66 Scioto River at S.R. 159 at Chillicothe, OH

Site Location:		
Site ID:	66	
Site Name:	Scioto River at S.R. 159 at Chill	icothe, OH
County:	Ross	
Nearest City:	Chillicothe	Contact: Scott Jackson
State:	ОН	U.S. Geological Survey 614-469-5553
Latitude:	392031	75 West Third Ave. Columbus, Ohio 43212
Longitude:	825827	or William Krouse
USGS Station ID:		Ohio Department of Transportation 614-466-2398
Route Number:	159	25 South Front St. Columbus, Ohio 43216
Route Class:	State	Publication:
Service Level:	Mainline	Jackson, K.S., 1996, Evaluation of bridge-scour data at selected sites in Ohio: U.S. Geological
Route Direction:	North	Survey Water-Resources Investigations Report 97-4182.
Highway Mile Poin	t: 0.43	
Stream Name:	Scioto River	

Site Description:

River Mile:

This site is located at SR 159 crossing the Scioto River at Chillicothe, Ross Couty, Ohio. The site is located about 0.25 mile North of were the B&O Railroad crosses S.R. 159. USGS streamgage Scioto River at Chillicothe (03231500) located 1400 feet downstream of scour site bridge. Gage data from 1920 (some fragmentary data available to 1907). Bridge is located at downstream end of large bend of the channel. Bed-material samples were collected during an annual low-flow survey. Notes: All piers are referenced numerically, increasing form left to right, when viewing the upstream face of the bridge while facing in the downstream direction. Slope in Vicinity (reported in Stream Site Data) is estimated from USGS 7.5-minute quadrangle topographic maps. Water-surface slope (if reported in Pier Scour Data comments section) is the measured slope between water surfaces at the approach and bridge sections during the scour measurement.

Elevation Reference

Datum:	MSL

MSL (ft): 0

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Description of Reference Elevation:

RM1 - USGS Reference mark (brass tablet) located on top of upstream right abutment (southwest corner of bridge). MSL elevation = 630.82

Stream Data

Drainage Area (sq mi):	3849	Floodplain Width:	Narrow
Slope in Vicinity(ft/ft):	0.00035	Natural Levees:	Little
Flow Impact:	Right	Apparent Incision:	None
Channel Evolution	Premodified	Channel Boundary:	Alluvial
Armoring:	Unknown	Banks Tree Cover:	Medium
Debris Frequency:	Frequent	Sinuosity:	Sinuous
Debris Effect:	Local	Braiding:	Locally
Stream Size:	Wide	Anabranching:	Locally
Flow Habit:	Perennial	Bars:	Narrow
Bed Material:	Gravel	Stream Width Variability,	Equiwidth
Valley Setting:	Moderate	variability:	

Roughness Data

	Manning's n Values								
	Left Overbank	Channel	Right Overbank						
High:	0.075	0.045	0.65						
Typical	0.065	0.042	0.06						
Low:	0.06	0.038	0.055						

Bed Material

Measurement Number	Yr	Мо	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape Cohesion	
AP-1	1992	10	22		58	36	8.8	0.64	2.65	Unknown	

AP-2	1993	8	11	48	40	15	0.4	2.65	Unknown	
AP-3	1994	7	14	40	29	14.1	0.74	2.65	Unknown	
BR-1	1990	10	3	1.75	1.4	0.74	0.16	2.65	Unknown	
BR-2	1991	10	3	68	48	1.21	0.54	2.65	Unknown	
BR-3	1992	10	22	4.7	2.2	0.72	0.4	2.65	Unknown	
BR-4	1993	8	11	65	53	3.1	0.4	2.65	Unknown	
BR-5	1994	7	14	5.4	2.5	0.41	0.09	2.65	Unknown	
P27-1	1990	10	3	7	4.8	3.1	1	2.65	Unknown	
P27-2	1991	10	3	13	3.2	0.1	0.007	2.65	Unknown	
₽27-3	1992	10	22	4.4	2.5	1.2	0.62	2.65	Unknown	
P27-4	1993	8	11	66	42	6	1.3	2.65	Unknown	
₽27-5	1994	7	14	39.9	27	12	0.3	2.65	Unknown	
P28-1	1990	10	3	42	30	20.5	6.8	2.65	Unknown	
P28-2	1991	10	3	5.6	2.3	0.75	0.24	2.65	Unknown	
P28-3	1992	10	22	37	29	2.95	0.94	2.65	Unknown	

