

SNAKE-CLEARWATER SEDIMENTATION & LOWER GRANITE VARIABLE MOP OPERATIONS

March 7, 2018

Stephen Hall, PE
USACE Walla Walla District

Aaron Marshall, PG
USACE Northwestern Division

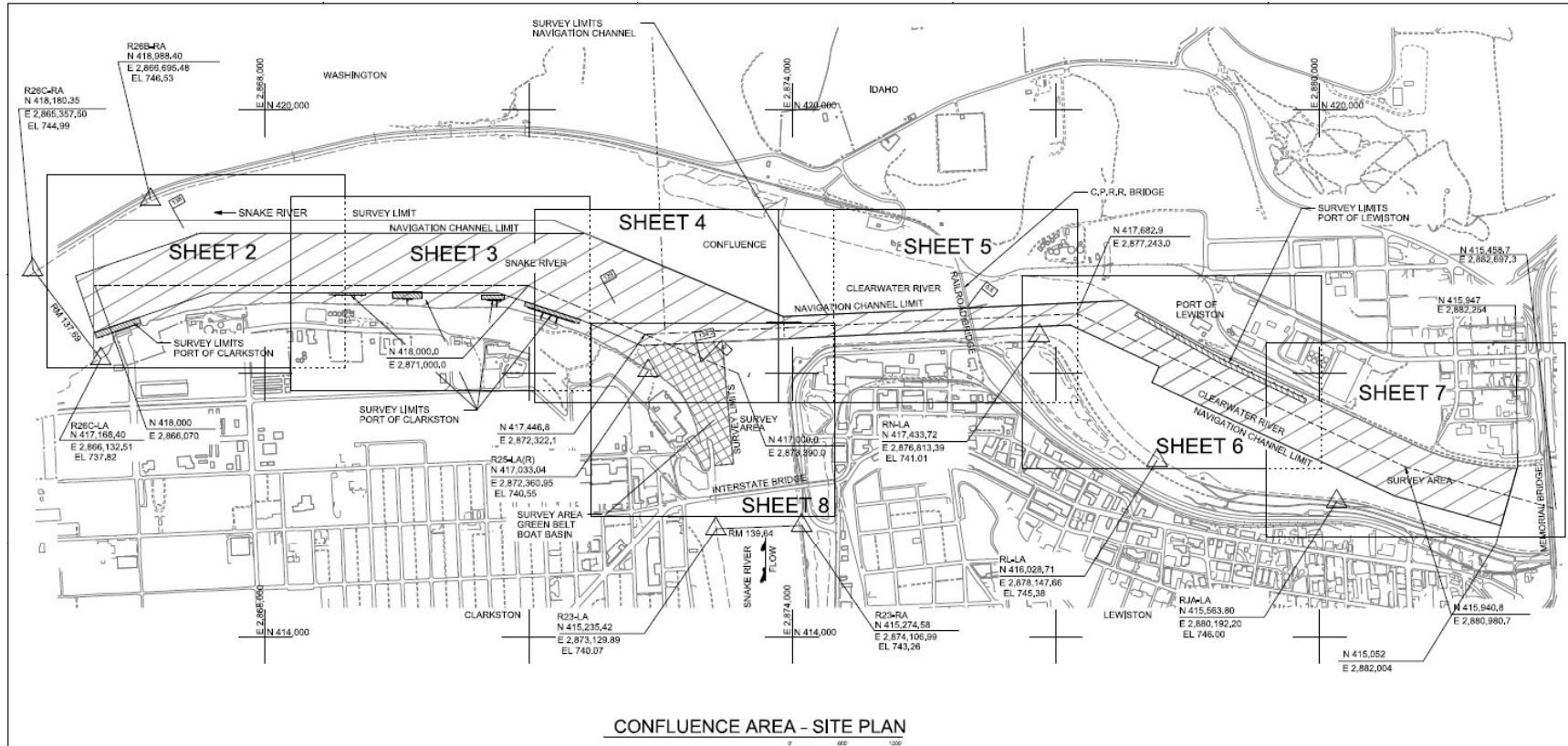


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CONFLUENCE AREA - SITE PLAN

HORIZONTAL AND VERTICAL CONTROL

R24C-LA GPS BASE STATION 3/12" BRASS DISK USAGE STAMPED "R24C-LA 1984" N 416874.54 E 287268.74 ELEVATION 741.08	R24A-LA 3-1/2" BRASS DISK USAGE STAMPED "R24A-LA 1985" N 415563.80 E 2860192.20 ELEVATION 746.00
R25A-LA(R) 3-1/2" BRASS DISK USAGE STAMPED "R25A-LA 1984" N 417033.04 E 2872369.95 ELEVATION 740.55	RL-LA 3-1/2" BRASS DISK USAGE STAMPED "RL-LA 1975" N 418028.71 E 2878147.66 ELEVATION 745.38
R26B-RA 3-1/2" BRASS DISK USAGE STAMPED "R26B-RA 1984" N 418988.40 E 2866595.48 ELEVATION 746.53	RN-LA 3-1/2" BRASS DISK USAGE STAMPED "RN-LA 1975" N 417433.72 E 2876813.39 ELEVATION 741.01

LEGEND

	SURVEY ALIGNMENT
	SURVEY AREA CONFLUENCE
	SURVEY AREA GREENBELT BOAT BASIN
	SURVEY AREA PORT OF CLARKSTON
	SURVEY AREA PORT OF LEWISTON
	RIVER MILE
