601 North Stream Restoration Project
Annual Monitoring Report

Monitoring Year: 2010
Monitoring Year: 3
As-built Date: 2008
NCEEP Project Number: D 06054-A

Submitted to:
NCDENR-Ecosystem Enhancement Program
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1.0 Executive Summary

This Annual Monitoring Report documents the results of monitoring activities during the 2010 (MY3) growing season on the 601 North Stream Restoration Project. Construction of the site, including planting of trees, was completed in March 2008. The 2010 data documents results from the third year of geomorphic and vegetation monitoring at the site.

The design of the 601 North Stream Restoration Project involved a major stream restoration. After construction, it was determined that the project generated 3,036 feet of stream restoration. The As-Built Survey is included as Appendix B.

This Annual Monitoring Report presents data from three vegetation monitoring plots, one crest gauge, one rain gauge, six cross sections, approximately 3,000 linear feet of profile survey and photographic reference locations, as specified in the approved Restoration Plan for the site.

A manual rain gauge was used in conjunction with the onsite automatic rain gauge to validate precipitation data. Although dryer conditions developed during the second and third quarters, the entire monitoring year had normal rainfall at this site.

The 2010 vegetation monitoring documented the surviving planted stem density for the plots between 323 and 566 stems per acre. The average density was 459 stems per acre. This represents a survival rate of approximately 76% based on a baseline density of 608 stems per acre. The initial vegetative success criteria of 360 stems per acre at the end of three years was achieved. The site is on track to achieve the final vegetative success criteria of 260 five-year-old planted stems surviving per acre at the end of five years of monitoring.

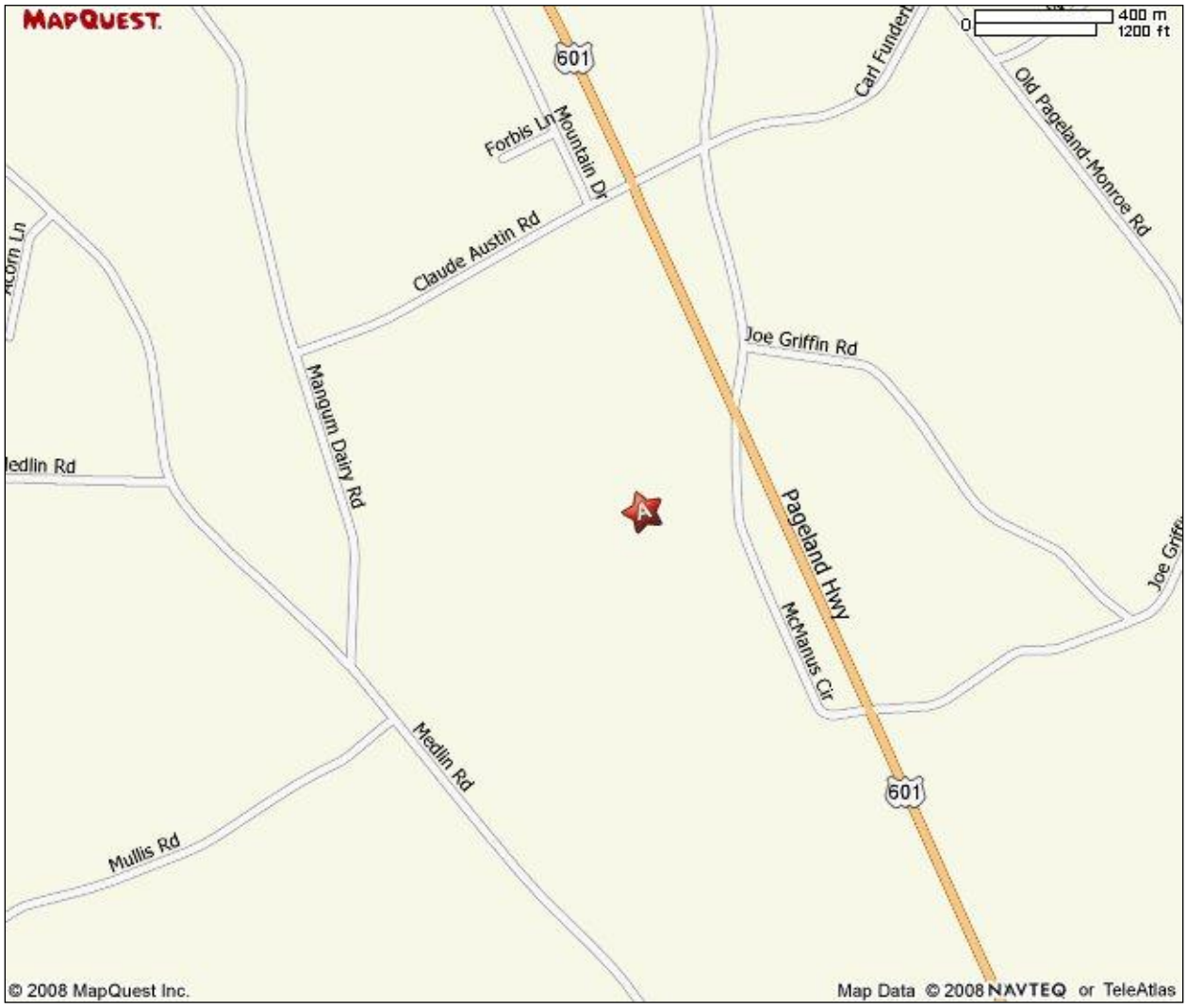
Two bankfull events were recorded in March and May. The restored stream channel has remained stable in the priority I section and is providing the intended habitat and hydrologic functions. Some minor problem areas mainly due to erosion and lack of vegetation were identified in MY2 around the beginning of the priority II section near station 119+50 and extending to the end of the project. Some of these problems are reduced with the growth of vegetation as evidenced in the Appendix D Photos. All monitored cross sections and the longitudinal profile for 2010 display very little adjustment in stream dimension.

2.0 Introduction

2.1 Project Description

The 601 North site is located approximately 10 miles south of Monroe in Union County (see Figure 1). The property is located off of McManus Circle, SR 2110, from Pageland Highway/US Hwy 601 South. The property is accessed by a gravel farm road off McManus Circle.

Figure 1 – 601 North Location Map



The project is a restoration of approximately 3,000 linear feet of unnamed tributary to Wicker Branch in the Yadkin Pee-Dee River Basin. The project is made up of an upper and lower section of UT, referred to as Reach 1 for monitoring. Reach 1 stationing is summarized in Table

1. The 601 North site has a drainage area of 0.23 mi^2 in the upper section and 0.3 mi^2 in the lower section. The dominant historic land use was originally timber production followed by intensive agricultural production of crops including corn, soybeans, and winter wheat. The channel was straightened and channelized for agricultural purposes. This led to an incised condition with little to no floodplain access.

Table 1 – 601 North Monitoring Reaches

Reach Name	As-Built Length (ft)	Monitoring Stations	Restoration Approach
UT/Reach 1	3,036	100+21 – 130+31	Restoration (Priority I/II)
Total	3,036	3,010	

2.2 Project Objectives

The 601 North site was identified by EBX to support the NC EEP full delivery mitigation process. The objective of the project was to produce a minimum of 3,000 stream mitigation units (SMU) to NC EEP through the full delivery process in the Yadkin Pee-Dee River 03040105 hydrologic unit.

Due to the incised condition of the channel and lack of access to the floodplain, the existing channel was abandoned and a Priority I Natural Channel Design approach was selected for the majority of the project. The last 1,000 feet of the project utilizes some Priority II approaches to create a lower elevation flood plain in order to meet the required elevations at the confluence with Wicker Branch. Given the valley type VIII drainage, a C4 channel was chosen as the design channel. Due to the coarseness of the native bed material, few structures were utilized in the design.

Monitoring of the 601 North site is required to demonstrate successful mitigation based on the success criteria specified in the Restoration Plan. Stream and vegetation monitoring are conducted on an annual basis. This Annual Monitoring Report documents the results of the monitoring for 2010 (MY3).

The as-built data documented 3,036 linear feet of stream restoration. The stream restoration will provide multiple ecological and water quality benefits within the Yadkin Pee-Dee River Basin. Those benefits are as follows:

Hydrology:

- Re-establishing floodplain connection by raising bed elevations
- Increase flood storage by re-establishing floodplain

Water Quality:

- Reducing turbidity by reducing sediment inputs
- Reducing water temperatures by providing shading
- Increasing/ stabilizing oxygen levels by reducing BOD/COD and increasing re-oxygenating turbulence

Habitat:

- Improve bed habitat by increasing riffle-pool diversity, reducing sediment deposition, and improving low flow water depths
- Improve bank habitat by increasing stability and woody biomass
- Improve floodplain habitat by establishing micro-topography and hydrology, removing invasive vegetation, and increasing habitat diversity
- Improve food web dynamics by adding biomass (such as detritus, wood debris, and leaf matter) and re-establishing floodplain connection

2.3 Project History

This project was identified by EBX in the winter of 2006.

Table 2 – 601 North Site History

Project Activity and Reporting History		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	February 2007	April 2007
Final Design - 90%	N/A	July 2007
Construction	N/A	February 2008
Temporary S&E mix applied to entire project area	N/A	February 2008
Permanent seed mix applied to reach	N/A	February 2008
Bare roots and live stakes	N/A	March 2008
Mitigation Plan / As-built (Monitoring Baseline)	March 2008	June 2008
Year 1 Monitoring	March 2009	March 2009
Year 2 Monitoring	October 2009	December 2009
Year 3 Monitoring	October 2010	December 2010
Year 4 Monitoring	September 2011	-
Year 5 Monitoring	September 2012	-

3.0 Project Condition and Monitoring Results

3.1 Vegetation Assessment

3.1.1 Vegetation Success Criteria

Successful establishment of vegetation in riparian areas will be the survival of 260 planted stems following Year 5 monitoring. The interim vegetative success criteria will be the survival of at least 320 planted stems per acre at the end of Year 3 monitoring. Up to 20% of the site species composition may be comprised of volunteers. Remedial action may be required should volunteers present a problem or exceed 20% composition.

A digital image photo log will be used to subjectively evaluate the restoration site over time. A series of images over the five year monitoring period should demonstrate maturation of planted vegetation and volunteer species.

3.1.2 Description of Vegetation Monitoring

Three semi-permanent vegetation plots were established within the planted restoration areas to monitor the success of planted vegetation. The vegetation plots are 0.01 hectares in size. The vegetation plots are distributed across the site, but the precise location and orientation of the plots was random (see location on as-built drawings.) The plots cover approximately two percent of the site. Seven species were planted on site (see Table 3).

Table 3 – 601 North Planted Species

Common Name	Scientific Name	Abbreviations
Paw Paw	Asimina triloba	AT
River Birch	Betula nigra	BN
Shag Bark Hickory	Carya ovate	CO
Green Ash	Fraxinus pennsylvanica	FP
Swamp Chestnut Oak	Quercus michauxii	QM
Water Oak	Quercus nigra	QN
Willow Oak	Quercus phellos	QP

Each of the planted stems inside the plots was flagged to help in locating them in the future.

The taxonomic standard for vegetation used in this report was based on "Manual of the Vascular of the Carolinas", by Albert E Radford et al. The vegetation monitoring protocol used for collecting vegetation data was established for this project in 2000 by the Wetland Restoration Program (WRP) and Karen Hall of NCSU.

3.1.3 Results of Vegetation Monitoring

601 North is now almost dominated by forbs. Again, Goldenrod is the dominate forb species found with much of the vegetation head high or above. Stream banks here are also better vegetated now with less exposed areas of soil and less erosion. No water was flowing at the time of the visit. The farm field adjacent to N1 has encroached to within about 3 feet of one plot corner. Minor impacts by animals and no vandalism was observed during this visit.

Original planting density, based on the three 0.01 hectare plots, (100 square meters) was 608 stems per acre. The current density is 459 stems per acre which represents a survival rate of approximately 76%. The planted stems in the monitoring plots ranged from 323 to 566 stems per acre. This site has met the interim success criteria of 360 stems per acre after three years and is on track to meet the final criteria of 260 stems per acre after five years.

Table 4 - Baseline Stem Counts

Baseline Data									
May 2008									
Plot	PLANTED SPECIES								
	AT	BN	CO	FP	QM	QN	QP	Q	PLANTED STEMS
N1		2		9	1	2			14
N2	2	3	2	2	1	2	1	1	14
N3		4		3	5		3	2	17
TOTALS	2	9	2	14	7	4	4	3	45
Percents	0.044	0.200	0.044	0.311	0.156	0.089	0.089	0.067	1.000

Table 5 – MY3 (2010) Stem Counts

October 2010 (MY3)									
Plot	PLANTED SPECIES								LIVE
	AT	BN	CO	FP	QM	QN	QP	Q	PLANTED STEMS
N1		2		9		1			12
N2		3		2	1	1	1		8
N3		4		3	5		2		14
TOTALS	0	9	0	14	6	2	3	0	34
Percents	0.000	0.265	0.000	0.412	0.176	0.059	0.088	0.000	1.000

Table 6 - Baseline Stems per Acre

Monitoring Plots Baseline Data					
May 2008					
Plot	**Trees**	**Plot size**	**Plot size**	**Plot size**	**Stems**
	n_i	m^2	ft^2	acre	**per acre**
N1	14	100	1076	0.0247	566
N2	14	100	1076	0.0247	566
N3	17	100	1076	0.0247	688
Totals:	45	300	3228	0.074	
Stems per plot	15			Average	608

Table 7 – MY3 (2010) Stems per Acre

Fall Monitoring Data					
October 2010					
Plot	**Trees**	**Plot size**	**Trees**	**Percent**	**Stems**
	n_i	m^2	**Loss**	**Loss**	**per acre**
N1	12	100	0	0.000	485
N2	8	100	0	0.000	323
N3	14	100	0	0.000	566
Totals:	34	300	0	0.000	
Stems per plot	11.33333			Average	459

3.2 Stream Assessment

3.2.1 Stream Success Criteria

As stated in the approved Mitigation Plan, the stream restoration criteria for the site includes the following:

Bankfull Events: A minimum of two bankfull flow events must be documented within the five-year monitoring period.

Cross-Sections: There should be little change in as-built cross sections. Cross sections shall be classified using the Rosgen stream classification method and all monitored cross-sections should fall within the quantitative parameters defined for C type channel.

Longitudinal Profiles: The longitudinal profiles should show that the bedform features are remaining stable, e.g. they are not aggrading or degrading. Bedforms observed should be consistent with those observed in C type channels.

Photo Reference Stations: Photographs will be used to subjectively evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation and effectiveness of erosion control measures.

3.2.2 Stream Morphology Monitoring Plan

Stream monitoring will document the stability of the restored channel. Monitoring will occur for 5 years or until the final success criteria have been achieved, whichever is longer. Monitoring methods used are based on US Army Corps of Engineering guidance documents and NC Division of Water Quality guidance documents.

Cross Sections

Two permanent cross sections, one at a riffle and one at a pool were installed for every 1,000 linear feet of restored stream. Each cross section was marked with permanent pins on both banks. Each cross section is tied to a benchmark to allow for comparison for data each year. The cross section survey takes into account water surface and all breaks in slope including thalweg, top of bank, and bankfull if present.

