

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Site Location:

Site ID:	12	
Site Name:	South Platte River at C.R. 87 near Masters, CO	
County:	Weld	
Nearest City:	Masters	Contact:
State:	CO	Robert D. Jarret, Hydrologist
Latitude:	401822	U.S. Geological Survey, Water
Longitude:	1041440	Resources Division, Colorado
USGS Station ID:	6756995	District
Route Number:	87	Building 53, Denver Federal
Route Class:	County	Center, Mail Stop 415, Box 25046
Service Level:	Mainline	Denver, CO 80225
Route Direction:	NA	
Highway Mile Point:		Publication:
Stream Name:	South Platte River	U.S. Geological Survey
River Mile:		Water Resources Investigations
		Report 86-4030
		Pilot Study for Collection of
		Bridge-Scour Data
		by Robert D. Jarret and Jeanne M.
		Boyle

Site Description:

The study site is located at the County Road 87 bridge crossing the South Platte River, 1 mile north of Masters and U.S. Highway 34. The drainage basin (12,119 sq mi) includes rolling, irrigated farmland and mountainous areas. Natural streamflow is affected by reservoirs, diversions, ground-water withdrawals and return flows. A diversion dam is located about 1000 ft upstream of the bridge. There is a sand-bed channel at this location. Two tributaries enter the South Platte River at about 100 ft and 25 ft upstream from the bridge on the right bank. The majority of the flow is along the right side of the channel. During low flows, there is a sandbar along the left side of the channel that extends upstream and downstream from the bridge.

The bridge, estimated to be at least 40 years old, is 361 ft long, and it has eight concrete piers spaced 40 ft apart. The piers are perpendicular to the bridge and generally aligned with the flow. The piers are square nosed with a width of 0.95 ft and a length of 24 ft. (Sediment samples taken from the pier-scour holes are identified with a "P".)

A USGS streamflow-gaging station is located on the right bank downstream from the bridge. The range of discharge during data collection was from 1,450 to 8,010 cubic feet per second. The maximum reported at-pier approach velocity was 5.2 feet per second. The maximum peak flow for 1984 (May 18) was 8,220 cubic feet per second.

Data collection near piers 6, 7, and 8 (numbered from the left bank) was complicated by accumulated debris and (or) velocities that made positioning the sounding weights difficult. The depth of scour was measured on either side

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

of these piers.

The data reported herein were collected as part of a study of general scour at bridge crossings and local scour at bridge piers at sites in Colorado in 1984 (Jarret and Boyle, 1986). The purpose of the study was to develop and test guidelines for collecting streambed-scour data at bridges during high flows. Equipment and procedures commonly used in the the U.S. Geological Survey streamflow-gaging program were employed. A secondary purpose was to evaluate local-sour-prediction equations. The four data-collection sites were selected because record or near-record snow packs were present in the basin headwaters, and the bridges at the sites did not appear to contract the main-channel flow. Estimates of local scour at piers based on the stream cross-section data collected at the upstream and downstream side of the bridge are reported here. Approach depths at piers were computed as the total depth minus the estimated scour-hole depth. At-pier approach velocity and flow skew angle are reported if available.

Elevation Reference

Datum: Gage

MSL (ft):

Description of Reference Elevation:

The elevations given are referenced to the gage datum, the elevation of which was not determined. The gage altitude from the topographic map was 4450 ft. Reference point, gage elevation 11.23, was on the top of the H-beam in the upstream wingwall of the right-bank abutment. The gage was discontinued in 1988.

Stream Data

Drainage Area (sq mi):	12120	Floodplain Width:	Unknown
Slope in Vicinity(ft/ft):	0.00132	Natural Levees:	Unknown
Flow Impact:	Straight	Apparent Incision:	Unknown
Channel Evolution	Unknown	Channel Boundary:	Alluvial
Armoring:	Unknown	Banks Tree Cover:	Medium
Debris Frequency:	Frequent	Sinuosity:	Unknown
Debris Effect:	Local	Braiding:	Locally
Stream Size:	Medium	Anabranching:	Locally
Flow Habit:	Perennial	Bars:	Unknown
Bed Material:	Sand	Stream Width Variability:	Unknown
Valley Setting:	Low		

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Roughness Data

Manning's n Values

Left Overbank Channel Right Overbank

High:

Typical

Low:

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1984	6	25	BM-54	16.8	9.4	2.29	0.52	2.65		Non-Cohesive
2	1984	6	25	BM-54 (P)	6.98	3.5	0.95	0.4	2.65		Non-Cohesive
3	1984	10	2	HAND	11.1	6.3	1.52	0.58	2.65		Non-Cohesive
4	1984	10	2	HAND (P)	9.3	2.1	0.67	0.31	2.65		Non-Cohesive

Bed Material Comments

Measurement No: 1

Measurement No: 2

Measurement No: 3

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Measurement No: 4

Bridge Data

Structure No: 87-44A

Length(ft): 361

Width(ft): 24

Number of Spans: 9

Vertical Configuration: Horizontal

Low Chord Elev (ft):

Upper Chord Elev (ft):

Overtopping Elev (ft):

Skew (degrees): 0

Guide Banks: Unknown

Waterway Classification: Unknown

Year Built:

Avg Daily Traffic:

Plans on File: Yes

Parallel Bridges No

Upstream/Downstream: N/A

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

The bridge is 361 ft long, and it has eight concrete piers (numbered left to right) spaced 40 ft apart with centerlines oriented perpendicular to the bridge centerline.