	SURVEY CONTROL
	SOUNDING
	AID TO NAVIGATION

NOTES

1. A MULTIBEAM BATHYMETRIC SURVEY OF SNAKE RIVER AND CLEARWATER RIVER CONFLUENCE WAS CONDUCTED BY TERRASO ND LIMITED ON SEPT 1-7, 2017
2. HORIZONTAL DATUM IS NAD27. PROJECTION IS WASHINGTON STATE PLANE SOUTH, VERTICAL DATUM IS NAVD09. ALL UNITS ARE IN US SURVEY FEET
3. HORIZONTAL AND VERTICAL POSITIONING WAS PROVIDED BY REAL-TIME KINEMATIC (RTK) GPS. RTK CORRECTIONS WERE BROADCAST FROM A LOCAL BASE STATION USING A TRIMBLE R10 GPS RECEIVER ON CONTROL POINT "R24A-LA"
4. BATHYMETRIC DATA COLLECTION WAS CONDUCTED USING A RESON 8125-H MULTIBEAM ECHOSOUNDER, CODA OCTOPUS F1MS INERTIAL NAVIGATION SYSTEM, AND MINOS-X SOUND VELOCITY PROBE. AND QINSY V8.1 ACQUISITION SOFTWARE. DATA WAS PROCESSED USING CARIS HIPS V9.1
5. CONTOURS SHOWN HEREON WERE GENERATED FROM A 5-FOOT HORIZONTAL RESOLUTION DATASET USING INVERSE WEIGHTED MEAN OF ALL SOUNDINGS WITHIN A 5-FOOT X 5-FOOT CELL.
6. PLOTTED SOUNDINGS REPRESENT A SHOAL-BIASED 50-FOOT RADIUS SORT OF THE 5-FOOT X 5-FOOT MEAN SOUNDINGS.
7. THIS MAP REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.