Longitudinal Profile

Longitudinal profile is surveyed once every year for five years or until the final success criteria are met. The longitudinal survey will include thalweg, water surface, bankfull and top of bank. Each survey point will occur at the head, midpoint, and end of each feature and the invert of each structure. The survey will be tied to a permanent benchmark.

Hydrology
Bankfull events will be monitored for the length of the monitoring period. One crest gauge is installed on site to capture bankfull events. Photographs of high water marks, wrack lines and sediment deposition will also be used to document these events.

Photo Reference Stations
Photographs will be taken at the same locations each year for the length of the monitoring period. These photos will document the progression of the site from year to year.

3.2.3 Stream Morphology Monitoring Results

Stream conditions are stable. Banks were stabilized with woven coir matting that provides stabilization until the vegetation is thoroughly established. Base flow was not present during the survey. Stream features including pools and riffles are remaining stable. There are 2 structures within the monitoring reaches. All structures appear to be stable. Constructed riffles are holding grade with no down cutting or headcuts observed.

Cross Sections
The survey data was collected in September 2010, and the results are presented in Appendix C. Cross sections appear to be stable.

Longitudinal Profile
The longitudinal profile survey was conducted in September 2010, and the results are presented in Appendix C. The profile survey showed little change in channel dimensions or profile.

Hydrology
Five bankfull events were documented during this year of monitoring by a crest gauge. The bankfull events were recorded in November 2009, December 2009, February 2010, May 2010 and June 2010 at stages of 0.50 ft., 0.74 ft., 0.78 ft., 0.14 ft. and 0.35 ft above bankfull, respectively

3.2.4 Problem Areas

There were nine problem areas identified from MY (2009) in the priority II section. These problem areas were all minor bank erosion issues. Four of these identified areas are resolving themselves with the resumption of normal rainfall which has improved the vegetative cover. The remaining five areas are stable but vegetative recovery is slower due to soil conditions. Vegetative assessment with possible supplemental seeding will be undertaken in 2011. This should allow the areas to repair themselves during the next growing season. A new tenth problem area (PA10) was located at station 119+24 where the top of bank is eroding outside the

coir matting. Additional matting and vegetative replanting is recommended here as well. No bank re-grading is required at present.

Table 8 - 601 North MY3 Problem Areas

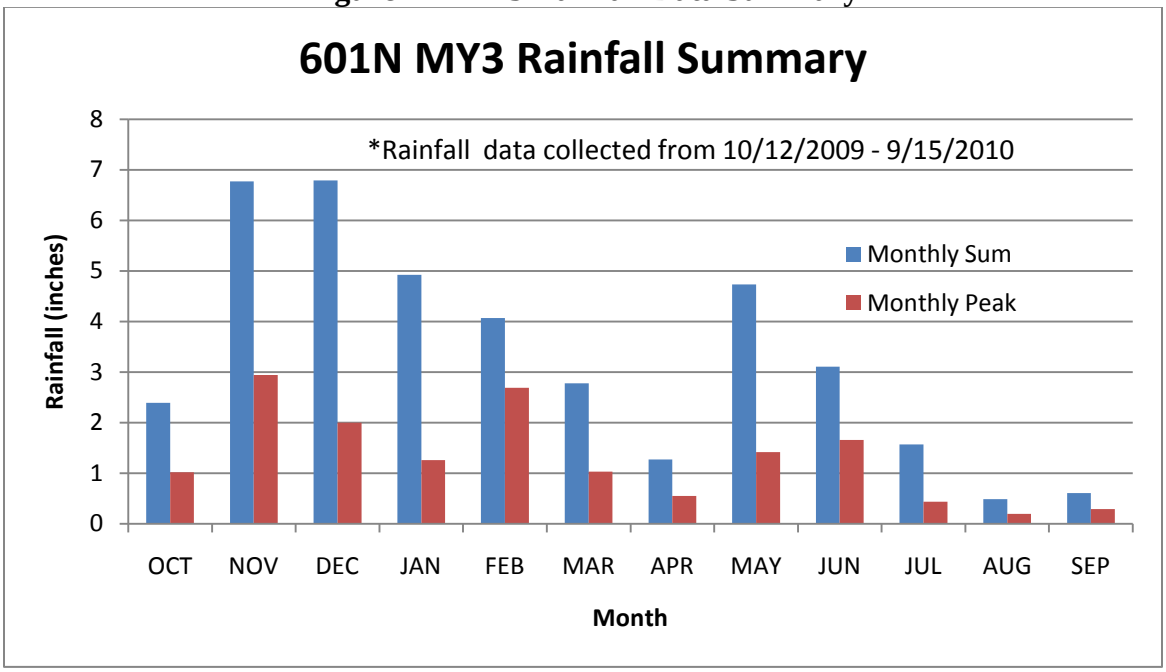
ID	Year Identified	Station	Description/ recommendation	Photo Number[1]
PA1	MY2	130+42 –130+62	Corrected	Problem Area Photo 1
PA2	MY2	130+00 –130+75	Replant	Problem Area Photo 2
PA3	MY2	129+49 –129+76	Replant	Problem Area Photo 3
PA4	MY2	128+72 – 129+39	Corrected	Problem Area Photo 4
PA5	MY2	128+12 – 128+65	Corrected	Problem Area Photo 5
PA6	MY2	127+50 – 127+94	Replant	Problem Area Photo 6
PA7	MY2	126+70 – 127+24	Corrected	Problem Area Photo 7
PA8	MY2	125+20 – 125+58	Replant	Problem Area Photo 8
PA9	MY2	121+50 –122+11	Replant	Problem Area Photo 9
PA10	MY3	119+24 – 119+61	Bank Erosion	Problem Area Photo 10

[1] See Appendix D.

3.3 Rainfall Data

Rainfall data is collected by an automated rain gauge and confirmed with a manual rain gauge. Rainfall data shows that normal rainfall occurred throughout the monitoring period. The average monthly peak for the 2010 monitoring period was 1.29 inches with a maximum of 2.94 inches occurring in November. The average monthly sum was 3.29 inches with a maximum of 6.79 inches occurring in December. Complete rainfall data is shown in Appendix F.

Figure 2 - MY3 Rainfall Data Summary



4.0 Conclusions

Overall stream dimension, pattern, and profile are stable with only minor erosional problem areas. Drought conditions that threatened vegetation in 2008 have eased, and riparian vegetation is flourishing. The entire channel was dry during data collection. All stream structures appear stable and properly functional. Overall, the site is on track to achieve the stream stability and vegetative success criteria specified in the Restoration Plan. Monitoring will continue through 2012.

Appendix A – As Built Survey

Appendix B – MY2 Survey

Figure B 1 - 601 North Reach 1 Sheet 1

Figure B 2 - 601 North Reach 1 Sheet 2

Appendix C – Profile, Cross Sections, and Pebble Counts

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Figure C 1 - R1 RXS-1 Cross Section Plot

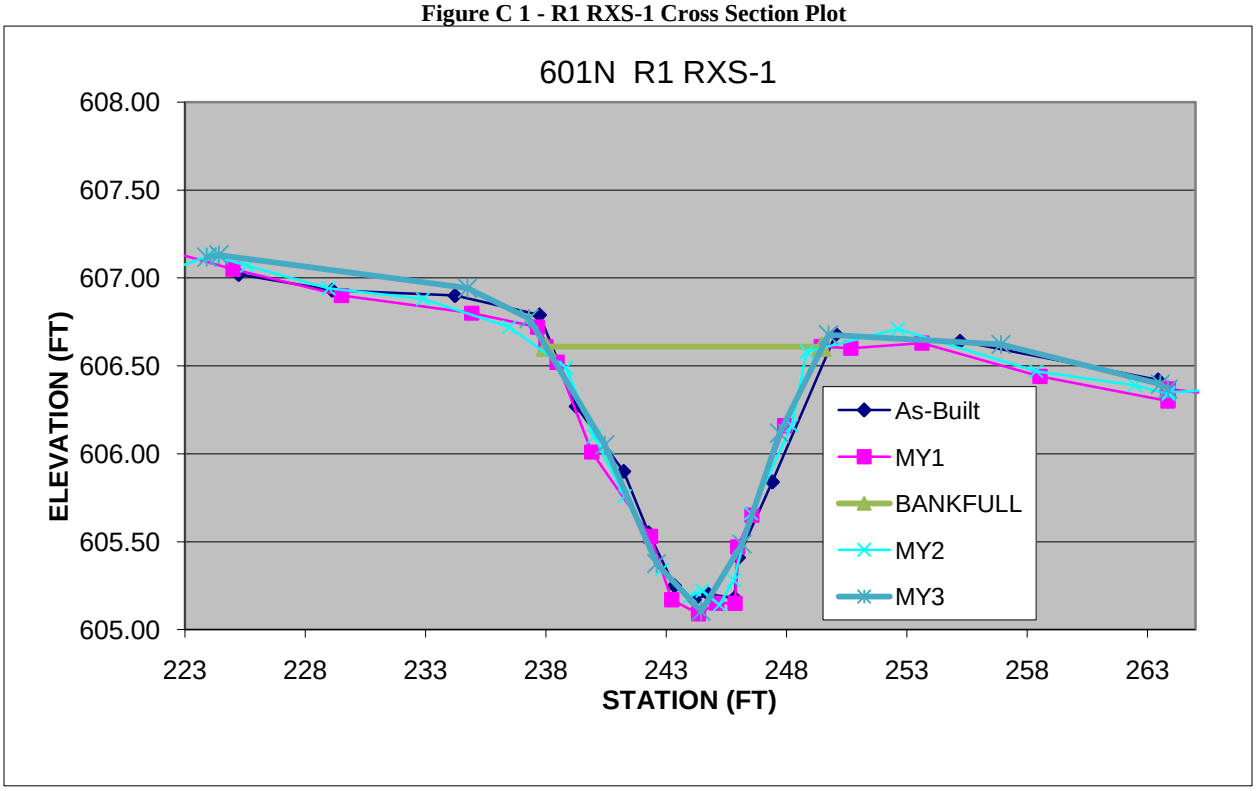


Table C 1 - R1 RXS-1 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
225.23	607.02	r1rxs1	19.5	613.62	RXS1	222.87	607.07	(XS)	223.91	607.118	L pin						
229.12	606.93	r1rxs1	21.16	613.79	RXS1	224.08	607.13	(PL)	224.41	607.131	Ground						
234.22	606.9	r1rxs1tob	40.93	612.91	RXS1	225.58	607.07	(XS)	234.74	606.942	Ground						
237.73	606.79	r1rxs1	60.81	611.9	RXS1	228.97	606.94	(XS)	237.3	606.769	Ground						
239.26	606.27	r1rxs1	79.02	610.99	RXS1	232.89	606.88	(XS)	240.45	606.051	Ground						
241.23	605.9	r1rxs1	97.46	609.58	RXS1	236.49	606.72	(XS)	242.6	605.376	Ground						
242.27	605.55	r1rxs1tos	116.64	609.08	RXS1	238.84	606.49	(XS)	244.45	605.105	Ground						
243.34	605.25	r1rxs1	135.42	608.38	RXS1	240.01	606.1	(XS)	246.15	605.486	Ground						
244.16	605.17	r1rxs1	151.49	607.79	RXS1	241.28	605.76	(XS)	247.71	606.117	Ground						
244.76	605.2	r1rxs1	164.76	607.75	RXS1	242.82	605.34	(XS)	249.75	606.676	Ground						
245.84	605.18	r1rxs1	175.55	607.16	RXS1	244	605.19	(XS)	256.91	606.622	Ground						
246	605.41	r1rxs1tos	185.58	607.07	RXS1	244.5	605.22	(XS)	263.54	606.397	Ground						
247.41	605.84	r1rxs1	189.68	606.31	RXS1	245.21	605.14	(XS)	263.85	606.367	R pin						
250.05	606.68	r1rxs1tob	192.92	605.89	RXS1	245.81	605.28	(XS)									
255.21	606.64	r1rxs1	195.61	606.01	RXS1	246.53	605.66	(XS)									
263.44	606.42	r1rxs1	198.29	606.32	RXS1	248.21	606.16	(XS)									
			201.53	607.09	RXS1	248.84	606.58	(XS)									
			217.66	607.33	RXS1	252.63	606.71	(XS)									
			225	607.05	RXS1	258.38	606.47	(XS)									
			229.5	606.9	RXS1	262.47	606.39	(XS)									
			234.92	606.8	RXS1	263.87	606.34	(XS)									
			237.65	606.72	RXS1	263.89	606.35	(PR)									
			238.47	606.52	RXS1	265.43	606.36	(XS)									
			239.9	606.01	RXS1	268.61	606.31	(XS)									
			242.35	605.53	RXS1	272.71	606.08	(XS)									
			243.23	605.17	RXS1	285.22	605.99	(XS)									
			244.35	605.09	RXS1	302.13	606.21	(XS)									
			245.1	605.15	RXS1	316.6	606.05	(XS)									
			245.86	605.15	RXS1												
			245.97	605.47	RXS1												
			246.56	605.65	RXS1												
			247.92	606.16	RXS1												
			249.45	606.61	RXS1												
			250.68	606.6	RXS1												
			253.63	606.63	RXS1												
			258.54	606.44	RXS1												
			263.86	606.3	RXS1												
			263.87	606.37	RXS1PR												
			269.75	606.27	RXS1												
			269.91	606.26	RXS1												
			277.62	606.11	RXS1												
			290.36	606.16	RXS1												
			290.54	606.16	RXS1												
			299.79	606.13	RXS1												
			310.54	606.04	RXS1												
			318.2	606.15	RXS1												
			326.26	606.25	RXS1												
			333.62	606.43	RXS1												
			341.01	606.39	RXS1												
			352.16	606.53	RXS1												
			359.63	606.69	RXS1												
			364.26	606.76	RXS1												
			376.28	607.56	RXS1												
			389.13	608.51	RXS1												
			401.27	609.79	RXS1												
			412.86	610.99	RXS1												
			424.34	612.3	RXS1												
			436.14	613.58	RXS1												
			448.82	614.94	RXS1												
			458.18	615.85	RXS1												
			465.83	616.43	RXS1												

Bankfull Width (ft)	12.3		Bankfull Width (ft)	10.98		Bankfull Width (ft)	11.72		Bankfull Width (ft)	10.41		Bankfull Width (ft)			Bankfull Width (ft)		
Bankfull Cross Sectional Area (sq ft)	11.6		Bankfull Cross Sectional Area (sq ft)	9.62		Bankfull Cross Sectional Area (sq ft)	9.17		Bankfull Cross Sectional Area (sq ft)	9.02		Bankfull Cross Sectional Area (sq ft)			Bankfull Cross Sectional Area (sq ft)		
Bankfull Mean Depth (ft)	0.94		Bankfull Mean Depth (ft)	0.88		Bankfull Mean Depth (ft)	0.78		Bankfull Mean Depth (ft)	0.87		Bankfull Mean Depth (ft)			Bankfull Mean Depth (ft)		
Bankfull Max Depth (ft)	1.51		Bankfull Max Depth (ft)	1.52		Bankfull Max Depth (ft)	1.58		Bankfull Max Depth (ft)	1.57		Bankfull Max Depth (ft)			Bankfull Max Depth (ft)		
Flood Prone Width (ft)	>100		Flood Prone Width (ft)	135.4		Flood Prone Width (ft)	135.4		Flood Prone Width (ft)	135.4		Flood Prone Width (ft)			Flood Prone Width (ft)		
Entrenchment Ratio (ft/ft)	>8.1		Entrenchment Ratio (ft/ft)	14		Entrenchment Ratio (ft/ft)	14		Entrenchment Ratio (ft/ft)	13		Entrenchment Ratio (ft/ft)			Entrenchment Ratio (ft/ft)		
Width/Depth Ratio (ft/ft)	13.05		Width/Depth Ratio (ft/ft)	12.5		Width/Depth Ratio (ft/ft)	14.98		Width/Depth Ratio (ft/ft)	12.01		Width/Depth Ratio (ft/ft)			Width/Depth Ratio (ft/ft)		
D50 (mm)	14.91		D50 (mm)	13.39		D50 (mm)	13.6		D50 (mm)	17.56		D50 (mm)			D50 (mm)		
D84 (mm)	39.77		D84 (mm)	32.0		D84 (mm)	20.7		D84 (mm)	45.0		D84 (mm)			D84 (mm)		

