162.4
B4	3.53	180.3	11May2010, 01:37	65
B5	2.14	116.6	11May2010, 01:01	32.8
J3	5.67	273.7	11May2010, 01:19	97.8
R3	5.67	273.1	11May2010, 01:31	97.8
B6	0.56	15.3	11May2010, 00:55	5.1
B8	0.08	13.4	11May2010, 00:19	1.7
J4	14.27	775.2	11May2010, 01:43	267.1
R4	14.27	770.4	11May2010, 01:49	266.9
B9	0.9	21.9	11May2010, 01:07	8.2
B10	0.01	2	11May2010, 00:13	0.2
J5	15.18	787.3	11May2010, 01:49	275.3
R5	15.18	762.7	11May2010, 02:07	274.7
B11	0.4	8.3	11May2010, 01:07	3.2
Oshoto R.	15.58	408.4	11May2010, 03:43	277.7
R6	15.58	408.2	11May2010, 03:49	277.7
B13	1.65	101.6	11May2010, 01:25	33.1
B12	0.04	9	11May2010, 00:19	1.2
J6	17.27	445.3	11May2010, 03:43	312
R7	17.27	444.9	11May2010, 03:49	312
B14	0.44	50.1	11May2010, 00:31	8.8
B15	0.16	16.8	11May2010, 00:19	2.5
J7	0.6	63.1	11May2010, 00:25	11.3
R8	0.6	62.8	11May2010, 00:37	11.3
B16	0.16	4.3	11May2010, 00:37	1.3
B17	0.02	5.4	11May2010, 00:13	0.6
J8	18.05	455.8	11May2010, 03:43	325.2
R9	18.05	455.6	11May2010, 03:49	325.2
B18	0.13	3.2	11May2010, 00:25	0.9
B19	0.01	0.6	11May2010, 00:13	0.1
J9	18.19	456.6	11May2010, 03:49	326.2
R10	18.19	456.5	11May2010, 03:49	326.2
B20	0.01	3.3	11May2010, 00:07	0.3
J10	18.2	456.7	11May2010, 03:49	326.5

HEC-HMS RESULTS

5yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	507.2	11May2010, 01:13	135.9
B1	2.18	384	11May2010, 01:07	95.4
J1	5.7	890.3	11May2010, 01:07	231.3
R1	5.7	884.7	11May2010, 01:37	231.5
B3	2.07	374.8	11May2010, 00:43	74.9
B7	0.19	34.1	11May2010, 00:13	4.1
J2	7.96	1072.5	11May2010, 01:31	310.5
R2	7.96	1069.3	11May2010, 01:37	310.5
B4	3.53	401.5	11May2010, 01:31	127.7
B5	2.14	288.1	11May2010, 00:55	67.7
J3	5.67	631.9	11May2010, 01:13	195.4
R3	5.67	630.9	11May2010, 01:19	195.4
B6	0.56	51.4	11May2010, 00:43	12.2
B8	0.08	28.4	11May2010, 00:13	3.3
J4	14.27	1714.5	11May2010, 01:31	521.4
R4	14.27	1700.7	11May2010, 01:31	521.2
B9	0.9	71.7	11May2010, 00:55	19.6
B10	0.01	4.1	11May2010, 00:13	0.4
J5	15.18	1754.1	11May2010, 01:31	541.2
R5	15.18	1699.5	11May2010, 01:49	539.5
B11	0.4	29.4	11May2010, 00:55	8
Oshoto R.	15.58	1093.5	11May2010, 02:55	547.3
R6	15.58	1092.1	11May2010, 02:55	547.3
B13	1.65	219.2	11May2010, 01:19	63.7
B12	0.04	16.7	11May2010, 00:19	2.1
J6	17.27	1190.5	11May2010, 02:49	613.1
R7	17.27	1190.3	11May2010, 02:55	613.1
B14	0.44	109.4	11May2010, 00:25	17
B15	0.16	43.4	11May2010, 00:13	5.1
J7	0.6	142.8	11May2010, 00:25	22
R8	0.6	142	11May2010, 00:31	22
B16	0.16	16.7	11May2010, 00:31	3.2
B17	0.02	9.9	11May2010, 00:13	1
J8	18.05	1213.1	11May2010, 02:55	639.4
R9	18.05	1212.3	11May2010, 02:55	639.4
B18	0.13	14.7	11May2010, 00:19	2.4
B19	0.01	2	11May2010, 00:13	0.2
J9	18.19	1214.8	11May2010, 02:55	642
R10	18.19	1213.8	11May2010, 02:55	642
B20	0.01	6.1	11May2010, 00:07	0.5
J10	18.2	1214.2	11May2010, 02:55	642.5

HEC-HMS RESULTS

10yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	721.3	11May2010, 01:07	185.6
B1	2.18	531.5	11May2010, 01:01	128.1
J1	5.7	1251.7	11May2010, 01:07	313.7
R1	5.7	1243.7	11May2010, 01:31	313.9
B3	2.07	541	11May2010, 00:43	103.2
B7	0.19	56	11May2010, 00:13	6.1
J2	7.96	1520.9	11May2010, 01:25	423.3
R2	7.96	1517.7	11May2010, 01:31	423.3
B4	3.53	576.8	11May2010, 01:25	176
B5	2.14	428	11May2010, 00:55	95
J3	5.67	923.8	11May2010, 01:07	271
R3	5.67	919.6	11May2010, 01:19	271
B6	0.56	85	11May2010, 00:43	18.1
B8	0.08	39.9	11May2010, 00:13	4.5
J4	14.27	2469.3	11May2010, 01:25	716.8
R4	14.27	2449.9	11May2010, 01:25	716.5
B9	0.9	118	11May2010, 00:55	29.1
B10	0.01	5.8	11May2010, 00:07	0.6
J5	15.18	2539.3	11May2010, 01:25	746.2
R5	15.18	2463.6	11May2010, 01:43	743.9
B11	0.4	49.3	11May2010, 00:55	12.1
Oshoto R.	15.58	1946.7	11May2010, 02:25	755.9
R6	15.58	1941.1	11May2010, 02:25	755.8
B13	1.65	311.3	11May2010, 01:19	87
B12	0.04	22.3	11May2010, 00:19	2.7
J6	17.27	2117.5	11May2010, 02:25	845.6
R7	17.27	2110.1	11May2010, 02:25	845.6
B14	0.44	156.2	11May2010, 00:25	23.2
B15	0.16	64.8	11May2010, 00:13	7.1
J7	0.6	204.7	11May2010, 00:19	30.3
R8	0.6	204	11May2010, 00:31	30.3
B16	0.16	28.7	11May2010, 00:25	4.8
B17	0.02	13.2	11May2010, 00:13	1.4
J8	18.05	2146.8	11May2010, 02:25	882.1
R9	18.05	2140.4	11May2010, 02:31	882
B18	0.13	25.9	11May2010, 00:19	3.6
B19	0.01	3.2	11May2010, 00:13	0.3
J9	18.19	2144.2	11May2010, 02:31	886
R10	18.19	2142.8	11May2010, 02:31	886.1
B20	0.01	8.2	11May2010, 00:07	0.7
J10	18.2	2143.2	11May2010, 02:31	886.7

HEC-HMS RESULTS

25yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	1073.8	11May2010, 01:07	266.9
B1	2.18	771.2	11May2010, 01:01	181.1
J1	5.7	1839.8	11May2010, 01:07	448
R1	5.7	1824.6	11May2010, 01:25	448.1
B3	2.07	814.2	11May2010, 00:43	149.8
B7	0.19	96.7	11May2010, 00:07	9.6
J2	7.96	2261.9	11May2010, 01:19	607.5
R2	7.96	2254	11May2010, 01:25	607.5
B4	3.53	870.5	11May2010, 01:25	255.4
B5	2.14	667.5	11May2010, 00:49	140.6
J3	5.67	1413.2	11May2010, 01:07	396
R3	5.67	1408.4	11May2010, 01:13	396
B6	0.56	145.3	11May2010, 00:43	28.3
B8	0.08	58.6	11May2010, 00:13	6.4
J4	14.27	3732.3	11May2010, 01:19	1038.1
R4	14.27	3702.1	11May2010, 01:19	1037.7
B9	0.9	201	11May2010, 00:55	45.5
B10	0.01	8.5	11May2010, 00:07	0.8
J5	15.18	3861.3	11May2010, 01:19	1083.9
R5	15.18	3745.2	11May2010, 01:31	1080.9
B11	0.4	86.4	11May2010, 00:49	19.1
Oshoto R.	15.58	3359.3	11May2010, 02:01	1099.7
R6	15.58	3342.6	11May2010, 02:07	1099.6
B13	1.65	462.3	11May2010, 01:19	125.1
B12	0.04	31.2	11May2010, 00:19	3.8
J6	17.27	3670.3	11May2010, 02:01	1228.5
R7	17.27	3657.2	11May2010, 02:07	1228.6
B14	0.44	232.7	11May2010, 00:25	33.4
B15	0.16	100.4	11May2010, 00:13	10.5
J7	0.6	309.4	11May2010, 00:19	43.9
R8	0.6	304.7	11May2010, 00:25	43.9
B16	0.16	50.7	11May2010, 00:25	7.6
B17	0.02	18.4	11May2010, 00:13	1.9
J8	18.05	3719	11May2010, 02:01	1282
R9	18.05	3713.8	11May2010, 02:07	1282
B18	0.13	46.3	11May2010, 00:19	5.9
B19	0.01	5.2	11May2010, 00:13	0.5
J9	18.19	3720.4	11May2010, 02:07	1288.3
R10	18.19	3718.1	11May2010, 02:07	1288.4
B20	0.01	11.4	11May2010, 00:07	0.9
J10	18.2	3718.7	11May2010, 02:07	1289.3

HEC-HMS RESULTS

50yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	1323.1	11May2010, 01:07	324.6
B1	2.18	939	11May2010, 01:01	218.3
J1	5.7	2253.9	11May2010, 01:07	542.9
R1	5.7	2242.7	11May2010, 01:25	542.9
B3	2.07	1007.9	11May2010, 00:43	182.9
B7	0.19	127.2	11May2010, 00:07	12.1
J2	7.96	2788.7	11May2010, 01:19	738
R2	7.96	2776.4	11May2010, 01:19	738
B4	3.53	1079.7	11May2010, 01:25	312
B5	2.14	839.9	11May2010, 00:49	173.3
J3	5.67	1763.3	11May2010, 01:07	485.3
R3	5.67	1757.1	11May2010, 01:13	485.3
B6	0.56	190.2	11May2010, 00:43	35.8
B8	0.08	71.6	11May2010, 00:13	7.7
J4	14.27	4632.5	11May2010, 01:19	1266.8
R4	14.27	4608.2	11May2010, 01:19	1266.3
B9	0.9	263.4	11May2010, 00:49	57.5
B10	0.01	10.3	11May2010, 00:07	1
J5	15.18	4812.3	11May2010, 01:19	1324.7
R5	15.18	4673.1	11May2010, 01:31	1321.3
B11	0.4	114.6	11May2010, 00:49	24.3
Oshoto R.	15.58	4338	11May2010, 01:55	1345.3
R6	15.58	4328.8	11May2010, 01:55	1345.3
B13	1.65	569.5	11May2010, 01:13	152.1
B12	0.04	37.3	11May2010, 00:19	4.5
J6	17.27	4766.4	11May2010, 01:55	1502
R7	17.27	4762	11May2010, 01:55	1502.1
B14	0.44	286.6	11May2010, 00:25	40.6
B15	0.16	125.8	11May2010, 00:13	13
J7	0.6	383.7	11May2010, 00:19	53.5
R8	0.6	379	11May2010, 00:25	53.6
B16	0.16	67.2	11May2010, 00:25	9.7
B17	0.02	22	11May2010, 00:13	2.3
J8	18.05	4843.2	11May2010, 01:55	1567.6
R9	18.05	4831.6	11May2010, 01:55	1567.5
B18	0.13	62.2	11May2010, 00:13	7.5
B19	0.01	6.7	11May2010, 00:07	0.7
J9	18.19	4840.4	11May2010, 01:55	1575.7
R10	18.19	4830.6	11May2010, 01:55	1575.8
B20	0.01	13.6	11May2010, 00:07	1.1
J10	18.2	4831.5	11May2010, 01:55	1576.8

HEC-HMS RESULTS

100yr 24hr

Hydraulic Element	Drainage Area (mi ²)	Peak Discharge (cfs)	Time of Peak	Volume (acre-ft)
B2	3.52	1580.9	11May2010, 01:07	384.4
B1	2.18	1111.5	11May2010, 01:01	256.7
J1	5.7	2680.8	11May2010, 01:07	641.1
R1	5.7	2669.8	11May2010, 01:25	641.1
B3	2.07	1210	11May2010, 00:37	217.4
B7	0.19	159.5	11May2010, 00:07	14.8
J2	7.96	3333.4	11May2010, 01:13	873.4
R2	7.96	3329.4	11May2010, 01:19	873.4
B4	3.53	1296.9	11May2010, 01:25	370.8
B5	2.14	1019.9	11May2010, 00:49	207.5
J3	5.67	2127.8	11May2010, 01:07	578.3
R3	5.67	2121	11May2010, 01:13	578.3
B6	0.56	239	11May2010, 00:37	43.8
B8	0.08	85.1	11May2010, 00:13	9.1
J4	14.27	5582.5	11May2010, 01:13	1504.6
R4	14.27	5546.4	11May2010, 01:19	1504
B9	0.9	330.9	11May2010, 00:49	70.3
B10	0.01	12.3	11May2010, 00:07	1.1
J5	15.18	5808.6	11May2010, 01:13	1575.5
R5	15.18	5631.1	11May2010, 01:25	1572.4
B11	0.4	144.7	11May2010, 00:49	29.8
Oshoto R.	15.58	5341.1	11May2010, 01:49	1602
R6	15.58	5331.6	11May2010, 01:49	1601.9
B13	1.65	681.1	11May2010, 01:13	180.2
B12	0.04	43.5	11May2010, 00:19	5.2
J6	17.27	5890.3	11May2010, 01:49	1787.3
R7	17.27	5883.5	11May2010, 01:49	1787.4
B14	0.44	342.3	11May2010, 00:25	48
B15	0.16	152.3	11May2010, 00:13	15.5
J7	0.6	460.7	11May2010, 00:19	63.6
R8	0.6	456.6	11May2010, 00:25	63.6
B16	0.16	84.9	11May2010, 00:25	11.9
B17	0.02	25.6	11May2010, 00:13	2.6
J8	18.05	5985.4	11May2010, 01:49	1865.5
R9	18.05	5973.9	11May2010, 01:49	1865.4
B18	0.13	79.6	11May2010, 00:13	9.2
B19	0.01	8.4	11May2010, 00:07	0.8
J9	18.19	5984.9	11May2010, 01:49	1875.5
R10	18.19	5974	11May2010, 01:49	1875.6
B20	0.01	15.9	11May2010, 00:07	1.3
J10	18.2	5975.1	11May2010, 01:49	1876.8

HEC-HMS INPUT FILE

Basin: Basin 1

Description: AMC II

Last Modified Date: 8 September 2010

Last Modified Time: 22:48:39

Version: 3.4

Unit System: English

Missing Flow To Zero: No

Enable Flow Ratio: No

Allow Blending: No

Compute Local Flow At Junctions: No

Enable Sediment Routing: No

Enable Quality Routing: No

End:

Subbasin: B2

Canvas X: -7897.077509529859

Canvas Y: -3551.4612452350684

Area: 3.52

Downstream: J1

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 78

Transform: SCS

Lag: 68

Unitgraph Type: STANDARD

Baseflow: None

End:

Subbasin: B1

Canvas X: -7770.012706480304

Canvas Y: 3271.918678526048

Area: 2.18

Downstream: J1

Canopy: None

Surface: None

LossRate: SCS

HEC-HMS INPUT FILE

Percent Impervious Area: 0.0
Curve Number: 80

Transform: SCS
Lag: 64
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J1
Canvas X: -6880.559085133416
Canvas Y: 400.254129606099
Label X: -48.0
Label Y: 2.0
Downstream: R1
End:

Reach: R1
Canvas X: -5196.95044472681
Canvas Y: 387.5476493011438
From Canvas X: -6880.559085133416
From Canvas Y: 400.254129606099
Label X: -26.0
Label Y: 10.0
Downstream: J2

Route: Muskingum Cunge
Channel: Trapezoid
Length: 15558
Energy Slope: 0.0051
Width: 45
Side Slope: 3
Mannings n: 0.030
Use Variable Time Step: No
Channel Loss: None
End:

Subbasin: B3
Canvas X: -5978.398983481575
Canvas Y: 3144.853875476493
Area: 2.07
Downstream: J2

Canopy: None

Surface: None

HEC-HMS INPUT FILE

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 77

Transform: SCS
Lag: 44
Unitgraph Type: STANDARD

Baseflow: None
End:

Subbasin: B7
Canvas X: -5578.144853875476
Canvas Y: -1467.598475222363
Area: 0.19
Downstream: J2

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 70

Transform: SCS
Lag: 14
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J2
Canvas X: -5196.95044472681
Canvas Y: 387.5476493011438
Label X: -12.0
Label Y: 20.0
Downstream: R2

End:

Reach: R2
Canvas X: -3462.51588310038
Canvas Y: 387.5476493011438
From Canvas X: -5196.95044472681
From Canvas Y: 387.5476493011438
Label X: -16.0
Label Y: 11.0
Downstream: J4

HEC-HMS INPUT FILE

Route: Muskingum Cunge
Channel: Trapezoid
Length: 2924
Energy Slope: 0.0055
Width: 35
Side Slope: 3
Mannings n: 0.030
Use Variable Time Step: No
Channel Loss: None

End:

Subbasin: B4

Canvas X: -5476.493011435832
Canvas Y: -3614.9936467598473
Area: 3.53
Downstream: J3

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 77

Transform: SCS
Lag: 84
Unitgraph Type: STANDARD

Baseflow: None

End:

Subbasin: B5

Canvas X: -2770.0127064803046
Canvas Y: -3386.277001270648
Area: 2.14
Downstream: J3

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 75

Transform: SCS

HEC-HMS INPUT FILE

Lag: 52

Unitgraph Type: STANDARD

Baseflow: None

End:

Junction: J3

Canvas X: -4161.3722998729345

Canvas Y: -1200.762388818297

Downstream: R3

End:

Reach: R3

Canvas X: -3462.51588310038

Canvas Y: 387.5476493011438

From Canvas X: -4161.3722998729345

From Canvas Y: -1200.762388818297

Label X: -10.0

Label Y: -14.0

Downstream: J4

Route: Muskingum Cunge

Channel: Trapezoid

Length: 4514

Energy Slope: 0.0044

Width: 30

Side Slope: 3

Mannings n: 0.030

Use Variable Time Step: No

Channel Loss: None

End:

Subbasin: B6

Canvas X: -2903.4307496823367

Canvas Y: -1594.663278271918

Area: 0.56

Downstream: J4

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 70

Transform: SCS

Lag: 42

HEC-HMS INPUT FILE

Unitgraph Type: STANDARD

Baseflow: None
End:

Subbasin: B8
Canvas X: -4351.969504447266
Canvas Y: 3017.789072426938
Area: 0.08
Downstream: J4

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 79

Transform: SCS
Lag: 20
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J4
Canvas X: -3462.51588310038
Canvas Y: 387.5476493011438
Label X: -11.0
Label Y: 22.0
Downstream: R4
End:

Reach: R4
Canvas X: -1747.1410419313843
Canvas Y: 362.13468869123244
From Canvas X: -3462.51588310038
From Canvas Y: 387.5476493011438
Label X: -20.0
Label Y: 11.0
Downstream: J5

Route: Muskingum Cunge
Channel: Trapezoid
Length: 773
Energy Slope: 0.001
Width: 30

HEC-HMS INPUT FILE

Side Slope: 3
Mannings n: 0.03
Use Variable Time Step: No
Channel Loss: None

End:

Subbasin: B9

Canvas X: -2509.5298602287157
Canvas Y: 2903.430749682338
Area: 0.9
Downstream: J5

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 70

Transform: SCS
Lag: 52
Unitgraph Type: STANDARD

Baseflow: None

End:

Subbasin: B10

Canvas X: -1728.081321473951
Canvas Y: -1124.523506988564
Area: 0.01
Downstream: J5

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 79

Transform: SCS
Lag: 15
Unitgraph Type: STANDARD

Baseflow: None

End:

HEC-HMS INPUT FILE

Junction: J5

Canvas X: -1747.1410419313843

Canvas Y: 362.13468869123244

Label X: -11.0

Label Y: 22.0

Downstream: R5

End:

Reach: R5

Canvas X: -273.18932655654316

Canvas Y: 349.4282083862772

From Canvas X: -1747.1410419313843

From Canvas Y: 362.13468869123244

Label X: -18.0

Label Y: 12.0

Downstream: Oshoto R.

Route: Muskingum Cunge

Channel: Trapezoid

Length: 4947

Energy Slope: 0.001

Width: 30

Side Slope: 3

Mannings n: 0.03

Use Variable Time Step: No

Channel Loss: None

End:

Subbasin: B11

Canvas X: -387.5476493011429

Canvas Y: -1086.4040660736973

Area: 0.4

Downstream: Oshoto R.

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 69

Transform: SCS

Lag: 49

Unitgraph Type: STANDARD

Baseflow: None

End:

HEC-HMS INPUT FILE

Reservoir: Oshoto R.

Canvas X: -273.18932655654316

Canvas Y: 349.4282083862772

Label X: -38.0

Label Y: 20.0

Downstream: R6

Route: Controlled Outflow

Routing Curve: Elevation-Area

Initial Elevation: 4134

Elevation-Area Table: Oshoto

Adaptive Control: On

Main Tailwater Condition: None

Auxiliary Tailwater Condition: None

Spillway: Broad-Crested Spillway

Spillway Outlet: Main

Spillway Crest Length: 45

Spillway Crest Elevation: 4134

Spillway Coefficient: 2.63

End Spillway:

Spillway: Broad-Crested Spillway

Spillway Outlet: Main

Spillway Crest Length: 50

Spillway Crest Elevation: 4135.5

Spillway Coefficient: 2.63

End Spillway:

Dam Top: Level Dam

Dam Top Outlet: Main

Overflow Coefficient: 2.63

Top Length: 415

Top Elevation: 4137.5

End Dam Top:

Evaporation Method: Zero Evaporation

End Evaporation:

End:

Reach: R6

Canvas X: 1416.7725540025422

Canvas Y: 374.84116899618857

From Canvas X: -273.18932655654316

From Canvas Y: 349.4282083862772

Label X: -23.0

Label Y: 10.0

HEC-HMS INPUT FILE

Downstream: J6

Route: Muskingum Cunge

Channel: Trapezoid

Length: 1919

Energy Slope: 0.0031

Width: 30

Side Slope: 3

Mannings n: 0.03

Use Variable Time Step: No

Channel Loss: None

End:

Subbasin: B13

Canvas X: 1035.5781448538764

Canvas Y: -1048.2846251588307

Area: 1.65

Downstream: J6

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 78

Transform: SCS

Lag: 76

Unitgraph Type: STANDARD

Baseflow: None

End:

Subbasin: B12

Canvas X: 635.3240152477756

Canvas Y: 2077.509529860229

Area: 0.04

Downstream: J6

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 83

HEC-HMS INPUT FILE

Transform: SCS
Lag: 25
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J6
Canvas X: 1416.7725540025422
Canvas Y: 374.84116899618857
Label X: -12.0
Label Y: 21.0
Downstream: R7
End:

Reach: R7
Canvas X: 3017.789072426938
Canvas Y: 374.84116899618857
From Canvas X: 1416.7725540025422
From Canvas Y: 374.84116899618857
Label X: -22.0
Label Y: 10.0
Downstream: J8

Route: Muskingum Cunge
Channel: Trapezoid
Length: 1602
Energy Slope: 0.005
Width: 30
Side Slope: 3
Mannings n: 0.03
Use Variable Time Step: No
Channel Loss: None
End:

Subbasin: B14
Canvas X: 1048.2846251588326
Canvas Y: 3424.396442185515
Area: 0.44
Downstream: J7

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 78

HEC-HMS INPUT FILE

Transform: SCS
Lag: 31
Unitgraph Type: STANDARD

Baseflow: None
End:

Subbasin: B15
Canvas X: 2928.843710292249
Canvas Y: 3500.635324015248
Area: 0.16
Downstream: J7

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 75

Transform: SCS
Lag: 18
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J7
Canvas X: 2445.9974587039396
Canvas Y: 1925.0317662007628
Downstream: R8
End:

Reach: R8
Canvas X: 3017.789072426938
Canvas Y: 374.84116899618857
From Canvas X: 2445.9974587039396
From Canvas Y: 1925.0317662007628
Label X: -10.0
Label Y: 9.0
Downstream: J8

Route: Muskingum Cunge
Channel: Trapezoid
Length: 3568
Energy Slope: 0.0106

HEC-HMS INPUT FILE

Width: 30
Side Slope: 3
Mannings n: 0.03
Use Variable Time Step: No
Channel Loss: None

End:

Subbasin: B16

Canvas X: 3703.9390088945365
Canvas Y: 1950.4447268106737
Area: 0.16
Downstream: J8

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 69

Transform: SCS
Lag: 28
Unitgraph Type: STANDARD

Baseflow: None

End:

Subbasin: B17

Canvas X: 2585.76874205845
Canvas Y: -1111.8170266836078
Area: 0.02
Downstream: J8

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 83

Transform: SCS
Lag: 19
Unitgraph Type: STANDARD

Baseflow: None

End:

HEC-HMS INPUT FILE

Junction: J8

Canvas X: 3017.789072426938
Canvas Y: 374.84116899618857
Label X: -10.0
Label Y: -13.0
Downstream: R9

End:

Reach: R9

Canvas X: 4974.58703939009
Canvas Y: 387.5476493011438
From Canvas X: 3017.789072426938
From Canvas Y: 374.84116899618857
Label X: -21.0
Label Y: 11.0
Downstream: J9

Route: Muskingum Cunge
Channel: Trapezoid
Length: 599
Energy Slope: 0.0017
Width: 30
Side Slope: 3
Mannings n: 0.03
Use Variable Time Step: No
Channel Loss: None

End:

Subbasin: B18

Canvas X: 4758.576874205846
Canvas Y: 1886.9123252858963
Area: 0.13
Downstream: J9

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 68

Transform: SCS
Lag: 20
Unitgraph Type: STANDARD

Baseflow: None

HEC-HMS INPUT FILE

End:

Subbasin: B19

Canvas X: 4682.337992376113

Canvas Y: -1200.762388818297

Area: 0.01

Downstream: J9

Canopy: None

Surface: None

LossRate: SCS

Percent Impervious Area: 0.0

Curve Number: 71

Transform: SCS

Lag: 15

Unitgraph Type: STANDARD

Baseflow: None

End:

Junction: J9

Canvas X: 4974.58703939009

Canvas Y: 387.5476493011438

Label X: -8.0

Label Y: 20.0

Downstream: R10

End:

Reach: R10

Canvas X: 7058.449809402795

Canvas Y: 412.96060991105514

From Canvas X: 4974.58703939009

From Canvas Y: 387.5476493011438

Label X: -30.0

Label Y: 19.0

Downstream: J10

Route: Muskingum Cunge

Channel: Trapezoid

Length: 635

Energy Slope: 0.0031

Width: 30

Side Slope: 3

Mannings n: 0.03

Use Variable Time Step: No

HEC-HMS INPUT FILE

Channel Loss: None
End:

Subbasin: B20
Canvas X: 6842.439644218552
Canvas Y: 1785.2604828462518
Area: 0.01
Downstream: J10

Canopy: None

Surface: None

LossRate: SCS
Percent Impervious Area: 0.0
Curve Number: 82

Transform: SCS
Lag: 11
Unitgraph Type: STANDARD

Baseflow: None
End:

Junction: J10
Canvas X: 7058.449809402795
Canvas Y: 412.96060991105514
End:

Basin Schematic Properties:
Last View N: 5000.0
Last View S: -5000.0
Last View W: -5000.0
Last View E: 5000.0
Maximum View N: 5000.0
Maximum View S: -5000.0
Maximum View W: -5000.0
Maximum View E: 5000.0
Extent Method: Elements
Buffer: 0
Draw Icons: Yes
Draw Icon Labels: Yes
Draw Map Objects: No
Draw Gridlines: No
Draw Flow Direction: No
Fix Element Locations: No
Fix Hydrologic Order: No
End:

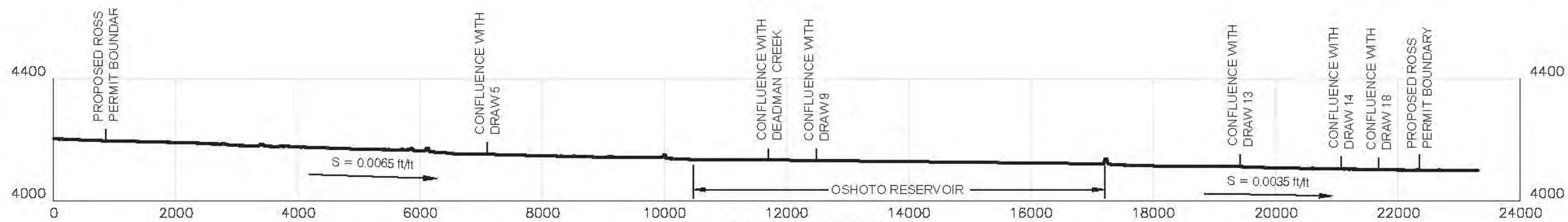
ADDENDUM 2.7-B
MILLER PEAK FLOW ESTIMATES

Miller Peak Flow Estimates

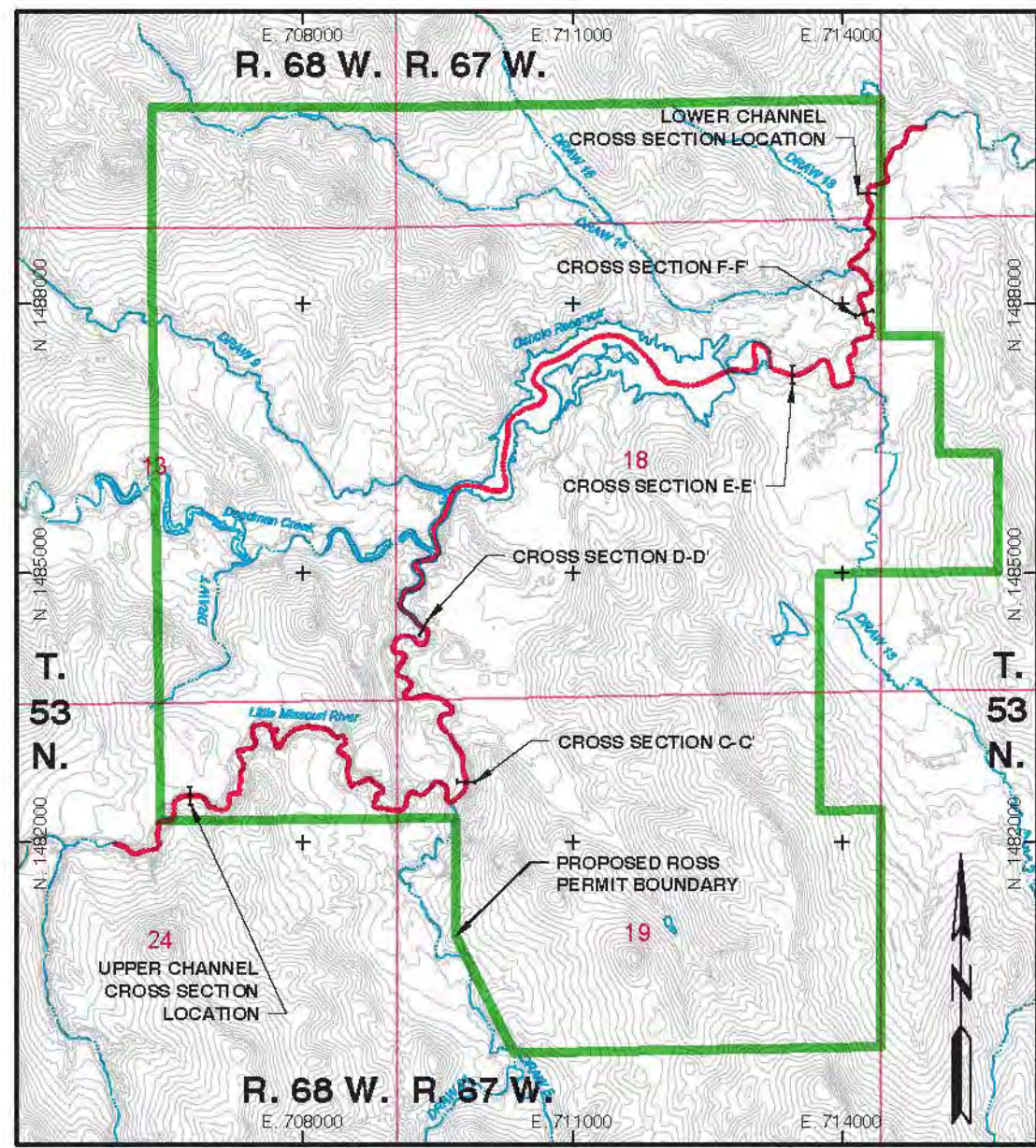
Equation	Junction	Area (mi ²)	Peak Discharge (cfs)
$Q_2 = 29.9(\text{Area}^{0.475})$	10	18.2	112
$Q_5 = 80.9(\text{Area}^{0.455})$	10	18.2	303
$Q_{10} = 134(\text{Area}^{0.447})$	10	18.2	490
$Q_{25} = 225(\text{Area}^{0.439})$	10	18.2	804
$Q_{50} = 311(\text{Area}^{0.434})$	10	18.2	1096
$Q_{100} = 415(\text{Area}^{0.430})$	10	18.2	1445

Note: Equations for the estimation of peak flows use Hydrologic Region 2 from Miller, 2003.