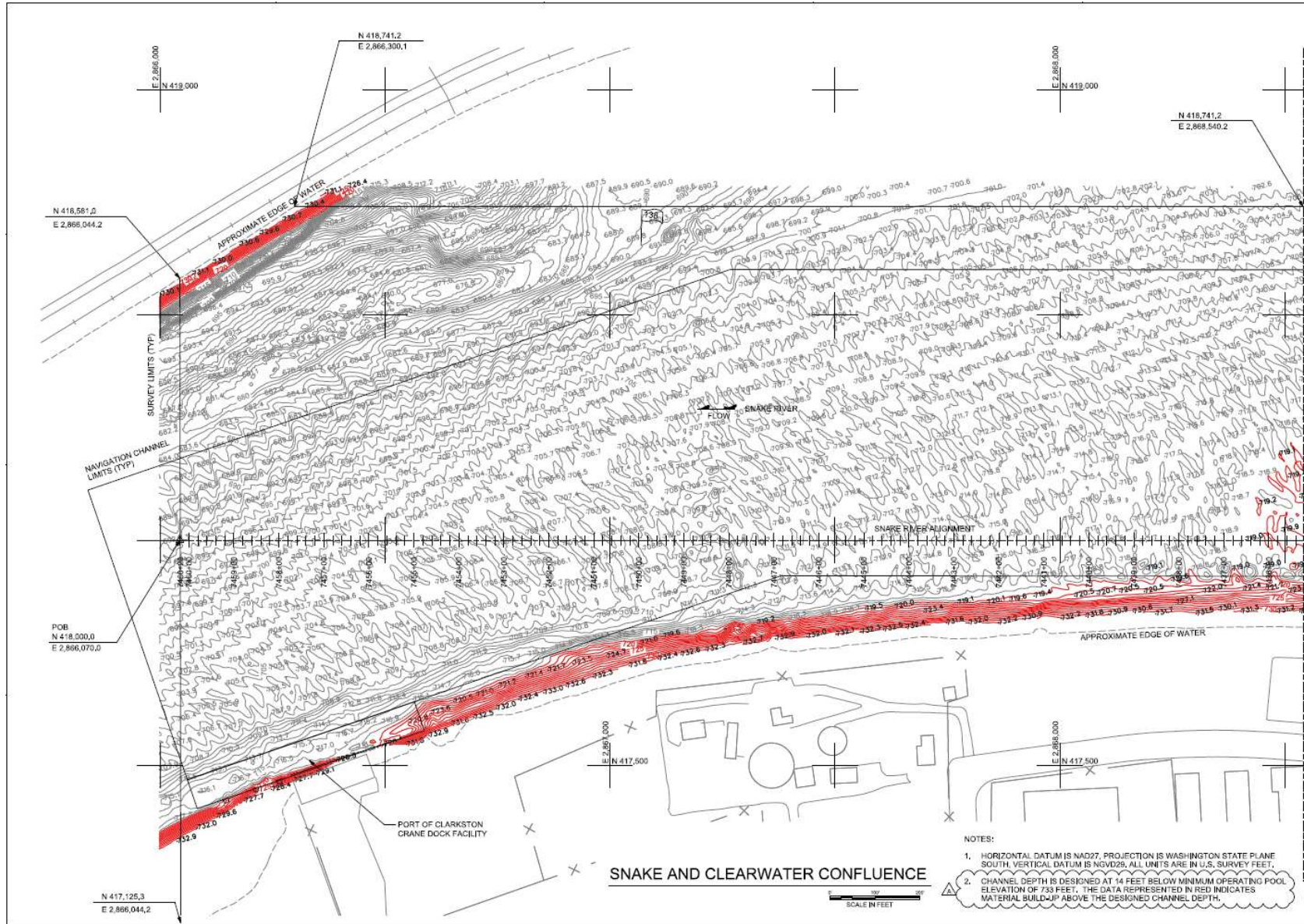
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TERRASO ND

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SUBMITTED BY: T.E. NOLAN
DATE: 09/07/2017

LOWER GRANITE LOCK AND DAM
SNAKE AND CLEARWATER RIVERS, WASHINGTON AND IDAHO
SNAKE RIVER AND CLEARWATER RIVER CONFLUENCE
MULTIBEAM BATHYMETRIC SURVEY