601 North R1 PXS-1

Photo C 4 - R1 PXS-1 Left Pin

Photo C 5 - R1 PXS-1 Right Pin

Photo C 6 - R1 PXS-1 Downstream

Figure C 2 - R1 PXS-1 Cross Section Plot

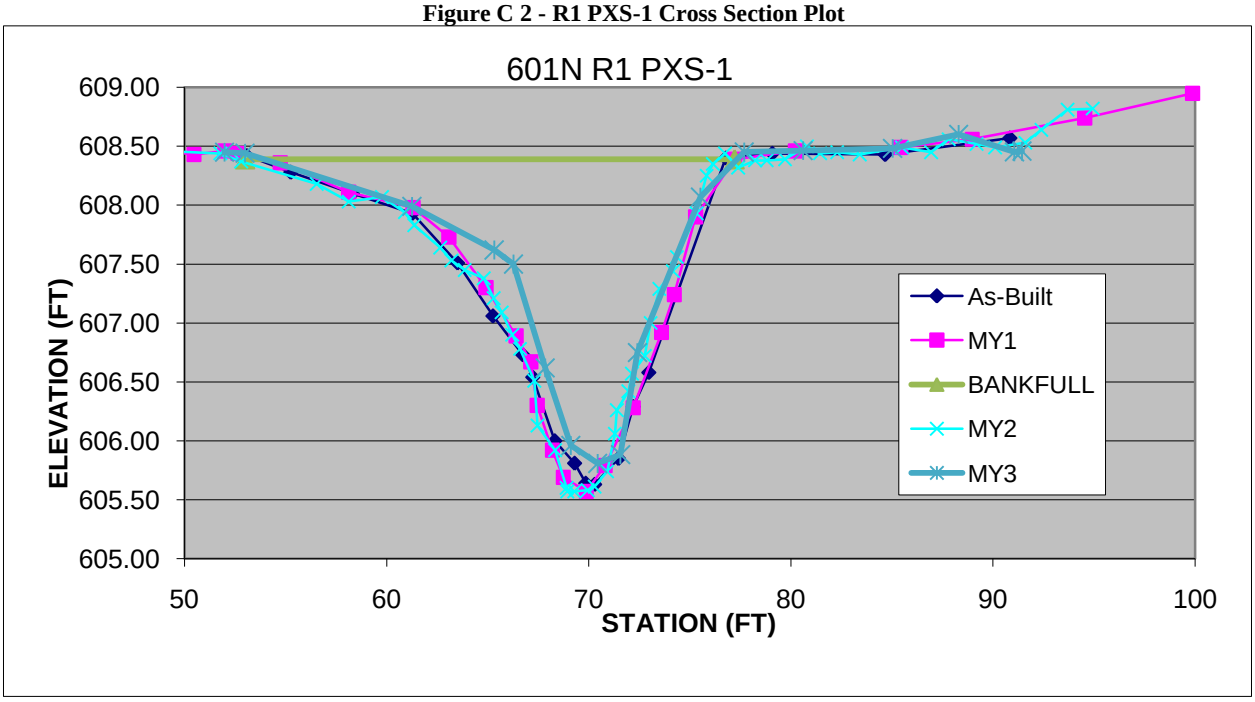


Table C 2 - R1 PXS-1 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
53.09	608.42	r1pxs1	12.96	609.51	PXS1	1.19	609.61	PXS1	51.98	608.449	L pin						
55.26	608.28	r1pxs1	20.84	608.88	PXS1	8.14	609.64	PXS1	52.99	608.442	Ground						
58.31	608.1	r1pxs1	29.15	608.78	PXS1	12.2	609.48	PXS1	61.25	607.991	Ground						
61.27	607.93	r1pxs1tob	38.4	608.59	PXS1	16.17	609.25	PXS1	65.32	607.62	Ground						
63.51	607.51	r1pxs1	45.25	608.53	PXS1	20.69	608.91	PXS1	66.28	607.5	Ground						
65.26	607.06	r1pxs1	50.47	608.43	PXS1	25.16	608.85	PXS1	67.84	606.619	Ground						
66.74	606.73	r1pxs1	51.99	608.46	XS1PL	31.01	608.8	XS1PL	69.11	605.96	Ground						
67.23	606.54	r1pxs1tos	52.65	608.44	PXS1	33.91	608.62	PXS1	70.44	605.808	Ground						
68.32	606	r1pxs1	54.73	608.36	PXS1	37.32	608.55	PXS1	71.57	605.882	Ground						
69.3	605.81	r1pxs1	58.12	608.11	PXS1	39.48	608.54	PXS1	72.41	606.749	Ground						
69.85	605.64	r1pxs1	61.31	607.98	PXS1	43.41	608.44	PXS1	75.52	608.07	Ground						
70.29	605.63	r1pxs1	63.08	607.73	PXS1	46.99	608.52	PXS1	77.69	608.451	Ground						
71.47	605.85	r1pxs1	64.91	607.3	PXS1	49	608.46	PXS1	80.6	608.464	Ground						
72.2	606.29	r1pxs1	66.4	606.89	PXS1	51.77	608.44	PXS1	85.03	608.482	Ground						
72.97	606.58	r1pxs1tos	67.13	606.67	PXS1	52.8	608.37	PXS1	88.3	608.602	Ground						
76.78	608.4	r1pxs1tob	67.45	606.3	PXS1	56.54	608.18	PXS1	91.06	608.452	Ground						
79.08	608.44	r1pxs1	68.2	605.92	PXS1	58.12	608.03	PXS1	91.43	608.459	R pin						
84.66	608.43	r1pxs1	68.74	605.69	PXS1	59.77	608.07	PXS1									
90.83	608.57	r1pxs1	69.88	605.57	PXS1	60.9	607.94	PXS1									
			70.8	605.79	PXS1	61.37	607.83	PXS1									
			72.2	606.28	PXS1	62.65	607.64	PXS1									
			73.6	606.92	PXS1	63.21	607.53	PXS1									
			74.23	607.24	PXS1	63.86	607.45	PXS1									
			75.29	607.9	PXS1	64.8	607.38	PXS1									
			77.22	608.39	PXS1	65.3	607.21	PXS1									
			80.23	608.46	PXS1	65.69	607.09	PXS1									
			85.43	608.49	PXS1	66.21	606.9	PXS1									
			88.97	608.56	PXS1	66.6	606.78	PXS1									
			94.54	608.74	PXS1	67.31	606.51	PXS1									
			99.87	608.95	PXS1	67.46	606.13	PXS1									
			106.73	608.95	PXS1	68.33	605.92	PXS1									
			115.9	609.28	PXS1	68.91	605.6	PXS1									
			128.59	610.92	PXS1	68.94	605.57	PXS1									
			137.66	612.28	PXS1	69.28	605.57	PXS1									
						69.95	605.58	PXS1									
						70.29	605.61	PXS1									
						70.91	605.74	PXS1									
						71.29	606.06	PXS1									
						71.39	606.26	PXS1									
						71.96	606.42	PXS1									
						72.13	606.57	PXS1									
						72.77	606.72	PXS1									
						73.06	607	PXS1									
						73.49	607.29	PXS1									
						74.16	607.44	PXS1									
						74.36	607.56	PXS1									
						75.33	607.93	PXS1									
						75.83	608.25	PXS1									
						76.14	608.35	PXS1									
						76.74	608.44	PXS1									
						77.39	608.32	PXS1									
						78.23	608.38	PXS1									
						78.81	608.38	PXS1									
						79.71	608.39	PXS1									
						80.79	608.5	PXS1									
						81.44	608.44	PXS1									
						82.29	608.45	PXS1									
						83.41	608.43	PXS1									
						85.5	608.49	PXS1									
						86.94	608.45	PXS1									
						87.81	608.56	PXS1									
						89.19	608.52	PXS1									

Bankfull Width (ft)	23.7		Bankfull Width (ft)	24.22		Bankfull Width (ft)	26.01		Bankfull Width (ft)	22.53		Bankfull Width (ft)			Bankfull Width (ft)		
Bankfull Cross Sectional Area (sq ft)	25.7		Bankfull Cross Sectional Area (sq ft)	24.6		Bankfull Cross Sectional Area (sq ft)	24.43		Bankfull Cross Sectional Area (sq ft)	20.63		Bankfull Cross Sectional Area (sq ft)			Bankfull Cross Sectional Area (sq ft)		
Bankfull Mean Depth (ft)	1.09		Bankfull Mean Depth (ft)	1.02		Bankfull Mean Depth (ft)	0.94		Bankfull Mean Depth (ft)	0.92		Bankfull Mean Depth (ft)			Bankfull Mean Depth (ft)		
Bankfull Max Depth (ft)	2.77		Bankfull Max Depth (ft)	2.8		Bankfull Max Depth (ft)	2.8		Bankfull Max Depth (ft)	2.3		Bankfull Max Depth (ft)			Bankfull Max Depth (ft)		
Flood Prone Width (ft)	>100		Flood Prone Width (ft)	-		Flood Prone Width (ft)	-		Flood Prone Width (ft)	-		Flood Prone Width (ft)			Flood Prone Width (ft)		
Entrenchment Ratio (ft/ft)	>4.2		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)			Entrenchment Ratio (ft/ft)		
Width/Depth Ratio (ft/ft)	21.7		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)			Width/Depth Ratio (ft/ft)		
D50 (mm)	11.0		D50 (mm)	0.06		D50 (mm)	0.06		D50 (mm)	0.06		D50 (mm)			D50 (mm)		
D84 (mm)	26.13		D84 (mm)	5.13		D84 (mm)	0.06		D84 (mm)	0.06		D84 (mm)			D84 (mm)		