ADDENDUM 2.7-C
FLOOD INUNDATION STUDY



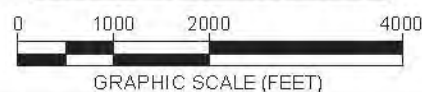
**LITTLE MISSOURI RIVER
CHANNEL PROFILE
EXAGGERATION 5H:1V (FT)**



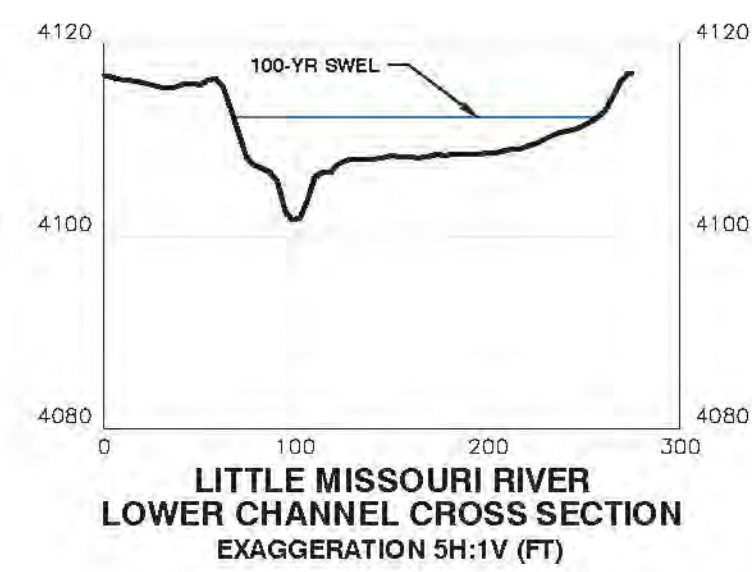
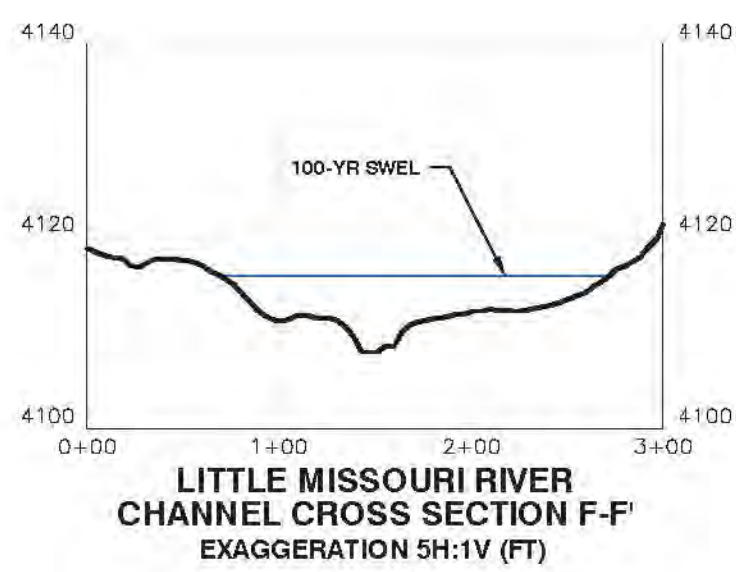
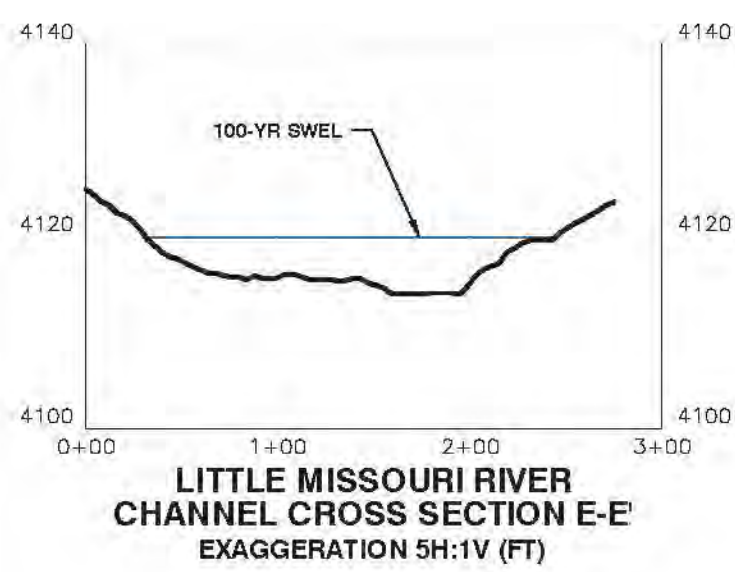
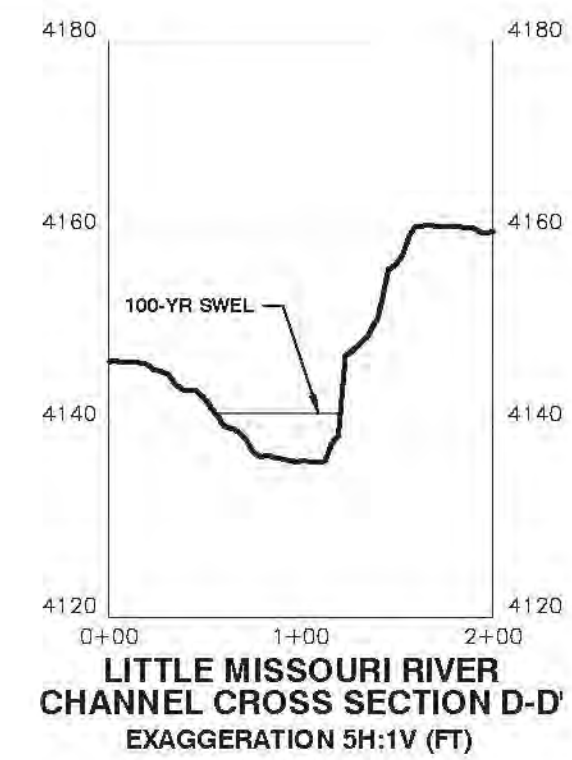
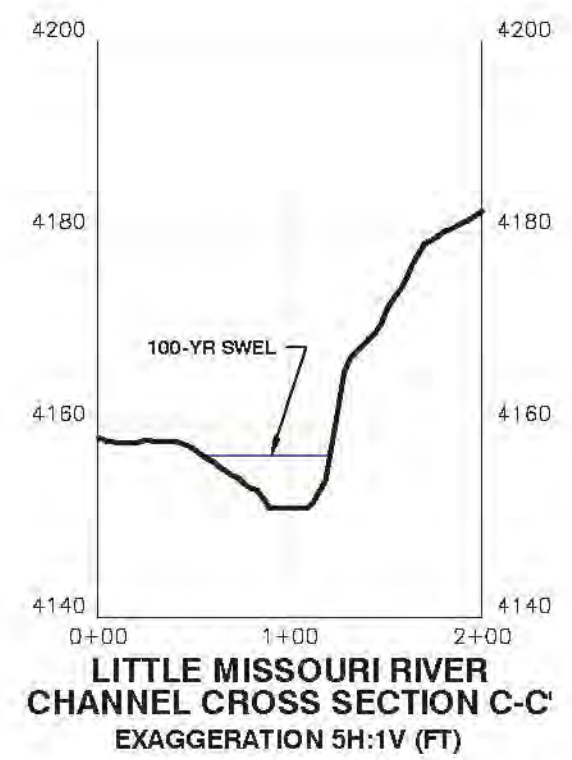
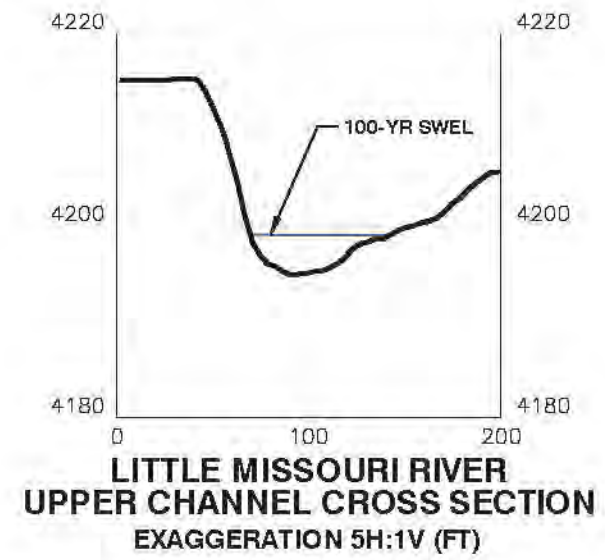
Basemap: 5' Contours from May 2010 Flight

Drawing Coordinates: WY83EF

ROSS PROJECT AREA

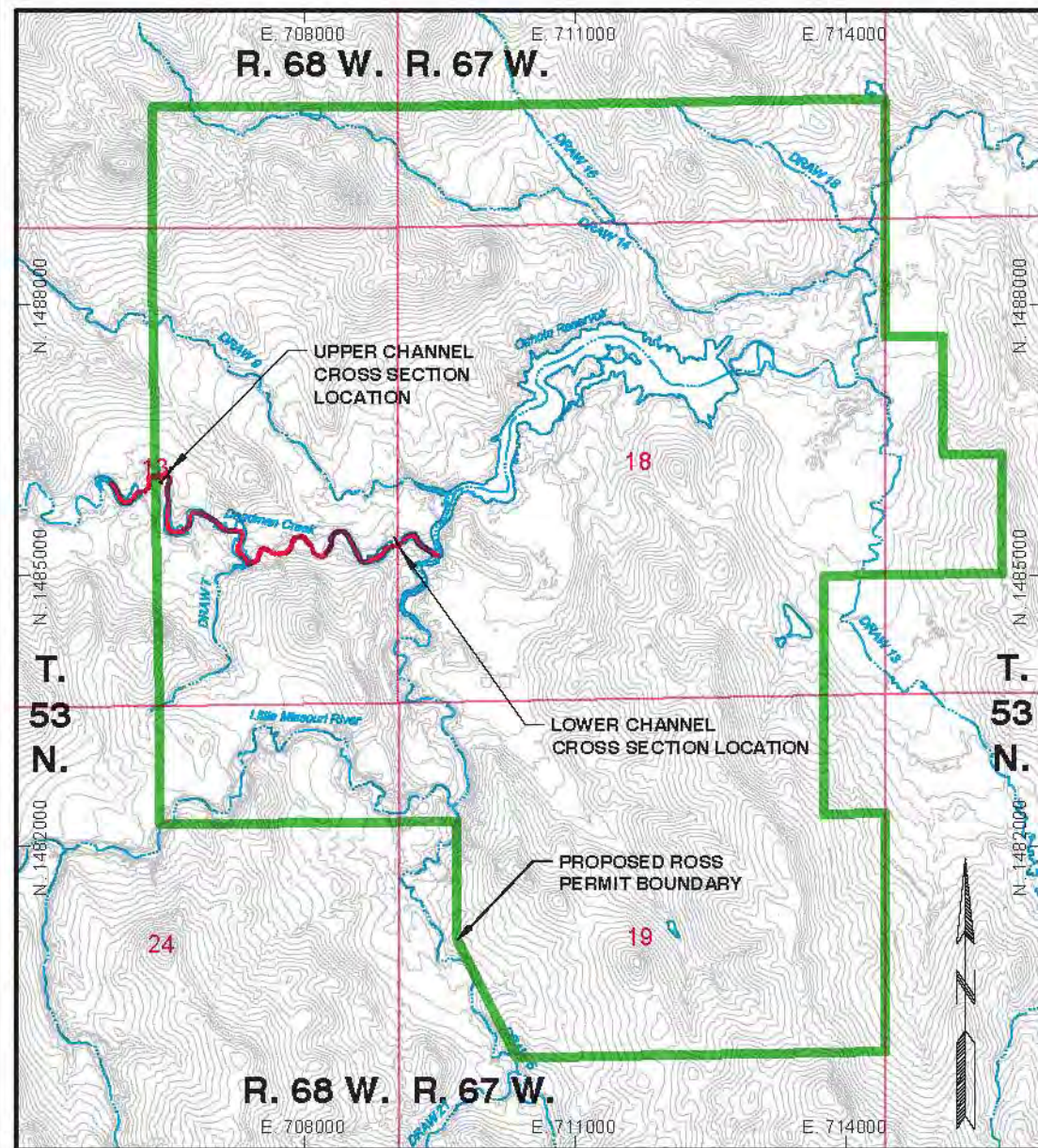


		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																							
		ADDENDUM 2.7-C FIGURE 1																							
REVISIONS <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		Date	Description																					SHEET 1 OF 2 LITTLE MISSOURI RIVER CHANNEL PROFILE AND CROSS SECTIONS	
Date	Description																								
Drawn By: DCJ Checked By: DEB Date: 11/24/10																									
FILE: ROSS_ER_HYD_PRO_LMR																									



		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																							
		ADDENDUM 2.7-C FIGURE 1																							
REVISIONS <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		Date	Description																					SHEET 2 OF 2 LITTLE MISSOURI RIVER CHANNEL PROFILE AND CROSS SECTIONS	
Date	Description																								
Drawn By: DCJ Checked By: DEB Date: 11/24/10																									
FILE: ROSS_ISR_HYD_PRO_LMR																									

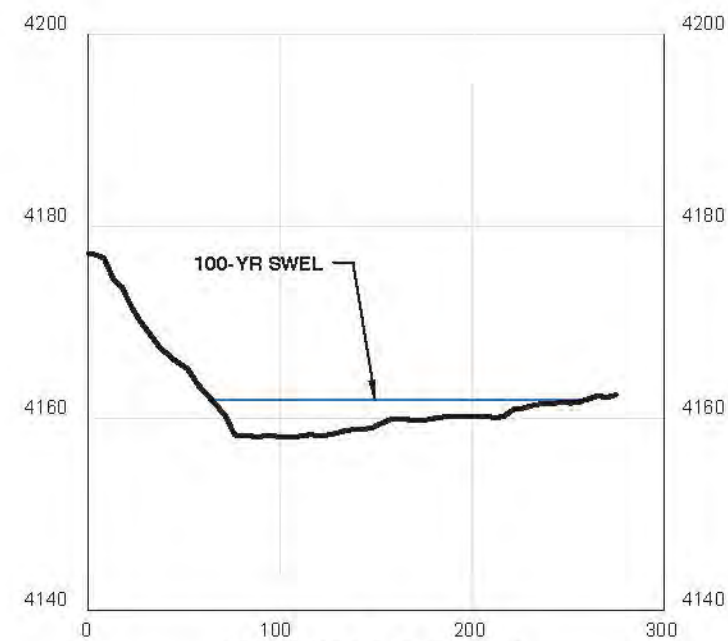
K:\Penins_Ula_Minerals\09142\DWGS_WY83B\ROSS_ISR_HYD_PRO_LMR.dwg TRA_2.7-C_FIGURE_1_SH2 12/18/2010 1:57:51 PM



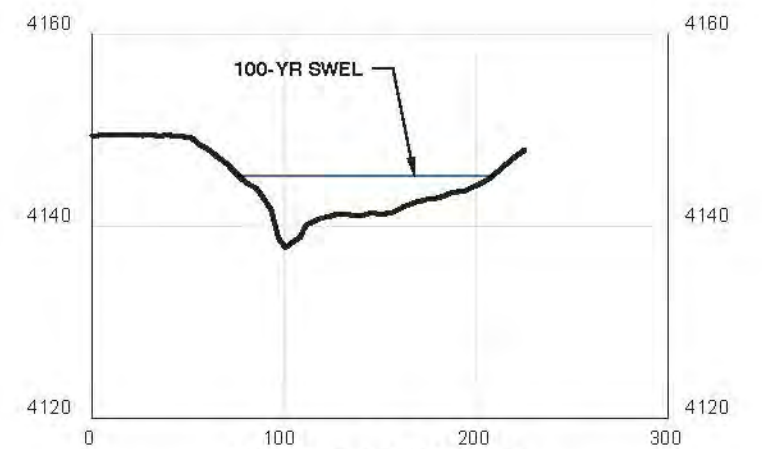
Basemap: 5' Contours from May 2010 Flight

Drawing Coordinates: WY83EF

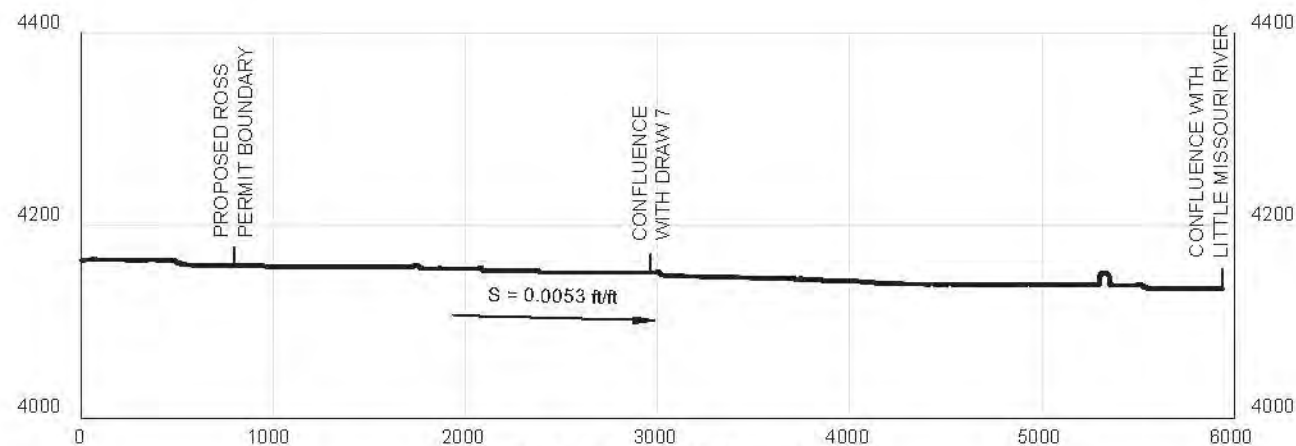
ROSS PROJECT AREA





**DEADMAN CREEK
UPPER CHANNEL CROSS SECTION
EXAGGERATION 5H:1V (FT)**

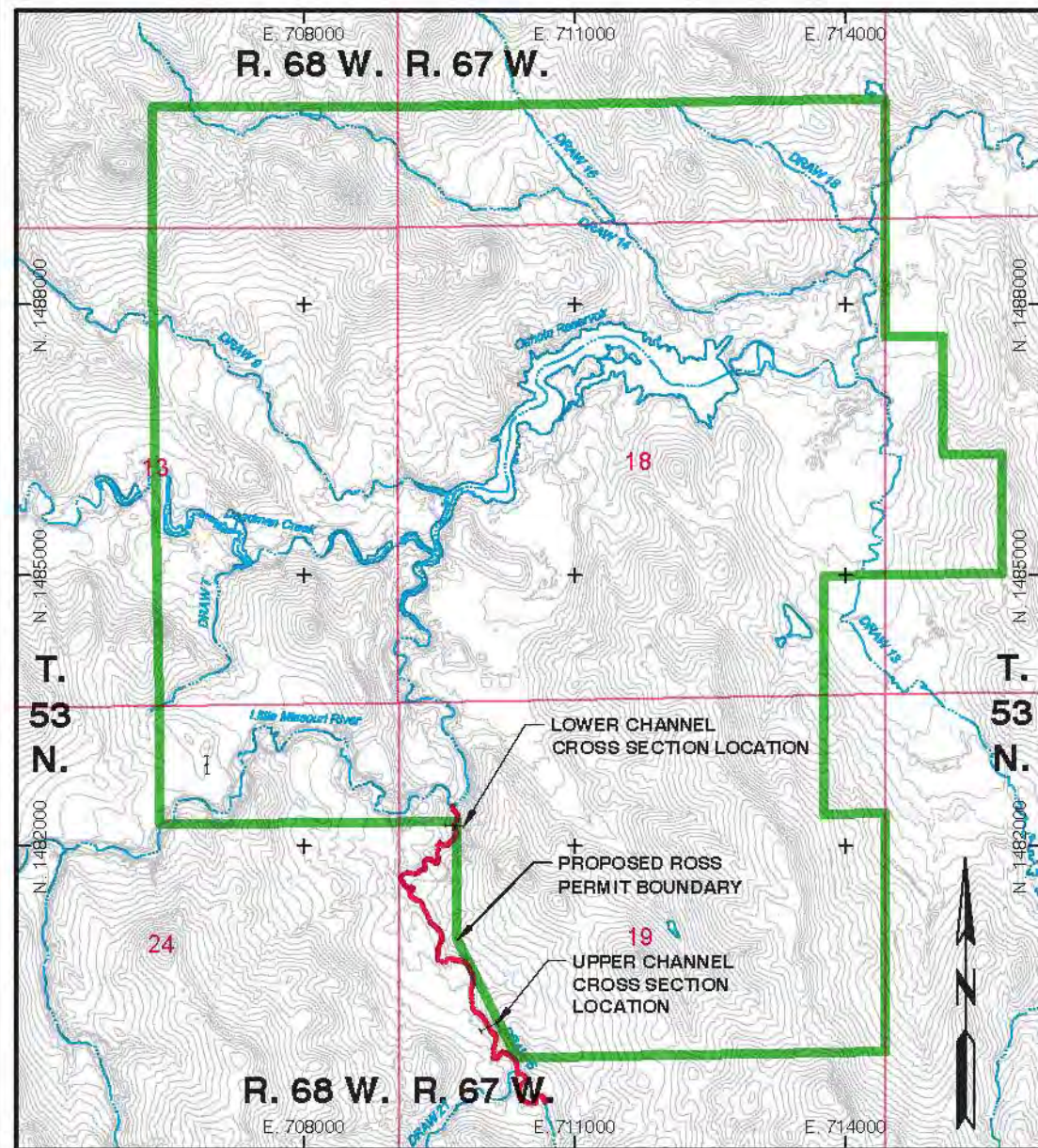


**DEADMAN CREEK
LOWER CHANNEL CROSS SECTION
EXAGGERATION 5H:1V (FT)**



**DEADMAN CREEK
CHANNEL PROFILE
EXAGGERATION 5H:1V (FT)**

 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY	
		P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.7-C FIGURE 2 DEADMAN CREEK CHANNEL PROFILE AND CROSS SECTIONS	
Date	Description		
		Drawn By: DCJ	 WWC ENGINEERING www.wyccengineering.com
		Checked By: DEB	
		Date: 11/24/10	
FILE: ROSS_ER_HYD_PRO_DEADMAN			



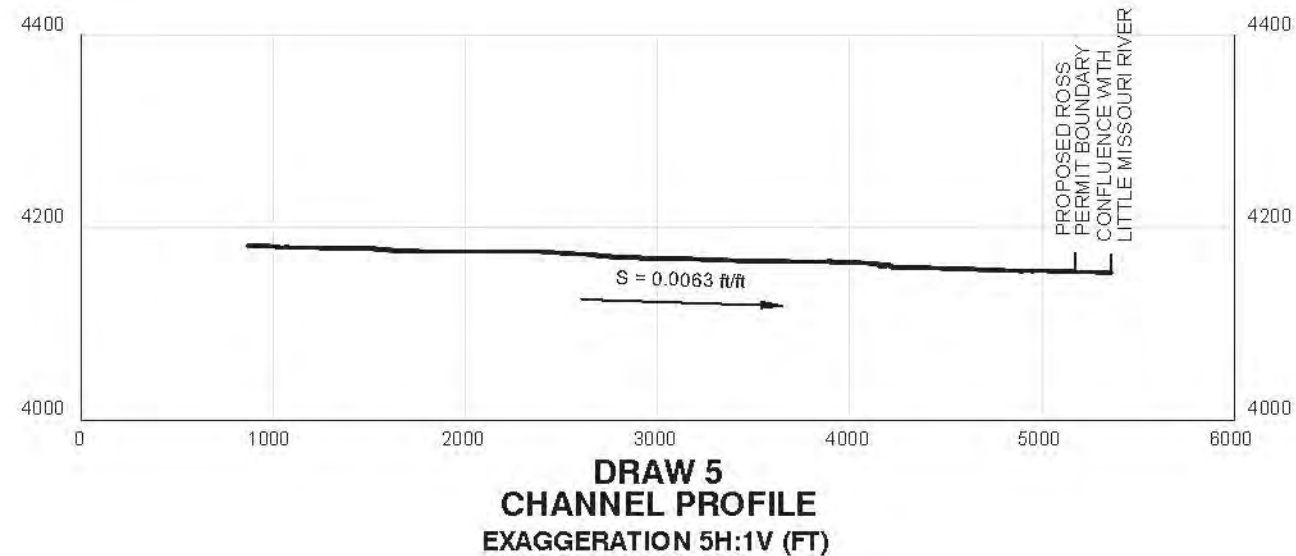
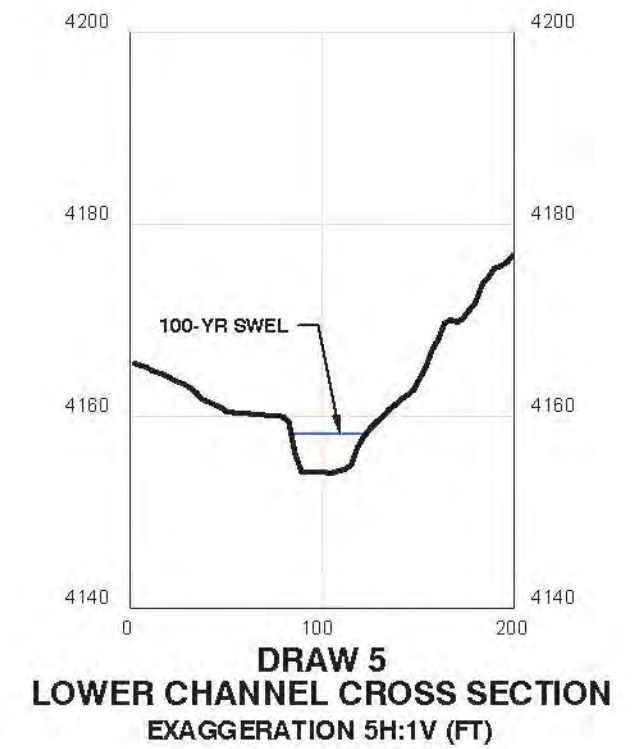
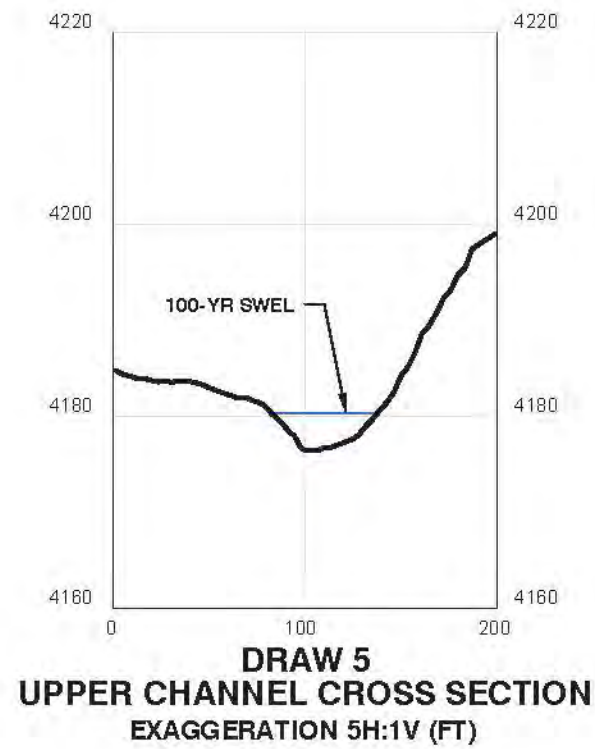
Basemap: 5' Contours from May 2010 Flight