SHEET ID
V-101



MATCH LINE TO SHEET V403



NO.	DATE	BY	DESCRIPTION

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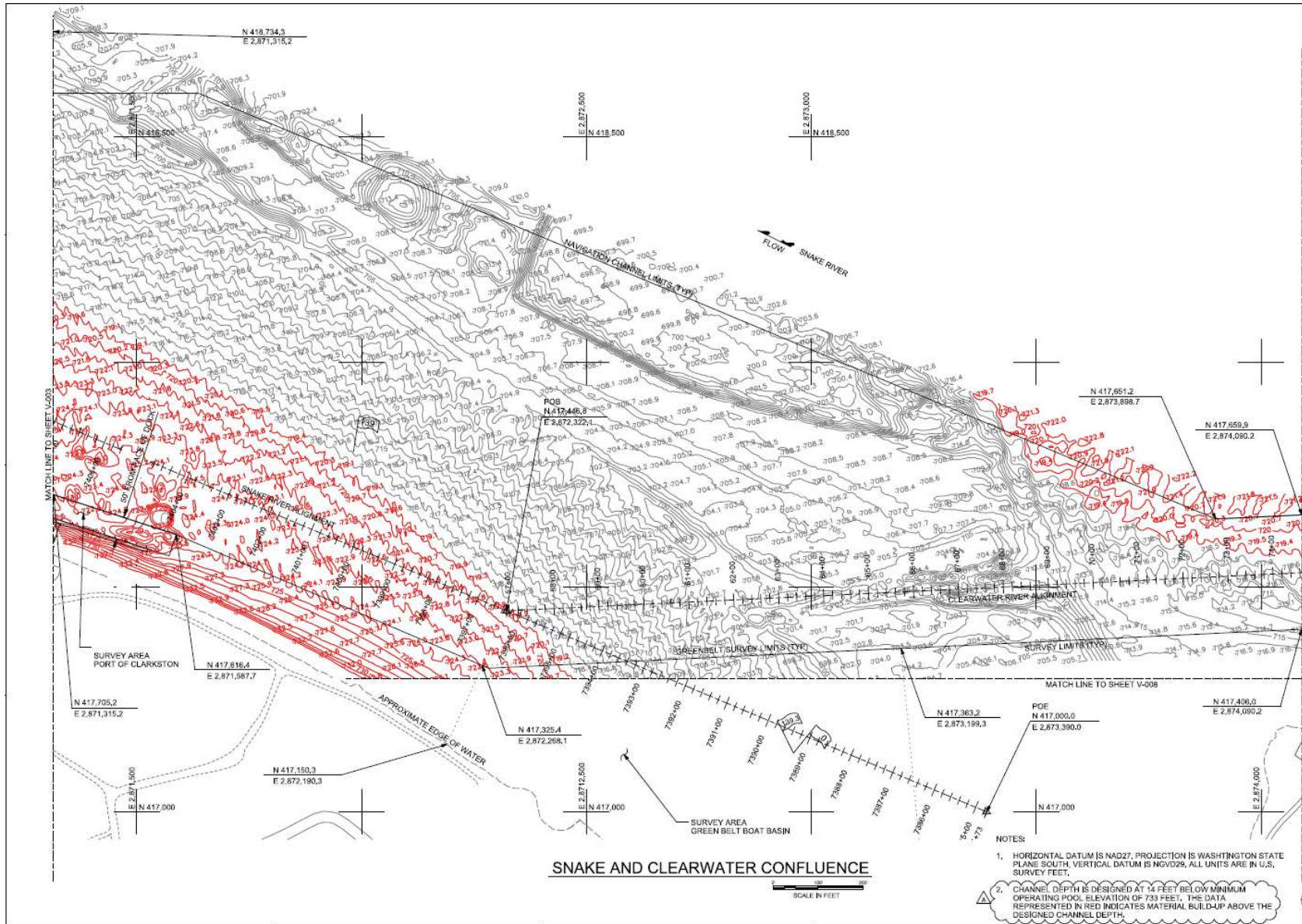
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 SURVEYING & ENGINEERING
 1000 W. WALLA STREET, WALLA, WA 99156