601 North R1 RXS-2

Photo C 7 – R1 RXS-2 Left Pin

Photo C 8 – R1 RXS-2 Right Pin

Photo C 9 – R1 RXS-2 Downstream

Figure C 3 – R1 RXS-2 Cross Section Plot

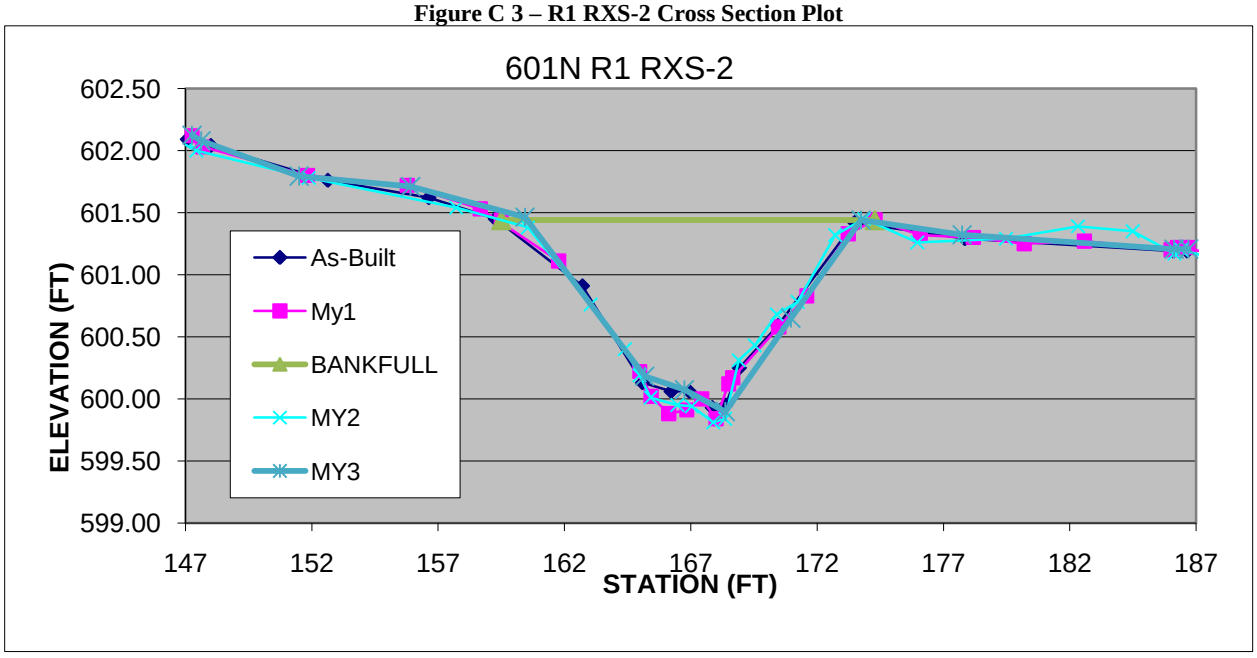


Table C 3 - R1 RXS-2 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
147.07	602.09	(r1rxs2l	18.55	610.81	(RXS2	135.29	602.46	(XS) XS	147.26	602.123	L pin						
148	602.04	(r1rxs2	33.41	609.76	(RXS2	142.49	602.27	(XS) XS	147.62	602.079	Ground						
152.63	601.76	(r1rxs2	46.47	608.54	(RXS2	146.79	602.07	(XSLP) XSLP	151.5	601.795	Ground						
156.63	601.62	(r1rxs2	59.78	607.42	(RXS2	147.43	602	(XS) XS	155.91	601.711	Ground						
159.26	601.45	(r1rxs2tob	70.38	606.43	(RXS2	151.88	601.78	(XS) XS	160.44	601.463	Ground						
162.71	600.91	(r1rxs2	81.73	605.43	(RXS2	157.72	601.54	(XS) XS	165.18	600.183	Ground						
165.09	600.13	(r1rxs2tos	94.56	604.29	(RXS2	160.55	601.38	(XS) XS	166.75	600.074	Ground						
166.22	600.06	(r1rxs2	100.95	603.72	(RXS2	163.04	600.76	(XS) XS	168.37	599.897	Ground						
166.94	600.06	(r1rxs2	110.72	603.05	(RXS2	164.39	600.4	(XS) XS	170.96	600.649	Ground						
167.85	599.93	(r1rxs2	119.67	602.85	(RXS2	164.97	600.19	(XS) XS	173.74	601.44	Ground						
168.38	599.95	(r1rxs2	130.34	602.62	(RXS2	165.41	600.01	(XS) XS	177.74	601.322	Ground						
168.92	600.25	(r1rxs2tos	138.59	602.33	(RXS2	166.47	599.95	(XS) XS	186.13	601.206	Ground						
170.45	600.59	(r1rxs2	145.71	602.11	(RXS2	167.04	599.94	(XS) XS	186.7	601.207	R pin						
173.49	601.42	(r1rxs2tob	147.26	602.12	(RXS2PL	167.89	599.81	(XS) XS									
177.85	601.29	(r1rxs2	147.68	602.03	(RXS2	168.36	599.84	(XS) XS									
186.1	601.19	(r1rxs2	151.83	601.8	(RXS2	168.9	600.31	(XS) XS									
186.65	601.19	(r1rxs2r	155.78	601.72	(RXS2	169.53	600.43	(XS) XS									
			158.67	601.53	(RXS2	170.4	600.68	(XS) XS									
			161.77	601.11	(RXS2	171.23	600.78	(XS) XS									
			164.98	600.22	(RXS2	172.71	601.32	(XS) XS									
			165.43	600.02	(RXS2	173.86	601.45	(XS) XS									
			166.13	599.88	(RXS2	175.97	601.26	(XS) XS									
			166.84	599.91	(RXS2	179.48	601.29	(XS) XS									
			167.43	600	(RXS2	182.33	601.39	(XS) XS									
			168	599.84	(RXS2	184.49	601.35	(XS) XS									
			168.5	600.12	(RXS2	186.14	601.17	(XS) XS									
			168.66	600.17	(RXS2	186.42	601.2	(XSRP) XSRP									
			170.48	600.58	(RXS2	188.44	601.09	(XS) XS									
			171.59	600.83	(RXS2	191.8	601	(XS) XS									
			173.23	601.33	(RXS2												
			174.28	601.44	(RXS2												
			176.08	601.32	(RXS2												
			178.18	601.3	(RXS2												
			180.2	601.25	(RXS2												
			182.58	601.27	(RXS2												
			186.01	601.2	(RXS2												
			186.26	601.22	(RXS2												
			186.67	601.22	(RXS2PR												
			190.4	600.99	(RXS2												
			193.8	600.8	(RXS2												
			196.14	600.19	(RXS2												
			198.99	599.8	(RXS2												
			201.64	600.04	(RXS2												
			205.37	600.48	(RXS2												
			210.87	601.13	(RXS2												
			215.82	601.53	(RXS2												
			223.34	602.13	(RXS2												
			232.26	602.31	(RXS2												
			245.05	602.43	(RXS2												
			258.91	603.14	(RXS2												
			267.38	603.8	(RXS2												
			280.02	604.81	(RXS2												
			294.93	605.91	(RXS2												
			307.56	606.87	(RXS2												
			321.05	607.41	(RXS2												
			321.24	607.38	(RXS2												
			342.9	608.33	(RXS2												
			364.24	609.38	(RXS2												

Bankfull Width (ft)	14.23		Bankfull Width (ft)	15.6		Bankfull Width (ft)	13.31		Bankfull Width (ft)	13.3		Bankfull Width (ft)			Bankfull Width (ft)		
Bankfull Cross Sectional Area (sq ft)	11.3		Bankfull Cross Sectional Area (sq ft)	11.8		Bankfull Cross Sectional Area (sq ft)	11.42		Bankfull Cross Sectional Area (sq ft)	11.7		Bankfull Cross Sectional Area (sq ft)			Bankfull Cross Sectional Area (sq ft)		
Bankfull Mean Depth (ft)	0.8		Bankfull Mean Depth (ft)	0.75		Bankfull Mean Depth (ft)	0.85		Bankfull Mean Depth (ft)	0.88		Bankfull Mean Depth (ft)			Bankfull Mean Depth (ft)		
Bankfull Max Depth (ft)	1.5		Bankfull Max Depth (ft)	1.6		Bankfull Max Depth (ft)	1.58		Bankfull Max Depth (ft)	1.54		Bankfull Max Depth (ft)			Bankfull Max Depth (ft)		
Flood Prone Width (ft)	>100		Flood Prone Width (ft)	148		Flood Prone Width (ft)	148		Flood Prone Width (ft)	148.2		Flood Prone Width (ft)			Flood Prone Width (ft)		
Entrenchment Ratio (ft/ft)	>7		Entrenchment Ratio (ft/ft)	9.5		Entrenchment Ratio (ft/ft)	9.5		Entrenchment Ratio (ft/ft)	11.1		Entrenchment Ratio (ft/ft)			Entrenchment Ratio (ft/ft)		
Width/Depth Ratio (ft/ft)	17.9		Width/Depth Ratio (ft/ft)	20.7		Width/Depth Ratio (ft/ft)	15.52		Width/Depth Ratio (ft/ft)	15.12		Width/Depth Ratio (ft/ft)			Width/Depth Ratio (ft/ft)		
D50 (mm)	18.97		D50 (mm)	12.48		D50 (mm)	5.58		D50 (mm)	12.08		D50 (mm)			D50 (mm)		
D84 (mm)	40.0		D84 (mm)	28.87		D84 (mm)	20.42		D84 (mm)	27.30		D84 (mm)			D84 (mm)		

601 North R1 PXS-2

Photo C 10 – R1 PXS-2 Left Pin

Photo C 11 – R1 PXS-2 Right Pin

Photo C 12 – R1 PXS-2 Downstream

Figure C 4 - R1 PXS-2 Cross Section Plot

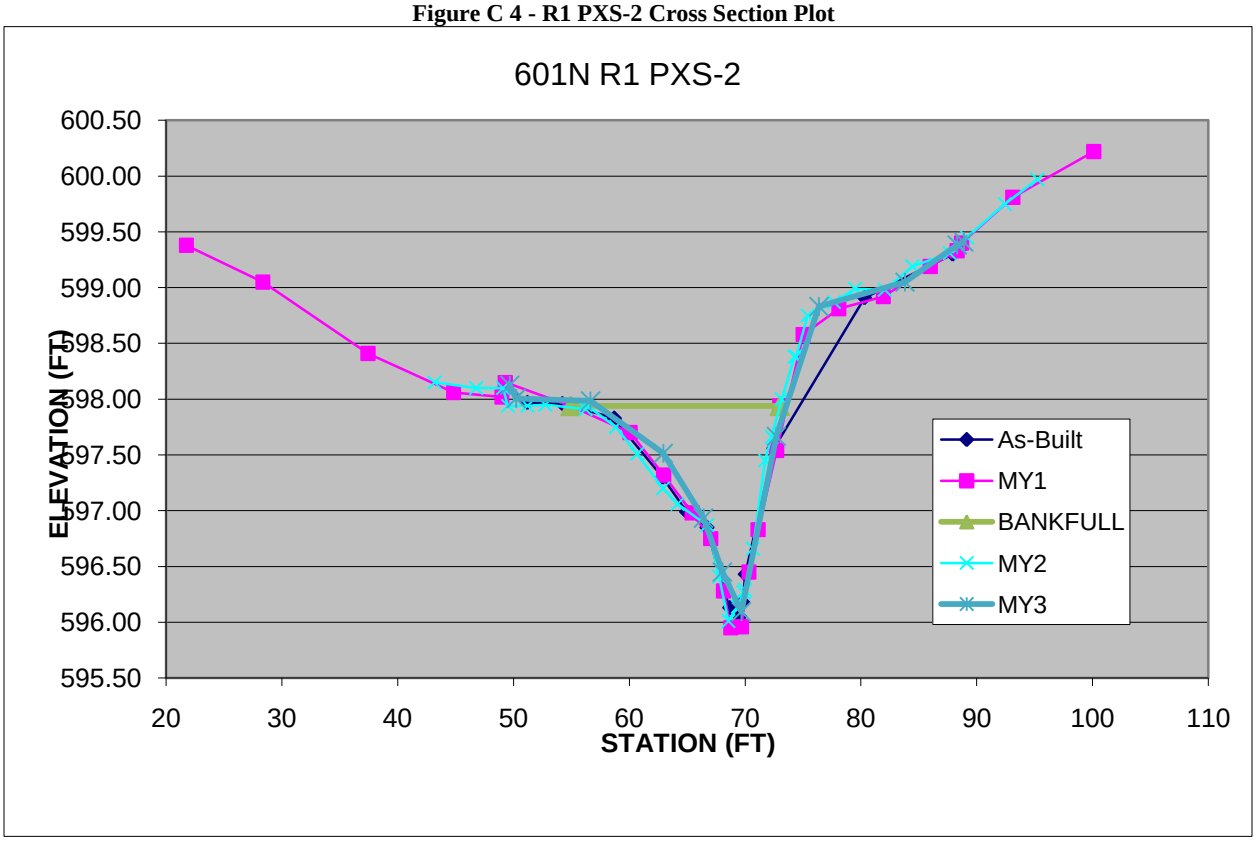


Table C 4 – R1 PXS-2 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
49.29	598.11	r1pxs2l	21.75	599.38	PXS2	43.19	598.15	(XS)	49.68	598.125	L pin						
51.2	597.97	r1pxs2	28.36	599.05	PXS2	46.78	598.1	(XS)	50.22	598.006	Ground						
54.22	597.96	r1pxs2	37.43	598.41	PXS2	49.1	598.1	(XSLP) X	56.65	597.985	Ground						
58.7	597.83	r1pxs2tob	44.83	598.06	PXS2	49.52	597.94	(XS)	62.93	597.514	Ground						
58.7	597.82	r1pxs2tob	49	598.02	PXS2	51.21	597.94	(XS)	66.41	596.933	Ground						
62.89	597.3	r1pxs2	49.29	598.15	PXS2PL	52.75	597.95	(XS)	68.04	596.45	Ground						
64.95	596.99	r1pxs2	54.92	597.94	PXS2	56.22	597.91	(XS)	69.67	596.094	Ground						
66.71	596.85	r1pxs2	60.07	597.7	PXS2	56.23	597.95	(XS)	72.69	597.666	Ground						
68.14	596.29	r1pxs2tos	62.97	597.32	PXS2	58.84	597.75	(XS)	76.38	598.83	Ground						
68.68	596.13	r1pxs2	65.43	596.98	PXS2	60.67	597.51	(XS)	83.8	599.049	Ground						
69.53	596.05	r1pxs2	67.03	596.75	PXS2	62.91	597.2	(XS)	88.32	599.382	Ground						
69.78	596.18	r1pxs2	68.13	596.28	PXS2	64.16	597.06	(XS)	88.88	599.408	R pin						
70.02	596.43	r1pxs2tos	68.77	595.95	PXS2	66.73	596.87	(XS)									
72.49	597.56	r1pxs2	69.68	595.96	PXS2	67.74	596.41	(XS)									
80.31	598.91	r1pxs2	70.33	596.45	PXS2	68.56	596.01	(XS)									
87.93	599.3	r1pxs2	71.12	596.83	PXS2	69.37	596.14	(XS)									
88.48	599.34	r1pxs2r	72.73	597.54	PXS2	69.85	596.27	(XS)									
			75.02	598.58	PXS2	70	596.29	(XS)									
			78.1	598.81	PXS2	70.68	596.66	(XS)									
			81.94	598.92	PXS2	71.73	597.45	(XS)									
			85.99	599.19	PXS2	72.29	597.66	(XS)									
			88.3	599.33	PXS2	73.16	598	(XS)									
			88.69	599.4	PXS2PR	74.27	598.38	(XS)									
			93.11	599.81	PXS2	74.41	598.38	(XS)									
			100.11	600.22	PXS2	75.4	598.75	(XS)									
						77.68	598.87	(XS)									
						79.5	598.99	(XS)									
						82.06	598.98	(XS)									
						84.44	599.19	(XS)									
						87.66	599.31	(XS)									
						88.5	599.37	(XSRP) X									
						89.17	599.45	(XS)									
						92.42	599.75	(XS)									
						95.24	599.97	(XS)									

Bankfull Width (ft)	20.28		Bankfull Width (ft)	18.1		Bankfull Width (ft)	19.54		Bankfull Width (ft)	13.02		Bankfull Width (ft)			Bankfull Width (ft)		
Bankfull Cross Sectional Area (sq ft)	13.4		Bankfull Cross Sectional Area (sq ft)	13.4		Bankfull Cross Sectional Area (sq ft)	13.22		Bankfull Cross Sectional Area (sq ft)	11.64		Bankfull Cross Sectional Area (sq ft)			Bankfull Cross Sectional Area (sq ft)		
Bankfull Mean Depth (ft)	0.66		Bankfull Mean Depth (ft)	0.74		Bankfull Mean Depth (ft)	0.68		Bankfull Mean Depth (ft)	0.89		Bankfull Mean Depth (ft)			Bankfull Mean Depth (ft)		
Bankfull Max Depth (ft)	1.9		Bankfull Max Depth (ft)	2		Bankfull Max Depth (ft)	1.9		Bankfull Max Depth (ft)	1.89		Bankfull Max Depth (ft)			Bankfull Max Depth (ft)		
Flood Prone Width (ft)	>80		Flood Prone Width (ft)	-		Flood Prone Width (ft)	-		Flood Prone Width (ft)	-		Flood Prone Width (ft)			Flood Prone Width (ft)		
Entrenchment Ratio (ft/ft)	>4		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)	-		Entrenchment Ratio (ft/ft)			Entrenchment Ratio (ft/ft)		
Width/Depth Ratio (ft/ft)	30.6		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)	-		Width/Depth Ratio (ft/ft)			Width/Depth Ratio (ft/ft)		
D50 (mm)	17.5		D50 (mm)	4.68		D50 (mm)	6.08		D50 (mm)	8.83		D50 (mm)			D50 (mm)		
D84 (mm)	34.17		D84 (mm)	16.0		D84 (mm)	20.4		D84 (mm)	36.3		D84 (mm)			D84 (mm)		