Drawing Coordinates: WY83EF

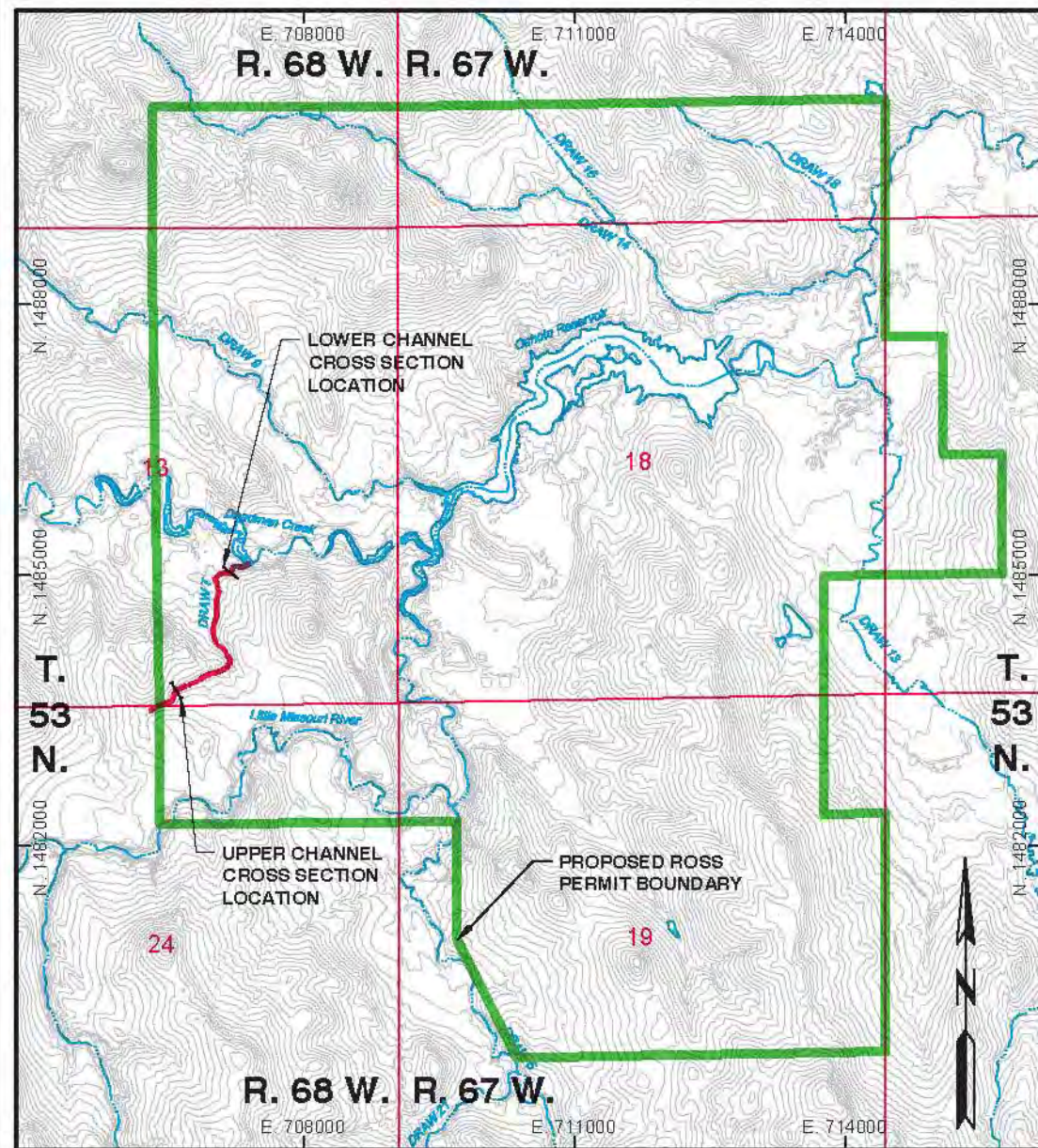
ROSS PROJECT AREA



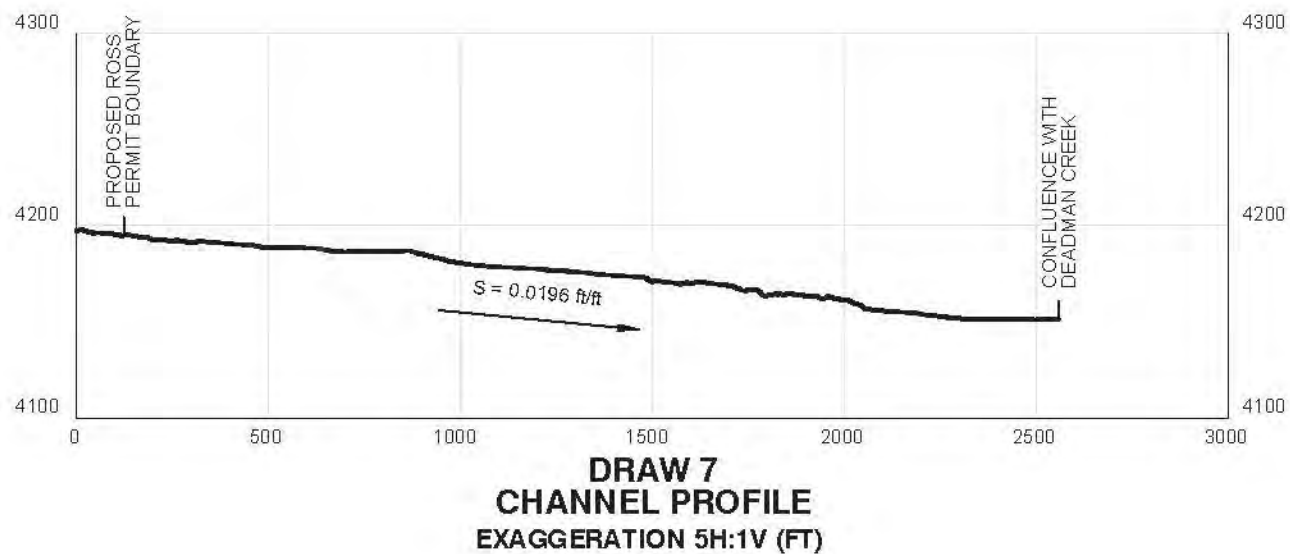
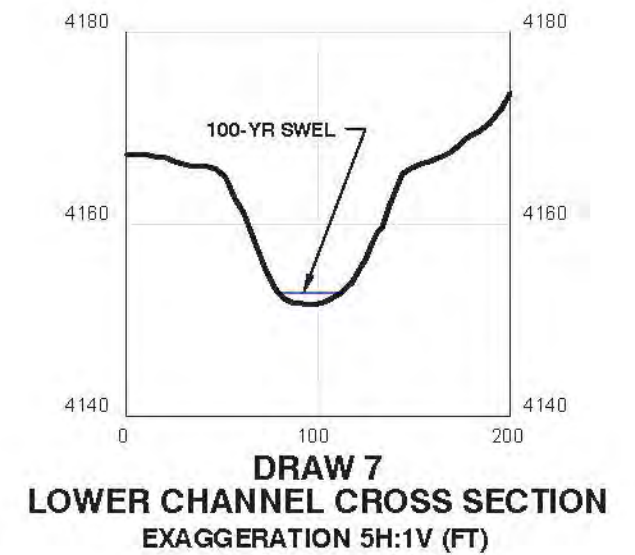
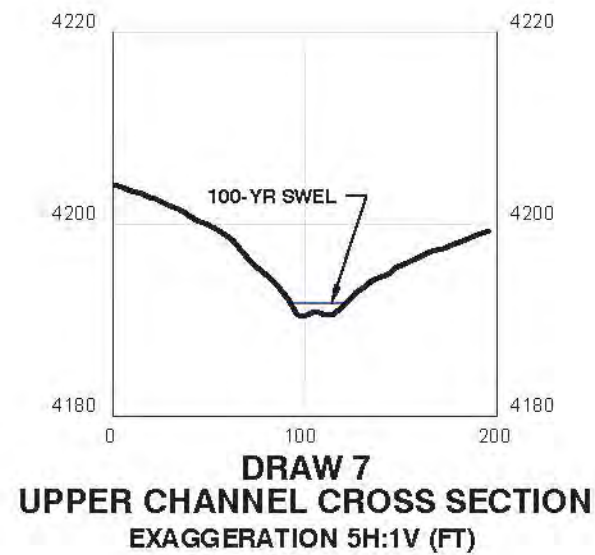
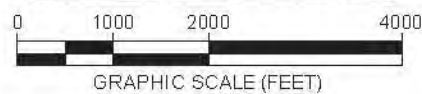
GRAPHIC SCALE (FEET)





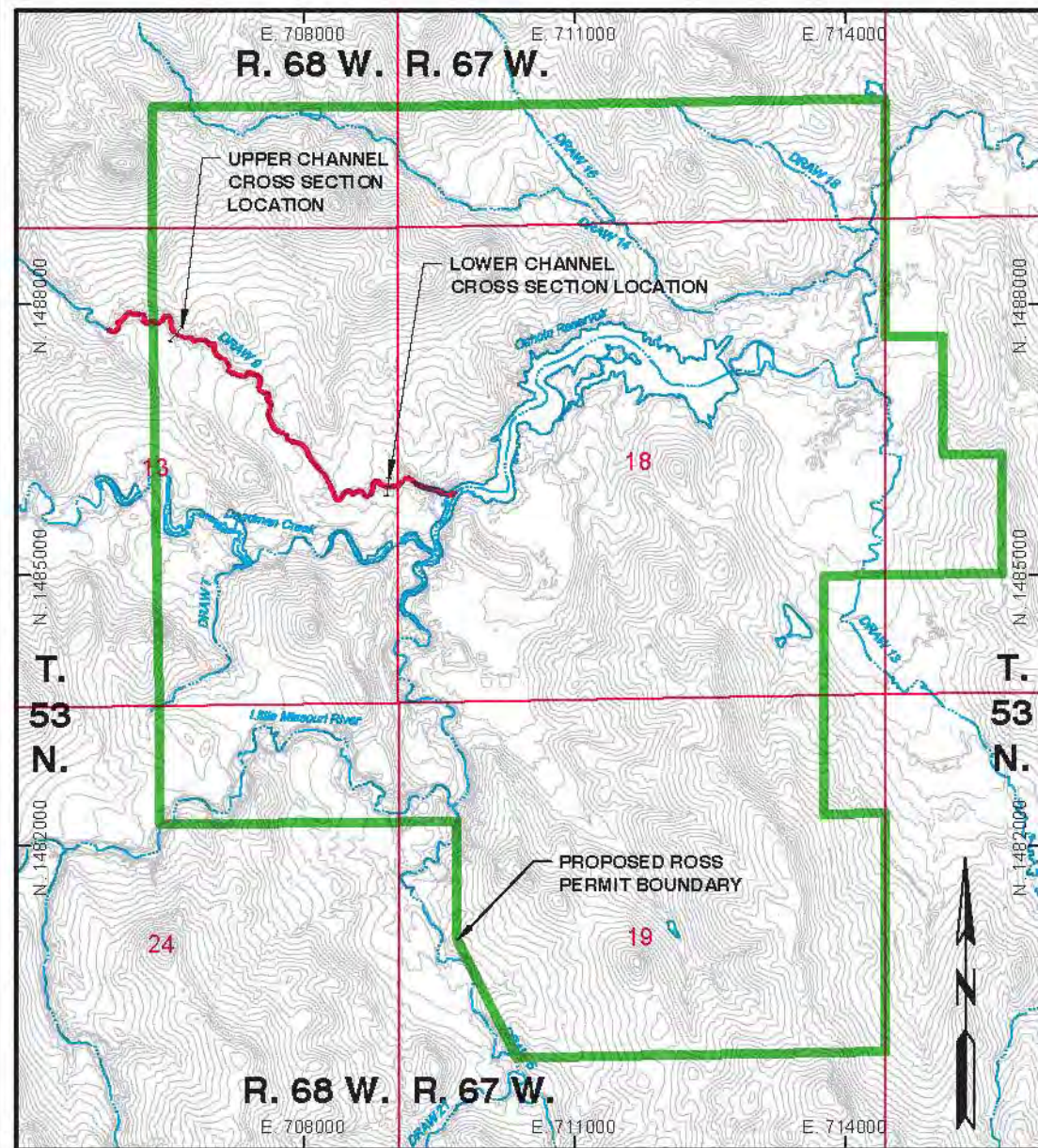
 STRATA ENERGY		ROSS ISR PROJECT	
		CROOK COUNTY, WY	
		P.O. BOX 2318	
		GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.7-C	
Date	Description	FIGURE 3	
		DRAW 5 CHANNEL PROFILE AND CROSS SECTIONS	
		Drawn By: DCJ	 WWC ENGINEERING www.wwc-engineering.com
		Checked By: DEB	
		Date: 11/24/10	
FILE: ROSS_ER_HYD_PRO_DRAW 5			



ROSS PROJECT AREA



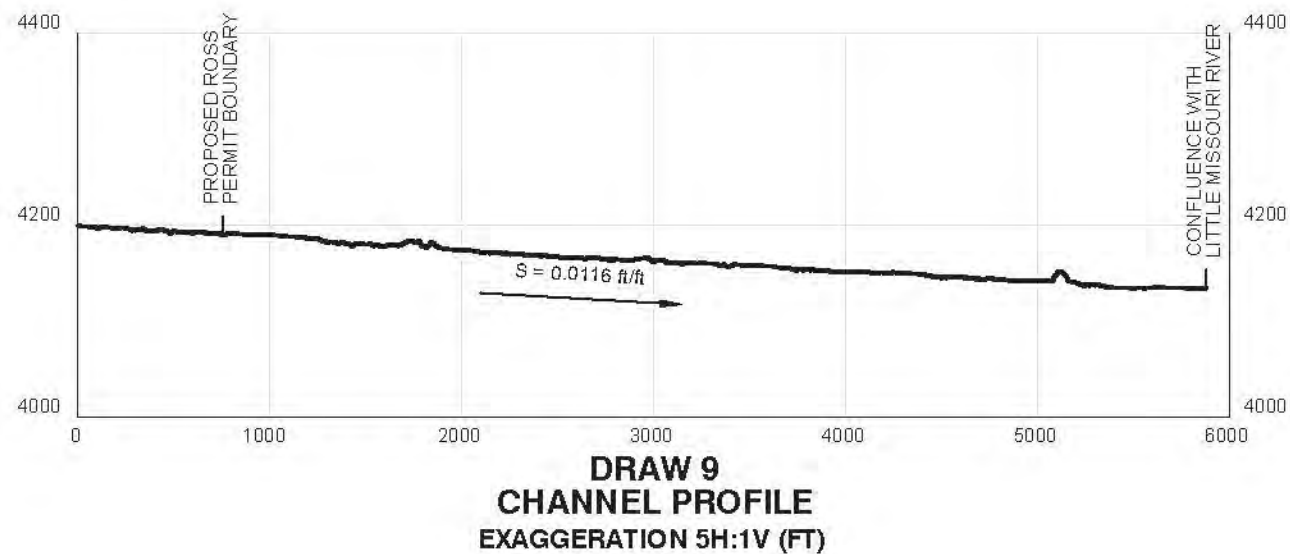
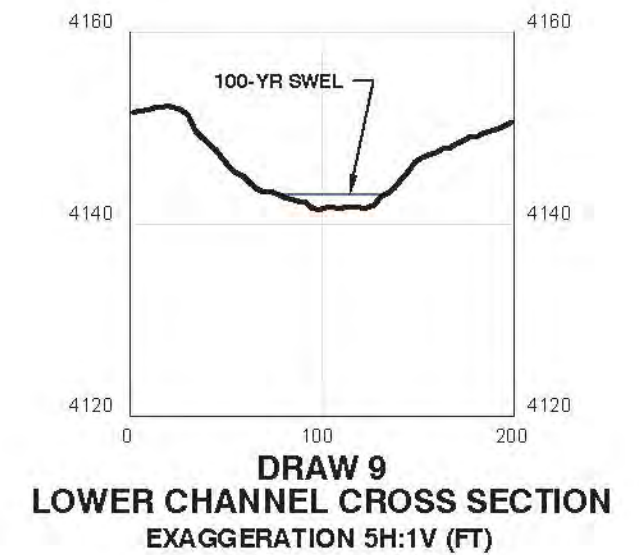
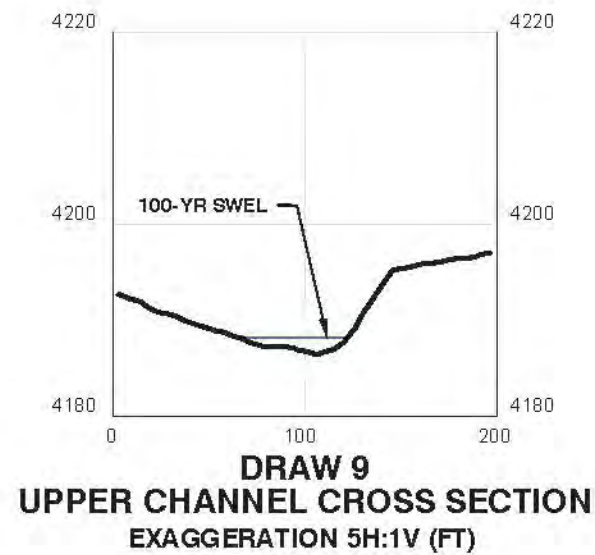
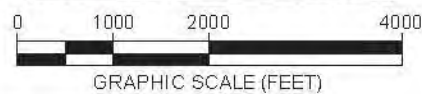
 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY	
		P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.7-C	
Date	Description	FIGURE 4	
		DRAW 7 CHANNEL PROFILE AND CROSS SECTIONS	
		Drawn By: DCJ	 WWC ENGINEERING www.wwcengineering.com
		Checked By: DEB	
		Date: 11/24/10	
FILE: ROSS_ER_HYD_PRO_DRAW 7			





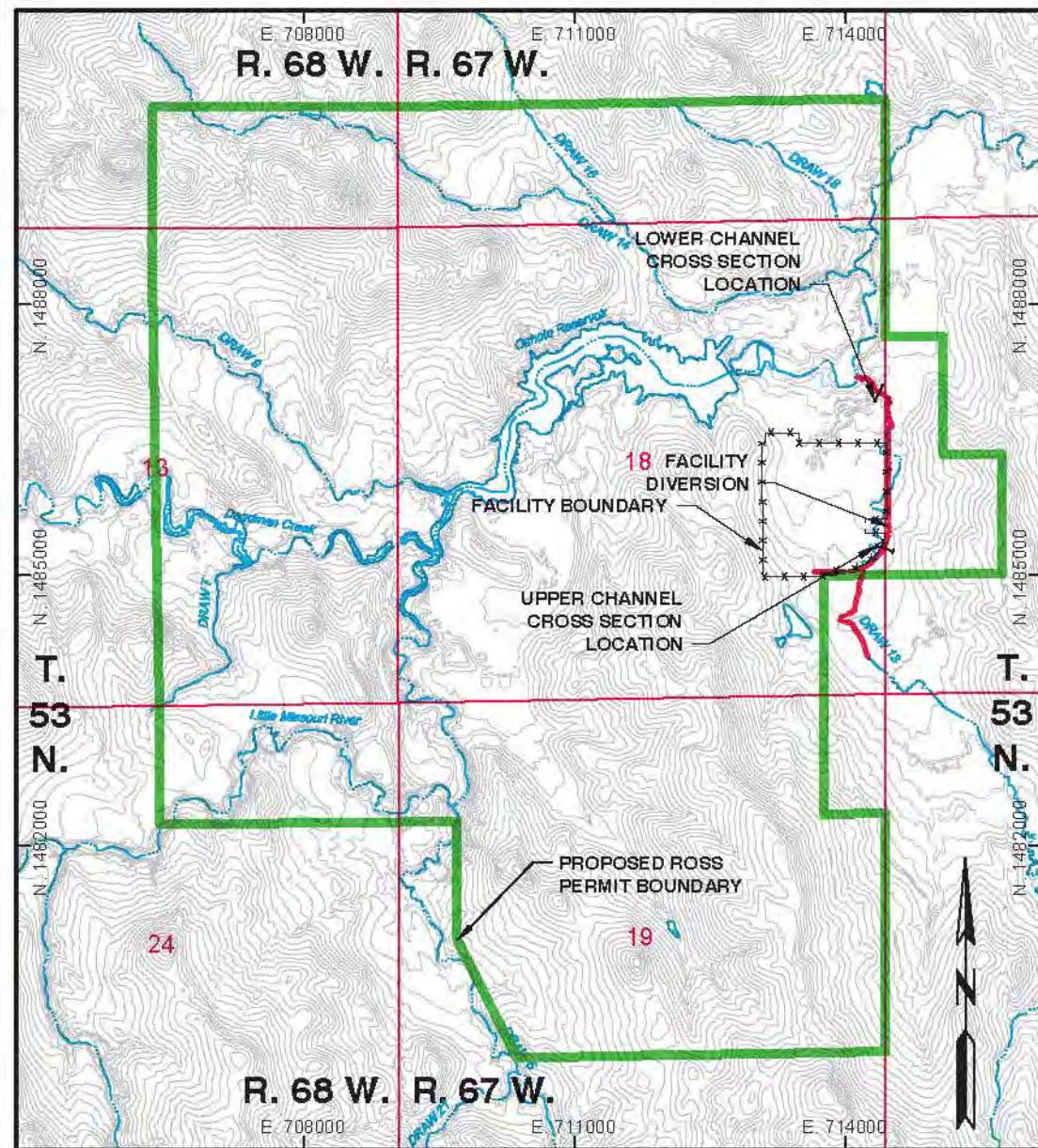
Basemap: 5' Contours from May 2010 Flight

Drawing Coordinates: WY83EF

ROSS PROJECT AREA



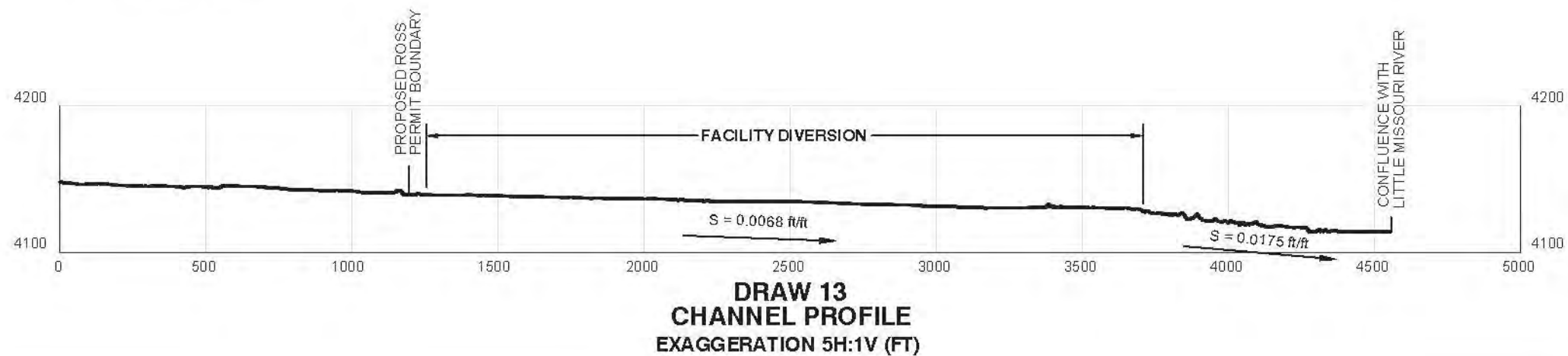
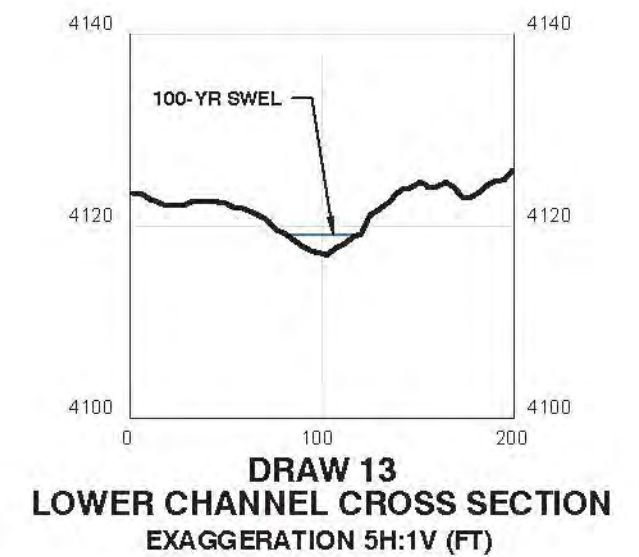
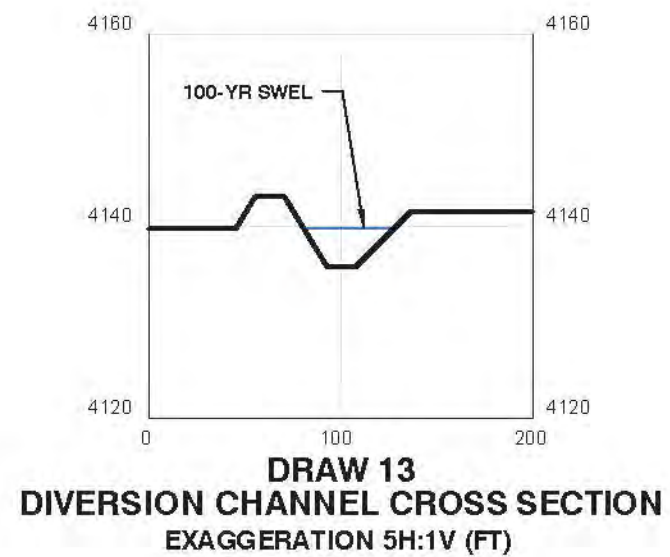
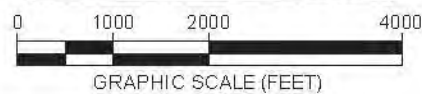
 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY	
		P.O. BOX 2318 GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.7-C	
Date	Description	FIGURE 5	
		DRAW 9 CHANNEL PROFILE AND CROSS SECTIONS	
		Drawn By: DCJ	 WWC ENGINEERING www.wwcengineering.com
		Checked By: DEB	
		Date: 11/24/10	
FILE: ROSS_ER_HYD_PRO_DRAW 9			





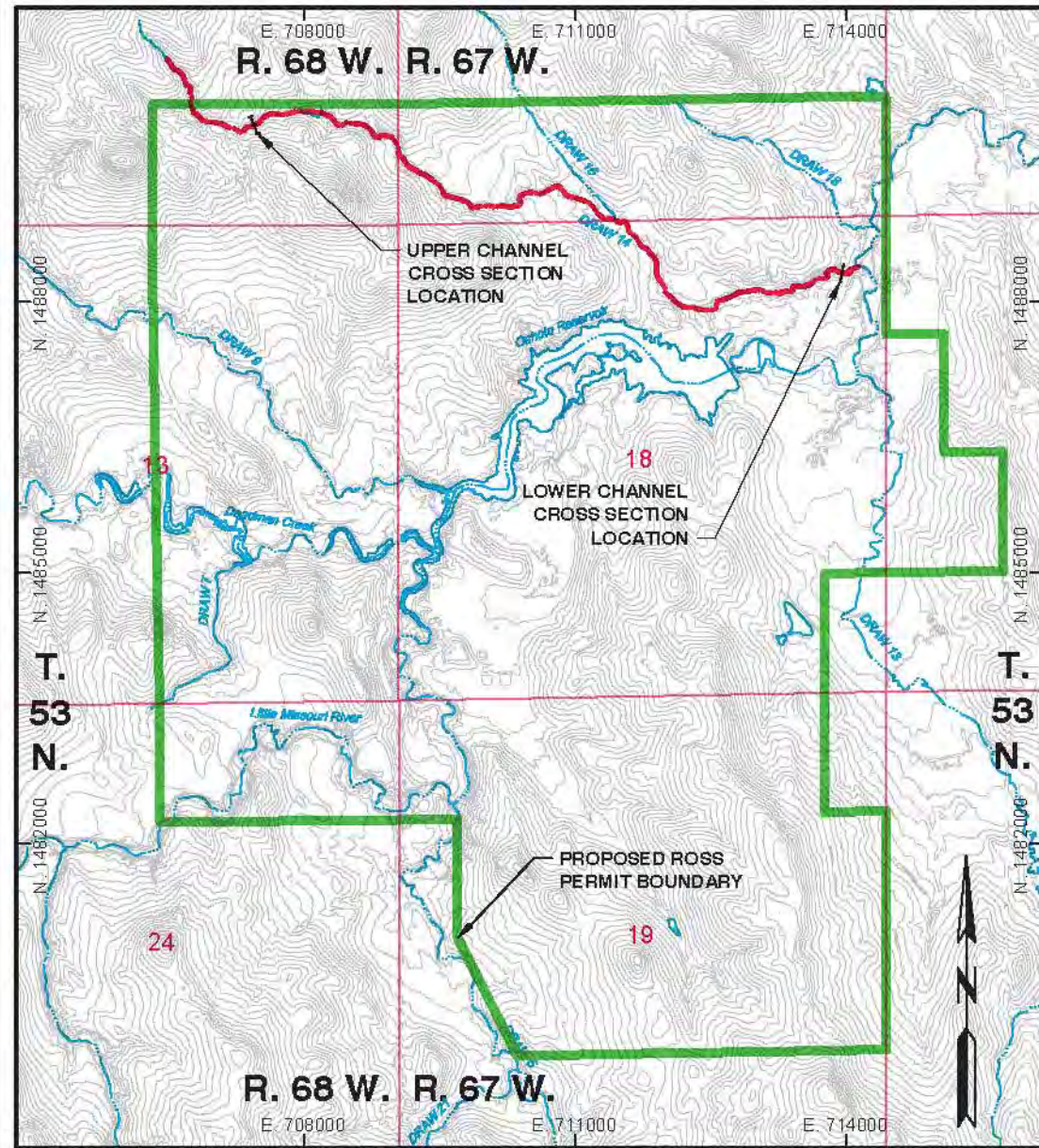
Basemap: 5' Contours from May 2010 Flight