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LOWER GRANITE LOCK AND DAM
 SNAKE AND CLEARWATER RIVERS, WASHINGTON AND IDAHO
 SNAKE RIVER AND CLEARWATER
 RIVER CONFLUENCE
 MULT-BEAM BATHYMETRIC SURVEY

SHEET ID
V-102

- NOTES:
- HORIZONTAL DATUM IS NAD27. PROJECTION IS WASHINGTON STATE PLANE SOUTH. VERTICAL DATUM IS NGVD29. ALL UNITS ARE IN U.S. SURVEY FEET.
 - CHANNEL DEPTH IS DESIGNED AT 14 FEET BELOW MINIMUM OPERATING POOL ELEVATION OF 733 FEET. THE DATA REPRESENTED IN RED INDICATES MATERIAL BUILDUP ABOVE THE DESIGNED CHANNEL DEPTH.



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LOWER GRANITE LOCK AND DAM
 SNAKE AND CLEARWATER RIVERS, WASHINGTON AND IDAHO
 SNAKE RIVER AND CLEARWATER RIVER CONFLUENCE
 MULTIBEAM BATHYMETRIC SURVEY

SHEET ID
V-104



Snake and Clearwater Confluence

- NOTES:
- HORIZONTAL DATUM IS NAD27. PROJECTION IS WASHINGTON STATE PLANE SOUTH. VERTICAL DATUM IS NGVD29. ALL UNITS ARE IN U.S. SURVEY FEET.
 - CHANNEL DEPTH IS DESIGNED AT 14 FEET BELOW MINIMUM OPERATING POOL ELEVATION OF 733 FEET. THE DATA REPRESENTED IN RED INDICATES MATERIAL BUILDUP ABOVE THE DESIGNED CHANNEL DEPTH.

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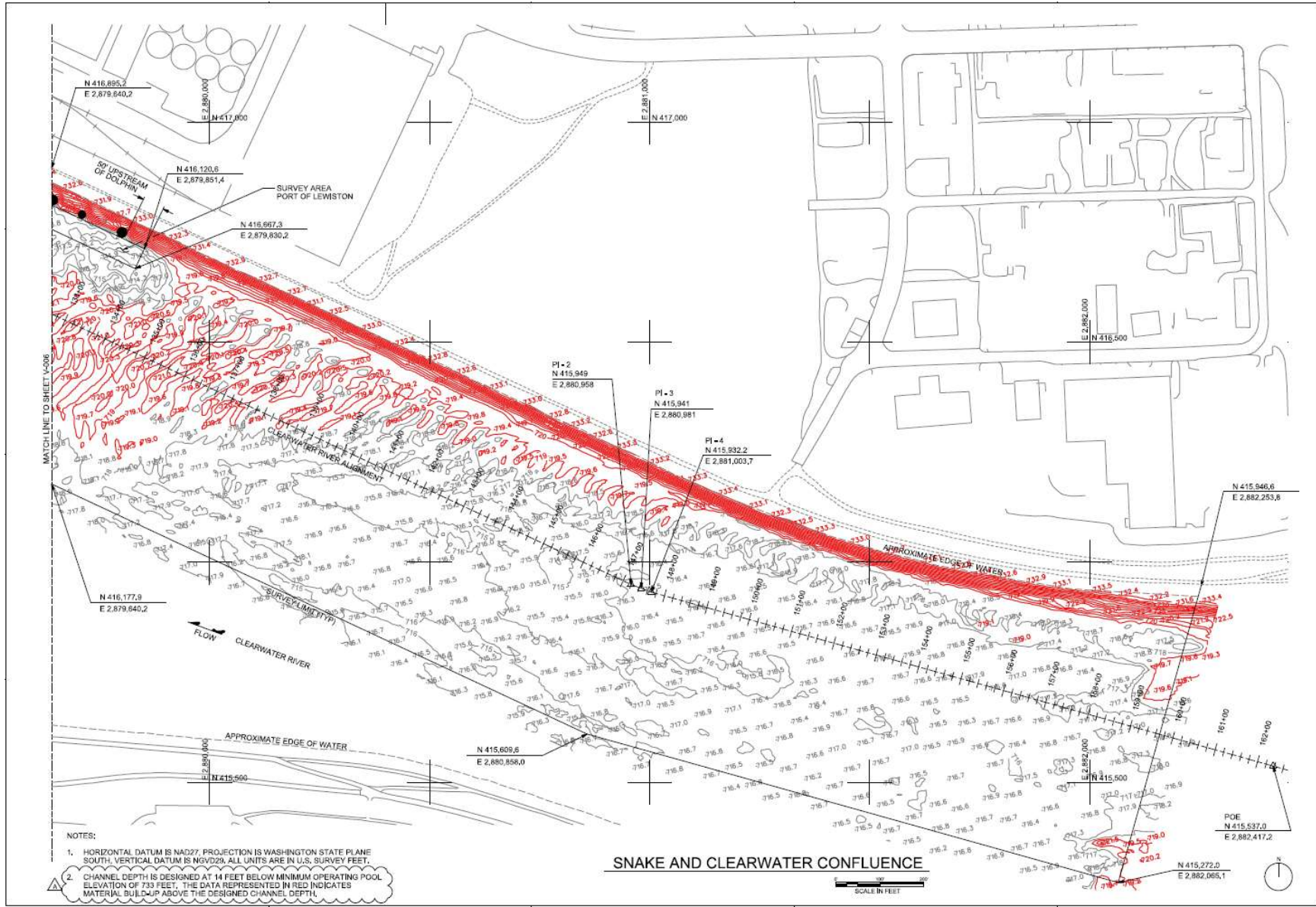
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LOWER GRANITE LOCK AND DAM
 SNAKE AND CLEARWATER RIVERS, WASHINGTON AND IDAHO
 SNAKE RIVER AND CLEARWATER
 RIVER CONFLUENCE
 MULTIBEAM BATHYMETRIC SURVEY