601 North R1 RXS-3

Photo C 13 – R1 RXS-3 Left Pin

Photo C 14 – R1 RXS-3 Right Pin

Photo C 15 – R1 RXS-3 Downstream

Figure C 5 – R1 RXS-3 Cross Section Plot

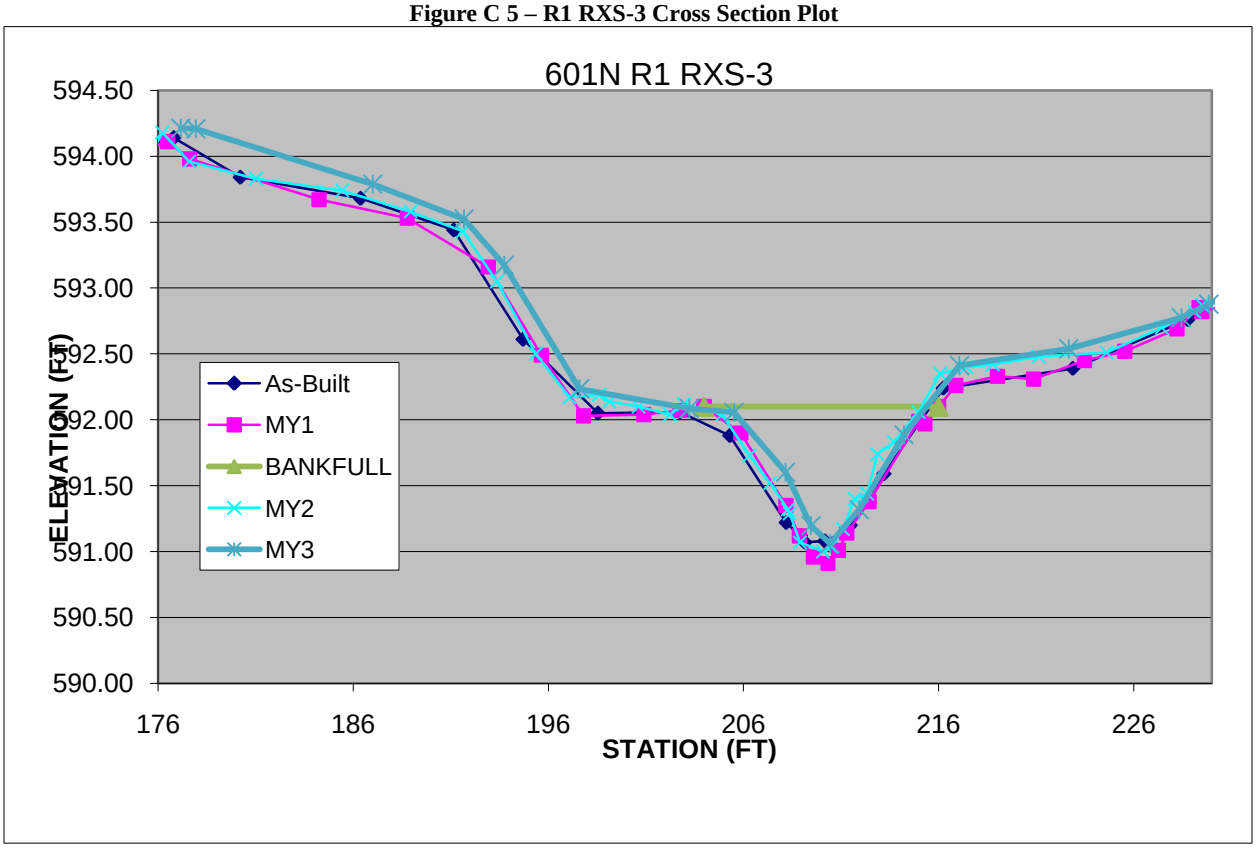


Table C 5 - R1 RXS-3 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
176.37	594.11	r1rxs3l	14.15	602.28	RXS3	168.62	593.84	(XS)	177.16	594.212	L pin						
176.8	594.14	r1rxs3	30.58	600.87	RXS3	172.95	594.02	(XS)	177.93	594.208	Ground						
180.21	593.84	r1rxs3	66.21	597.45	RXS3	175.98	594.11	(XS)	187	593.788	Ground						
186.37	593.68	r1rxs3	92.86	595.43	RXS3	176.2	594.18	(XSLP) X	191.67	593.524	Ground						
191.15	593.44	r1rxs3	115.15	595.14	RXS3	177.59	593.96	(XS)	193.74	593.174	Ground						
194.7	592.61	r1rxs3	115.33	595.15	RXS3	181.01	593.83	(XS)	197.6	592.235	Ground						
198.54	592.05	r1rxs3	130.33	594.57	RXS3	185.43	593.74	(XS)	203.22	592.086	Ground						
202.74	592.06	r1rxs3tob	130.39	594.6	RXS3	188.94	593.58	(XS)	205.51	592.057	Ground						
205.3	591.88	r1rxs3	139.86	594.38	RXS3	191.61	593.43	(XS)	208.16	591.602	Ground						
208.19	591.22	r1rxs3tos	149.95	593.8	RXS3	193.36	593.05	(XS)	209.46	591.198	Ground						
208.92	591.12	r1rxs3	150.06	593.81	RXS3	195.35	592.5	(XS)	210.43	591.061	Ground						
209.14	591.07	r1rxs3	161.42	593.48	RXS3	197.08	592.17	(XS)	211.93	591.319	Ground						
210.17	591.08	r1rxs3	166.56	593.26	RXS3	198.59	592.19	(XS)	214.23	591.887	Ground						
211.28	591.15	r1rxs3	171.07	593.7	RXS3	199.12	592.14	(XS)	217.07	592.412	Ground						
211.47	591.2	r1rxs3tos	174.86	594.03	RXS3	200.62	592.1	(XS)	222.67	592.539	Ground						
213.2	591.59	r1rxs3	176.48	594.11	RXS3L	202.23	592.04	(XS)	228.44	592.776	Ground						
216.24	592.24	r1rxs3tob	177.61	593.98	RXS3	202.94	592.12	(XS)	229.85	592.877	Ground						
222.88	592.39	r1rxs3	184.24	593.67	RXS3	204.91	592.04	(XS)	230.25	592.907	R pin						
228.77	592.76	r1rxs3	188.76	593.53	RXS3	206.31	591.73	(XS)									
229.5	592.82	r1rxs3r	192.92	593.16	RXS3	207.36	591.52	(XS)									
			195.64	592.49	RXS3	208.27	591.32	(XS)									
			197.8	592.03	RXS3	208.37	591.29	(XS)									
			200.89	592.04	RXS3	208.89	591.07	(XS)									
			202.74	592.07	RXS3	210.07	591	(XS)									
			203.98	592.1	RXS3	210.49	591.04	(XS)									
			205.86	591.9	RXS3	211.09	591.17	(XS)									
			208.17	591.35	RXS3	211.69	591.4	(XS)									
			208.86	591.12	RXS3	212.34	591.44	(XS)									
			209.58	590.96	RXS3	212.86	591.74	(XS)									
			210.33	590.91	RXS3	213.71	591.83	(XS)									
			210.87	591.01	RXS3	214.97	592.06	(XS)									
			211.29	591.14	RXS3	216.08	592.35	(XS)									
			212.44	591.38	RXS3	217.41	592.4	(XS)									
			214.98	591.99	RXS3	218.78	592.42	(XS)									
			215.3	591.97	RXS3	221.13	592.48	(XS)									
			216.89	592.26	RXS3	224.61	592.51	(XS)									
			219.02	592.33	RXS3	227.44	592.7	(XS)									
			220.87	592.31	RXS3	229.11	592.82	(XS)									
			223.48	592.45	RXS3	229.51	592.87	(XSRP) X									
			225.54	592.52	RXS3	231.63	593	(XS)									
			228.22	592.69	RXS3	235.42	593.07	(XS)									
			229.34	592.85	RXS3	236.84	593.19	(XS)									
			229.5	592.82	RXS3PR	240.95	593.21	(XS)									
			233.99	593.02	RXS3												
			240.09	593.22	RXS3												
			246.14	593.21	RXS3												
			251.73	593.44	RXS3												
			259.01	593.27	RXS3												
			266.34	593.24	RXS3												
			274.91	593.44	RXS3												
			283.68	593.56	RXS3												
			289.9	593.68	RXS3												
			290.31	593.71	RXS3												
			328.26	595.49	RXS3												

Bankfull Width (ft)	10.5		Bankfull Width (ft)	11		Bankfull Width (ft)	13.09		Bankfull Width (ft)	8.71		Bankfull Width (ft)			Bankfull Width (ft)		
Bankfull Cross Sectional Area (sq ft)	6.4		Bankfull Cross Sectional Area (sq ft)	6.6		Bankfull Cross Sectional Area (sq ft)	6.04		Bankfull Cross Sectional Area (sq ft)	5.14		Bankfull Cross Sectional Area (sq ft)			Bankfull Cross Sectional Area (sq ft)		
Bankfull Mean Depth (ft)	0.61		Bankfull Mean Depth (ft)	0.6		Bankfull Mean Depth (ft)	0.46		Bankfull Mean Depth (ft)	0.59		Bankfull Mean Depth (ft)			Bankfull Mean Depth (ft)		
Bankfull Max Depth (ft)	1		Bankfull Max Depth (ft)	1.2		Bankfull Max Depth (ft)	1.1		Bankfull Max Depth (ft)	1.02		Bankfull Max Depth (ft)			Bankfull Max Depth (ft)		
Flood Prone Width (ft)	>150		Flood Prone Width (ft)	166		Flood Prone Width (ft)	166		Flood Prone Width (ft)	86.15		Flood Prone Width (ft)			Flood Prone Width (ft)		
Entrenchment Ratio (ft/ft)	>10		Entrenchment Ratio (ft/ft)	15		Entrenchment Ratio (ft/ft)	12.68		Entrenchment Ratio (ft/ft)	9.89		Entrenchment Ratio (ft/ft)			Entrenchment Ratio (ft/ft)		
Width/Depth Ratio (ft/ft)	17.2		Width/Depth Ratio (ft/ft)	18.3		Width/Depth Ratio (ft/ft)	28.35		Width/Depth Ratio (ft/ft)	14.7		Width/Depth Ratio (ft/ft)			Width/Depth Ratio (ft/ft)		
D50 (mm)	15.77		D50 (mm)	8.0		D50 (mm)	6.28		D50 (mm)	6.8		D50 (mm)			D50 (mm)		
D84 (mm)	31.1		D84 (mm)	25.73		D84 (mm)	14.12		D84 (mm)	22.6		D84 (mm)			D84 (mm)		

601 North R1 PXS-3

Photo C 16 – R1 PXS-3 Left Pin

Photo C 17 – R1 PXS-3 Right Pin

Photo C 18 – R1 PXS-3 Downstream

Figure C 6 – R1 PXS-3 Cross Section Plot

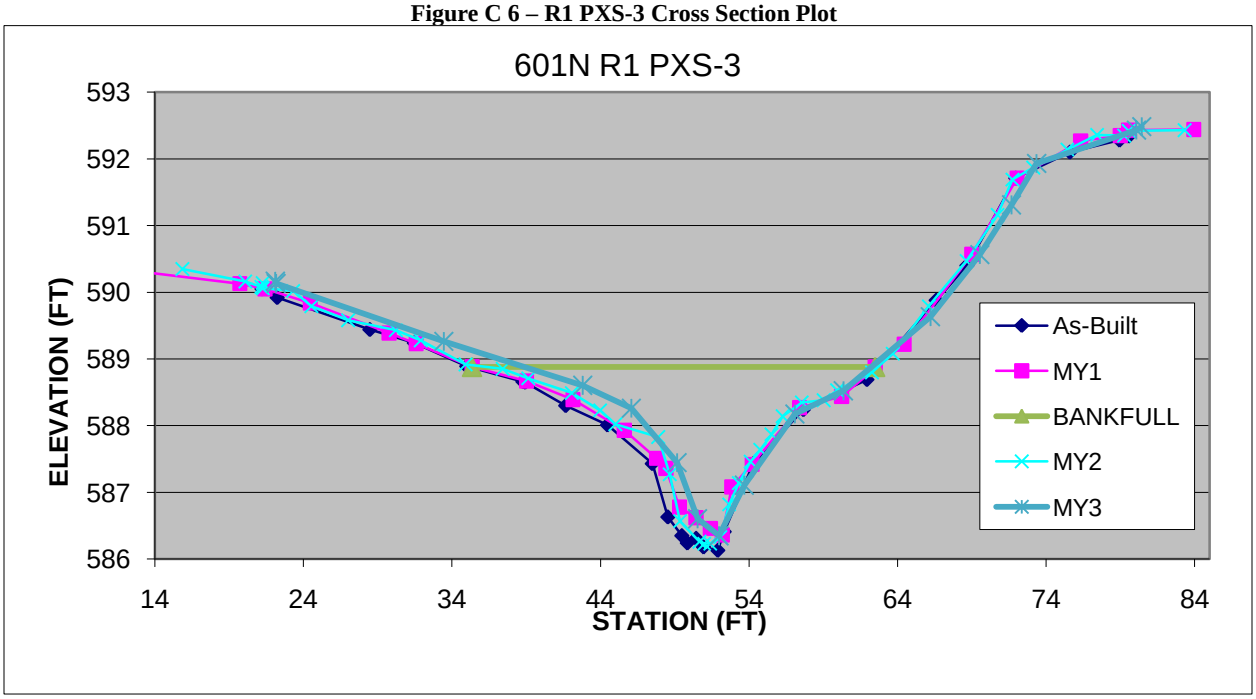


Table C 6 - R1 PXS-3 Dimension Data

As Built			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5 (2012)		
Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description	Station	Elevation	Description
21.22	590.05	r1pxs3l	13.71	590.29	PXS3	15.86	590.35	(XS)	22.11	590.165	L pin						
22.24	589.92	r1pxs3	19.72	590.13	PXS3	20.09	590.16	(XS)	22.17	590.132	Ground						
28.48	589.44	r1pxs3	21.42	590.05	PXS3PL	21.18	590.08	(XS)	33.46	589.265	Ground						
31.47	589.24	r1pxs3	24.46	589.84	PXS3	21.25	590.14	(XSLP) X	42.8	588.604	Ground						
35	588.89	r1pxs3	29.77	589.39	PXS3	21.27	590.06	(XS)	46.08	588.26	Ground						
38.78	588.66	tob	31.59	589.23	PXS3	23.31	590.02	(XS)	49.16	587.445	Ground						
38.93	588.65	r1pxs3tob	35.36	588.88	PXS3	24.54	589.79	(XS)	50.54	586.604	Ground						
41.66	588.3	r1pxs3	39.02	588.67	PXS3	27.02	589.58	(XS)	51.98	586.35	Ground						
44.47	588.01	r1pxs3	42.15	588.39	PXS3	30.22	589.43	(XS)	53.68	587.107	Ground						
47.49	587.43	r1pxs3	45.61	587.93	PXS3	31.91	589.28	(XS)	57.08	588.176	Ground						
48.54	586.63	r1pxs3tos	47.78	587.51	PXS3	34.92	588.92	(XS)	60.35	588.523	Ground						
49.48	586.35	r1pxs3	48.41	587.36	PXS3	37.42	588.85	(XS)	66.21	589.634	Ground						
49.85	586.24	r1pxs3	49.32	586.78	PXS3	39.14	588.71	(XS)	69.54	590.563	Ground						
50.44	586.31	r1pxs3	50.43	586.62	PXS3	42.07	588.49	(XS)	71.67	591.31	Ground						
50.94	586.18	r1pxs3	51.4	586.46	PXS3	43.98	588.23	(XS)	73.36	591.932	Ground						
51.9	586.13	r1pxs3	52.2	586.36	PXS3	45	588.02	(XS)	80.08	592.43	Ground						
52.33	586.41	r1pxs3tos	52.84	587.08	PXS3	47.89	587.83	(XS)	80.44	592.485	R pin						
54.29	587.43	r1pxs3	54.21	587.42	PXS3	48.67	587.27	(XS)									
57.66	588.24	r1pxs3tob	57.4	588.27	PXS3	49.36	586.57	(XS)									
61.94	588.69	r1pxs3toe	60.23	588.44	PXS3	50.66	586.26	(XS)									
66.6	589.88	r1pxs3	64.44	589.22	PXS3	50.98	586.23	(XS)									
68.67	590.4	r1pxs3	69	590.57	PXS3	51.39	586.23	(XS)									
71.96	591.71	r1pxs3	72.05	591.71	PXS3	52.07	586.33	(XS)									
75.6	592.1	r1pxs3top	76.32	592.27	PXS3	52.66	586.82	(XS)									
78.94	592.28	r1pxs3	78.99	592.35	PXS3	53.32	587.14	(XS)									
79.56	592.34	r1pxs3r	79.56	592.43	PXS3PR	54.1	587.46	(XS)									
			83.94	592.44	PXS3	54.75	587.64	(XS)									
						55.51	587.87	(XS)									
						56.26	588.14	(XS)									
						57.55	588.35	(XS)									
						59.03	588.38	(XS)									
						59.93	588.53	(XS)									
						62.28	588.8	(XS)									
						63.68	589.08	(XS)									
						66.1	589.79	(XS)									
						68.64	590.47	(XS)									
						70.73	591.16	(XS)									
						71.73	591.69	(XS)									
						73.14	591.87	(XS)									
						75.43	592.14	(XS)									
						77.43	592.36	(XS)									
						79.25	592.35	(XS)									
						79.56	592.42	(XSRP) X									
						83.33	592.43	(XS)									