Drawing Coordinates: WY83EF

ROSS PROJECT AREA

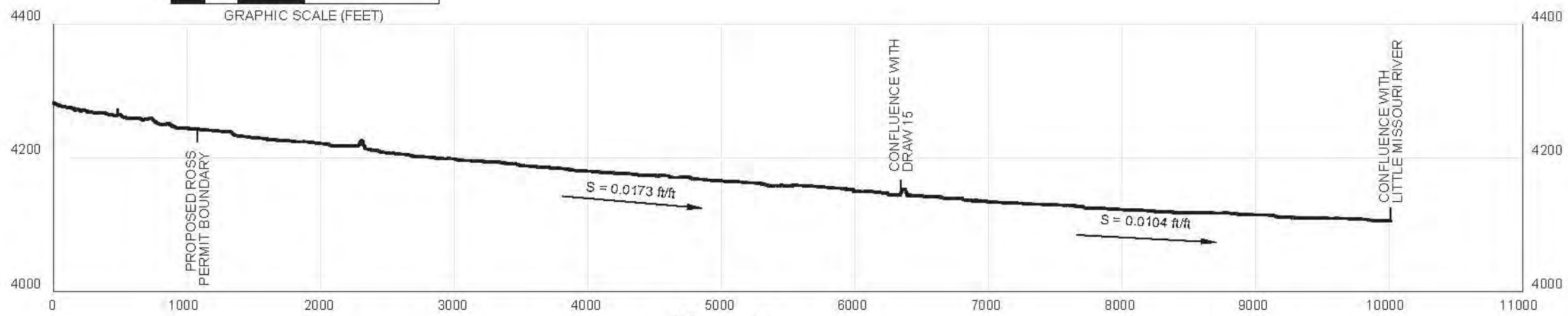
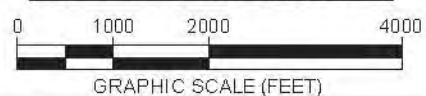


 STRATA ENERGY		ROSS ISR PROJECT	
		CROOK COUNTY, WY	
		P.O. BOX 2318	
		GILLETTE, WY 82716	
REVISIONS		ADDENDUM 2.6-C FIGURE 6 DRAW 13 CHANNEL PROFILE AND CROSS SECTIONS	
Date	Description		
Drawn By: DCJ		 WWCENGINEERING www.wwc-engineering.com	
Checked By: DEB			
Date: 11/24/10			
FILE: ROSS_ER_HYD_PRO_DRAW_13			

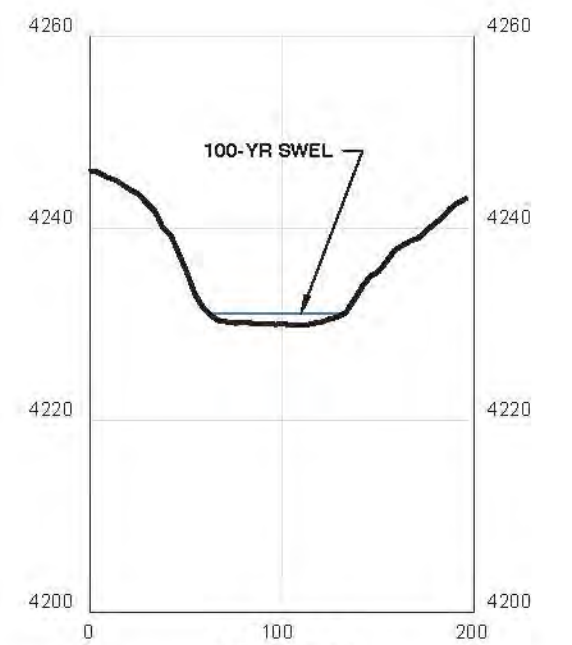


Basemap: 5' Contours from May 2010 Flight Drawing Coordinates: WY83EF

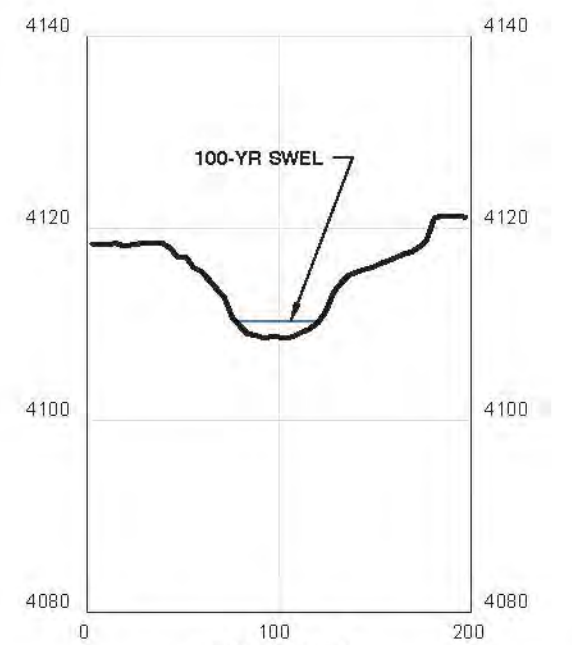
ROSS PROJECT AREA



**DRAW 14
CHANNEL PROFILE
EXAGGERATION 5H:1V (FT)**

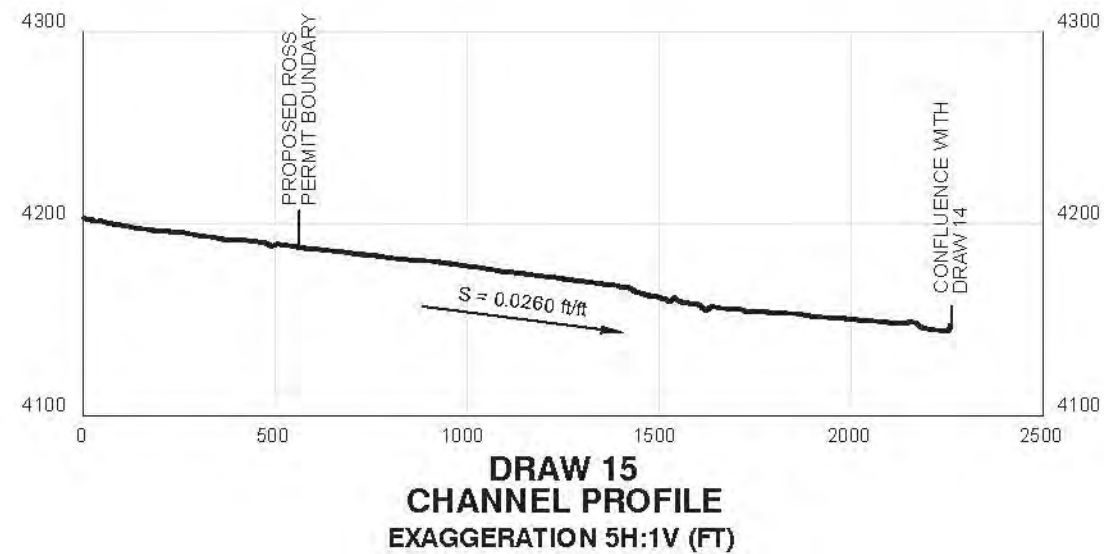
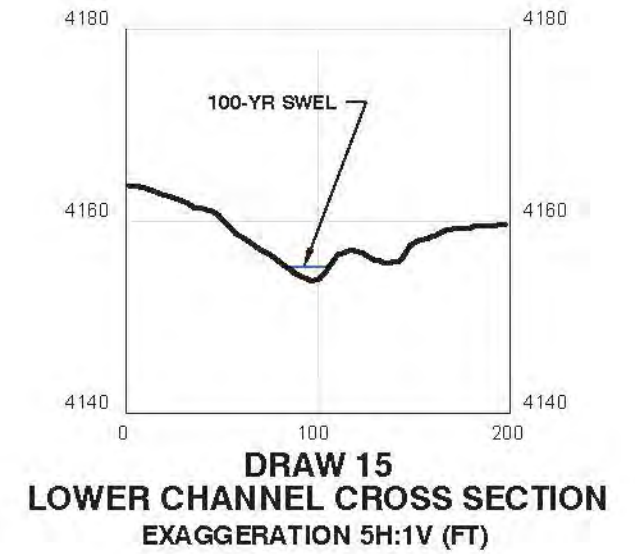
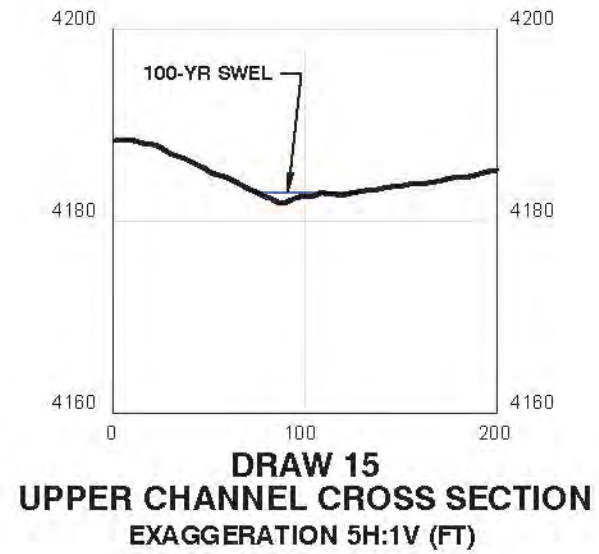
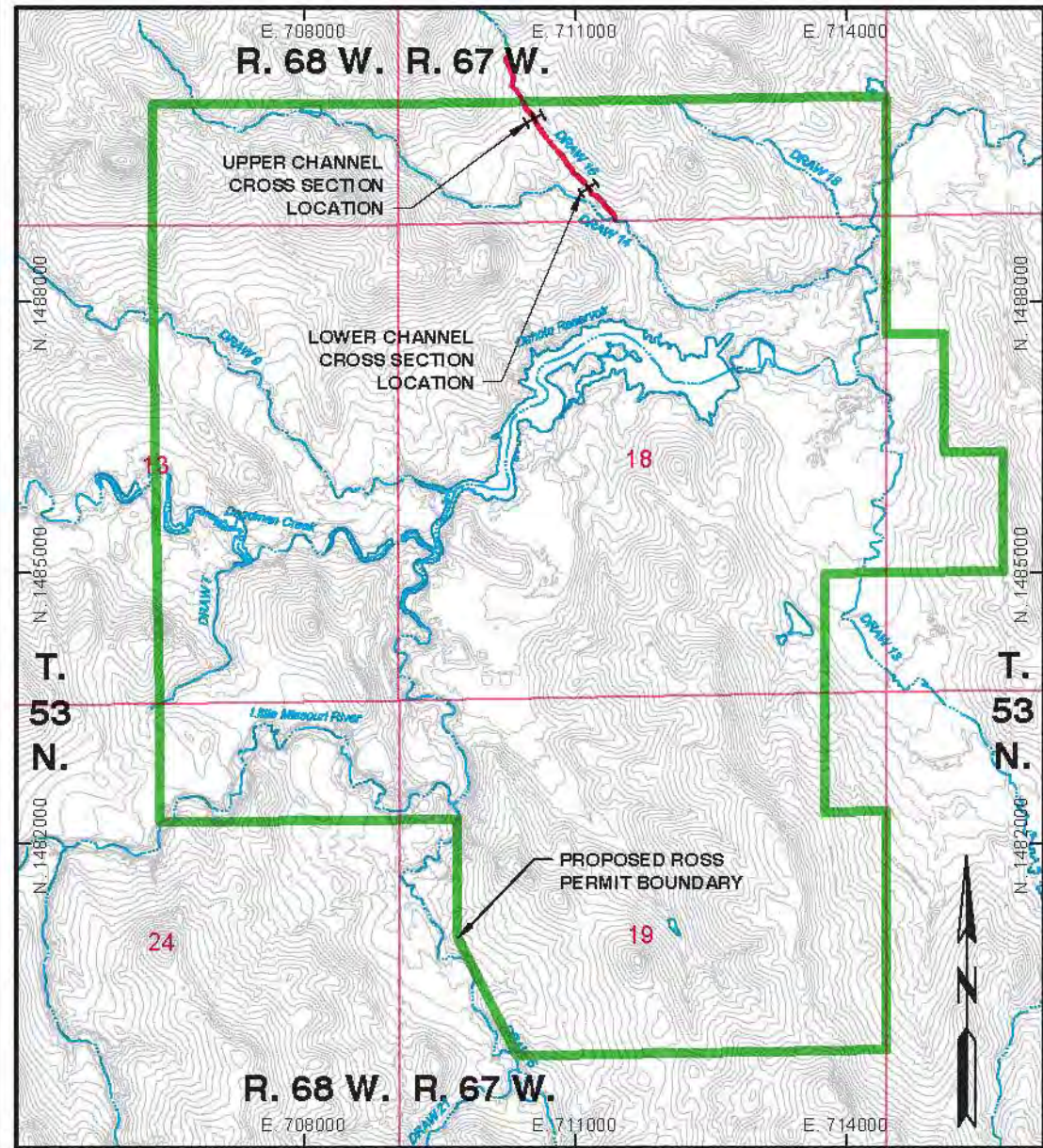





**DRAW 14
UPPER CHANNEL CROSS SECTION
EXAGGERATION 5H:1V (FT)**

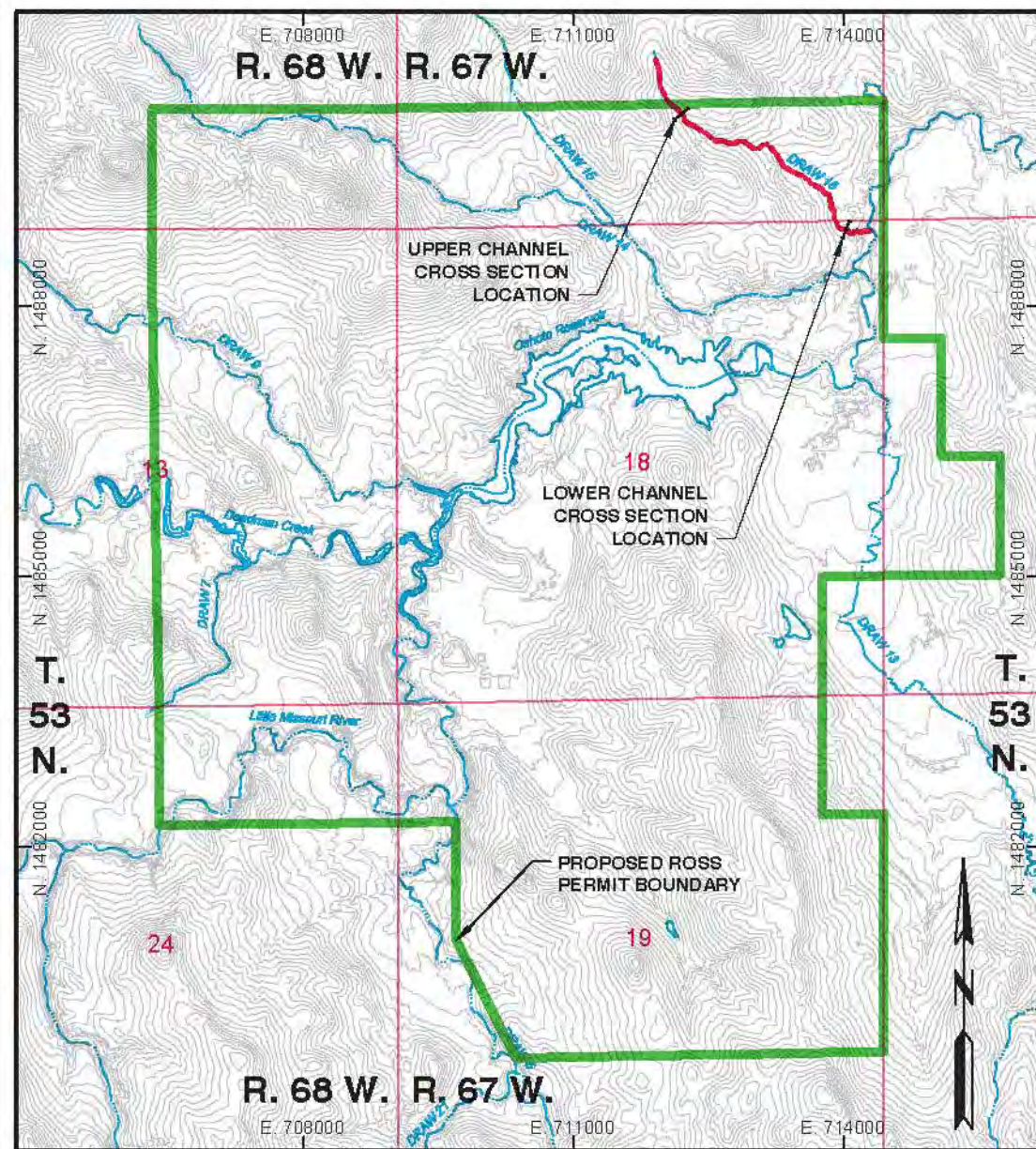


**DRAW 14
LOWER CHANNEL CROSS SECTION
EXAGGERATION 5H:1V (FT)**

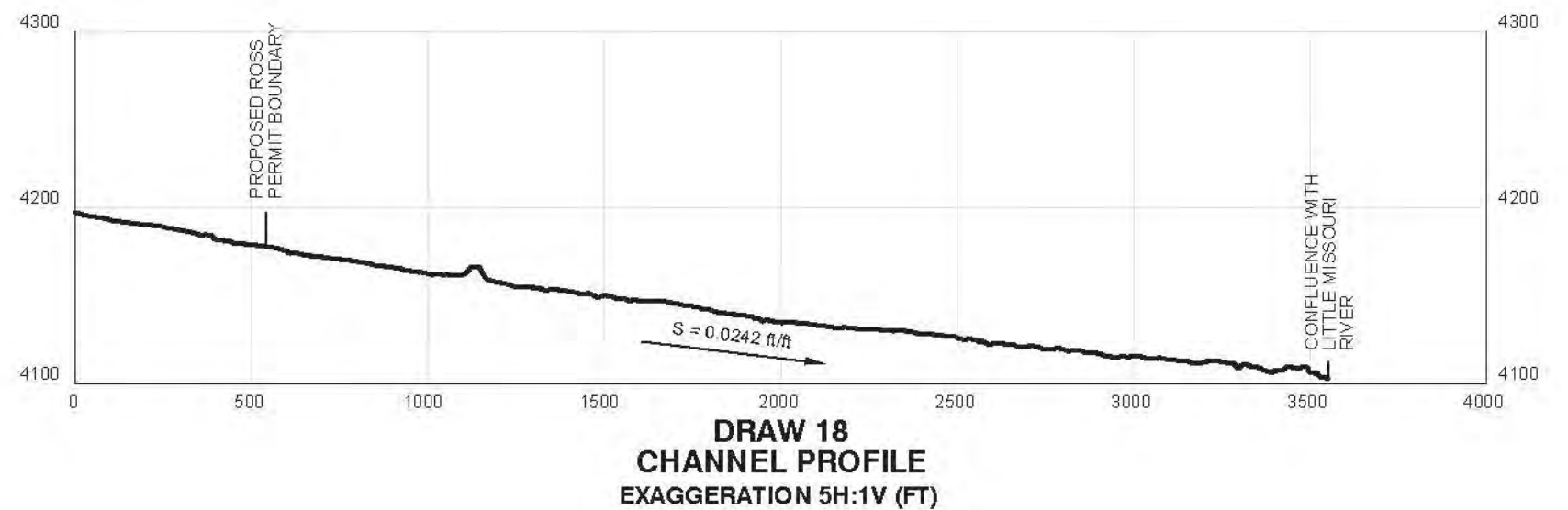
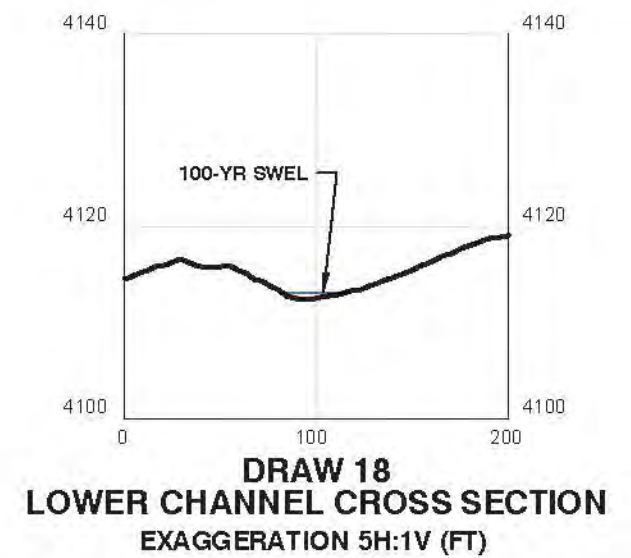
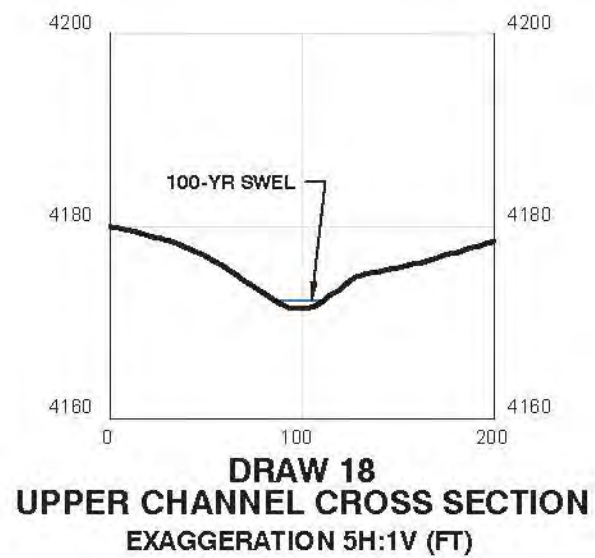
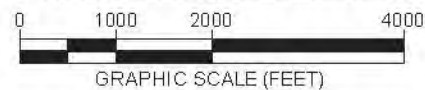
		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																													
		ADDENDUM 2.7-C FIGURE 7 DRAW 14 CHANNEL PROFILE AND CROSS SECTIONS																													
REVISIONS <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		Date	Description																					<table border="1"> <tr> <td>Drawn By:</td> <td>DCJ</td> </tr> <tr> <td>Checked By:</td> <td>DEB</td> </tr> <tr> <td>Date:</td> <td>11/24/10</td> </tr> </table>		Drawn By:	DCJ	Checked By:	DEB	Date:	11/24/10
Date	Description																														
Drawn By:	DCJ																														
Checked By:	DEB																														
Date:	11/24/10																														
FILE: ROSS_ER_HYD_PRO_DRAW_14																															





 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716	
		ADDENDUM 2.7-C FIGURE 8 DRAW 15 CHANNEL PROFILE AND CROSS SECTIONS	
REVISIONS		 WWC ENGINEERING www.wwcengineering.com	
Date	Description		
		Drawn By: DCJ	 WWC ENGINEERING www.wwcengineering.com
		Checked By: DEB	
		Date: 11/24/10	
FILE: ROSS_ER_HYD_PRO_DRAW_15			



ROSS PROJECT AREA

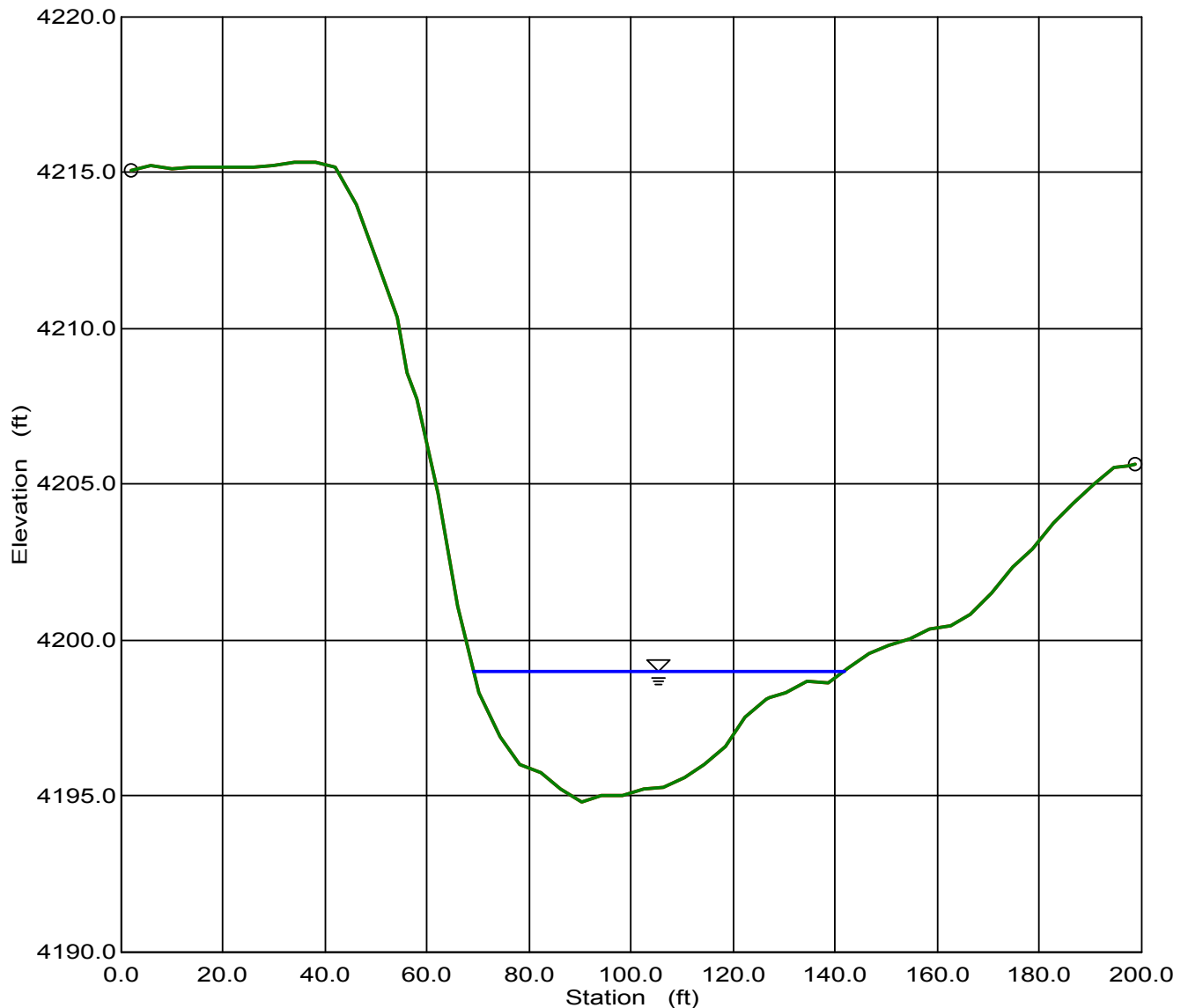


 STRATA ENERGY		ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716																													
		ADDENDUM 2.7-C FIGURE 9 DRAW 18 CHANNEL PROFILE AND CROSS SECTIONS																													
<table><tr><th colspan="2">REVISIONS</th></tr><tr><th>Date</th><th>Description</th></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>		REVISIONS		Date	Description																			<table><tr><td>Drawn By:</td><td>DCJ</td></tr><tr><td>Checked By:</td><td>DEB</td></tr><tr><td>Date:</td><td>11/24/10</td></tr></table>		Drawn By:	DCJ	Checked By:	DEB	Date:	11/24/10
REVISIONS																															
Date	Description																														
Drawn By:	DCJ																														
Checked By:	DEB																														
Date:	11/24/10																														
FILE: ROSS_ER_HYD_PRO_DRAW_18		 WWC ENGINEERING www.wwceengineering.com																													

Little Missouri R. Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.006500 ft/ft
Water Surface Elevation	4,198.98 ft
Discharge	1,297.00 cfs



Little Missouri R. Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.006500 ft/ft		
Elevation range: 4,194.80 ft to 4,215.34 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.94	4,215.07	1.94	198.83	0.030
5.96	4,215.20			
9.98	4,215.10			
13.99	4,215.14			
18.01	4,215.17			
22.03	4,215.17			
26.05	4,215.16			
30.07	4,215.23			
34.09	4,215.30			
38.10	4,215.34			
42.12	4,215.15			
46.14	4,213.96			
50.16	4,212.20			
54.18	4,210.35			
56.19	4,208.58			
58.19	4,207.74			
62.21	4,204.71			
66.23	4,201.08			
70.25	4,198.32			
74.27	4,196.88			
78.29	4,195.99			
82.30	4,195.71			
86.32	4,195.20			
90.34	4,194.80			
94.36	4,195.00			
98.38	4,195.00			
102.40	4,195.20			
106.41	4,195.28			
110.43	4,195.57			
114.45	4,196.01			
118.47	4,196.59			
122.49	4,197.52			
126.50	4,198.10			
127.28	4,198.14			
130.52	4,198.30			
134.54	4,198.67			
138.56	4,198.60			
142.58	4,199.07			

Little Missouri R. Upper Cross Section
Worksheet for Irregular Channel

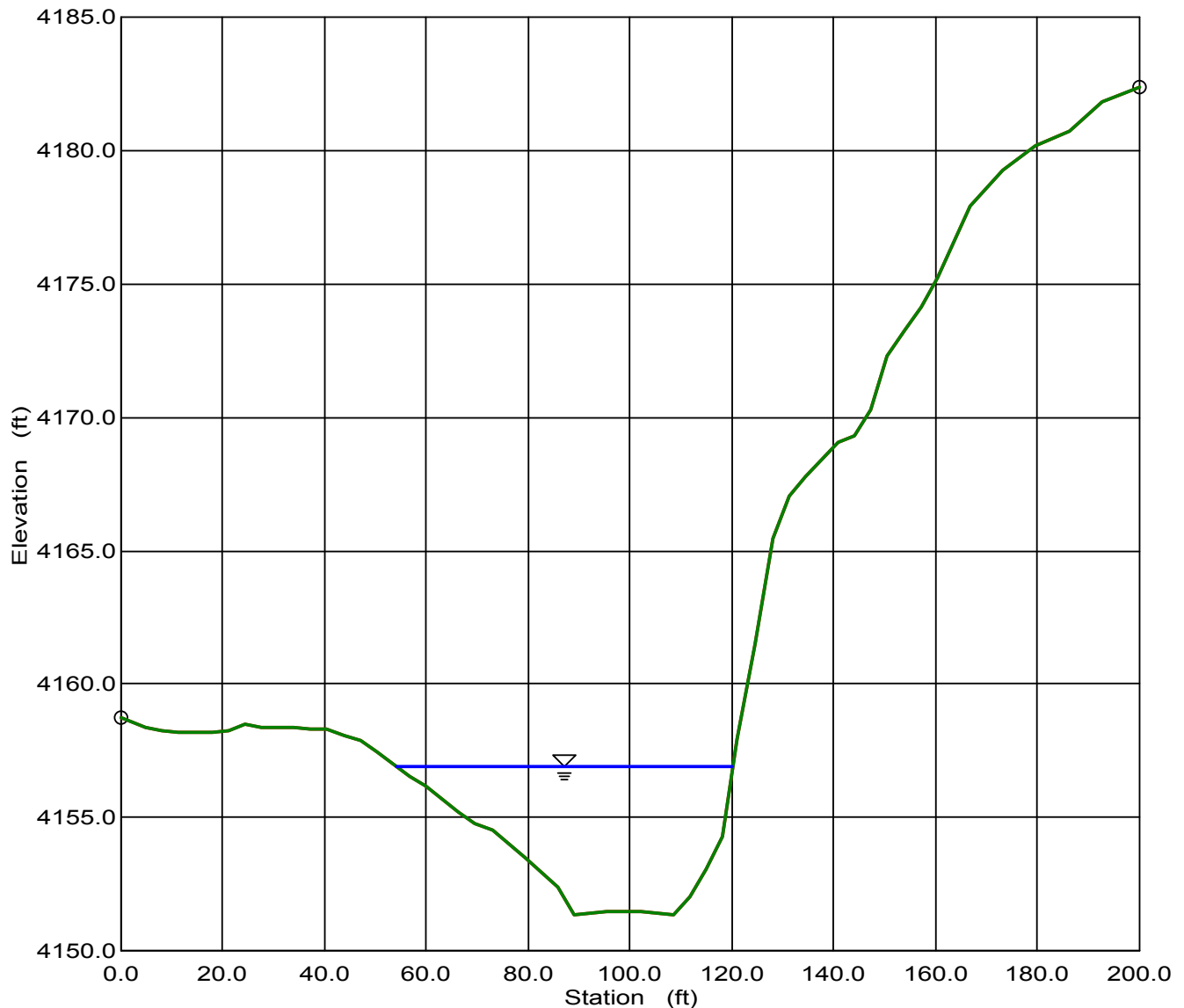
146.60	4,199.53	
150.61	4,199.83	
154.63	4,200.02	
158.65	4,200.32	
162.69	4,200.46	
166.69	4,200.83	
170.71	4,201.48	
174.72	4,202.35	
178.74	4,202.89	
182.76	4,203.72	
186.78	4,204.39	
190.80	4,205.02	
194.81	4,205.51	
197.64	4,205.58	
198.83	4,205.61	
Discharge	1,297.00	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,198.98	ft
Flow Area	179.16	ft ²
Wetted Perimeter	73.40	ft
Top Width	72.51	ft
Height	4.18	ft
Critical Depth	4,198.54	ft
Critical Slope	0.010008	ft/ft
Velocity	7.24	ft/s
Velocity Head	0.81	ft
Specific Energy	4,199.79	ft
Froude Number	0.81	
Flow is subcritical.		