SHEET ID
V-105



MATCH LINE TO SHEET V-096

- NOTES:
- HORIZONTAL DATUM IS NAD27, PROJECTION IS WASHINGTON STATE PLANE SOUTH. VERTICAL DATUM IS NGVD29. ALL UNITS ARE IN U.S. SURVEY FEET.
 - CHANNEL DEPTH IS DESIGNED AT 14 FEET BELOW MINIMUM OPERATING POOL ELEVATION OF 733 FEET. THE DATA REPRESENTED IN RED INDICATES MATERIAL BUILT UP ABOVE THE DESIGNED CHANNEL DEPTH.

SLAKE AND CLEARWATER CONFLUENCE





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LOWER GRANITE LOCK AND DAM
 SNAKE AND CLEARWATER RIVERS, WASHINGTON AND IDAHO
 SNAKE RIVER AND CLEARWATER
 RIVER CONFLUENCE
 MULTIBEAM BATHYMETRIC SURVEY

SHEET ID
V-107

LOWER GRANITE VARIABLE MOP

- 2011-2014 Lower Granite variable MOP
 - Implemented due to impairment of the Federal navigation channel
 - Operating range adjusted based on inflow
 - Balances navigation, flood control, and juvenile fish migration needs

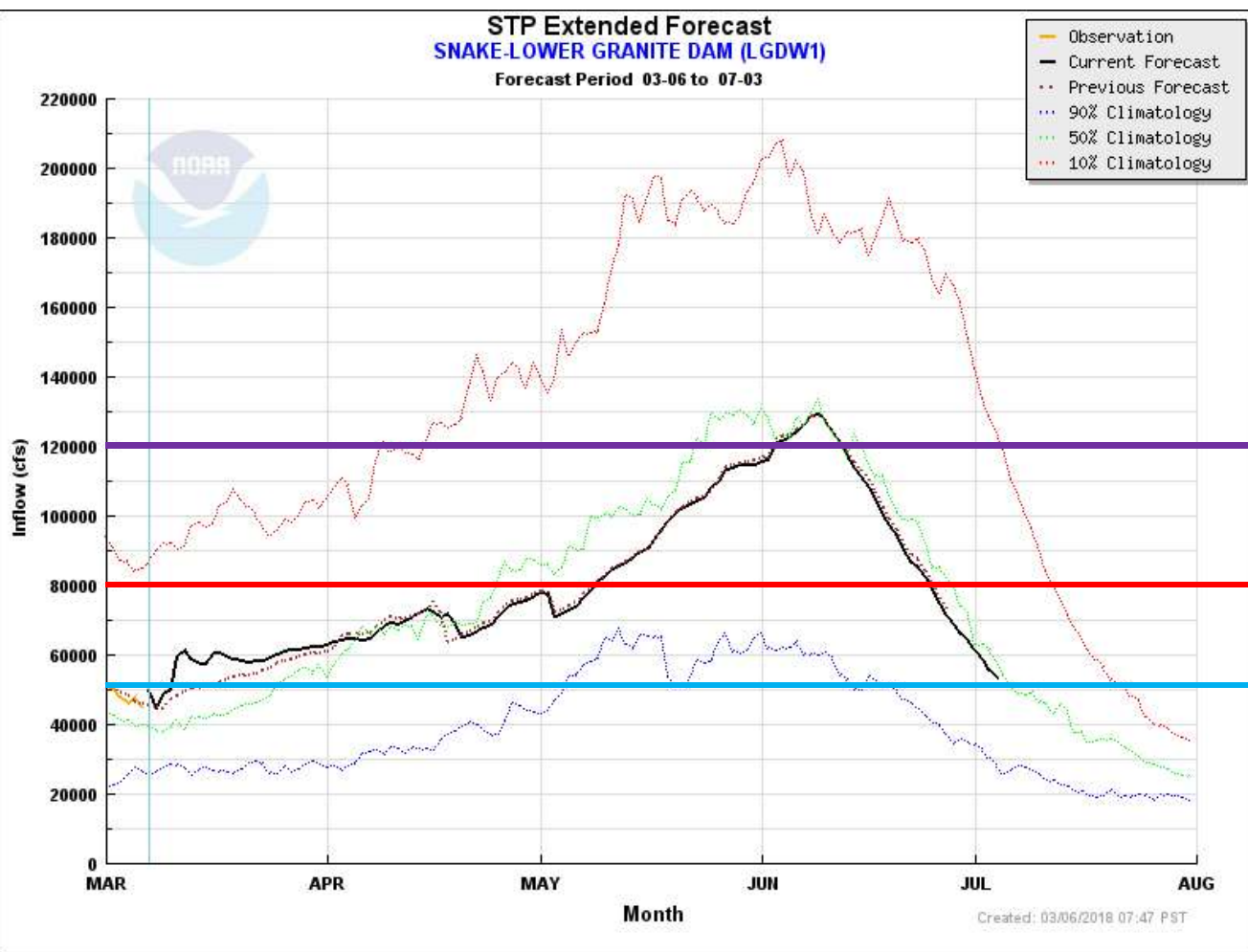
Inflow (kcfs)	Forebay Range (feet)
120+	733.0-734.0 (MOP)
80-120	734.0-735.0 (MOP+1)
50-80	734.5-735.5 (MOP+1.5)
0-50	735.0-736.0 (MOP+2)

- 2018 Lower Granite variable MOP
 - Same inflow and forebay levels as 2011-2014
 - Higher inflows require lower forebay levels
 - Lower inflows require higher forebay levels
 - Determined by day-ahead forecast coordinated in real-time by RCC and BPA
 - Levels may be adjusted in-season for navigation safety



LOWER GRANITE VARIABLE MOP

STP Extended Forecast
 SNAKE-LOWER GRANITE DAM (LGDW1)
 Forecast Period 03-06 to 07-03



733.0-734.0 (MOP)

734.0-735.0 (MOP+1)

734.5-735.5 (MOP+1.5)

735.0-736.0 (MOP+2)



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