Bankfull Width (ft)	26.94	Bankfull Width (ft)	24.9	Bankfull Width (ft)	22.51	Bankfull Width (ft)	17.55	Bankfull Width (ft)		Bankfull Width (ft)	
Bankfull Cross Sectional Area (sq ft)	28.2	Bankfull Cross Sectional Area (sq ft)	24.3	Bankfull Cross Sectional Area (sq ft)	23.5	Bankfull Cross Sectional Area (sq ft)	20.26	Bankfull Cross Sectional Area (sq ft)		Bankfull Cross Sectional Area (sq ft)	
Bankfull Mean Depth (ft)	1.05	Bankfull Mean Depth (ft)	0.98	Bankfull Mean Depth (ft)	1.04	Bankfull Mean Depth (ft)	1.15	Bankfull Mean Depth (ft)		Bankfull Mean Depth (ft)	
Bankfull Max Depth (ft)	2.76	Bankfull Max Depth (ft)	2.5	Bankfull Max Depth (ft)	2.62	Bankfull Max Depth (ft)	2.25	Bankfull Max Depth (ft)		Bankfull Max Depth (ft)	
Flood Prone Width (ft)	>100	Flood Prone Width (ft)	-	Flood Prone Width (ft)	-	Flood Prone Width (ft)	-	Flood Prone Width (ft)		Flood Prone Width (ft)	
Entrenchment Ratio (ft/ft)	>3.7	Entrenchment Ratio (ft/ft)	-	Entrenchment Ratio (ft/ft)	-	Entrenchment Ratio (ft/ft)	-	Entrenchment Ratio (ft/ft)		Entrenchment Ratio (ft/ft)	
Width/Depth Ratio (ft/ft)	25.7	Width/Depth Ratio (ft/ft)	-	Width/Depth Ratio (ft/ft)	-	Width/Depth Ratio (ft/ft)	-	Width/Depth Ratio (ft/ft)		Width/Depth Ratio (ft/ft)	
D50 (mm)	6.90	D50 (mm)	2.86	D50 (mm)	0.06	D50 (mm)	1.1	D50 (mm)		D50 (mm)	
D84 (mm)	15.48	D84 (mm)	6.47	D84 (mm)	4.85	D84 (mm)	4.7	D84 (mm)		D84 (mm)	