Little Missouri R. C-C' Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.006500 ft/ft
Water Surface Elevation	4,156.90 ft
Discharge	2,127.80 cfs



Little Missouri R. C-C' Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.006500 ft/ft		
Elevation range: 4,151.37 ft to 4,182.35 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,158.76	0.00	200.00	0.030
1.80	4,158.60			
5.00	4,158.40			
8.24	4,158.25			
11.48	4,158.18			
14.72	4,158.20			
17.96	4,158.20			
21.19	4,158.24			
24.43	4,158.47			
27.67	4,158.37			
30.91	4,158.38			
34.14	4,158.38			
37.38	4,158.34			
40.62	4,158.31			
43.85	4,158.09			
47.09	4,157.86			
50.33	4,157.45			
56.80	4,156.55			
60.00	4,156.18			
66.52	4,155.20			
69.75	4,154.79			
72.99	4,154.55			
79.46	4,153.50			
85.94	4,152.39			
89.18	4,151.37			
95.65	4,151.44			
98.89	4,151.47			
102.13	4,151.50			
108.60	4,151.37			
111.84	4,151.99			
115.07	4,153.08			
118.31	4,154.29			
121.00	4,157.97			
124.79	4,161.49			
128.02	4,165.44			
131.26	4,167.06			
134.50	4,167.75			
140.97	4,169.09			

Little Missouri R. C-C' Cross Section
Worksheet for Irregular Channel

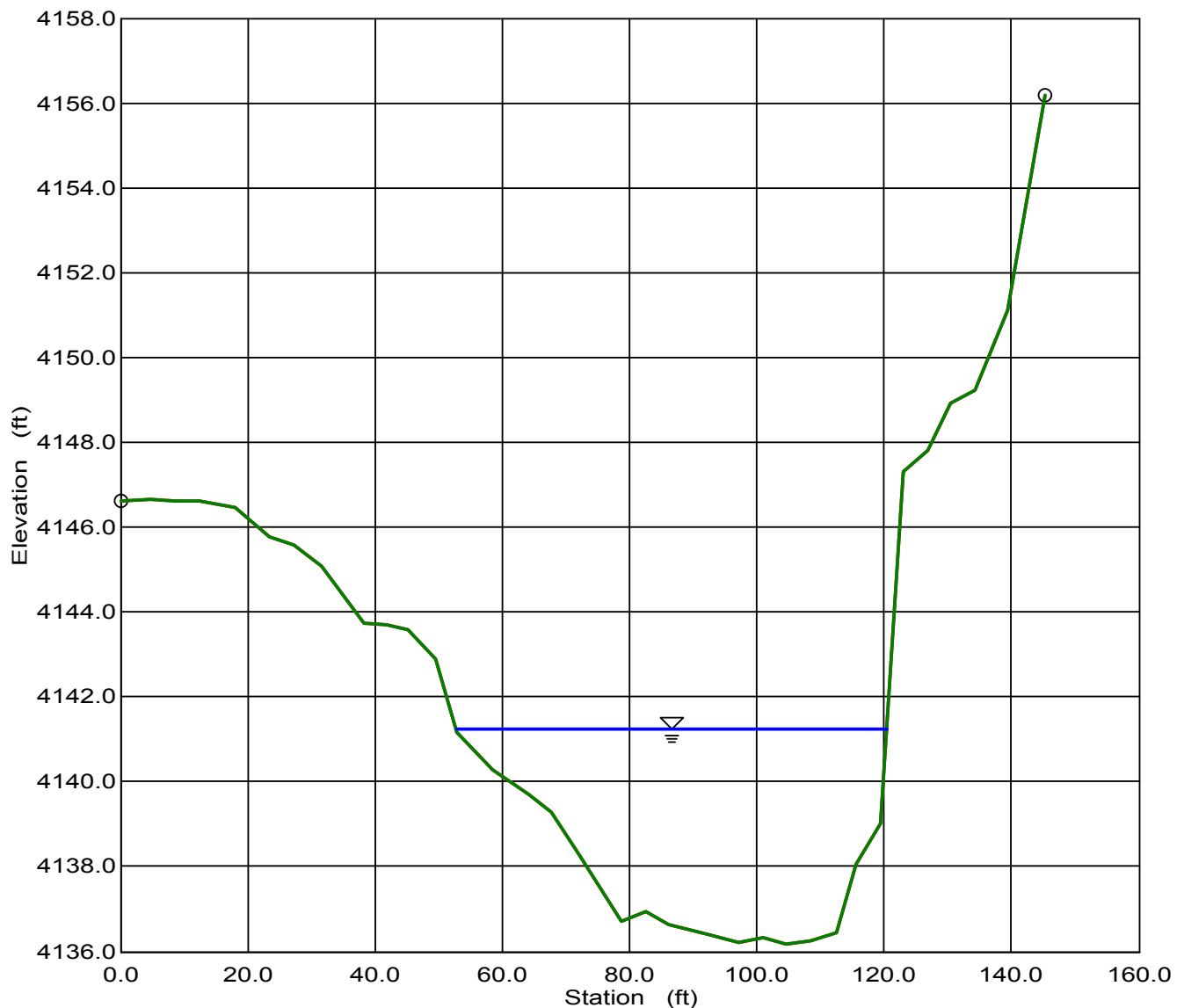
144.21	4,169.28	
147.45	4,170.28	
150.69	4,172.28	
153.92	4,173.28	
157.16	4,174.12	
160.40	4,175.24	
166.87	4,177.92	
173.35	4,179.24	
179.82	4,180.19	
186.30	4,180.71	
192.77	4,181.80	
200.00	4,182.35	
Discharge	2,127.80	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,156.90	ft
Flow Area	234.20	ft ²
Wetted Perimeter	68.24	ft
Top Width	65.97	ft
Height	5.53	ft
Critical Depth	4,156.47	ft
Critical Slope	0.009187	ft/ft
Velocity	9.09	ft/s
Velocity Head	1.28	ft
Specific Energy	4,158.19	ft
Froude Number	0.85	
Flow is subcritical.		

Little Missouri R. D-D' Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.006500 ft/ft
Water Surface Elevation	4,141.22 ft
Discharge	2,127.80 cfs



Little Missouri R. D-D' Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.006500 ft/ft		
Elevation range: 4,136.19 ft to 4,156.18 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,146.60	0.00	145.22	0.030
4.69	4,146.64			
8.69	4,146.63			
12.38	4,146.61			
18.17	4,146.48			
23.45	4,145.77			
27.14	4,145.59			
31.65	4,145.08			
38.39	4,143.73			
41.90	4,143.70			
45.13	4,143.59			
49.59	4,142.89			
52.97	4,141.18			
58.61	4,140.29			
64.04	4,139.70			
67.73	4,139.27			
72.09	4,138.30			
78.80	4,136.70			
82.49	4,136.95			
86.18	4,136.64			
92.30	4,136.40			
97.25	4,136.21			
100.94	4,136.32			
104.63	4,136.19			
108.32	4,136.26			
112.52	4,136.43			
115.70	4,138.06			
119.39	4,139.01			
123.08	4,147.29			
126.77	4,147.79			
130.46	4,148.93			
134.15	4,149.22			
139.48	4,151.10			
145.22	4,156.18			
Discharge	2,127.80	cfs		

Results

Little Missouri R. D-D' Cross Section
Worksheet for Irregular Channel

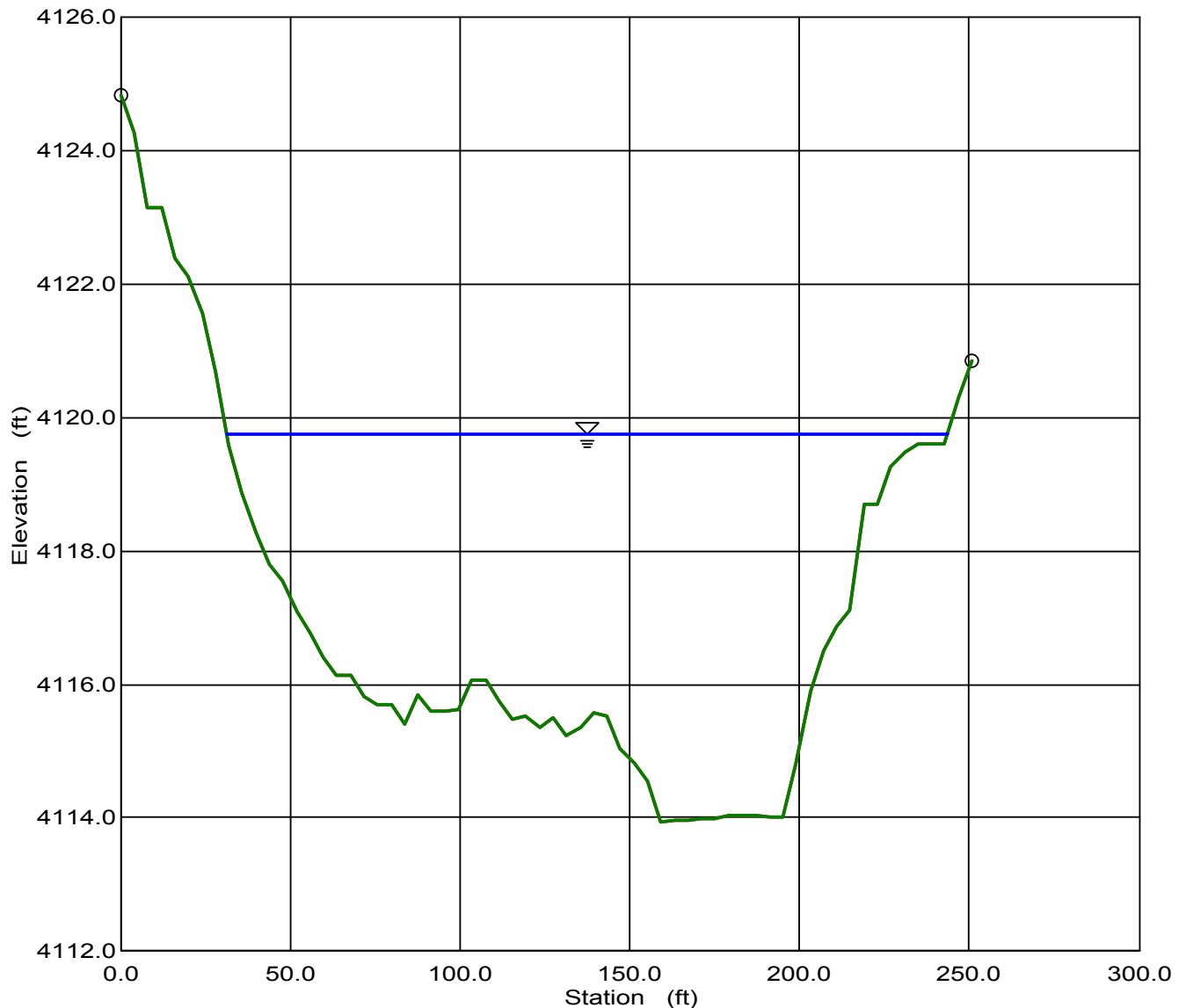
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,141.22	ft
Flow Area	236.48	ft ²
Wetted Perimeter	69.92	ft
Top Width	67.50	ft
Height	5.03	ft
Critical Depth	4,140.81	ft
Critical Slope	0.009267	ft/ft
Velocity	9.00	ft/s
Velocity Head	1.26	ft
Specific Energy	4,142.48	ft
Froude Number	0.85	
Flow is subcritical.		

Little Missouri R. E-E' Cross Section

Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.003500 ft/ft
Water Surface Elevation	4,119.74 ft
Discharge	5,331.60 cfs



Little Missouri R. E-E' Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.003500 ft/ft		
Elevation range: 4,113.94 ft to 4,124.84 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,124.84	0.00	250.77	0.030
4.17	4,124.27			
8.14	4,123.15			
12.12	4,123.15			
16.10	4,122.39			
20.08	4,122.12			
24.05	4,121.57			
28.03	4,120.69			
32.01	4,119.57			
35.99	4,118.88			
39.96	4,118.26			
43.94	4,117.80			
47.92	4,117.55			
51.90	4,117.09			
55.87	4,116.78			
59.85	4,116.41			
63.83	4,116.13			
67.81	4,116.13			
71.78	4,115.82			
75.76	4,115.69			
79.74	4,115.70			
83.71	4,115.41			
87.69	4,115.85			
91.67	4,115.60			
95.65	4,115.60			
99.62	4,115.63			
103.60	4,116.06			
107.58	4,116.07			
111.56	4,115.75			
115.53	4,115.48			
119.51	4,115.52			
123.49	4,115.35			
127.47	4,115.51			
131.44	4,115.24			
135.42	4,115.36			
139.40	4,115.57			
143.38	4,115.53			
147.35	4,115.03			

Little Missouri R. E-E' Cross Section
Worksheet for Irregular Channel

151.33	4,114.82
155.31	4,114.54
159.29	4,113.94
163.26	4,113.96
167.24	4,113.97
171.22	4,113.98
175.19	4,113.98
179.17	4,114.04
183.15	4,114.03
187.13	4,114.03
191.10	4,114.02
195.08	4,114.00
199.06	4,114.81
203.04	4,115.88
207.01	4,116.51
210.99	4,116.87
214.97	4,117.12
218.95	4,118.71
222.92	4,118.71
226.90	4,119.25
230.88	4,119.49
234.86	4,119.60
238.83	4,119.60
242.81	4,119.60
246.79	4,120.32
250.77	4,120.85

Discharge	5,331.60	cfs
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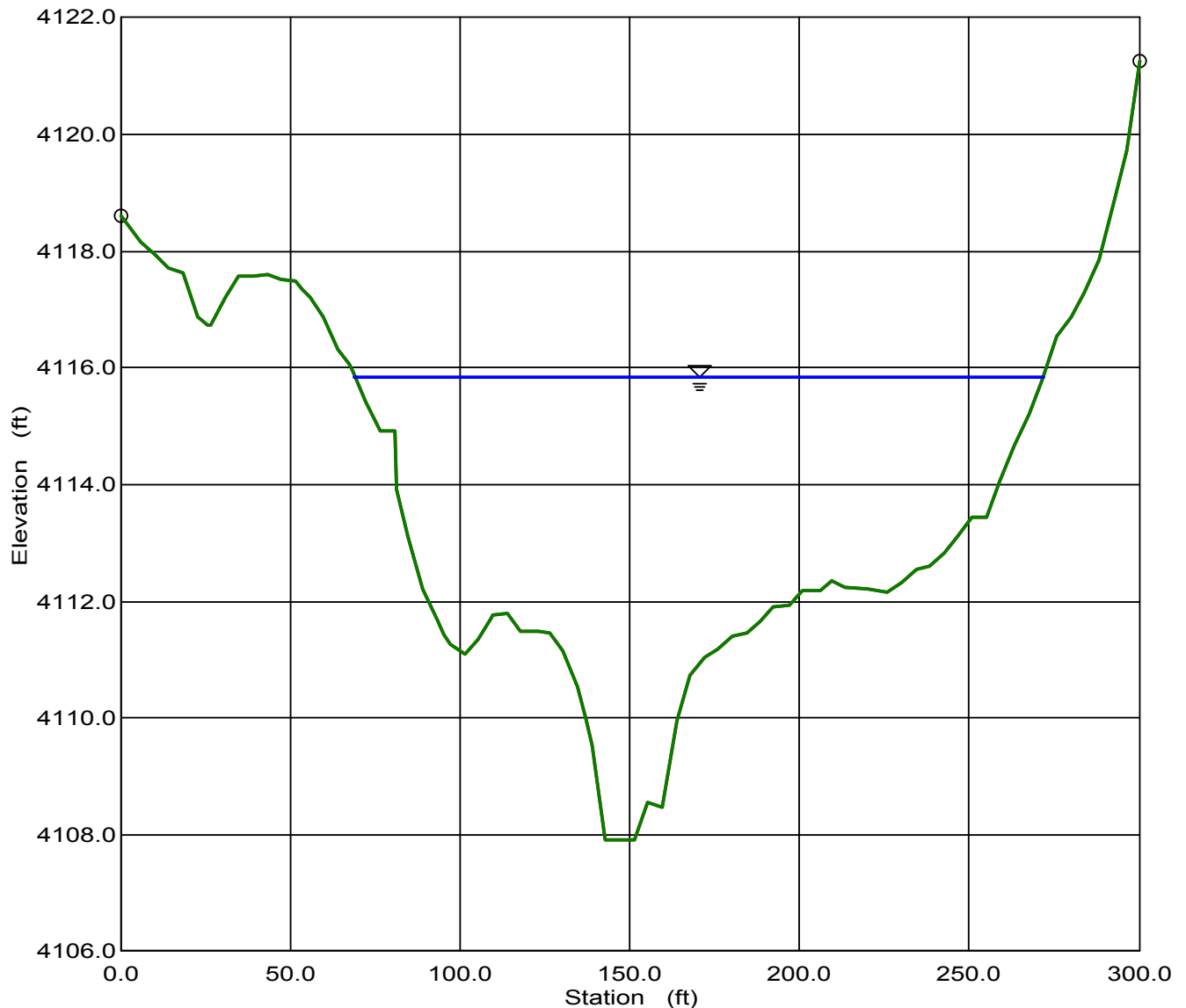
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,119.74	ft
Flow Area	771.91	ft ²
Wetted Perimeter	213.30	ft
Top Width	212.19	ft
Height	5.80	ft
Critical Depth	4,118.55	ft
Critical Slope	0.009150	ft/ft
Velocity	6.91	ft/s
Velocity Head	0.74	ft
Specific Energy	4,120.48	ft
Froude Number	0.64	
Flow is subcritical.		

Little Missouri R. F-F' Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.003500 ft/ft
Water Surface Elevation	4,115.85 ft
Discharge	5,883.50 cfs



Little Missouri R. F-F' Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.003500 ft/ft		
Elevation range: 4,107.92 ft to 4,121.25 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,118.61	0.00	300.00	0.030
5.96	4,118.15			
10.12	4,117.92			
14.27	4,117.72			
18.42	4,117.63			
22.57	4,116.87			
25.54	4,116.74			
26.72	4,116.73			
30.87	4,117.20			
35.02	4,117.58			
39.17	4,117.57			
43.32	4,117.60			
47.47	4,117.52			
51.62	4,117.50			
53.36	4,117.35			
55.77	4,117.21			
59.92	4,116.87			
64.07	4,116.32			
67.26	4,116.05			
68.23	4,115.95			
72.38	4,115.43			
76.53	4,114.91			
80.68	4,114.91			
81.17	4,113.91			
84.83	4,113.11			
88.98	4,112.20			
93.13	4,111.67			
95.08	4,111.43			
97.28	4,111.27			
101.43	4,111.09			
105.58	4,111.35			
108.99	4,111.71			
109.73	4,111.77			
113.88	4,111.78			
118.03	4,111.48			
122.19	4,111.47			
122.89	4,111.48			
126.34	4,111.46			

Little Missouri R. F-F' Cross Section
Worksheet for Irregular Channel

130.49	4,111.14
134.64	4,110.54
136.80	4,110.01
138.79	4,109.52
142.94	4,107.92
147.09	4,107.92
150.71	4,107.92
151.24	4,107.92
155.39	4,108.56
159.54	4,108.46
163.69	4,109.94
167.84	4,110.72
171.99	4,111.03
176.15	4,111.19
180.30	4,111.39
184.45	4,111.46
188.60	4,111.65
192.43	4,111.90
196.90	4,111.93
201.05	4,112.19
206.35	4,112.19
209.35	4,112.35
213.50	4,112.25
220.25	4,112.21
225.95	4,112.15
230.10	4,112.32
234.26	4,112.54
238.41	4,112.61
242.56	4,112.82
246.71	4,113.10
250.86	4,113.43
255.01	4,113.43
259.16	4,114.04
263.31	4,114.68
267.46	4,115.20
271.61	4,115.79
275.88	4,116.55
279.91	4,116.86
284.06	4,117.29
288.22	4,117.86
292.37	4,118.83
296.52	4,119.71
300.00	4,121.25

Discharge	5,883.50	cfs
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Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,115.85	ft
Flow Area	805.90	ft ²
Wetted Perimeter	204.93	ft
Top Width	202.85	ft
Height	7.93	ft

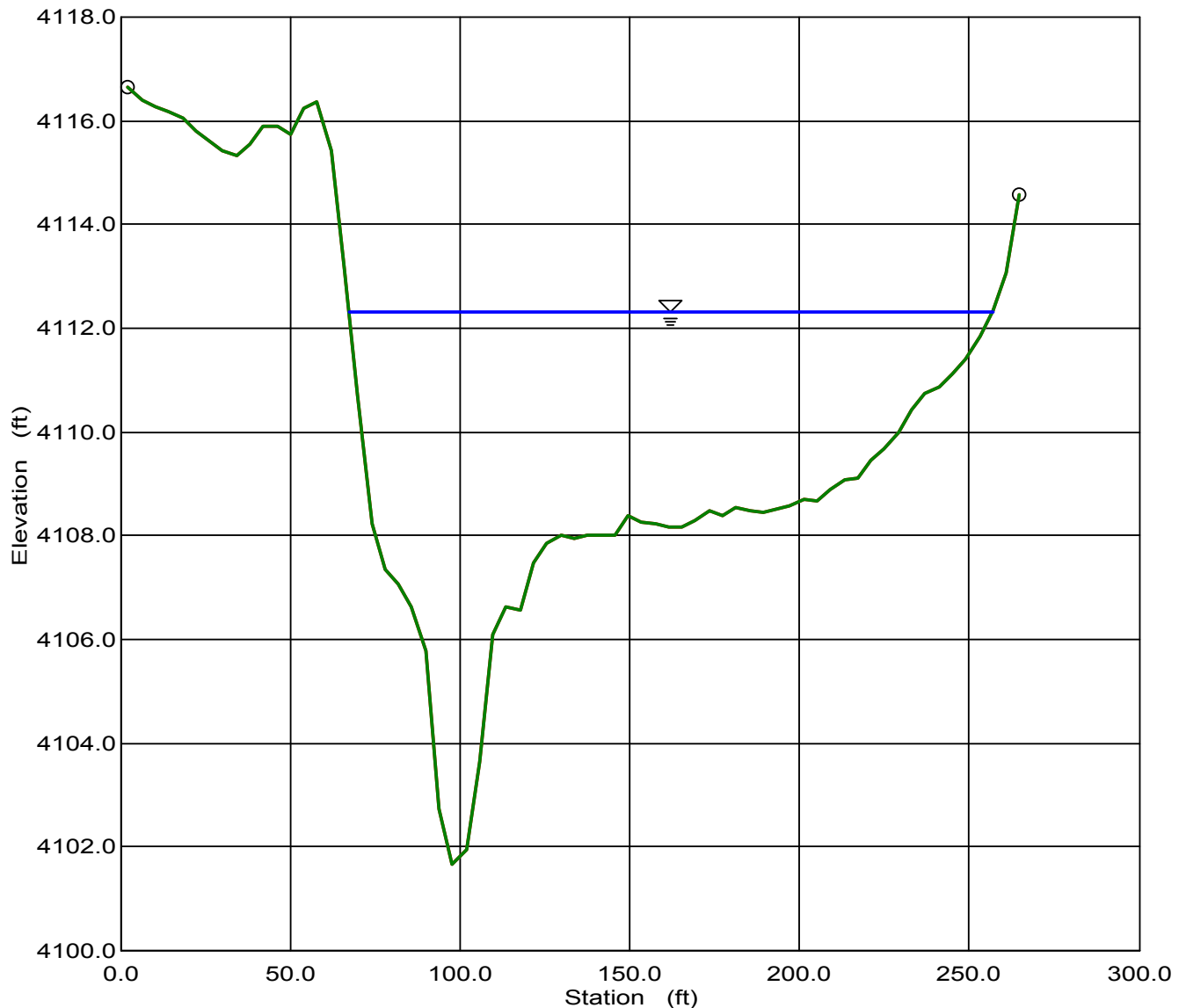
Little Missouri R. F-F' Cross Section
Worksheet for Irregular Channel

Critical Depth	4,114.68	ft
Critical Slope	0.009032	ft/ft
Velocity	7.30	ft/s
Velocity Head	0.83	ft
Specific Energy	4,116.67	ft
Froude Number	0.65	
Flow is subcritical.		