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P28-4	1993	8	11	22	18	6	0.7	2.65	Unknown
₽28-5	1994	7	14	6.2	3.5	1.25	0.27	2.65	Unknown
₽29-1	1990	10	3	11	6.8	1.35	0.34	2.65	Unknown
P29-2	1991	10	3	13.5	5.8	1.22	0.42	2.65	Unknown
₽29-3	1992	10	22	11.5	5.6	1.4	0.55	2.65	Unknown
₽29-4	1993	8	11	1.7	1.3	0.59	0.18	2.65	Unknown
₽29-5	1994	7	14	1.65	1.2	0.51	0.13	2.65	Unknown
P30-1	1990	10	3	70	63	21	5.8	2.65	Unknown
P30-2	1991	10	3	3.95	2.7	1.29	0.56	2.65	Unknown
P30-3	1992	10	22	4.4	1.4	0.2	0.04	2.65	Unknown
₽30-4	1993	8	11	19	16	2.41	0.04	2.65	Unknown
P30-5	1994	7	14	15	8.4	1.8	0.43	2.65	Unknown

Bed Material Comments

Measurement No: AP-1

Approach-section composite sample

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Measurement No: AP-2

Approach-section composite sample

Measurement No: AP-3

Approach-section composite sample

Measurement No: BR-1

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-2

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-3

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-4

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-5

Bridge-section composite sample, collected along the upstream bridge face.

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Measurement No: P27-1

Sample collected at the upstream face of pier 27

Measurement No: P27-2

Sample collected at the upstream face of pier 27

Measurement No: P27-3

Sample collected at the upstream face of pier 27

Measurement No: P27-4

Sample collected at the upstream face of pier 27

Measurement No: P27-5

Sample collected at the upstream face of pier 27

Measurement No: P28-1

Sample collected at the upstream face of pier 28

Measurement No: P28-2 Sample collected at the upstream face of pier 28

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Measurement No: P28-3

Sample collected at the upstream face of pier 28

Measurement No: P28-4

Sample collected at the upstream face of pier 28

Measurement No: P28-5

Sample collected at the upstream face of pier 28

Measurement No: P29-1

Sample collected at the upstream face of pier 29

Measurement No: P29-2

Sample collected at the upstream face of pier 29

Measurement No: P29-3

Sample collected at the upstream face of pier 29

Measurement No: P29-4

Sample collected at the upstream face of pier 29

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Measurement No: P29-5

Sample collected at the upstream face of pier 29

Measurement No: P30-1

Sample collected at the upstream face of pier 30

Measurement No: P30-2

Sample collected at the upstream face of pier 30

Measurement No: P30-3

Sample collected at the upstream face of pier 30

Measurement No: P30-4

Sample collected at the upstream face of pier 30

Measurement No: P30-5

Sample collected at the upstream face of pier 30

Bridge Data	
Structure No:	ROS-159-0043
Length(ft):	1673.75
Width(ft):	62
Number of Spans:	10
Vertical Configura	ation: Horizontal
Low Chord Elev (ft	b): 625.1

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Upper Chord Elev (ft): 631.7 Overtopping Elev (ft): 631.7 20 Skew (degrees): Guide Banks: None Waterway Classification: Main Year Built: 1951 Avg Daily Traffic: 29120 Plans on File: Yes Parallel Bridges No Upstream/Downstream: Unknown Continuous Abutment: No Distance Between Centerlines: Distance Between Pier Faces:

Bridge Description:

The bridge is constructed of concrete and steel I-beams, and it has solidwall round-nose piers. The site plans are dated 1951 and consisted of plans for only four piers. The bridge was later widened on the left overflow bank in 1962. The piers are referenced from the left to the right abutments when looking downstream.

Abutment Data

Left Station:	708.35						
Right Station:	691.6125						
Left Skew (deg):	0						
Right Skew (deg)	0						
Left Abutment Leng	Left Abutment Length (ft): 62						
Right Abutment Length (ft) 62							
Left Abutment to (Channel Bank (ft): 1380						
Right Abutment to	Channel Bank (ft): 57						
Left Abutment Prot	cection:						

Right Abutment Protection

Contracted Opening Type:	III
Embankment Skew (deg):	0
Embankment Slope (ft/ft):	2
Abutment Slope (ft/ft)	2
Wingwalls:	No
Wingwall Angle (deg):	0