Figure C 7 - R1 Longitudinal Profile Single Sheet

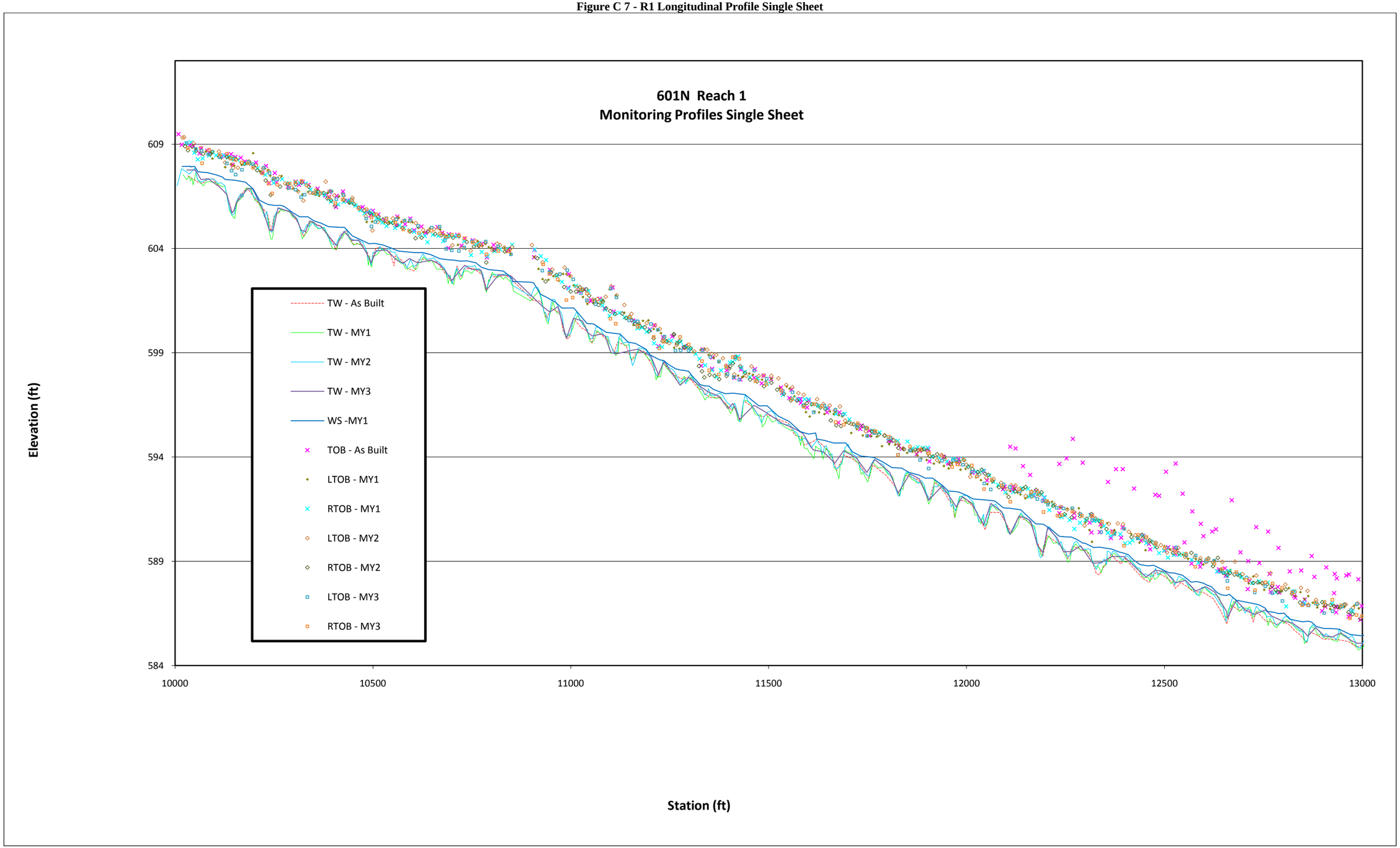


Figure C 8 - R1 Longitudinal Profile Sheet 1

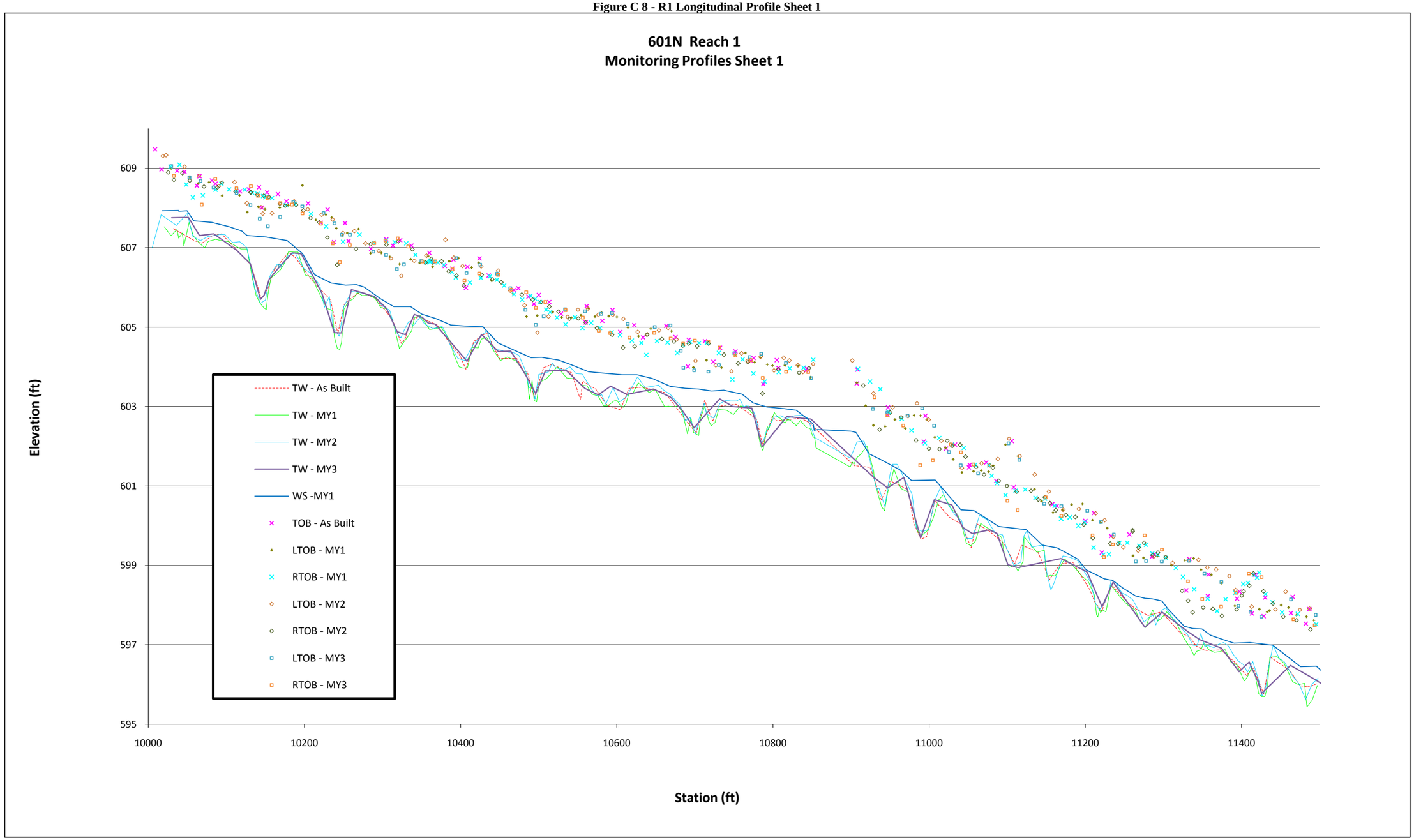


Figure C 9 - R1 Longitudinal Profile Sheet 2

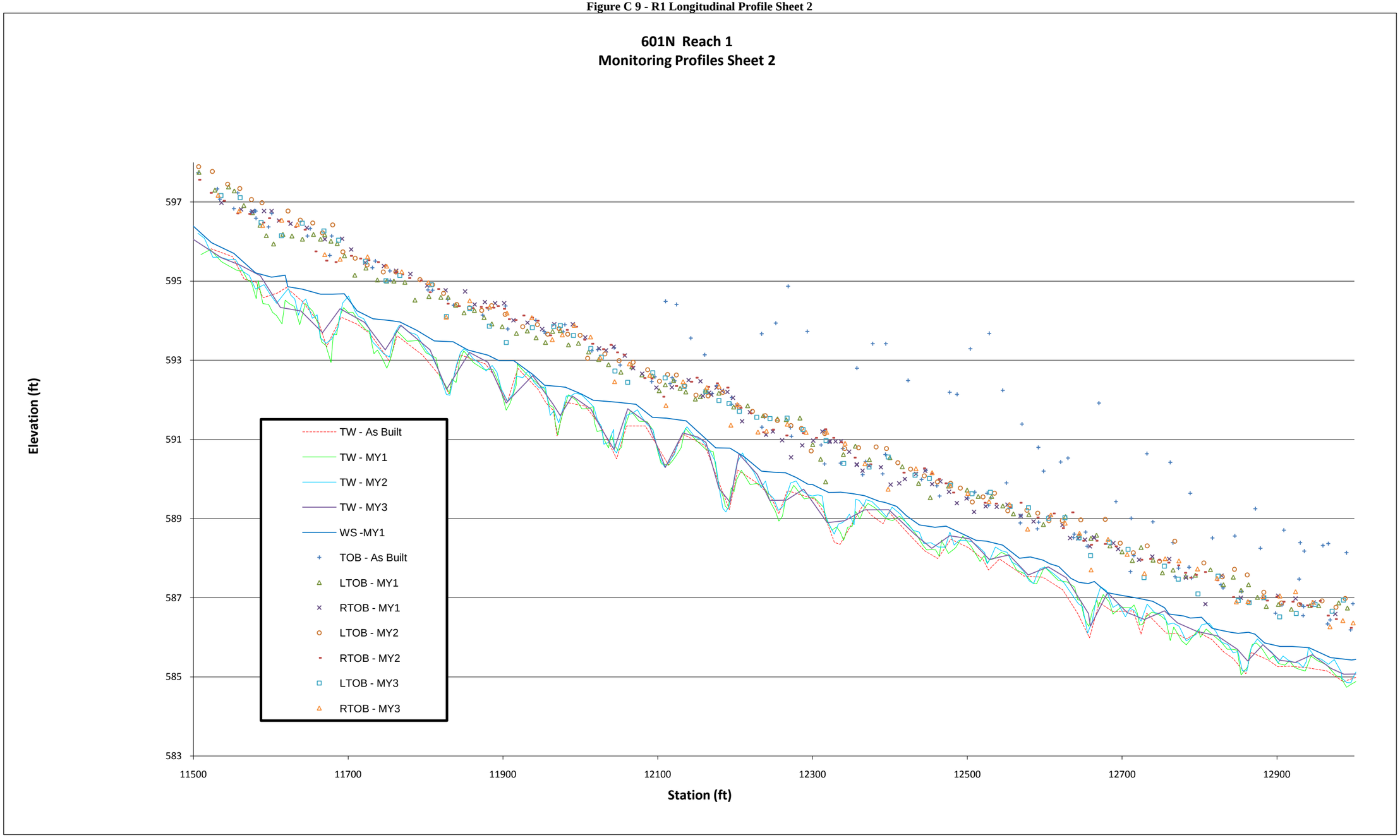


Figure C 10 - R1 RXS-1 Pebble Count

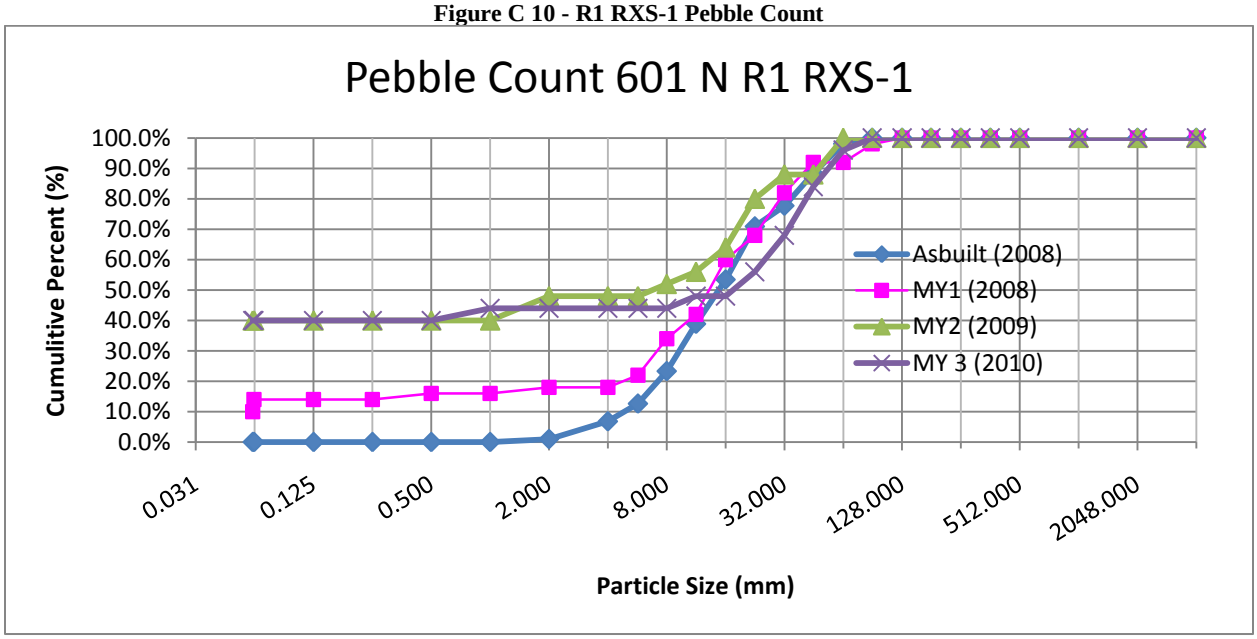


Figure C 11 - R1 PXS-1 Pebble Count

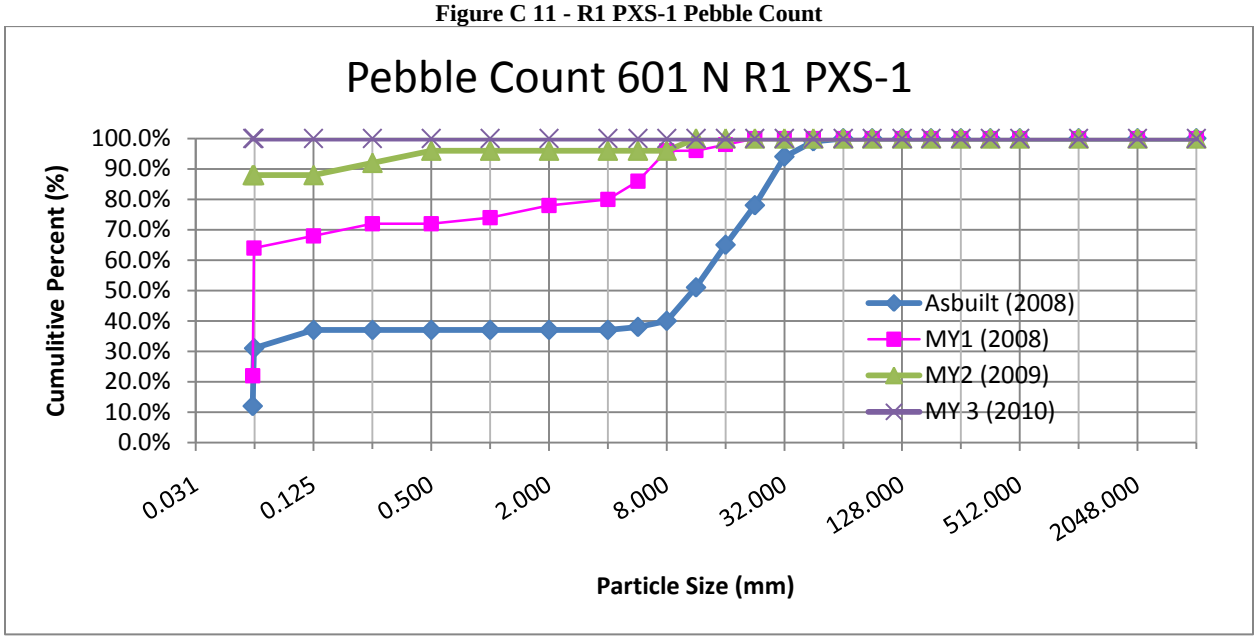


Figure C 12 - R1 RXS-2 Pebble Count

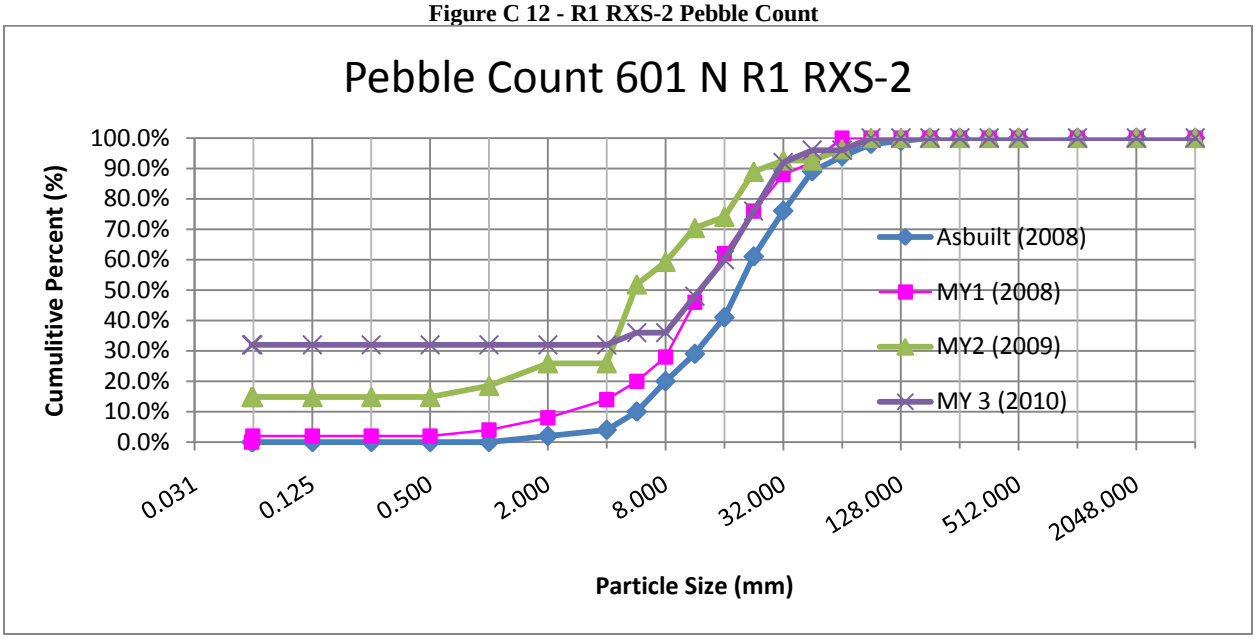


Figure C 13 - R1 PXS-2 Pebble Count

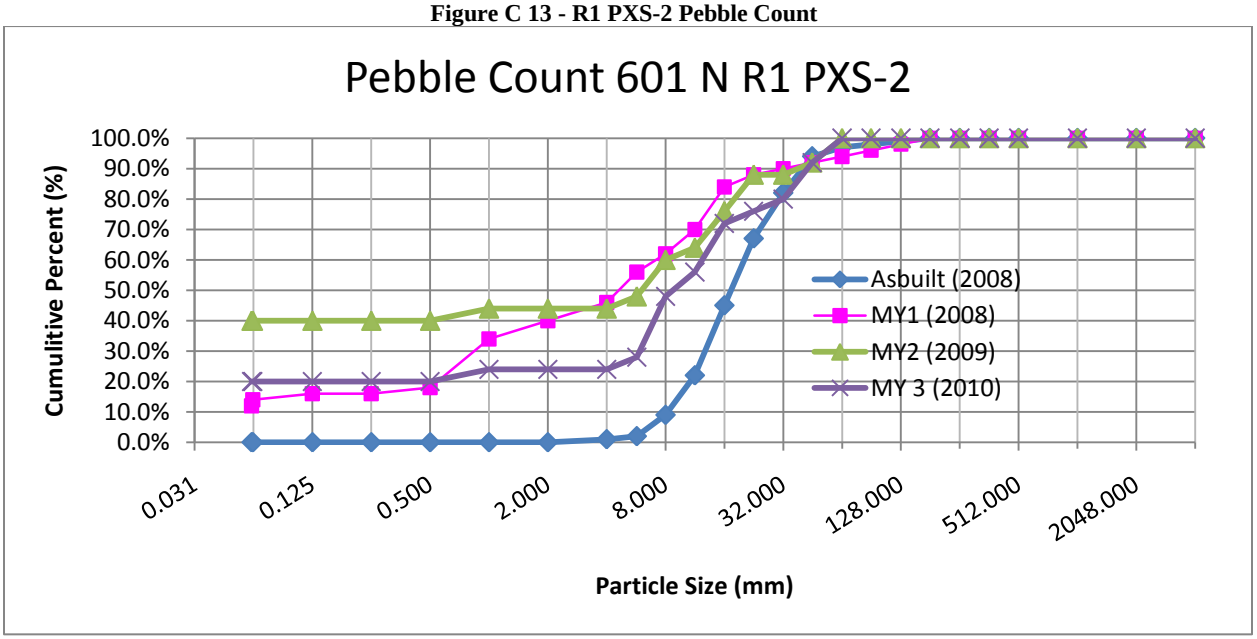


Figure C 14 - R1 RXS-3 Pebble Count

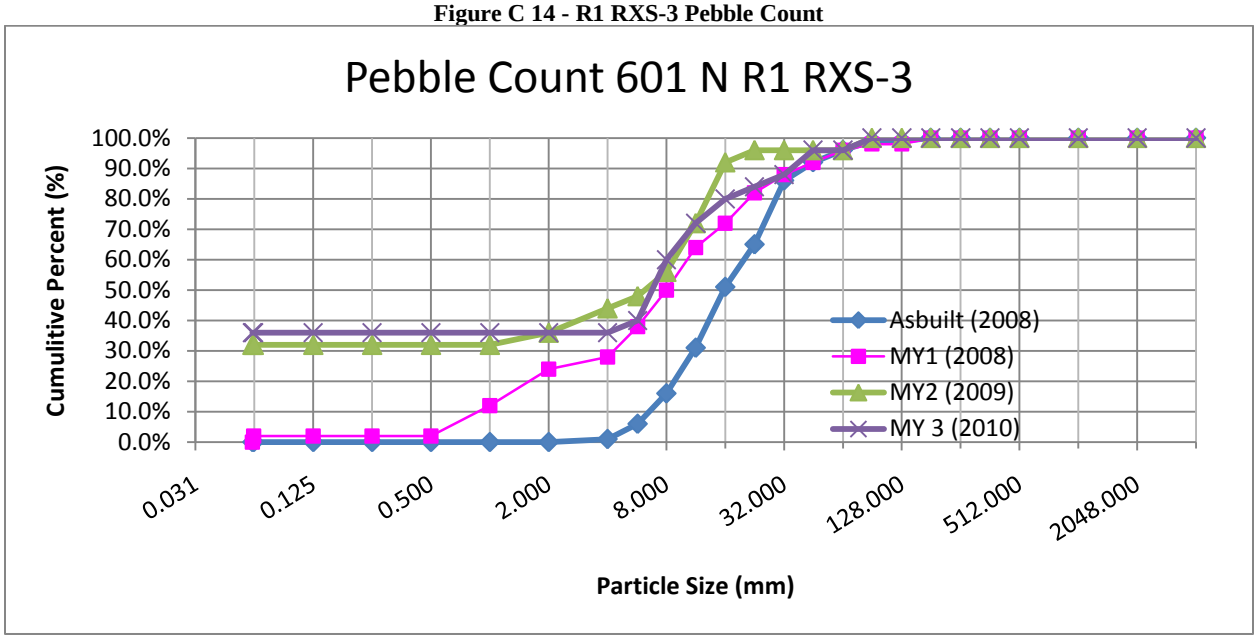
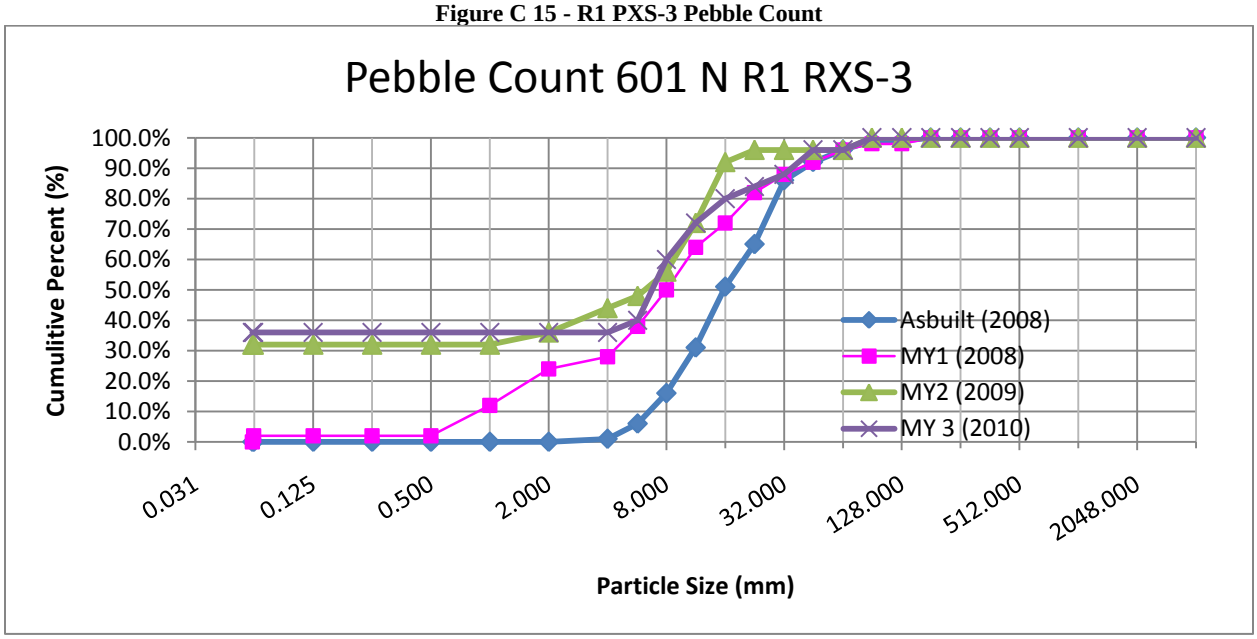


Figure C 15 - R1 PXS-3 Pebble Count



Appendix D – Site Photos

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List of Photos

List of Photos (contd.)