Little Missouri R. Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.003500 ft/ft
Water Surface Elevation	4,112.32 ft
Discharge	5,975.00 cfs



Little Missouri R. Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	LMR_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.003500 ft/ft		
Elevation range: 4,101.66 ft to 4,116.63 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.38	4,116.63	2.38	264.89	0.030
6.36	4,116.40			
10.34	4,116.26			
14.31	4,116.18			
18.29	4,116.05			
22.27	4,115.81			
26.24	4,115.60			
30.22	4,115.42			
34.20	4,115.34			
38.18	4,115.56			
42.15	4,115.90			
46.13	4,115.89			
50.11	4,115.73			
54.09	4,116.22			
58.06	4,116.37			
62.04	4,115.41			
66.02	4,113.14			
69.99	4,110.71			
73.97	4,108.22			
77.95	4,107.34			
81.93	4,107.06			
85.91	4,106.63			
89.88	4,105.77			
93.84	4,102.72			
97.84	4,101.66			
101.81	4,101.94			
105.79	4,103.65			
109.77	4,106.09			
113.75	4,106.62			
117.72	4,106.57			
121.70	4,107.46			
125.68	4,107.84			
129.66	4,108.01			
133.63	4,107.93			
137.61	4,108.00			
141.59	4,108.02			
145.57	4,108.02			
149.54	4,108.37			

Little Missouri R. Lower Cross Section
Worksheet for Irregular Channel

153.52	4,108.27
157.50	4,108.23
161.48	4,108.16
165.45	4,108.15
169.43	4,108.30
173.41	4,108.49
177.39	4,108.38
181.36	4,108.53
185.34	4,108.48
189.32	4,108.45
193.29	4,108.51
197.27	4,108.57
201.25	4,108.69
205.23	4,108.67
209.20	4,108.89
213.18	4,109.08
217.16	4,109.10
221.14	4,109.45
225.11	4,109.66
229.09	4,110.00
233.07	4,110.43
237.05	4,110.75
241.02	4,110.87
245.00	4,111.13
248.98	4,111.41
252.96	4,111.84
256.93	4,112.34
260.91	4,113.05
264.89	4,114.57

Discharge	5,975.00	cfs
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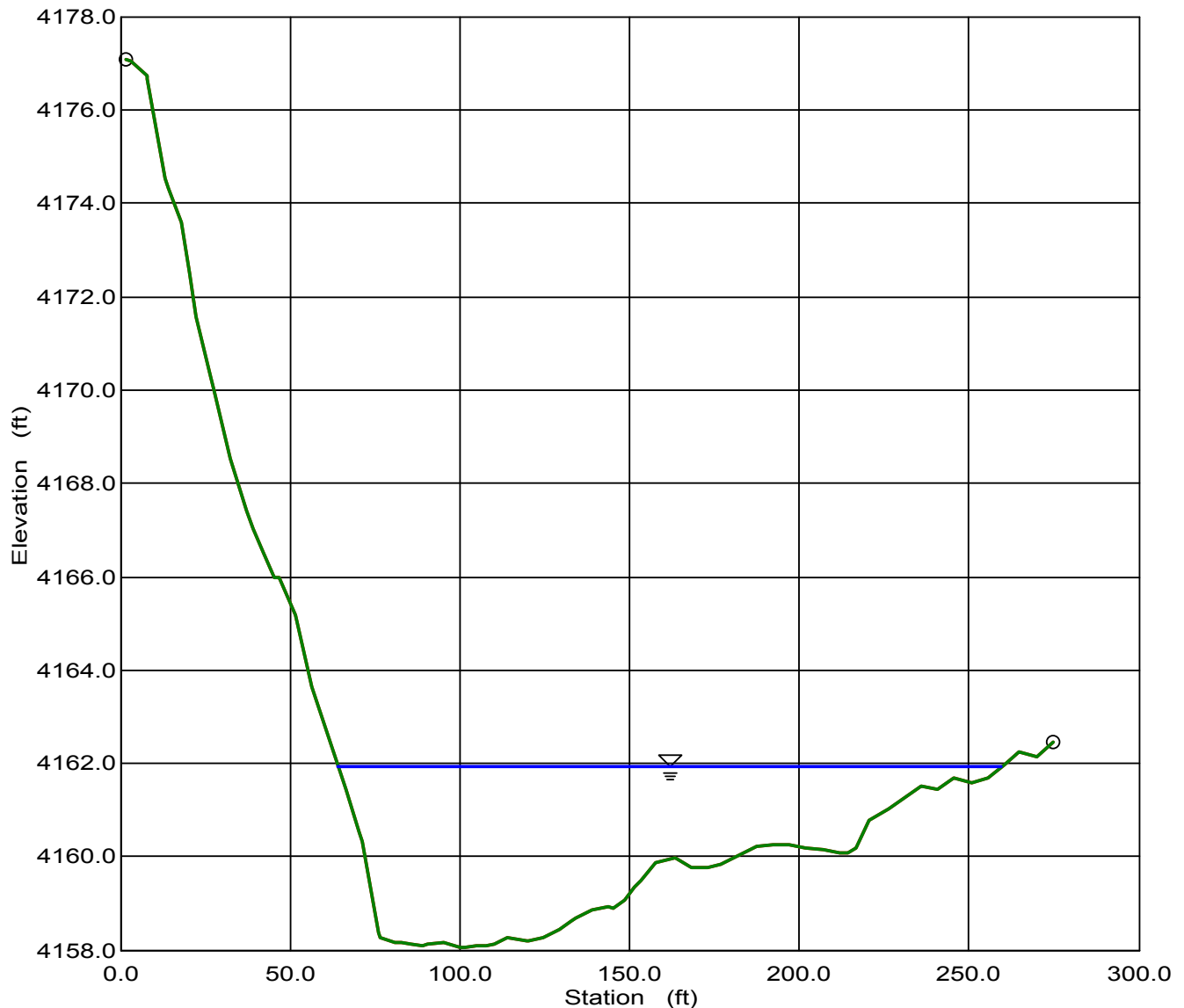
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,112.32	ft
Flow Area	794.78	ft ²
Wetted Perimeter	193.41	ft
Top Width	189.45	ft
Height	10.66	ft
Critical Depth	4,111.15	ft
Critical Slope	0.009052	ft/ft
Velocity	7.52	ft/s
Velocity Head	0.88	ft
Specific Energy	4,113.20	ft
Froude Number	0.65	
Flow is subcritical.		

Deadman Creek Lower Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Deadman_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.005300 ft/ft
Water Surface Elevation	4,161.92 ft
Discharge	2,670.00 cfs



Deadman Creek Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Deadman_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.005300 ft/ft		
Elevation range: 4,158.07 ft to 4,177.09 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.50	4,177.09	1.50	275.00	0.030
3.26	4,177.05			
7.75	4,176.73			
8.11	4,176.66			
12.96	4,174.55			
14.01	4,174.34			
17.81	4,173.60			
20.27	4,172.51			
22.27	4,171.57			
26.52	4,170.28			
27.51	4,169.99			
32.36	4,168.52			
37.21	4,167.41			
39.04	4,167.03			
42.06	4,166.56			
45.29	4,165.98			
46.90	4,165.99			
51.55	4,165.18			
56.60	4,163.66			
57.81	4,163.32			
61.45	4,162.50			
64.06	4,161.97			
66.30	4,161.45			
70.32	4,160.53			
71.15	4,160.34			
75.99	4,158.38			
76.58	4,158.26			
80.85	4,158.17			
82.83	4,158.17			
85.70	4,158.12			
89.09	4,158.10			
90.55	4,158.12			
95.35	4,158.17			
100.25	4,158.07			
101.60	4,158.08			
105.09	4,158.09			
107.86	4,158.09			
109.94	4,158.13			

Deadman Creek Upper Cross Section

Worksheet for Irregular Channel

114.11	4,158.27
119.64	4,158.21
120.37	4,158.21
124.49	4,158.26
126.63	4,158.33
129.34	4,158.46
132.88	4,158.63
134.19	4,158.70
139.04	4,158.86
143.89	4,158.92
145.40	4,158.91
148.74	4,159.07
151.65	4,159.35
153.58	4,159.50
157.91	4,159.89
163.28	4,159.97
168.12	4,159.77
172.98	4,159.77
176.68	4,159.85
182.68	4,160.04
187.53	4,160.24
192.38	4,160.27
195.45	4,160.26
197.23	4,160.27
201.71	4,160.18
206.92	4,160.17
211.77	4,160.07
214.22	4,160.09
216.62	4,160.18
220.48	4,160.77
226.32	4,161.02
231.17	4,161.28
236.02	4,161.53
240.87	4,161.46
245.72	4,161.68
250.57	4,161.59
255.42	4,161.68
258.02	4,161.84
260.26	4,161.96
264.73	4,162.26
269.96	4,162.15
275.00	4,162.48

Discharge	2,670.00	cfs
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Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,161.92	ft
Flow Area	435.18	ft ²
Wetted Perimeter	196.08	ft
Top Width	195.35	ft
Height	3.85	ft
Critical Depth	4,161.36	ft

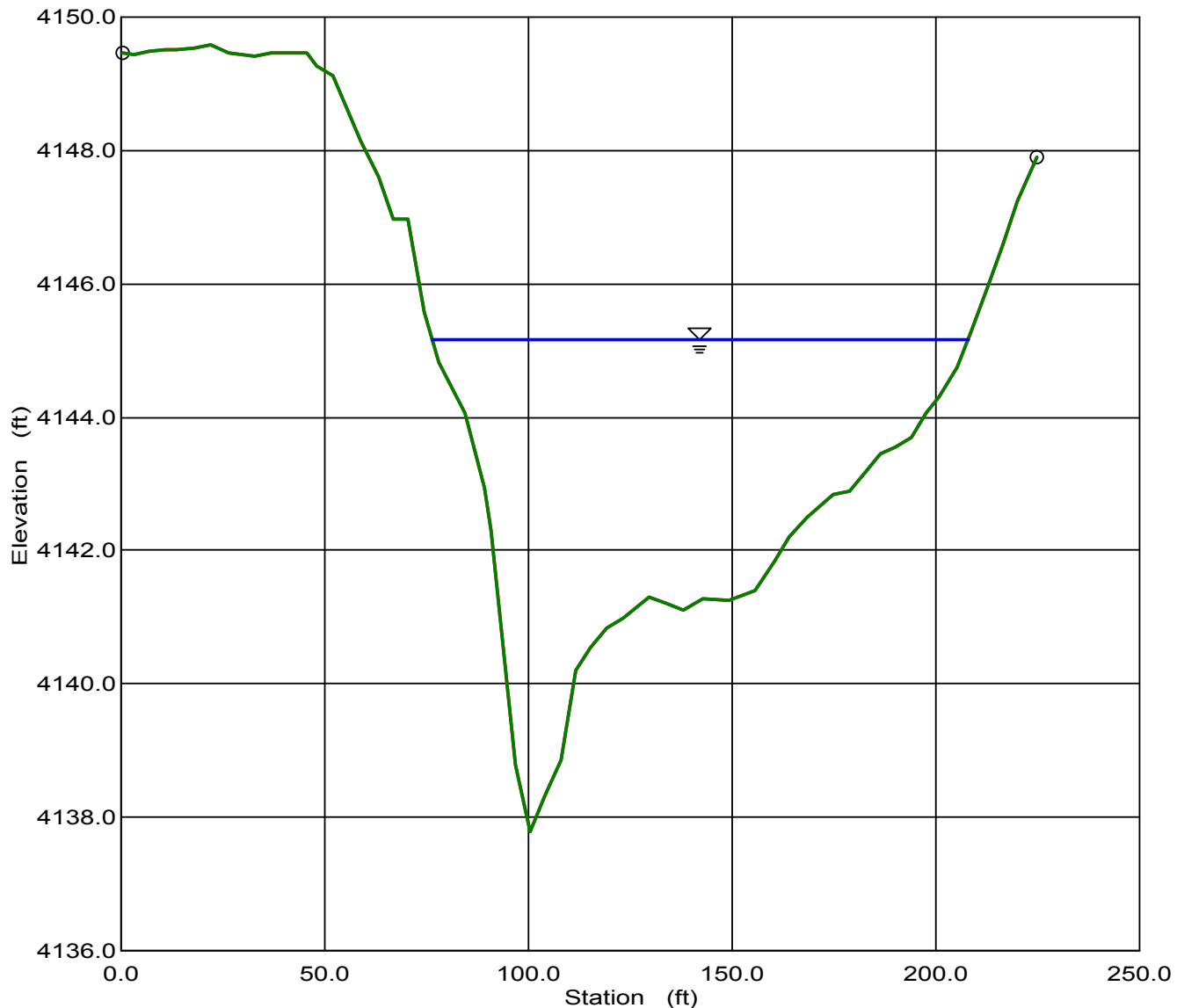
Deadman Creek Upper Cross Section
Worksheet for Irregular Channel

Critical Slope	0.010457	ft/ft
Velocity	6.14	ft/s
Velocity Head	0.58	ft
Specific Energy	4,162.51	ft
Froude Number	0.72	
Flow is subcritical.		

Deadman Creek Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Deadman_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.005300 ft/ft
Water Surface Elevation	4,145.17 ft
Discharge	3,329.00 cfs



Deadman Creek Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Deadman_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.005300 ft/ft		
Elevation range: 4,137.79 ft to 4,149.58 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.68	4,149.45	0.68	225.00	0.030
3.40	4,149.44			
7.14	4,149.48			
10.88	4,149.52			
13.60	4,149.52			
18.36	4,149.53			
22.10	4,149.58			
26.53	4,149.45			
32.99	4,149.42			
37.06	4,149.47			
40.80	4,149.46			
45.91	4,149.47			
48.28	4,149.27			
52.37	4,149.13			
58.84	4,148.15			
63.24	4,147.60			
66.98	4,146.97			
70.72	4,146.97			
74.46	4,145.57			
78.22	4,144.82			
84.68	4,144.06			
89.41	4,142.94			
91.14	4,142.30			
96.89	4,138.79			
100.63	4,137.79			
104.37	4,138.31			
108.11	4,138.86			
111.85	4,140.19			
115.59	4,140.55			
119.33	4,140.84			
123.45	4,140.99			
129.91	4,141.30			
134.29	4,141.20			
138.03	4,141.11			
142.84	4,141.27			
149.25	4,141.24			
155.76	4,141.39			
160.47	4,141.83			

Deadman Creek Lower Cross Section

Worksheet for Irregular Channel

164.21	4,142.21
168.68	4,142.49
175.15	4,142.84
179.17	4,142.89
182.91	4,143.18
186.64	4,143.46
190.38	4,143.56
194.12	4,143.70
197.86	4,144.06
200.99	4,144.29
205.34	4,144.75
209.08	4,145.32
212.82	4,145.96
216.56	4,146.58
220.30	4,147.23
225.00	4,147.90

Discharge	3,329.00	cfs
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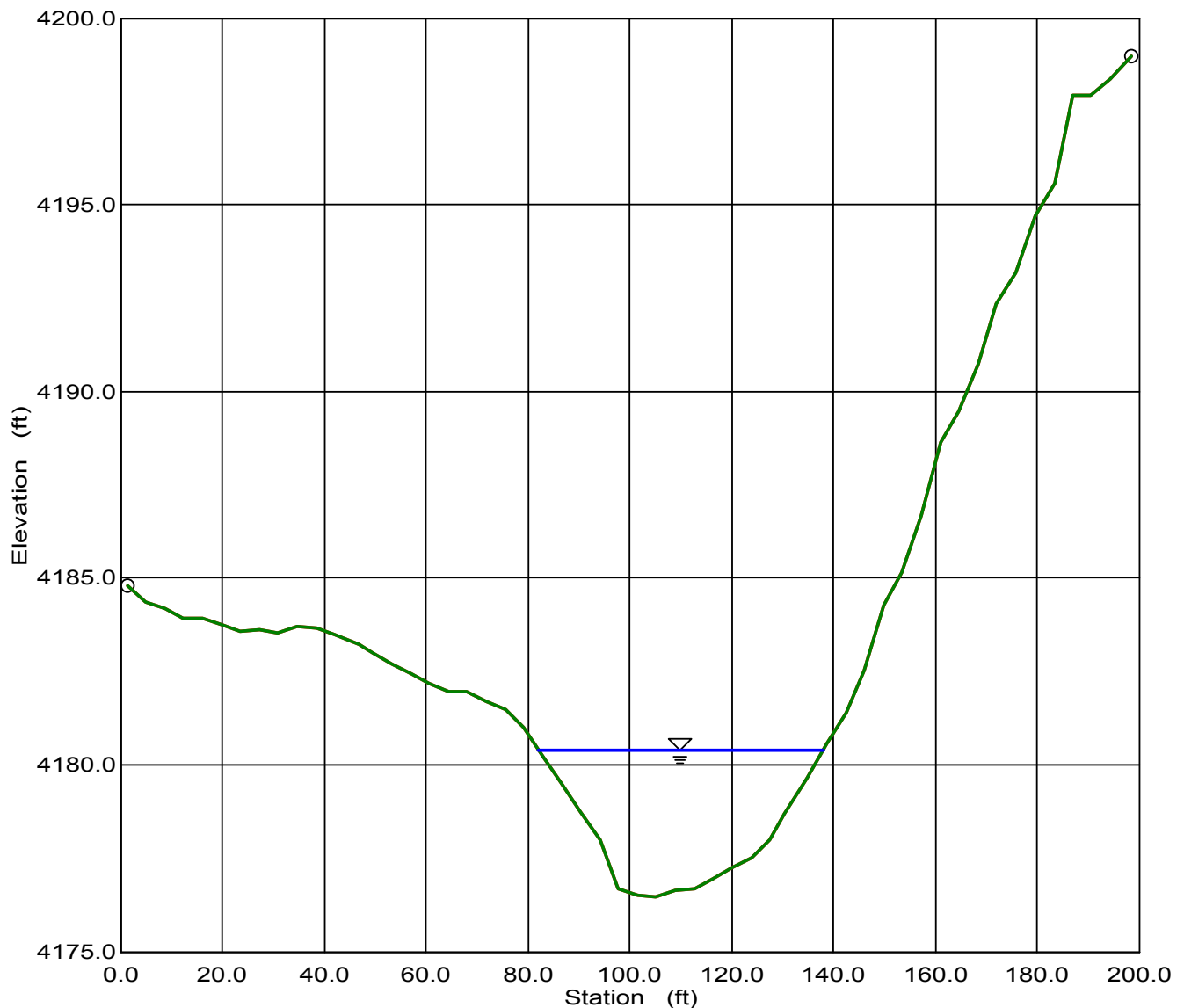
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,145.17	ft
Flow Area	426.02	ft ²
Wetted Perimeter	133.54	ft
Top Width	131.58	ft
Height	7.38	ft
Critical Depth	4,144.56	ft
Critical Slope	0.009457	ft/ft
Velocity	7.81	ft/s
Velocity Head	0.95	ft
Specific Energy	4,146.11	ft
Froude Number	0.77	
Flow is subcritical.		

Draw 5 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw5_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.006300 ft/ft
Water Surface Elevation	4,180.38 ft
Discharge	1,020.00 cfs



Draw 5 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw5_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.006300 ft/ft		
Elevation range: 4,176.47 ft to 4,198.98 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.28	4,184.79	1.28	198.63	0.030
5.00	4,184.38			
8.90	4,184.18			
12.43	4,183.91			
16.14	4,183.91			
19.85	4,183.74			
23.57	4,183.57			
27.28	4,183.63			
31.00	4,183.53			
34.71	4,183.70			
38.42	4,183.66			
42.14	4,183.48			
46.85	4,183.24			
49.57	4,183.00			
53.28	4,182.69			
56.99	4,182.43			
60.71	4,182.17			
64.42	4,181.94			
68.13	4,181.98			
71.85	4,181.68			
75.56	4,181.46			
79.28	4,181.00			
82.99	4,180.21			
86.70	4,179.50			
90.42	4,178.72			
94.13	4,177.99			
97.85	4,176.66			
101.56	4,176.50			
105.27	4,176.47			
108.99	4,176.62			
112.70	4,176.69			
116.42	4,176.96			
120.13	4,177.23			
123.84	4,177.53			
127.56	4,178.01			
130.32	4,178.68			
134.99	4,179.63			
138.70	4,180.58			

Draw 5 Upper Cross Section Worksheet for Irregular Channel

142.41	4,181.39
146.13	4,182.53
149.84	4,184.26
153.55	4,185.16
157.27	4,186.65
160.98	4,188.66
164.70	4,189.46
168.41	4,190.73
172.12	4,192.35
175.86	4,193.17
179.55	4,194.70
183.45	4,195.56
186.98	4,197.92
190.69	4,197.92
194.41	4,198.35
198.63	4,198.98

Discharge	1,020.00	cfs
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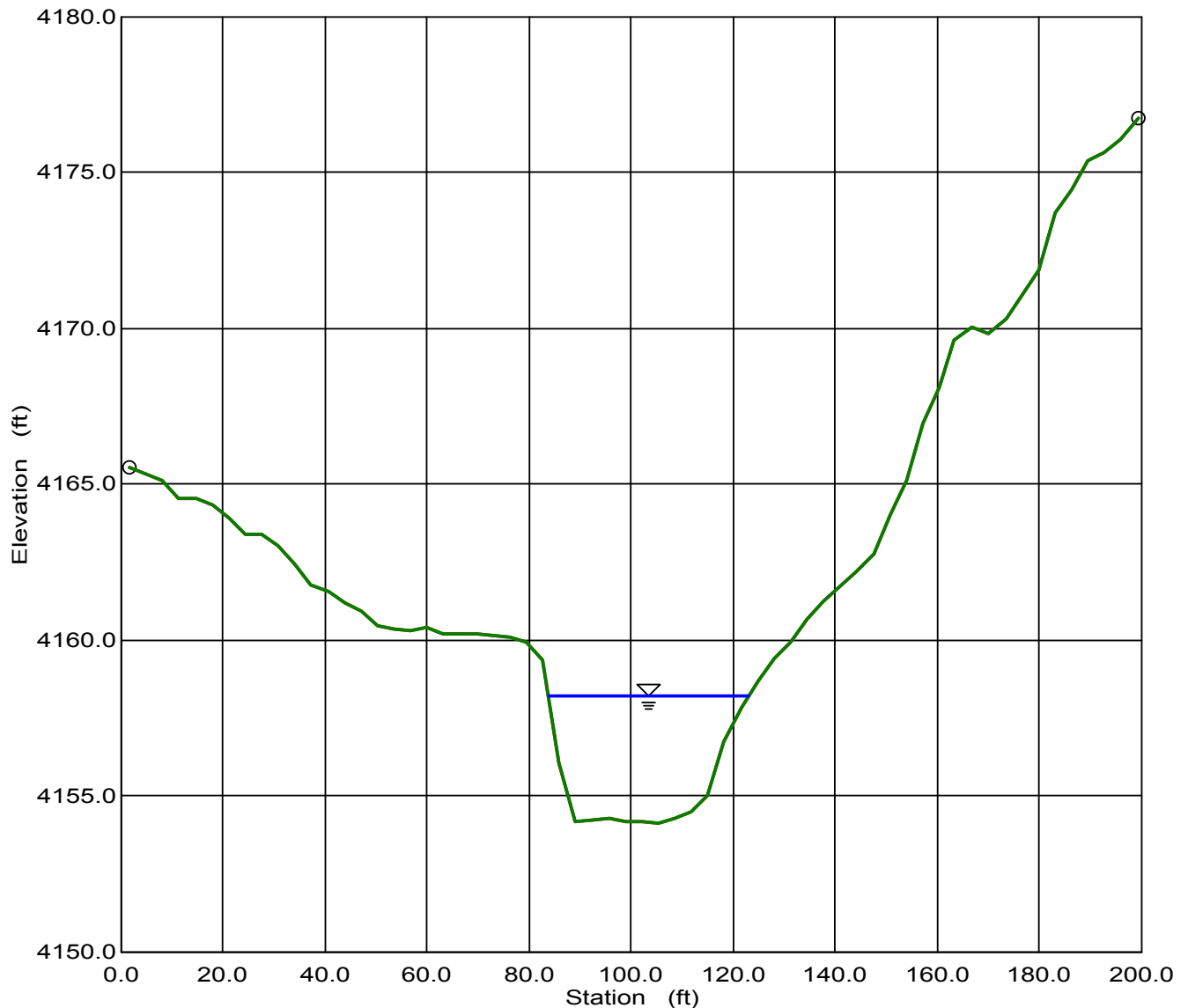
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,180.38	ft
Flow Area	141.06	ft ²
Wetted Perimeter	56.55	ft
Top Width	55.74	ft
Height	3.91	ft
Critical Depth	4,179.97	ft
Critical Slope	0.010141	ft/ft
Velocity	7.23	ft/s
Velocity Head	0.81	ft
Specific Energy	4,181.19	ft
Froude Number	0.80	
Flow is subcritical.		

Draw 5 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw5_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.006300 ft/ft
Water Surface Elevation	4,158.18 ft
Discharge	1,020.00 cfs



Draw 5 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw5_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.006300 ft/ft		
Elevation range: 4,154.08 ft to 4,176.73 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.79	4,165.52	1.79	199.37	0.030
5.03	4,165.30			
8.27	4,165.09			
11.51	4,164.54			
14.75	4,164.54			
17.98	4,164.31			
21.22	4,163.90			
24.46	4,163.40			
27.70	4,163.40			
30.94	4,162.99			
34.18	4,162.45			
37.42	4,161.77			
40.66	4,161.54			
43.90	4,161.18			
47.14	4,160.92			
50.38	4,160.43			
53.61	4,160.35			
56.85	4,160.31			
60.09	4,160.38			
63.33	4,160.21			
66.57	4,160.18			
69.81	4,160.18			
73.05	4,160.13			
76.29	4,160.09			
79.53	4,159.94			
82.77	4,159.36			
86.00	4,156.05			
89.24	4,154.16			
92.48	4,154.21			
95.72	4,154.28			
98.96	4,154.17			
102.20	4,154.14			
105.44	4,154.08			
108.68	4,154.29			
111.92	4,154.48			
115.16	4,154.98			
118.39	4,156.71			
121.63	4,157.83			

Draw 5 Lower Cross Section Worksheet for Irregular Channel

124.87	4,158.69
128.11	4,159.40
131.35	4,159.91
134.59	4,160.67
137.83	4,161.21
141.07	4,161.68
144.31	4,162.17
147.55	4,162.72
150.79	4,163.99
154.03	4,165.11
157.26	4,166.93
160.50	4,168.06
163.50	4,169.62
166.98	4,170.04
170.22	4,169.81
173.46	4,170.27
176.70	4,171.06
179.94	4,171.84
183.18	4,173.68
186.42	4,174.41
189.66	4,175.38
192.89	4,175.63
196.13	4,176.04
199.37	4,176.73

Discharge	1,020.00	cfs
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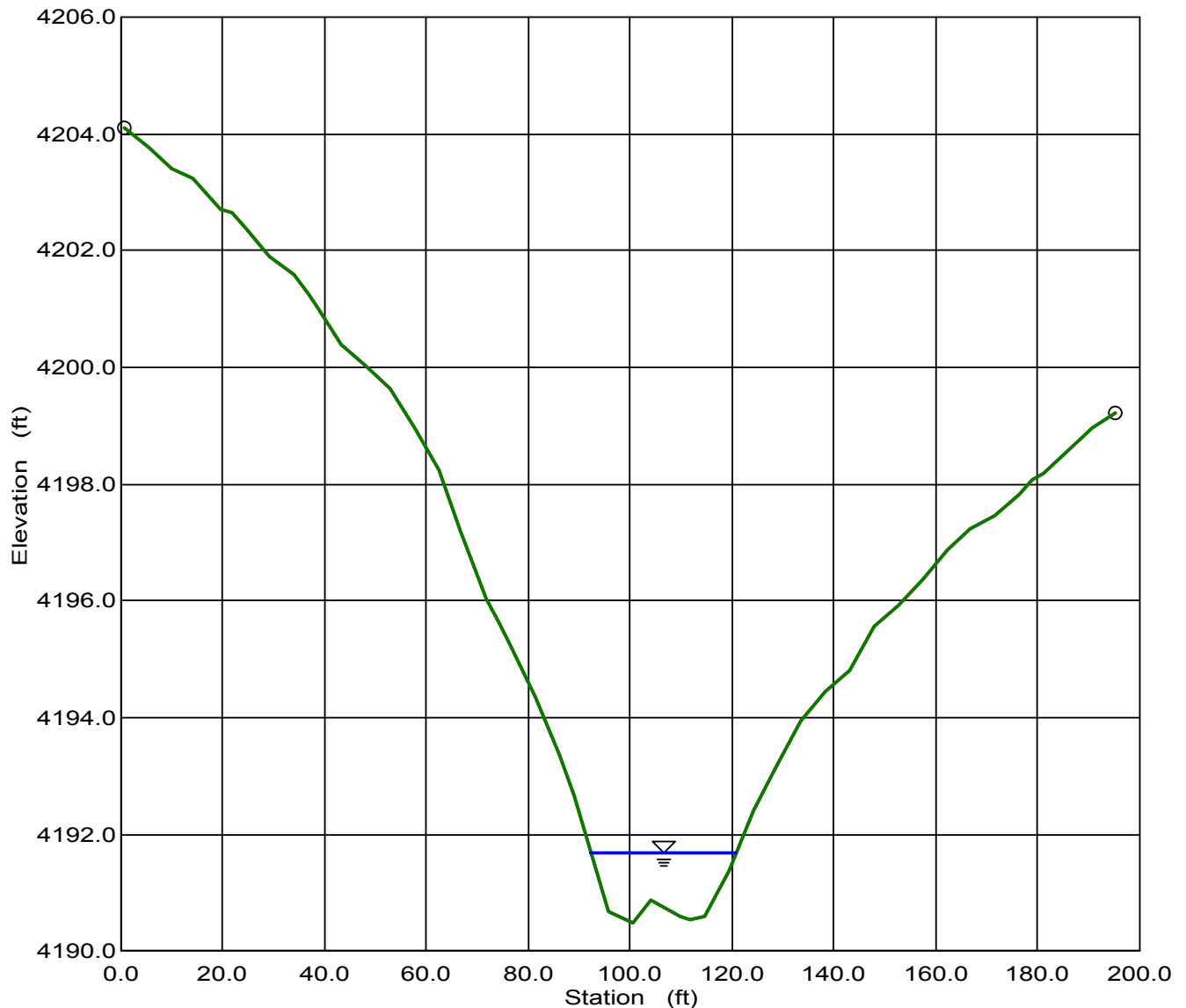
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,158.18	ft
Flow Area	124.26	ft ²
Wetted Perimeter	41.19	ft
Top Width	39.06	ft
Height	4.10	ft
Critical Depth	4,157.70	ft
Critical Slope	0.009849	ft/ft
Velocity	8.21	ft/s
Velocity Head	1.05	ft
Specific Energy	4,159.23	ft
Froude Number	0.81	
Flow is subcritical.		