Pier Data

Pier 1	ID	Bridge Station(ft)	Alignment	Highway	Station	n PierType	# Of Piles	Pile Spacing(ft)
27		1187	0	696	.48	Single	0	
28		1314.5	0	695	.205	Single	0	
29		1442	0	693.	9302	Single	0	
30		1569.5	0	692	.655	Single	0	
Pier	ID	Pier Width(ft)	Pier Shape	shape	Factor	Length(ft)	Protection	Foundation
27		3.5	Round			60	Riprap	Piles
28		4.5	Round			60	None	Piles
29		4.5	Round			60	None	Piles
30		4.5	Round			60	None	Piles
Pier	. ID	Top Elevation(Bo ft) Eleva	ottom ation(ft)	Foot) Cap W	or Pile Width(ft)	Cap Shape	Pile Tip Elevation(ft)
27	7	606.71	e	502.21		7	Square	
28	3	581.2		576.7		13	Square	
29	9	581.18	5	576.68		13	Square	
30)	581.18	5	575.68		13	Square	
Pier	De	escription						

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Pier ID 27

The concrete pier is a solid wall with round nose.

Pier ID 28

The concrete pier is a solid wall with round nose.

Pier ID 29

The concrete pier is a solid wall with round nose.

Pier ID 30

The concrete pier is a solid wall with round nose.

Pier	Scour	Data
FIE	Scour	ναια

_			Julu							
	Pier I	D I	Date	Time	USOrDS					
28		1/29/94		11:50	Upstream					
29		1/29/94		11:50	Upstream					
30		1/29/94		11:50	Upstream	Jpstream				
	Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprcl Vel (ft	h A :/s)De	apprch pth(ft)	Effective Pier Width	Skew to Flow(deg)
	28	1.4	0.5	11	30	2.9		12.3	4.5	0
	29	4.2	0.5	3.6	30	5		19.4	4.5	8
	30	6.1 0.5		4.2	50	4.2		18.7	4.5	10
	PierID	Sedim Trans	ment sport M	Bed aterial	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects	3
	28	Clear-	water No	n-cohesive	Unknown			5.0	7 Insignif	licant
	29	Live	-bed No	n-cohesive	Unknown			2.6	9 Unkno	own

30 Live	e-bed Non-co	hesive Unk	nown	1	9.8	Unknown				
PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm))					
28	22	18	6	0.7						
29	1.7	1.3	0.59	0.18						
30	19	16	2.41	0.041						
Pier Scour Comments										
Pier ID 28		Time: 11:50		US/DS:	Upstream					
Fathometer d	ata was colled	cted and used	to estimate	bed-geomet	ery.					
Pier ID 29 Time: 11:50 US/DS: Upstream										
Fathometer data was used to estimate bed geometry.										
Pier ID 30		Time: 11:50		US/DS:	Upstream					
Fathometer data was used to estimate bed geometry.										

Abutment Scour

ContractionScour

Measurement	Contracted	Contracted	Uncontracted	l Uncontracte	ed	Scour
Number	Date	Time	Date	Time	US/DS	Depth(ft)
1	1/29/94	11:00	7/14/94			1.5
Measurement	Accuracy	Contract	ed Contr	racted Co	ontracted	Contracted
Number		Avg Vel(f	t/s) Discha	rge(cfs) D	Depth(ft)	Width(ft)
1	0.5	4	2	0100	16.1	300

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Measurement Number	Uncontracted Avg Vel(ft/s	d Uncont s) Discha	tracted arge(cfs)	Uncontracte Depth(ft)	d Uncontrac Width(f	Channel ted Contraction t) Ratio
1	3.65	2	4800	14.4	425	0.05
Measurement Number	Pier Contraction Ratio	Scour Locatic	Eccer on rici	t- Sedimer ty Transpo	nt Bed ort Form	Debris Effects
1	0.053	Floodpla	in 0.25	3 Clear-wa	ater Unknow	n Unknown
Measurement Number	D95 (mm) I	084 (mm)	D50 (mm)	D16 (mm)	Sigma Bed Material	Bed Material
1	65	53	3.1	0.4	11.5	Non- cohesive

Contraction Scour Comments

Measurement No. 1

The data for the contracted section were measured from the bridge deck during the flood event on the specified date. The geometry of the reference uncontracted section was measured during low flow. The hydraulic data for the uncontracted section were estimated using WSPRO to estimate the approach hydraulics for the reference channel geometry and the flood discharge observed on the date of the contracted section measurement.

Stage and Discharge Data

Pea	ak D	ischa	rge	1	Flow	low Peak Stage					Stage	Water	Return	
year	mo	dy	hr	mi	(cfs)	Qacc	year	mo	dy	hr	mi	(ft)	Temp (C) Period(yr)
1994	1	29 11:50		26600)							0.5	1	

Hydrograph

Supporting Files