Photo Points

Photo Point 1

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Photo Point 5

Photo Point 6

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Photo Point 12

Photo Point 13

Photo Point 14

Photo Point 15

Photo Point 16

Photo Point 17

Photo Point 18

Photo Point 19

Problem Area Photos

Problem Area Photo 1

Problem Area Photo 2

Problem Area Photo 3

Problem Area Photo 4

Problem Area Photo 5

Problem Area Photo 6

Problem Area Photo 7

Problem Area Photo 8

Problem Area Photo 9

Problem Area Photo 10

Vegetation Photos

Photo D 1 - Vegetation Plot N1

Photo D 2 - Vegetation Plot N2

Photo D 3 - Vegetation Plot N3

Appendix E – Vegetation Data

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Table E 1 – MY3 (2010) Plot N1 Data

				Spring Data				Fall Data				Notes
No	Species	Coordinates		ddh	Height	DBH	Vigor	ddh	Height	DBH	Vigor	
		X (m)	Y (m)	(mm)	(cm)	(cm)		(mm)	(cm)	(cm)		
1	FP	0.16	3.57	12	111		4	20	181	8	4	
2	FP	0.36	5.86	11	101		4	14	127		4	
3	QM	0.65	8.00				0				0	
4	FP	2.80	2.04	14	138	2	4	17	141	3	4	
5	FP	3.08	4.61	44	87		4	16	115		4	
6	FP	3.39	7.01	5	69		4	6	69		4	
7	FP	3.71	9.61	16	174	5	4	19	179	5	4	
8	QN	6.11	2.65	15	135		4	18	193	5	4	
9	BN	6.41	5.14	16	114		4	23	171	3	4	
10	BN	6.92	7.98	25	176	4	4	36	226	11	4	
11	QN	8.80	2.22				0				0	
12	FP	9.35	4.59	11	115		4	15	142	3	4	
13	FP	9.58	7.03	7	63		4	7	63		3	
14	FP	9.72	9.32	8	78		4	10	79		3	

Table E 2 – MY3 (2010) Plot N2 Data

				Spring Data				Fall Data				Notes
No	Species	Coordinates		ddh	Height	DBH	Vigor	ddh	Height	DBH	Vigor	
		X (m)	Y (m)	(mm)	(cm)	(cm)		(mm)	(cm)	(cm)		
1	AT	0.17	0.42				0				0	
2	AT	0.25	3.30				0				0	
3	CO	0.36	6.50				0				0	
4	CO	0.43	9.42				0				0	
5	BN	3.01	2.20	15	123		4	22	173	5	4	
6	QM	3.50	8.67	12	101		4	16	153	6	4	Trunk gnawed
7	QN	3.65	6.16	7	47		4	9	106		4	
8	BN	6.75	9.46	26	191	6	4		275	16	4	
9	BN	6.88	6.85	34	230	10	4		304	19	4	
10	QN	7.05	2.23				0				0	
11	FP	7.15	4.69	23	182	7	4	31	213	10	4	
12	FP	9.21	7.94	32	167	6	4	38	187	9	4	
13	QP	9.64	5.33	6	67		4	7	68		4	
14	Q	9.85	2.74				0				0	

Table E 3 – MY3 (2010) Plot N3 Data

				Spring Data				Fall Data				Notes
No	Species	Coordinates		ddh	Height	DBH	Vigor	ddh	Height	DBH	Vigor	
		X (m)	Y (m)	(mm)	(cm)	(cm)		(mm)	(cm)	(cm)		
1	QP	0.75	8.62	9	81		4	16	215	7	4	
2	QM	0.78	6.15	12	129		4	17	212	11	4	Trunk gnawed
3	Q	1.00	3.82				0				0	
4	QP	1.25	1.35	19	225	8	4		362	19	4	
5	FP	3.39	9.33	11	99		4	16	128		4	
6	FP	3.69	6.56	19	136		4	30	226	10	4	
7	FP	3.89	4.00	17	167	5	4	26	238	11	4	
8	BN	3.90	1.38		270	19	4		328	25	4	
9	QP	6.37	8.21				0				0	
10	BN	6.47	3.47	20	231	9	4		329	19	4	
11	BN	6.65	1.20	16	165	3	4		263	10	4	
12	Q	6.88	5.78				0				0	
13	QM	9.23	7.75	4	43		4	5	43		4	
14	QM	9.35	0.41	2	29		4	4	60		4	
15	QM	9.55	2.90	4	36		4	4	37		4	Trunk gnawed
16	BN	9.60	9.94	24	188	8	4		306	23	4	
17	QM	9.67	5.21	13	92		4	16	154	4	4	

Appendix F – Rainfall Data

Date	Amount (in.)
10/12/2009	0.32
10/14/2009	0.21
10/15/2009	0.36
10/16/2009	0.01
10/17/2009	0.02
10/24/2009	0.21
10/27/2009	1.02
10/28/2009	0.21
10/29/2009	0.01
10/31/2009	0.02
11/1/2009	0.51
11/2/2009	0.01
11/10/2009	1.18
11/11/2009	2.94
11/12/2009	0.51
11/13/2009	0.01
11/18/2009	0.07
11/19/2009	0.03
11/20/2009	0.01
11/22/2009	0.80
11/23/2009	0.57
11/25/2009	0.02
11/26/2009	0.01
11/30/2009	0.10
12/2/2009	1.44
12/5/2009	0.06
12/6/2009	0.01
12/8/2009	0.84
12/9/2009	0.42
12/12/2009	0.05
12/13/2009	0.12
12/14/2009	0.02
12/15/2009	0.01
12/18/2009	1.40
12/19/2009	0.07
12/20/2009	0.01
12/21/2009	0.01
12/25/2009	2.00
12/30/2009	0.19
12/31/2009	0.14
1/16/2010	0.46
1/17/2010	1.26
1/19/2010	0.01
1/21/2010	0.82
1/22/2010	0.10
1/24/2010	0.89
1/25/2010	0.94
1/30/2010	0.04
1/31/2010	0.40
2/1/2010	0.08
2/2/2010	0.29
2/4/2010	0.05
2/5/2010	2.69
2/9/2010	0.03
2/10/2010	0.01
2/13/2010	0.06
2/15/2010	0.19
2/22/2010	0.54
2/24/2010	0.09
2/25/2010	0.04
3/2/2010	0.24
3/3/2010	0.25
3/10/2010	0.03
3/11/2010	0.14
3/12/2010	1.03
3/14/2010	0.03
3/21/2010	0.25
3/22/2010	0.02
3/26/2010	0.02
3/28/2010	0.13
3/29/2010	0.64
4/8/2010	0.35
4/9/2010	0.03
4/19/2010	0.01
4/20/2010	0.05
4/21/2010	0.01
4/24/2010	0.14
4/25/2010	0.13
4/27/2010	0.55

5/3/2010	0.36
5/4/2010	0.03
5/6/2010	0.01
5/11/2010	0.08
5/16/2010	1.15
5/17/2010	0.62
5/18/2010	0.08
5/21/2010	0.46
5/22/2010	0.27
5/23/2010	0.04
5/24/2010	0.02
5/25/2010	0.08
5/28/2010	0.11
5/31/2010	1.42
6/1/2010	0.05
6/2/2010	1.66
6/6/2010	0.25
6/10/2010	0.15
6/11/2010	0.01
6/12/2010	0.01
6/13/2010	0.13
6/14/2010	0.05
6/17/2010	0.05
6/18/2010	0.05
6/19/2010	0.03
6/20/2010	0.01
6/21/2010	0.02
6/22/2010	0.01
6/23/2010	0.02
6/24/2010	0.04
6/25/2010	0.02
6/26/2010	0.08
6/27/2010	0.04
6/28/2010	0.24
6/29/2010	0.15
6/30/2010	0.04
7/1/2010	0.03
7/2/2010	0.06
7/6/2010	0.07
7/7/2010	0.01
7/9/2010	0.09
7/12/2010	0.04
7/13/2010	0.05
7/16/2010	0.07
7/17/2010	0.44
7/18/2010	0.04
7/19/2010	0.25
7/20/2010	0.02
7/21/2010	0.19
7/22/2010	0.02
7/23/2010	0.04
7/25/2010	0.03
7/27/2010	0.08
7/29/2010	0.02
7/31/2010	0.02
8/1/2010	0.02
8/2/2010	0.01
8/4/2010	0.02
8/5/2010	0.07
8/6/2010	0.04
8/11/2010	0.04
8/12/2010	0.02
8/19/2010	0.03
8/20/2010	0.01
8/22/2010	0.20
8/23/2010	0.02
8/24/2010	0.01
9/3/2010	0.29
9/4/2010	0.01
9/8/2010	0.04
9/9/2010	0.05
9/10/2010	0.01
9/11/2010	0.01
9/12/2010	0.16
9/13/2010	0.04

Appendix G – Morphology Table

Morphology and Hydraulic Monitoring Summary

Parameter	601 N R1 RXS-1						601 N R1 PXS-1						601 N R1 RXS-2						601 N R1 PXS-2						601 N R1 RXS-3						601 N R1 PXS-3					
	Riffle						Pool						Riffle						Pool						Riffle						Pool					
Dimension	MY0	MY1	MY2	MY3	MY4	MY5	MY0	MY1	MY2	MY3	MY4	MY5	MY0	MY1	MY2	MY3	MY4	MY5	MY0	MY1	MY2	MY3	MY4	MY5	MY0	MY1	MY2	MY3	MY4	MY5	MY0	MY1	MY2	MY3	MY4	MY5
BF Width (ft)	12.3	10.98	11.7	10.41	-	-	23.7	24.22	26.0	22.5	-	-	14.23	15.61	13.31	13.3	-	-	20.28	18.08	19.54	13.02	-	-	10.5	11	13.1	8.71	-	-	26.94	24.87	22.51	17.55	-	-
Floodprone Width	135	135	135	135.40	-	-	-	-	-	-	-	-	148	148	148	148	-	-	-	-	-	-	-	-	166	166	166	86.15	-	-	-	-	-	-	-	-
BF Cross Sectional	10.4	9.62	9.17	9.02	-	-	25.7	24.6	24.4	20.6	-	-	11.32	11.78	11.42	11.7	-	-	13.44	13.44	13.23	11.64	-	-	6.4	6.624	6.0	5.14	-	-	28.22	24.32	23.50	20.26	-	-
BF Mean Depth	0.84	0.88	0.782	0.87	-	-	1.09	1.016	0.939	0.92	-	-	0.80	0.75	0.86	0.88	-	-	0.66	0.74	0.68	0.89	-	-	0.61	0.602	0.46	0.59	-	-	1.05	0.98	1.04	1.15	-	-
BF Max Depth (ft)	1.51	1.52	1.58	1.57	-	-	2.77	2.82	2.8	2.26	-	-	1.49	1.64	1.58	1.54	-	-	1.91	1.99	1.90	1.89	-	-	0.99	1.19	1.1	1.02	-	-	2.76	2.52	2.62	2.25	-	-
Width/Depth Ratio	14.60	12.54	14.98	12.01	-	-	-	-	-	-	-	-	17.90	20.68	15.52	15.12	-	-	-	-	-	-	-	-	17.12	18.27	28.35	14.75	-	-	-	-	-	-	-	-
Entrenchment Ratio	10.96	12.30	11.52	13.00	-	-	-	-	-	-	-	-	>7	9.5	9.5	11.1	-	-	-	-	-	-	-	-	15.87	15.09	12.7	9.89	-	-	-	-	-	-	-	-
Bank Height Ratio	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-
Substrate																																				
d50 (mm)	6.90	2.86	0.06	17.65	-	-	11.00	2.86	0.06	0.06	-	-	18.97	12.48	5.58	12.08	-	-	17.50	4.68	6.08	8.83	-	-	15.77	8.00	6.28	6.85	-	-	6.90	2.86	0.06	1.10	-	-
d84 (mm)	15.48	6.47	4.85	45	-	-	15.48	6.47	4.85	0.06	-	-	15.48	28.87	20.42	27.30	-	-	34.17	16.00	20.40	36.33	-	-	31.10	25.73	14.12	22.60	-	-	15.48	6.47	4.85	4.68	-	-

Parameter	MY0 (2008)			MY1 (2008)			MY2 (2009)			MY3 (2010)			MY4 (2011)			MY5(2012)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth	31.59	80.59	48.33	30	82	50.00	31.4	79.44	50	25.43	68.91	46	-	-	-	-	-	-
Radius of	13.29	45.23	24.78	15	46	25.00	18.1	35.63	22.09	15.76	33.89	21.66	-	-	-	-	-	-
Meander	89.19	163.33	119.32	92	165	120.00	87.6	137.7	115.4	95.55	131.9	112.22	-	-	-	-	-	-
Meander Width	2.56	6.54	3.92	2.73	7.45	4.55	2.4	6.069	3.82	2.443	6.62	4.4188	-	-	-	-	-	-
Profile																		
Riffle length (ft)	9.69	89.79	33	12	92	34	15.4	89.73	30.74	17.6	86	29	-	-	-	-	-	-
Riffle slope (ft/ft)	0.0032	0.0329	0.0136	0.0050	0.0290	0.0140	0.002	0.015	0.006	0.004	0.018	0.008	-	-	-	-	-	-
Pool length (ft)	13.84	75.77	35.05	14.6	78	36	7.78	72.77	43.19	10.13	82.55	45	-	-	-	-	-	-
Pool spacing (ft)	41.92	144.39	68.08	44	150	70	34.1	120.6	69.57	32.05	118.8	70.57	-	-	-	-	-	-
Additional Reach Parameters																		
Valley Length (ft)	2407																	
Channel Length	2976			2976			2976			2976			-			-		
Sinuosity	1.24			1.24			1.24			1.24			-			-		
Water Surface	N/A			0.0079			N/A			N/A			-			-		
BF slope (ft/ft)	0.0082			0.0079			0.0079			0.0076			-			-		
Rosgen	C4			C4			C5			C5			-			-		
Habitat Index*	N/A			N/A			N/A			N/A			N/A			N/A		
Macrobenthos*	N/A			N/A			N/A			N/A			N/A			N/A		

LEGEND

- DESIGN TOP OF BANK
- MONITORING ALIGNMENT (ALL YEARS)
- 2008 (MY1) THALWEG
- 2008 (MY0) TOP OF BANK
- 2009 (MY2) THALWEG
- 2009 (MY2) TOP OF BANK
- 2010 (MY3) THALWEG
- 2010 (MY3) TOP OF BANK

601N R1 RXS-1
STA: 103+58

EASEMENT

601N R1 PXS-1
STA: 101+43

601N R1 RXS-2
STA:110+78

601N R1 PXS-2
STA: 114+17

Direction
of Flow

100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00 110+00 111+00 112+00 113+00 114+00 115+00 116+00 117+00

N3

SHEET 1

SHEET 2

NORTH

NO.	NOTES:	DRN	CHK	DATE

BIOLOGICAL & AGRICULTURAL ENGINEERING
WEAVER LABS CAMPUS BOX 7625
NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695

NCDENR-EEP
RALEIGH, NC

601N - REACH 1

601N YEAR 2010 (MY3)
MONITORING

UNION COUNTY, NC

DATE
10/15/2010

PROJECT NO.
06054-B

FILENAME
601N.DWG

SHEET NO.
1 OF 2

LEGEND

- DESIGN TOP OF BANK
- MONITORING ALIGNMENT (ALL YEARS)
- 2008 (MY1) THALWEG
- 2008 (MY0) TOP OF BANK
- 2009 (MY2) THALWEG
- 2009 (MY2) TOP OF BANK
- 2010 (MY3) THALWEG
- 2010 (MY3) TOP OF BANK

N2

118+00 117+00 119+00 120+00 121+00 122+00 123+00 124+00 125+00 126+00 127+00 128+00 129+00 130+00

130+96.12

N1

EASEMENT

601N R1 RXS-3
STA:121+55

601N R1 PXS-3
STA: 126+54

Direction
of Flow

SHEET 1

SHEET 2

NORTH

NO.	NOTES:	DRN	CHK	DATE

BIOLOGICAL & AGRICULTURAL ENGINEERING
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NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695

NCDENR-EEP
RALEIGH, NC

601N - REACH 1

601N YEAR 2010 (MY3)
MONITORING

UNION COUNTY, NC

DATE
10/15/2010

PROJECT NO.
06054-B

FILENAME
601N.DWG

SHEET NO.
2 OF 2