Draw 7 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw7_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.019600 ft/ft
Water Surface Elevation	4,191.68 ft
Discharge	159.50 cfs



Draw 7 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw7_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.019600 ft/ft		
Elevation range: 4,190.48 ft to 4,204.12 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.72	4,204.12	0.72	195.52	0.030
5.47	4,203.76			
10.22	4,203.40			
14.39	4,203.24			
19.72	4,202.72			
21.88	4,202.64			
24.47	4,202.41			
29.36	4,201.91			
33.98	4,201.60			
36.85	4,201.27			
38.73	4,201.00			
43.48	4,200.40			
48.23	4,200.03			
52.98	4,199.64			
57.73	4,198.98			
62.48	4,198.25			
66.80	4,197.21			
71.99	4,196.04			
74.29	4,195.61			
76.74	4,195.21			
81.49	4,194.36			
86.24	4,193.36			
89.26	4,192.64			
95.74	4,190.66			
100.49	4,190.48			
104.24	4,190.86			
110.00	4,190.58			
111.73	4,190.54			
114.75	4,190.60			
119.50	4,191.38			
124.25	4,192.40			
129.00	4,193.21			
133.75	4,193.95			
138.50	4,194.45			
143.25	4,194.81			
148.00	4,195.55			
152.75	4,195.92			
157.51	4,196.38			

Draw 7 Upper Cross Section Worksheet for Irregular Channel

162.26	4,196.88
167.01	4,197.25
171.76	4,197.45
176.51	4,197.82
179.12	4,198.06
181.26	4,198.17
186.01	4,198.58
190.76	4,198.96
195.52	4,199.23

Discharge	159.50	cfs
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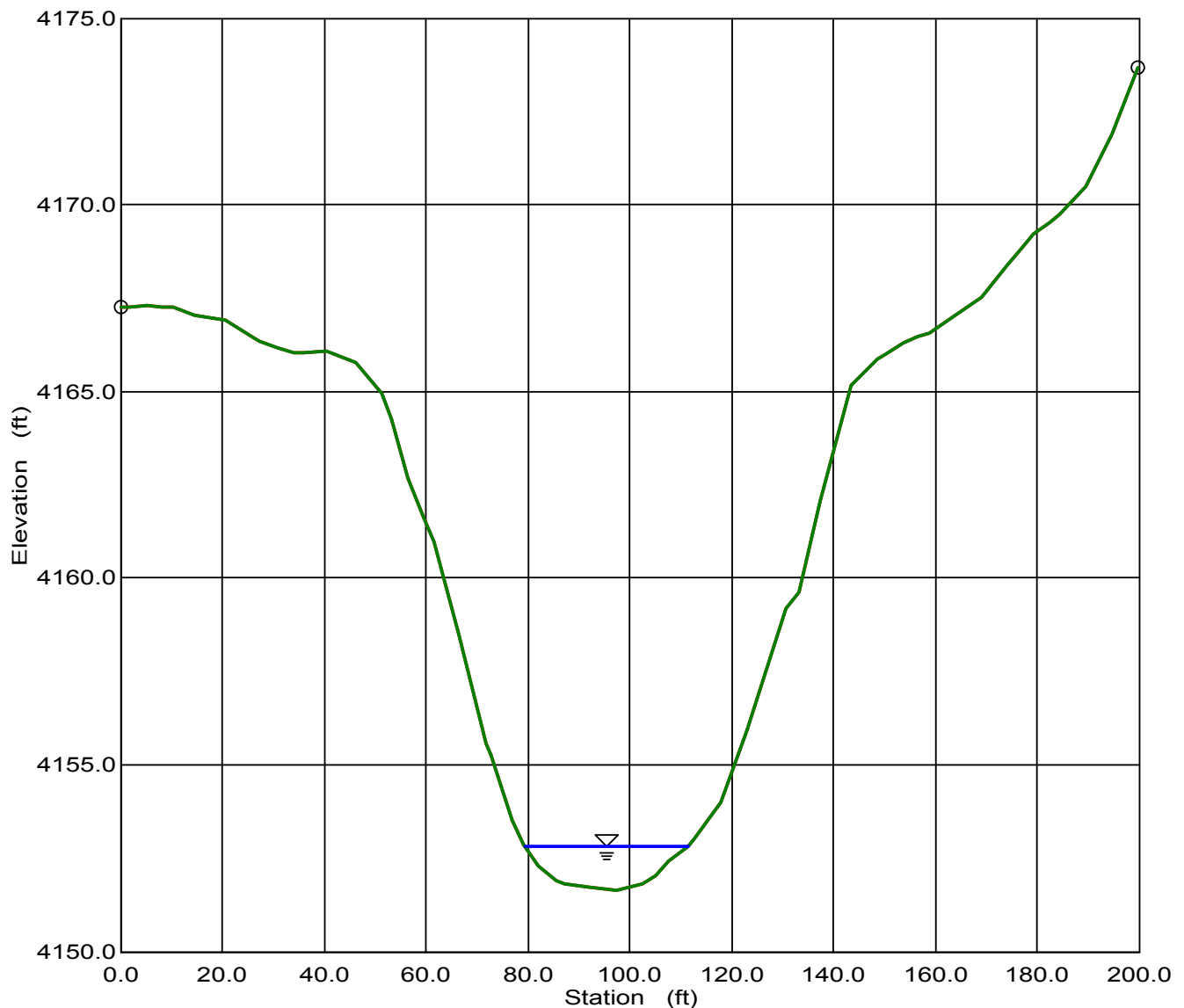
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,191.68	ft
Flow Area	25.17	ft ²
Wetted Perimeter	28.80	ft
Top Width	28.52	ft
Height	1.20	ft
Critical Depth	4,191.80	ft
Critical Slope	0.013435	ft/ft
Velocity	6.34	ft/s
Velocity Head	0.62	ft
Specific Energy	4,192.31	ft
Froude Number	1.19	
Flow is supercritical.		

Draw 7 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw7_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.019600 ft/ft
Water Surface Elevation	4,152.82 ft
Discharge	159.50 cfs



Draw 7 Lower Cross Section Worksheet for Irregular Channel

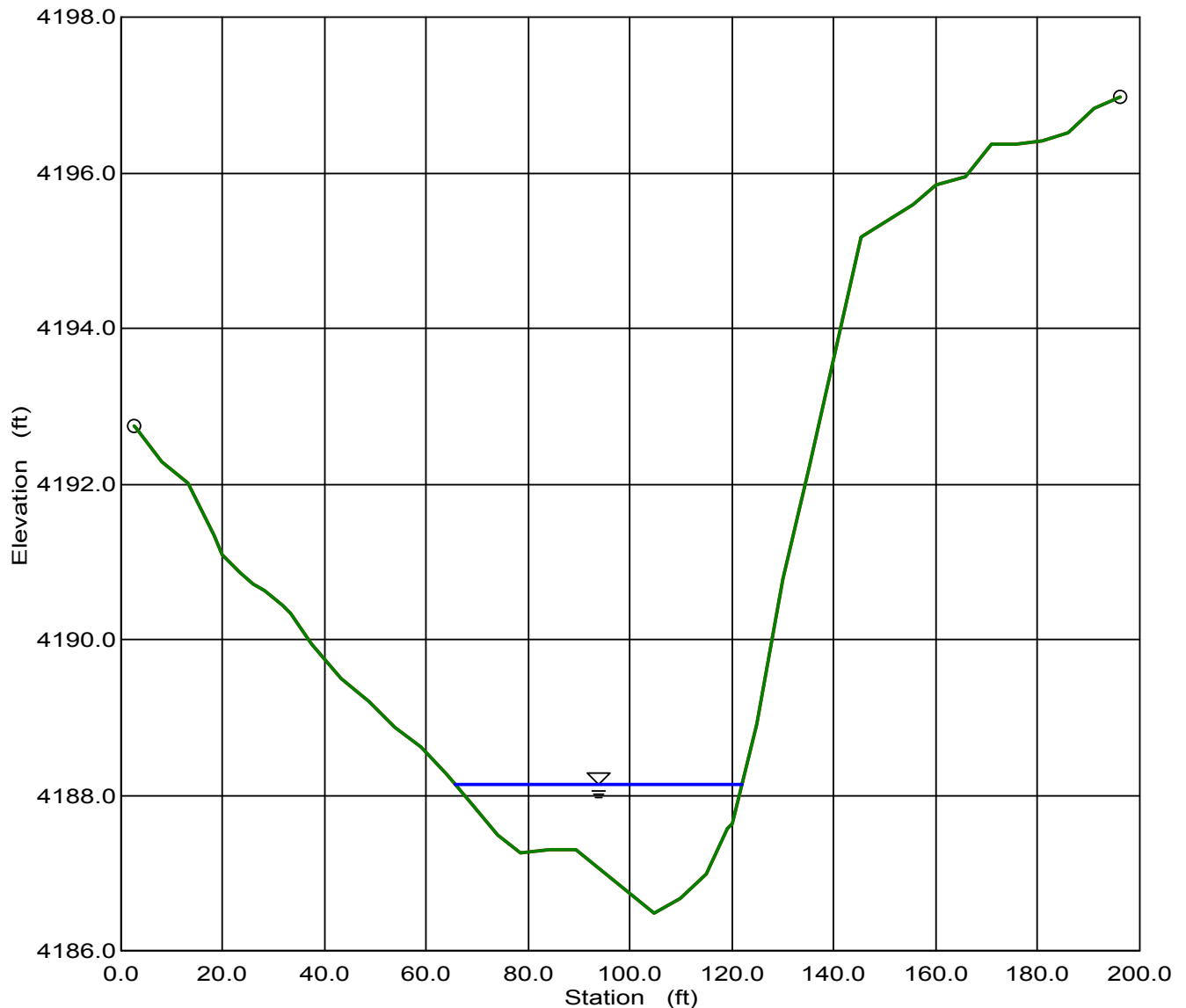
Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw7_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.019600 ft/ft		
Elevation range: 4,151.62 ft to 4,173.68 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.30	4,167.25	0.30	199.89	0.030
1.66	4,167.25			
5.42	4,167.29			
8.12	4,167.27			
10.53	4,167.24			
14.58	4,167.06			
20.77	4,166.90			
25.89	4,166.47			
27.50	4,166.36			
31.00	4,166.15			
33.96	4,166.04			
36.12	4,166.04			
40.42	4,166.07			
46.36	4,165.79			
51.48	4,164.94			
53.34	4,164.25			
56.59	4,162.67			
59.80	4,161.57			
61.71	4,160.99			
66.26	4,158.52			
71.95	4,155.57			
72.72	4,155.24			
77.06	4,153.51			
79.18	4,152.88			
82.18	4,152.27			
85.64	4,151.89			
87.30	4,151.80			
92.10	4,151.72			
97.54	4,151.62			
102.65	4,151.82			
105.03	4,152.05			
107.77	4,152.41			
111.49	4,152.80			
112.89	4,153.02			
117.95	4,154.01			
123.13	4,155.92			
128.24	4,158.10			
130.87	4,159.19			

Draw 9 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw9_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.016600 ft/ft
Water Surface Elevation	4,188.14 ft
Discharge	330.90 cfs



Draw 9 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw9_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.016600 ft/ft		
Elevation range: 4,186.48 ft to 4,196.97 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.64	4,192.74	2.64	196.33	0.030
3.01	4,192.71			
8.10	4,192.28			
13.19	4,192.00			
18.27	4,191.34			
20.13	4,191.09			
23.36	4,190.86			
25.96	4,190.71			
28.45	4,190.63			
31.79	4,190.44			
33.54	4,190.34			
37.62	4,189.93			
43.44	4,189.49			
48.80	4,189.19			
53.89	4,188.88			
58.97	4,188.61			
64.06	4,188.26			
69.15	4,187.87			
74.23	4,187.48			
78.41	4,187.25			
84.24	4,187.31			
89.50	4,187.30			
94.58	4,187.04			
99.67	4,186.76			
104.76	4,186.48			
109.85	4,186.68			
114.93	4,186.99			
119.21	4,187.57			
120.02	4,187.64			
125.04	4,188.91			
130.20	4,190.77			
135.28	4,192.20			
140.37	4,193.69			
145.46	4,195.17			
150.55	4,195.38			
155.63	4,195.60			
160.01	4,195.85			
165.81	4,195.94			

Draw 9 Upper Cross Section Worksheet for Irregular Channel

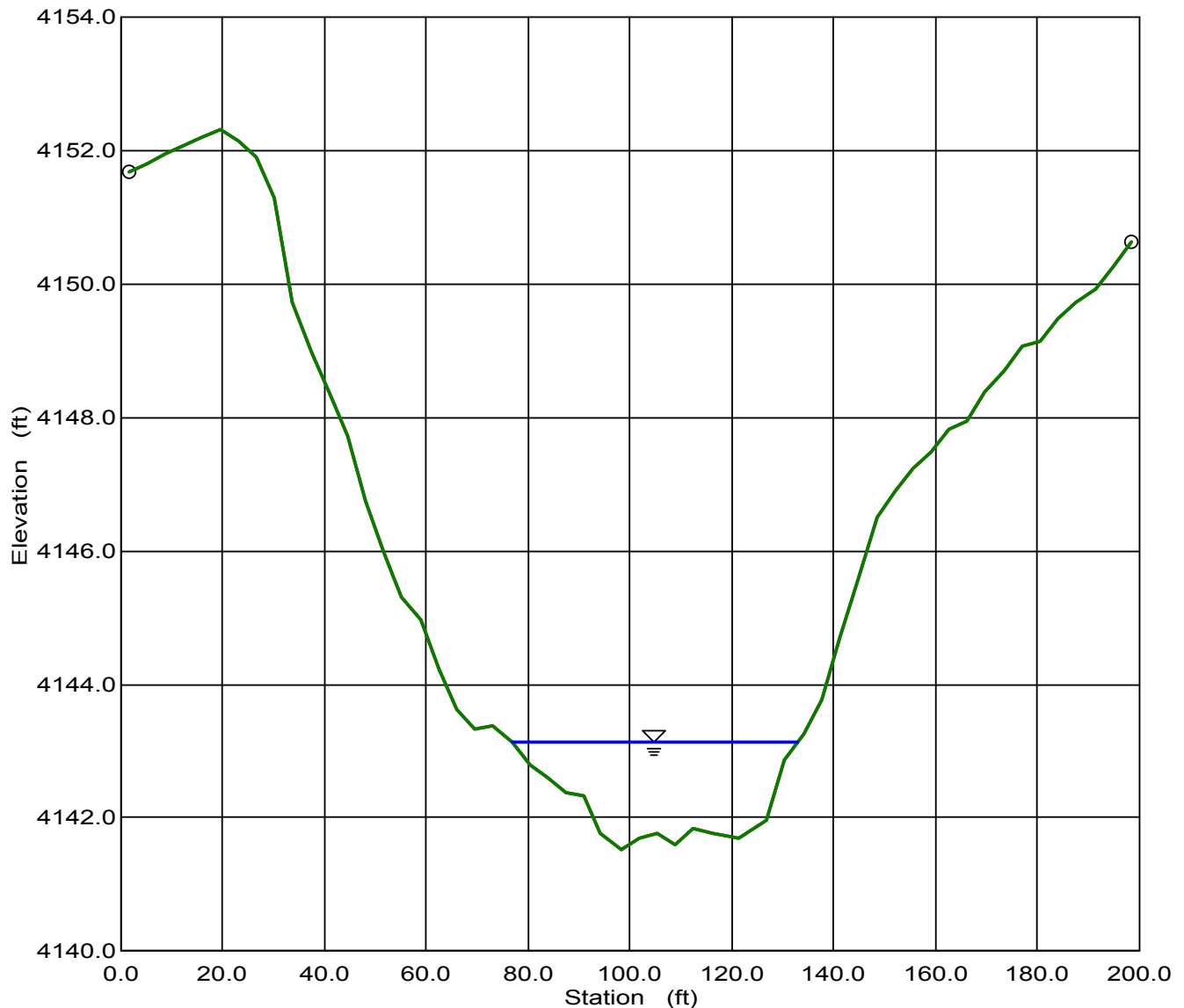
170.90	4,196.36	
175.98	4,196.36	
181.07	4,196.41	
186.16	4,196.52	
191.25	4,196.82	
196.33	4,196.97	
Discharge	330.90	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,188.14	ft
Flow Area	53.68	ft ²
Wetted Perimeter	56.56	ft
Top Width	56.38	ft
Height	1.67	ft
Critical Depth	4,188.22	ft
Critical Slope	0.013138	ft/ft
Velocity	6.16	ft/s
Velocity Head	0.59	ft
Specific Energy	4,188.73	ft
Froude Number	1.11	
Flow is supercritical.		

Draw 9 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw9_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.011600 ft/ft
Water Surface Elevation	4,143.13 ft
Discharge	330.90 cfs



Draw 9 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw9_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.011600 ft/ft		
Elevation range: 4,141.51 ft to 4,152.31 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.64	4,151.68	1.64	198.55	0.030
5.22	4,151.81			
8.80	4,151.95			
12.20	4,152.08			
15.96	4,152.21			
19.54	4,152.31			
23.12	4,152.14			
26.70	4,151.90			
30.28	4,151.28			
33.86	4,149.72			
37.44	4,148.98			
41.03	4,148.37			
44.61	4,147.72			
48.19	4,146.76			
51.77	4,145.99			
55.35	4,145.30			
58.93	4,144.97			
62.51	4,144.23			
66.08	4,143.63			
69.67	4,143.34			
73.25	4,143.39			
76.83	4,143.13			
80.41	4,142.79			
83.99	4,142.59			
87.57	4,142.39			
91.15	4,142.32			
94.13	4,141.76			
98.31	4,141.51			
101.89	4,141.70			
105.47	4,141.76			
109.05	4,141.58			
112.63	4,141.83			
116.21	4,141.75			
119.79	4,141.70			
121.44	4,141.68			
126.95	4,141.96			
130.53	4,142.87			
134.11	4,143.25			

Draw 9 Lower Cross Section Worksheet for Irregular Channel

137.69	4,143.76
141.27	4,144.69
144.85	4,145.55
148.75	4,146.51
152.01	4,146.89
155.59	4,147.23
159.17	4,147.47
162.75	4,147.83
166.33	4,147.95
169.91	4,148.39
173.49	4,148.70
177.07	4,149.08
180.65	4,149.14
184.23	4,149.49
187.81	4,149.74
191.39	4,149.91
194.97	4,150.26
198.55	4,150.64

Discharge	330.90	cfs
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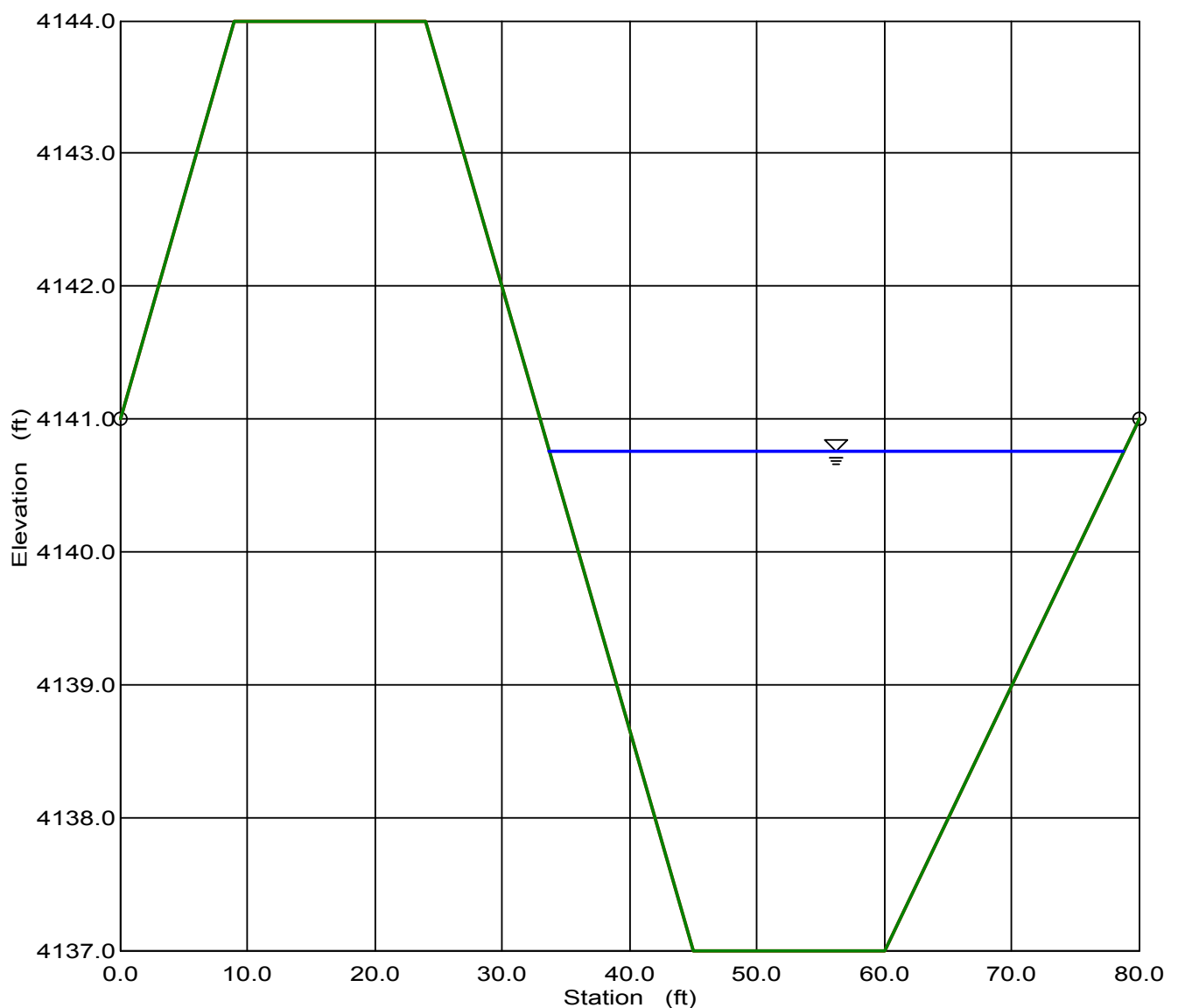
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,143.13	ft
Flow Area	59.70	ft ²
Wetted Perimeter	56.37	ft
Top Width	56.13	ft
Height	1.62	ft
Critical Depth	4,143.08	ft
Critical Slope	0.013032	ft/ft
Velocity	5.54	ft/s
Velocity Head	0.48	ft
Specific Energy	4,143.60	ft
Froude Number	0.95	
Flow is subcritical.		

Draw 13 Diversion Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw13_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

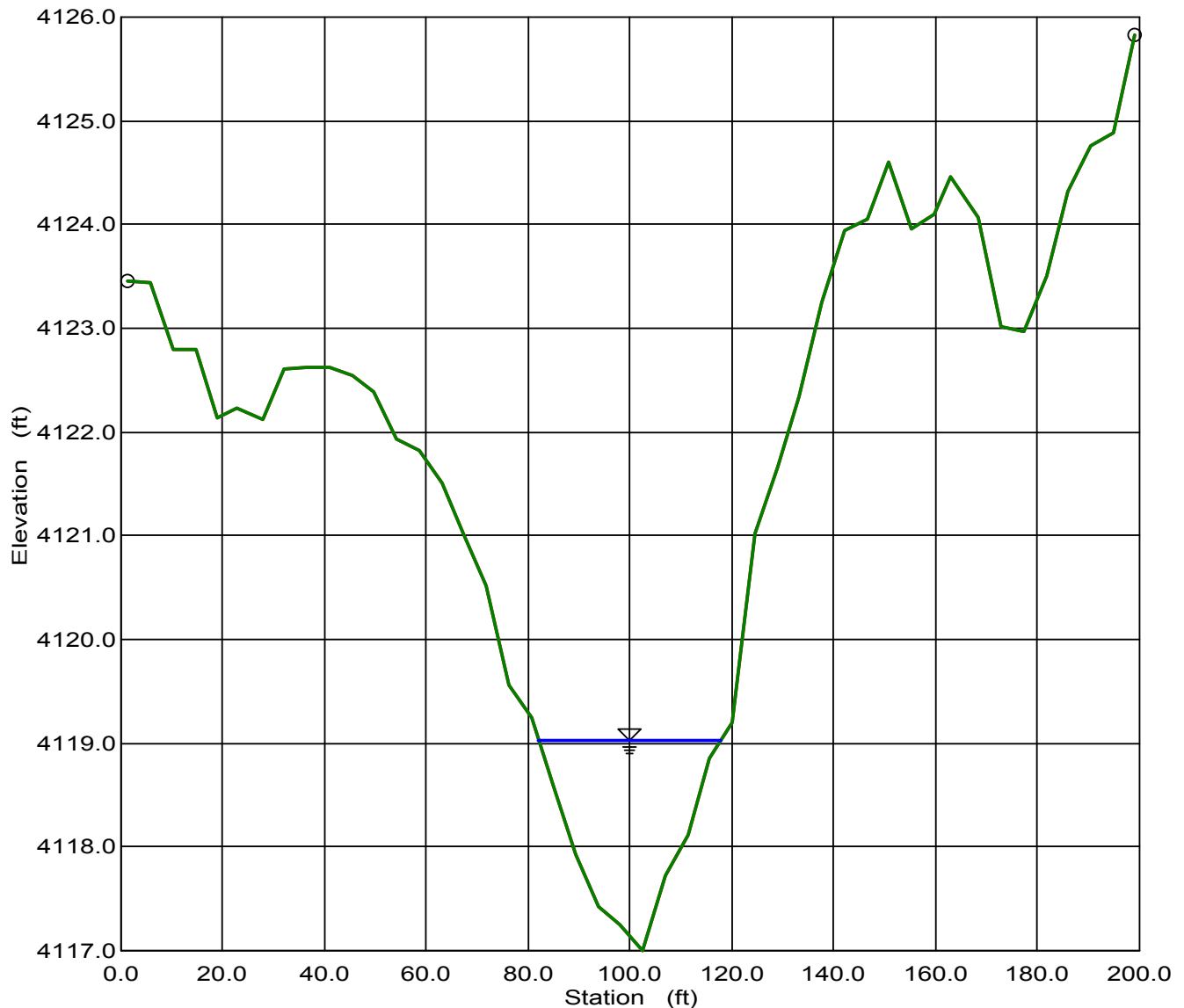
Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.004500 ft/ft
Water Surface Elevation	4,140.76 ft
Discharge	681.10 cfs



Draw 13 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw13_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.100000 ft/ft
Water Surface Elevation	4,119.02 ft
Discharge	681.10 cfs



Draw 13 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw13_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.100000 ft/ft		
Elevation range: 4,117.00 ft to 4,125.82 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.54	4,123.45	1.54	199.32	0.030
5.93	4,123.44			
10.33	4,122.79			
14.72	4,122.79			
19.12	4,122.13			
22.96	4,122.23			
27.91	4,122.13			
32.30	4,122.60			
36.70	4,122.62			
41.09	4,122.62			
45.49	4,122.54			
49.88	4,122.39			
54.28	4,121.92			
58.68	4,121.82			
63.07	4,121.51			
67.47	4,121.02			
71.86	4,120.52			
76.26	4,119.55			
80.65	4,119.25			
85.05	4,118.61			
89.44	4,117.93			
93.84	4,117.42			
98.23	4,117.25			
102.63	4,117.00			
107.07	4,117.72			
111.42	4,118.11			
115.81	4,118.85			
120.21	4,119.20			
124.60	4,121.01			
129.00	4,121.66			
133.39	4,122.34			
137.79	4,123.24			
142.19	4,123.94			
146.58	4,124.05			
150.98	4,124.60			
155.37	4,123.95			
159.77	4,124.10			
163.15	4,124.46			

Draw 13 Lower Cross Section Worksheet for Irregular Channel

168.56	4,124.07
172.95	4,123.02
177.35	4,122.97
181.84	4,123.50
186.14	4,124.32
190.53	4,124.75
194.93	4,124.88
199.32	4,125.82

Discharge	681.10	cfs
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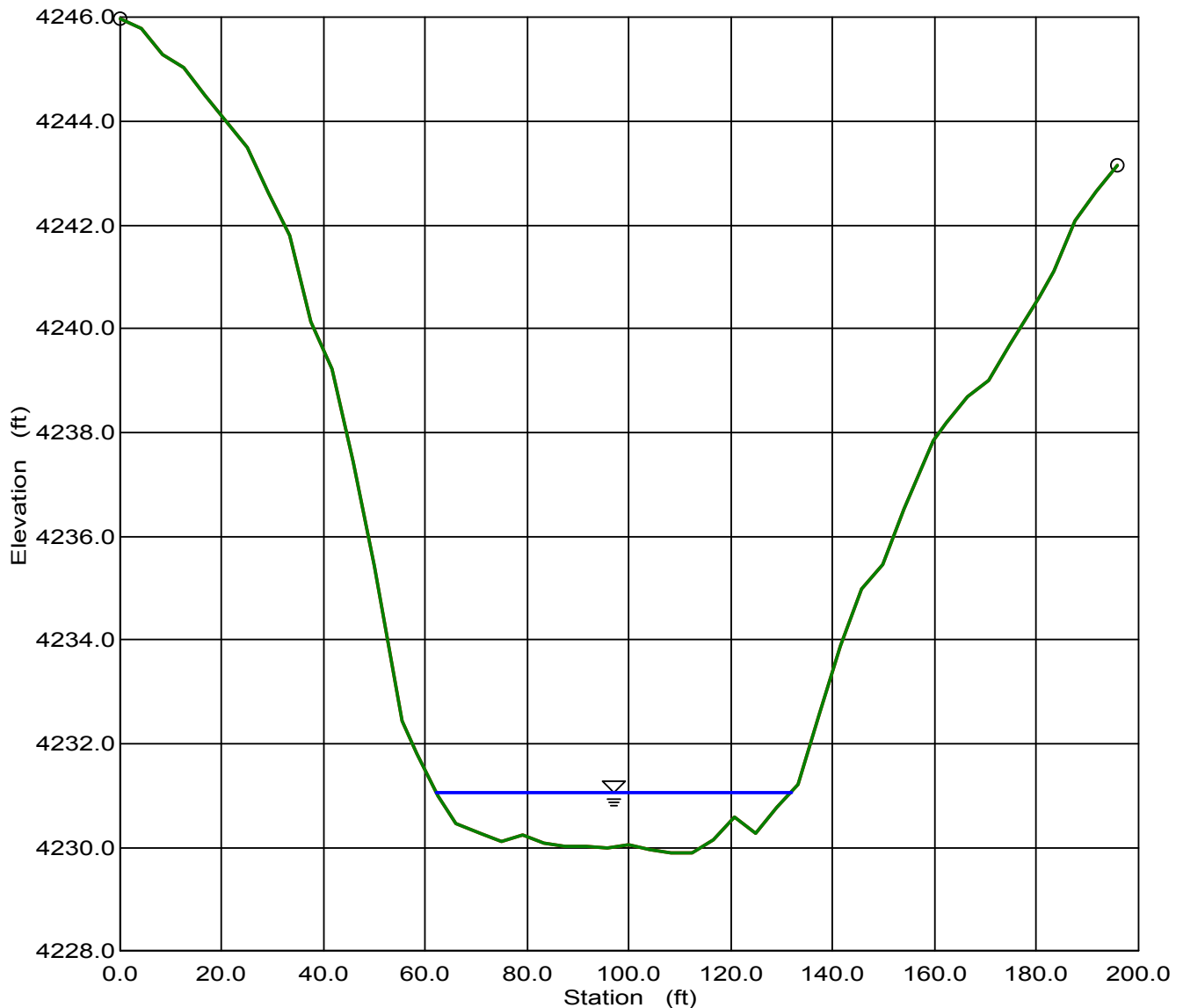
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,119.02	ft
Flow Area	40.35	ft ²
Wetted Perimeter	36.07	ft
Top Width	35.80	ft
Height	2.02	ft
Critical Depth	4,120.13	ft
Critical Slope	0.010900	ft/ft
Velocity	16.88	ft/s
Velocity Head	4.43	ft
Specific Energy	4,123.45	ft
Froude Number	2.80	
Flow is supercritical.		

Draw 14 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw14_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.016200 ft/ft
Water Surface Elevation	4,231.06 ft
Discharge	342.30 cfs



Draw 14 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw14_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.016200 ft/ft		
Elevation range: 4,229.89 ft to 4,245.98 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.24	4,245.98	0.24	195.85	0.030
4.41	4,245.80			
8.57	4,245.29			
12.73	4,245.04			
16.89	4,244.50			
21.05	4,243.99			
25.21	4,243.50			
29.38	4,242.63			
33.54	4,241.79			
37.70	4,240.12			
41.86	4,239.23			
46.02	4,237.43			
50.18	4,235.43			
55.59	4,232.43			
58.51	4,231.79			
62.67	4,230.99			
66.00	4,230.44			
70.99	4,230.26			
75.15	4,230.10			
79.32	4,230.23			
83.48	4,230.09			
87.64	4,230.02			
91.80	4,230.03			
95.96	4,229.97			
100.13	4,230.05			
104.29	4,229.94			
108.45	4,229.89			
112.61	4,229.90			
116.77	4,230.14			
120.94	4,230.57			
125.10	4,230.25			
129.26	4,230.77			
133.42	4,231.22			
137.58	4,232.57			
141.74	4,233.89			
145.91	4,234.99			
150.07	4,235.45			
154.23	4,236.52			

Draw 14 Upper Cross Section Worksheet for Irregular Channel

159.70	4,237.84
162.55	4,238.19
166.71	4,238.67
170.88	4,239.01
175.04	4,239.70
180.52	4,240.62
183.36	4,241.10
187.52	4,242.07
191.69	4,242.66
195.85	4,243.14

Discharge	342.30	cfs
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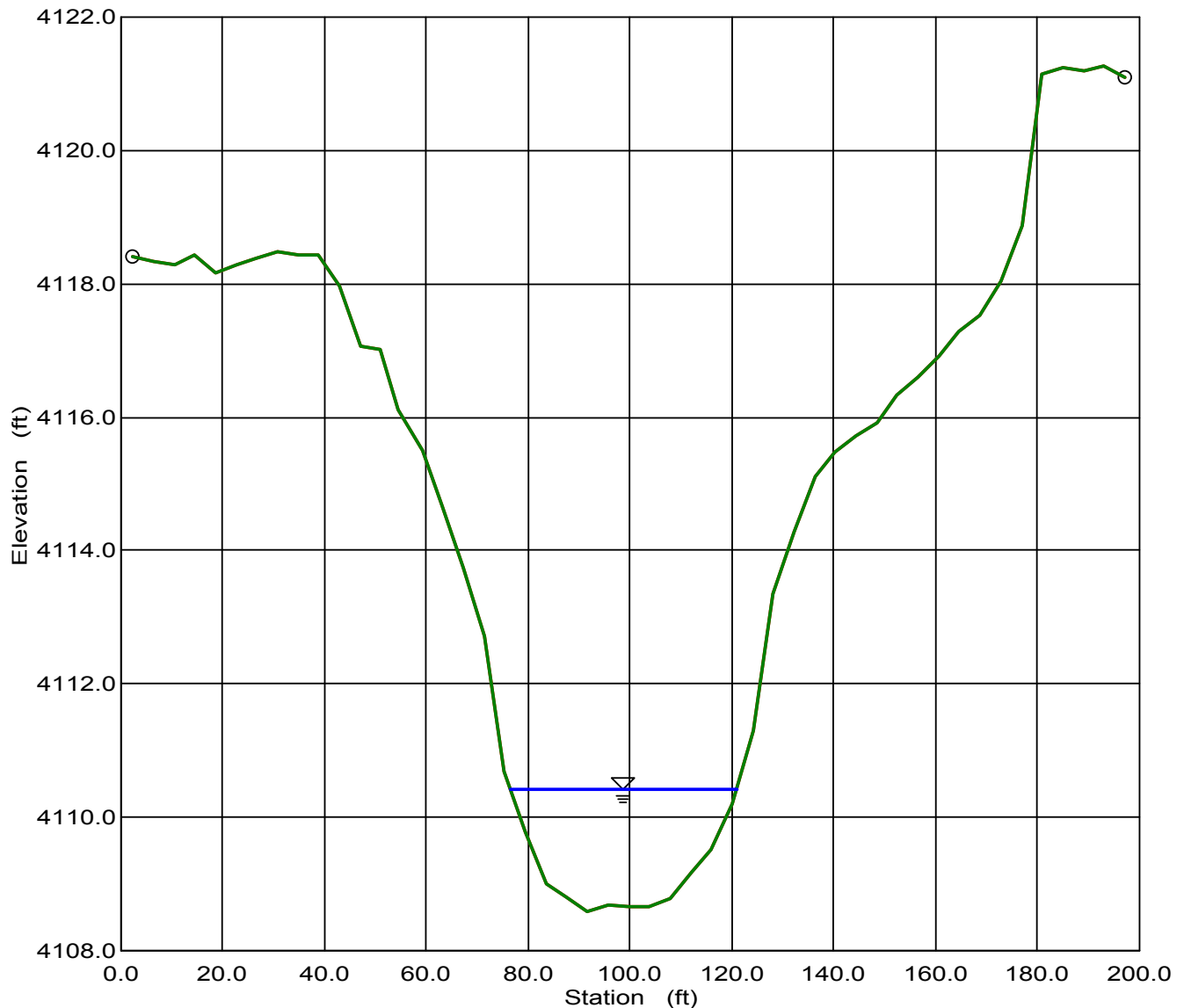
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,231.06	ft
Flow Area	60.04	ft ²
Wetted Perimeter	69.83	ft
Top Width	69.67	ft
Height	1.18	ft
Critical Depth	4,231.11	ft
Critical Slope	0.013613	ft/ft
Velocity	5.70	ft/s
Velocity Head	0.51	ft
Specific Energy	4,231.57	ft
Froude Number	1.08	
Flow is supercritical.		

Draw 14 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw14_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.016200 ft/ft
Water Surface Elevation	4,110.43 ft
Discharge	456.60 cfs



Draw 14 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw14_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.016200 ft/ft		
Elevation range: 4,108.57 ft to 4,121.27 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.45	4,118.40	2.45	197.25	0.030
6.51	4,118.34			
10.57	4,118.28			
14.55	4,118.43			
18.69	4,118.16			
22.75	4,118.28			
26.80	4,118.39			
30.86	4,118.47			
34.92	4,118.44			
38.98	4,118.44			
43.04	4,117.97			
47.10	4,117.07			
51.15	4,117.01			
54.58	4,116.11			
59.27	4,115.51			
63.33	4,114.68			
67.39	4,113.74			
71.45	4,112.72			
75.50	4,110.70			
79.56	4,109.77			
83.62	4,109.01			
87.68	4,108.81			
91.74	4,108.57			
95.80	4,108.68			
99.85	4,108.66			
103.91	4,108.66			
107.97	4,108.77			
112.03	4,109.17			
116.09	4,109.51			
120.14	4,110.19			
124.20	4,111.31			
128.26	4,113.35			
132.32	4,114.28			
136.38	4,115.10			
140.44	4,115.47			
144.44	4,115.71			
148.55	4,115.92			
152.61	4,116.32			

Draw 14 Lower Cross Section Worksheet for Irregular Channel

156.67	4,116.60
160.73	4,116.91
164.79	4,117.29
168.85	4,117.52
172.90	4,118.05
176.96	4,118.87
181.02	4,121.14
185.08	4,121.25
189.14	4,121.20
193.20	4,121.27
197.25	4,121.09

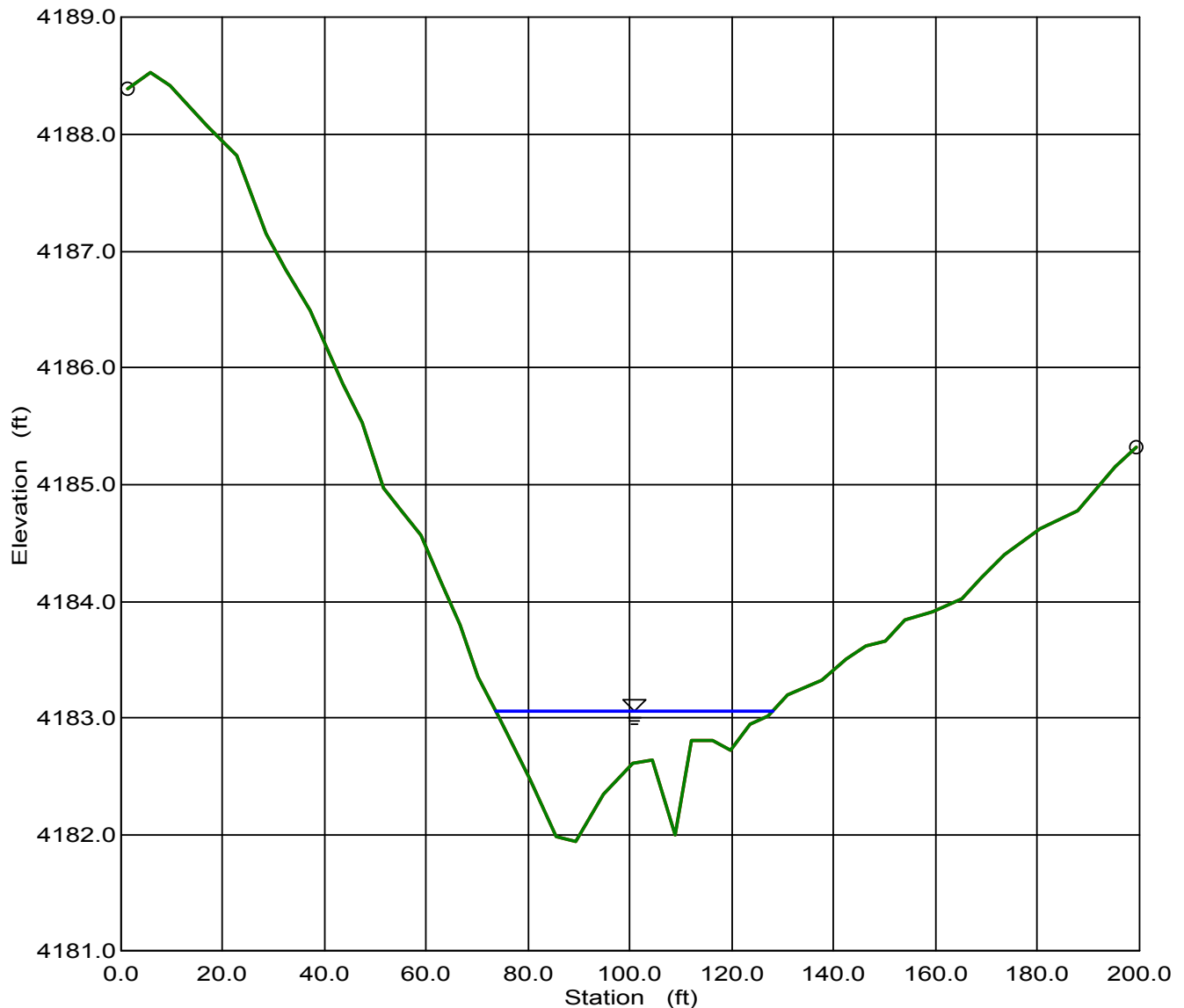
Discharge	456.60	cfs
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Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,110.43	ft
Flow Area	59.66	ft ²
Wetted Perimeter	44.61	ft
Top Width	44.33	ft
Height	1.85	ft
Critical Depth	4,110.58	ft
Critical Slope	0.011665	ft/ft
Velocity	7.65	ft/s
Velocity Head	0.91	ft
Specific Energy	4,111.34	ft
Froude Number	1.16	
Flow is supercritical.		

Draw 15 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw15_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.026000 ft/ft
Water Surface Elevation	4,183.06 ft
Discharge	152.30 cfs



Draw 15 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw15_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.026000 ft/ft		
Elevation range: 4,181.94 ft to 4,188.53 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.37	4,188.40	1.37	199.50	0.030
5.81	4,188.53			
9.61	4,188.42			
13.41	4,188.25			
17.21	4,188.07			
22.91	4,187.83			
28.60	4,187.16			
32.40	4,186.84			
37.28	4,186.49			
43.79	4,185.87			
47.59	4,185.54			
51.64	4,184.98			
55.19	4,184.77			
58.98	4,184.56			
62.78	4,184.18			
66.58	4,183.79			
70.38	4,183.35			
74.17	4,183.03			
80.37	4,182.47			
85.57	4,181.99			
89.37	4,181.94			
94.74	4,182.35			
100.76	4,182.61			
104.56	4,182.63			
109.10	4,182.00			
112.15	4,182.81			
116.29	4,182.80			
119.75	4,182.72			
123.55	4,182.94			
127.35	4,183.02			
131.14	4,183.20			
137.83	4,183.32			
142.54	4,183.51			
146.33	4,183.62			
150.13	4,183.66			
153.93	4,183.83			
159.38	4,183.92			
165.32	4,184.02			

Draw 15 Upper Cross Section Worksheet for Irregular Channel

169.12	4,184.20
173.75	4,184.39
180.51	4,184.62
188.11	4,184.77
195.29	4,185.15
199.50	4,185.32

Discharge	152.30	cfs
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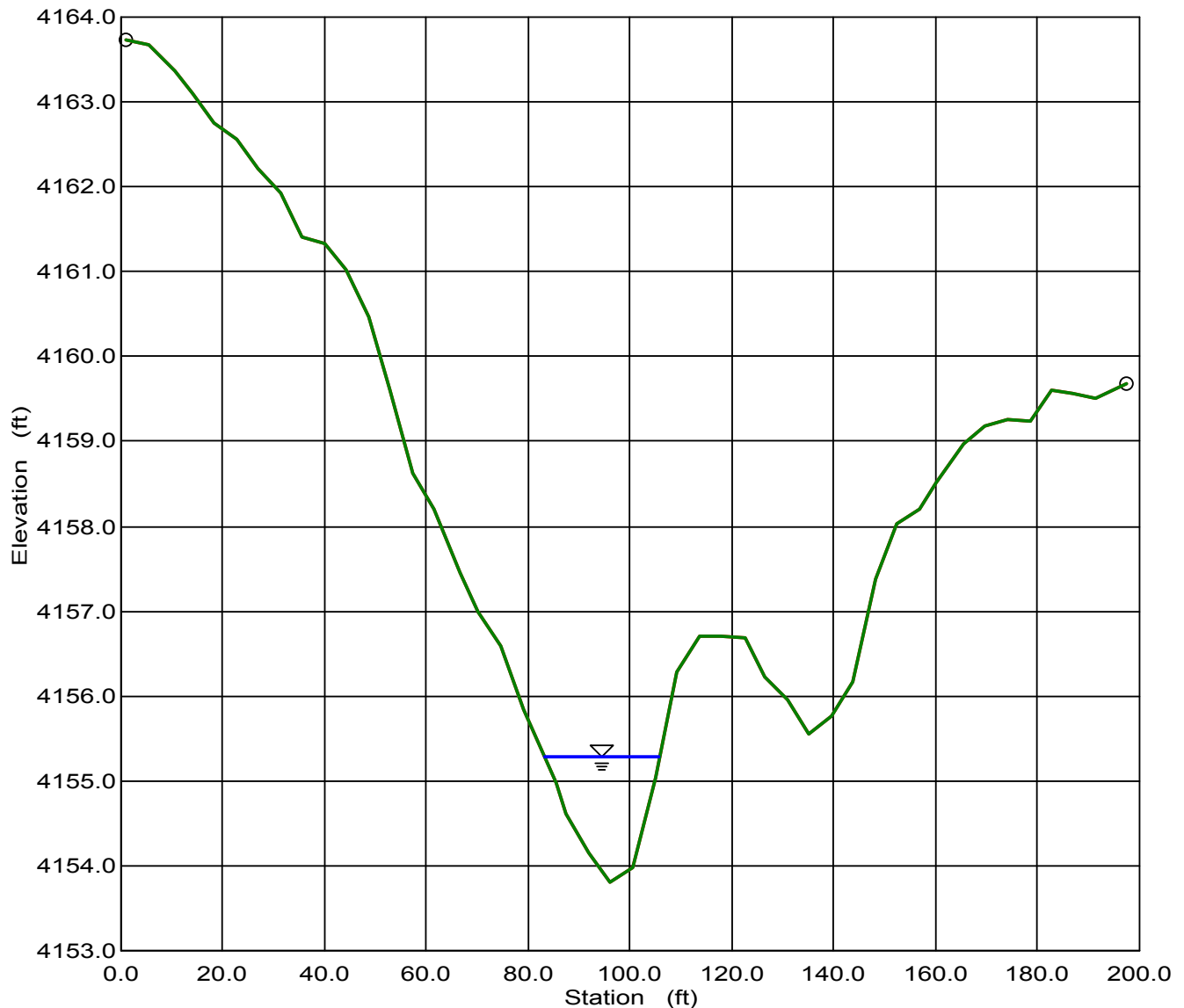
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,183.06	ft
Flow Area	29.01	ft ²
Wetted Perimeter	54.43	ft
Top Width	54.20	ft
Height	1.11	ft
Critical Depth	4,183.16	ft
Critical Slope	0.015615	ft/ft
Velocity	5.25	ft/s
Velocity Head	0.43	ft
Specific Energy	4,183.49	ft
Froude Number	1.27	
Flow is supercritical.		

Draw 15 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw15_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.026000 ft/ft
Water Surface Elevation	4,155.28 ft
Discharge	152.30 cfs



Draw 15 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw15_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.026000 ft/ft		
Elevation range: 4,153.80 ft to 4,163.73 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
1.21	4,163.73	1.21	197.45	0.030
5.54	4,163.68			
10.84	4,163.36			
14.18	4,163.10			
18.50	4,162.75			
22.83	4,162.55			
27.15	4,162.22			
31.47	4,161.92			
35.80	4,161.40			
40.19	4,161.33			
44.44	4,161.03			
48.76	4,160.47			
53.09	4,159.60			
57.41	4,158.63			
61.73	4,158.20			
66.82	4,157.45			
70.38	4,157.00			
74.70	4,156.58			
79.26	4,155.84			
85.48	4,154.97			
87.67	4,154.61			
91.99	4,154.15			
96.31	4,153.80			
100.64	4,153.98			
104.96	4,155.04			
109.28	4,156.28			
113.61	4,156.71			
117.93	4,156.71			
122.80	4,156.69			
126.57	4,156.23			
130.90	4,155.96			
135.24	4,155.55			
139.54	4,155.76			
143.86	4,156.16			
148.19	4,157.38			
152.51	4,158.03			
156.83	4,158.20			
160.12	4,158.51			

Draw 15 Lower Cross Section Worksheet for Irregular Channel

165.48	4,158.96
169.80	4,159.19
174.12	4,159.27
178.79	4,159.24
182.77	4,159.60
187.09	4,159.57
191.41	4,159.51
197.45	4,159.68

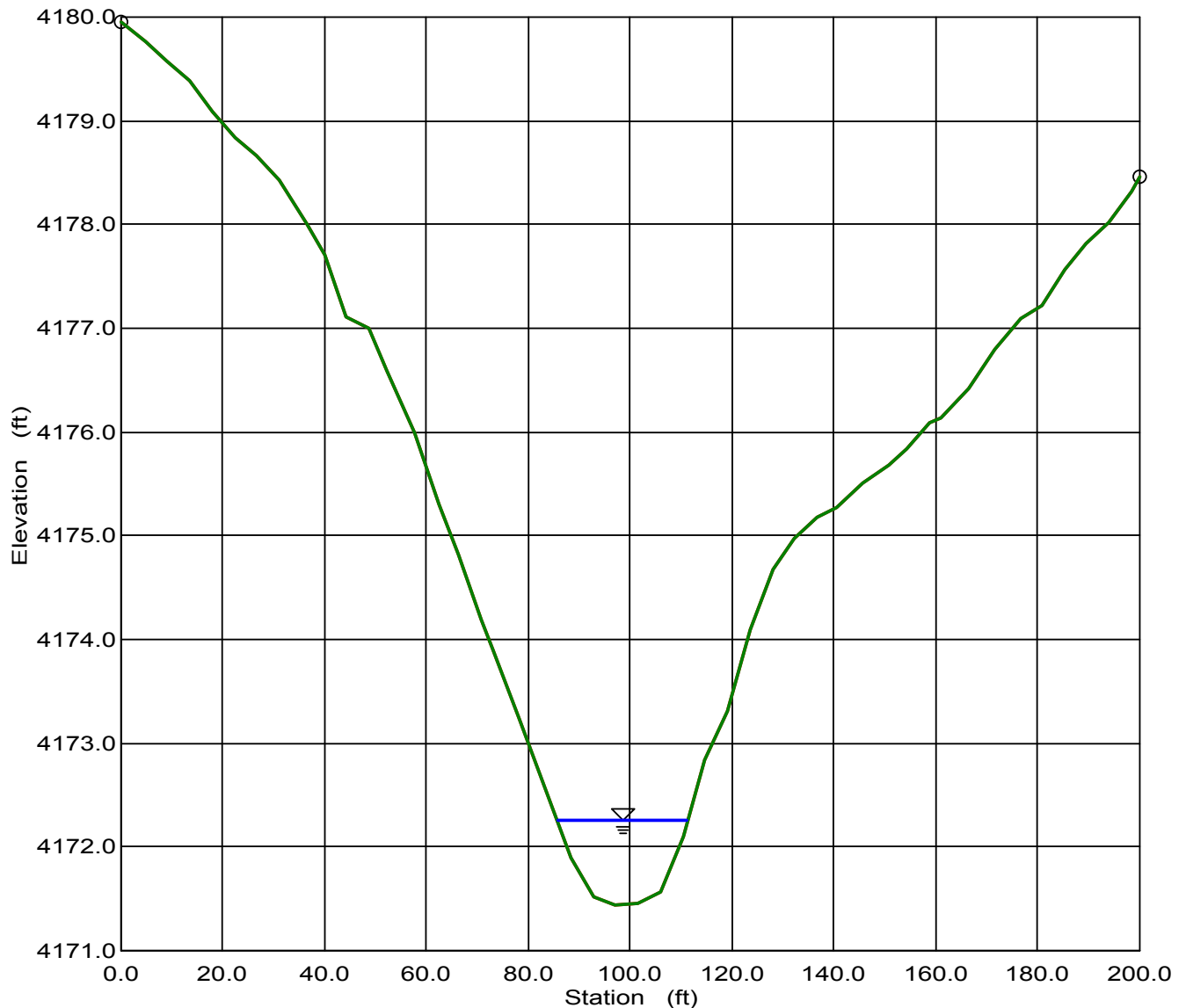
Discharge	152.30	cfs
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Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,155.28	ft
Flow Area	20.49	ft ²
Wetted Perimeter	22.83	ft
Top Width	22.57	ft
Height	1.48	ft
Critical Depth	4,155.53	ft
Critical Slope	0.013137	ft/ft
Velocity	7.43	ft/s
Velocity Head	0.86	ft
Specific Energy	4,156.14	ft
Froude Number	1.38	
Flow is supercritical.		

Draw 18 Upper Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw18_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.024200 ft/ft
Water Surface Elevation	4,172.25 ft
Discharge	79.60 cfs



Draw 18 Upper Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw18_A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.024200 ft/ft		
Elevation range: 4,171.44 ft to 4,179.95 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,179.95	0.00	200.00	0.030
4.81	4,179.76			
9.21	4,179.57			
13.61	4,179.38			
18.01	4,179.09			
22.41	4,178.84			
26.82	4,178.67			
31.22	4,178.43			
36.66	4,178.00			
40.02	4,177.71			
44.42	4,177.11			
48.82	4,176.99			
52.23	4,176.59			
57.63	4,175.99			
62.62	4,175.30			
66.43	4,174.82			
70.83	4,174.18			
73.00	4,173.90			
78.19	4,173.25			
83.38	4,172.57			
88.44	4,171.90			
92.84	4,171.52			
97.24	4,171.44			
101.64	4,171.45			
106.05	4,171.57			
110.45	4,172.10			
114.85	4,172.83			
119.25	4,173.30			
123.65	4,174.09			
128.05	4,174.68			
132.46	4,174.97			
136.86	4,175.17			
140.49	4,175.27			
145.66	4,175.51			
150.87	4,175.68			
154.46	4,175.84			
158.87	4,176.09			
161.26	4,176.14			

Draw 18 Upper Cross Section Worksheet for Irregular Channel

166.45	4,176.42
171.64	4,176.79
176.83	4,177.09
180.87	4,177.21
185.28	4,177.57
189.68	4,177.82
194.08	4,178.02
198.48	4,178.32
200.00	4,178.46

Discharge	79.60	cfs
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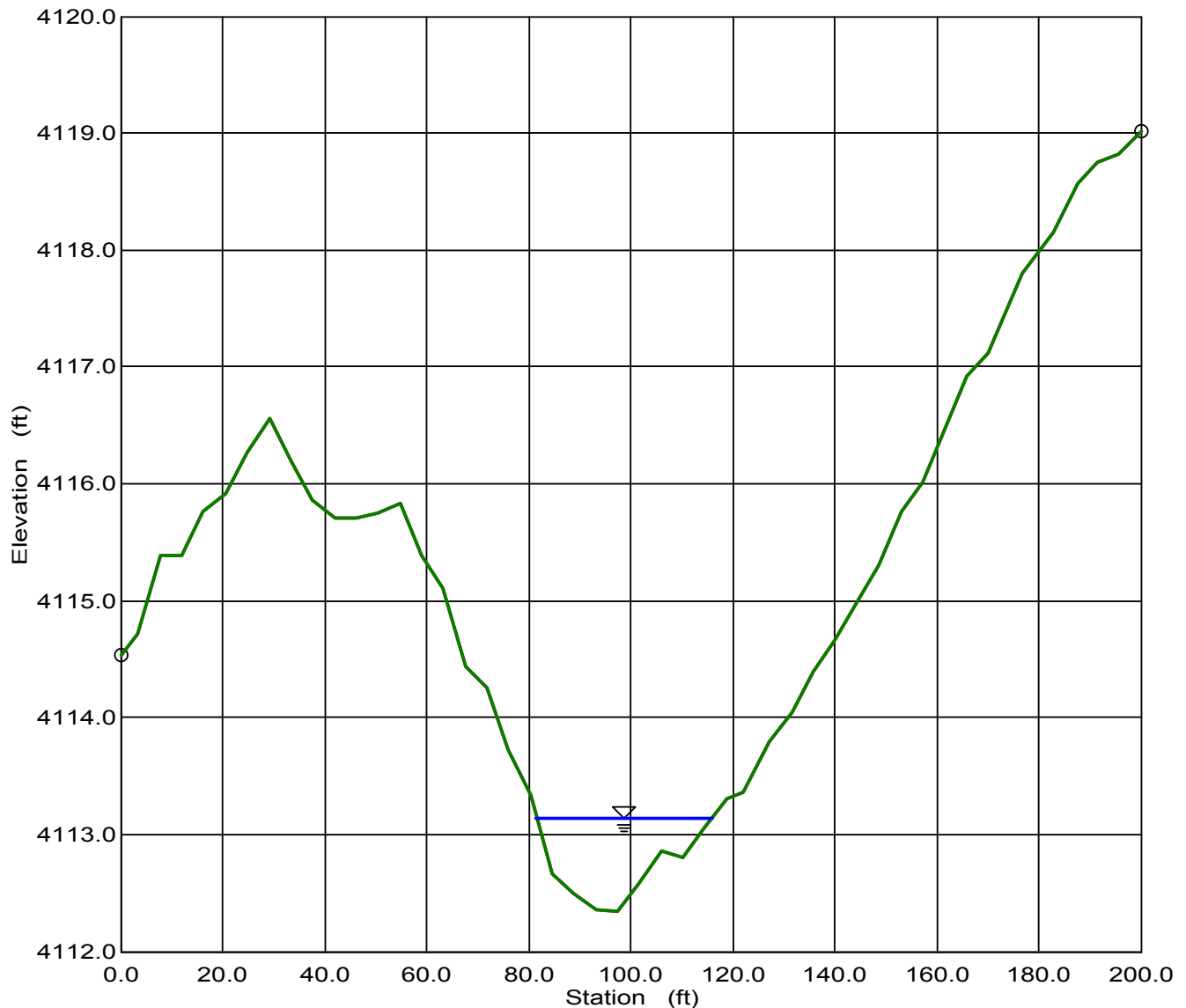
Results

Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,172.25	ft
Flow Area	14.85	ft ²
Wetted Perimeter	25.60	ft
Top Width	25.52	ft
Height	0.81	ft
Critical Depth	4,172.35	ft
Critical Slope	0.015224	ft/ft
Velocity	5.36	ft/s
Velocity Head	0.45	ft
Specific Energy	4,172.69	ft
Froude Number	1.24	
Flow is supercritical.		

Draw 18 Lower Cross Section Cross Section for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw18_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.030
Channel Slope	0.024200 ft/ft
Water Surface Elevation	4,113.14 ft
Discharge	79.60 cfs



Draw 18 Lower Cross Section Worksheet for Irregular Channel

Project Description	
Project File	k:\common\clint_a\flowmaster\strata.fm2
Worksheet	Draw18_B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.024200 ft/ft		
Elevation range: 4,112.34 ft to 4,119.01 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	4,114.53	0.00	200.00	0.030
3.50	4,114.72			
7.77	4,115.38			
12.04	4,115.38			
16.31	4,115.76			
20.59	4,115.91			
24.86	4,116.27			
29.13	4,116.56			
33.40	4,116.20			
37.67	4,115.86			
41.94	4,115.70			
46.21	4,115.71			
50.48	4,115.75			
54.74	4,115.83			
59.02	4,115.39			
63.29	4,115.10			
67.56	4,114.43			
71.83	4,114.26			
76.10	4,113.72			
80.37	4,113.34			
84.64	4,112.66			
88.91	4,112.49			
93.18	4,112.35			
97.45	4,112.34			
101.72	4,112.58			
105.99	4,112.86			
110.26	4,112.80			
114.53	4,113.06			
118.80	4,113.30			
122.07	4,113.36			
127.34	4,113.79			
131.61	4,114.04			
135.88	4,114.39			
140.15	4,114.66			
144.42	4,114.99			
148.69	4,115.30			
152.96	4,115.76			
157.23	4,116.01			

Draw 18 Lower Cross Section Worksheet for Irregular Channel

165.77	4,116.92
170.04	4,117.12
176.73	4,117.80
182.85	4,118.15
187.66	4,118.57
191.39	4,118.75
195.66	4,118.82
200.00	4,119.01

Discharge	79.60	cfs
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Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	4,113.14	ft
Flow Area	16.74	ft ²
Wetted Perimeter	34.51	ft
Top Width	34.44	ft
Height	0.80	ft
Critical Depth	4,113.22	ft
Critical Slope	0.016230	ft/ft
Velocity	4.76	ft/s
Velocity Head	0.35	ft
Specific Energy	4,113.50	ft
Froude Number	1.20	
Flow is supercritical.		