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Abutment Data

Left Station: 0
Right Station: 358
Left Skew (deg): 0
Right Skew (deg) 0
Left Abutment Length (ft): 24
Right Abutment Length (ft) 24
Left Abutment to Channel Bank (ft): 0
Right Abutment to Channel Bank (ft): 0
Left Abutment Protection:
Right Abutment Protection
Contracted Opening Type: IV
Embankment Skew (deg): 0
Embankment Slope (ft/ft):
Abutment Slope (ft/ft)
Wingwalls: No
Wingwall Angle (deg): 0

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
1	39	0	0	Single	0	
2	79	0	0	Single	0	
3	119	0	0	Single	0	
4	159	0	0	Single	0	
5	199	0	0	Single	0	
6	239	0	0	Single	0	
7	279	0	0	Single	0	

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

8 319 0 0 Single 0

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	0.95	Square		24	Unknown	Piles
2	0.95	Square		24	Unknown	Piles
3	0.95	Square		24	Unknown	Piles
4	0.95	Square		24	Unknown	Piles
5	0.95	Square		24	Unknown	Piles
6	0.95	Square		24	Unknown	Piles
7	0.95	Square		24	Unknown	Piles
8	0.95	Square		24	Unknown	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
1				Unknown	
2				Unknown	
3				Unknown	
4				Unknown	
5				Unknown	
6				Unknown	
7				Unknown	
8				Unknown	

Pier Description

Pier ID 1

The concrete pier encases six 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.)

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 2

The concrete pier encases five 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 2.

Pier ID 3

The concrete pier encases five 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 3.

Pier ID 4

The concrete pier encases five 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 4.

Pier ID 5

The concrete pier encases six 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 5.

Pier ID 6

The concrete pier encases six 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 6.

Pier ID 7

The concrete pier encases six 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 7.

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 8

The concrete pier encases six 8-inch by 8-inch steel "H" piles. Pier width is 0.95 ft, pier length is 24 ft, and pier height is at least 10.5 ft (exact height is unknown). Depth to pile tip is also unknown. (Detailed construction plans are unavailable.) NO Pier coordinates exist for pier ID 8.

Pier Scour Data

Pier ID	Date	Time	USOrDS
1	5/18/84	11:00	Upstream
1	5/18/84	13:30	Downstream
1	6/25/84	14:00	Upstream
1	6/25/84	16:30	Downstream
1	10/2/84	14:00	Upstream
1	10/2/84	16:00	Downstream
2	5/18/84	11:00	Upstream
2	5/18/84	13:00	Downstream
3	5/18/84	11:00	Upstream
3	5/18/84	13:30	Downstream
3	6/25/84	14:00	Upstream
3	6/25/84	16:30	Downstream
4	5/18/84	11:00	Upstream
4	5/18/84	13:30	Downstream
4	6/25/84	14:00	Upstream
4	6/25/84	16:30	Downstream
4	10/2/84	14:00	Upstream
5	5/18/84	11:00	Upstream
5	5/18/84	13:30	Downstream
5	6/25/84	14:00	Upstream
5	6/25/84	16:30	Downstream
5	10/2/84	14:00	Upstream
5	10/2/84	16:00	Downstream
6	5/18/84	11:00	Upstream
6	5/18/84	13:30	Downstream
6	6/25/84	14:00	Upstream
6	6/25/84	16:30	Downstream
6	10/2/84	14:00	Upstream
6	10/2/84	16:00	Downstream
7	5/18/84	11:00	Upstream
7	5/18/84	13:30	Downstream

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

7	6/25/84	14:00	Upstream
7	6/25/84	16:30	Downstream
7	10/2/84	14:00	Upstream
7	10/2/84	16:00	Downstream
8	5/18/84	11:00	Upstream
8	5/18/84	13:30	Downstream
8	10/2/84	14:00	Upstream
8	10/2/84	16:00	Downstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)
1	2	0.5	10.5	44	2.6	3.3	0.95	26
1	1.9	0.5	5.9	18	2.6	3.3	0.95	26
1	0.7	0.5	10.7	17	2.3	1.9	0.95	15
1	1.4	0.5	6.2	17	2.3	1.9	0.95	15
1	1.7	0.5	10	34	2.4	0.5	0.95	15
1	0	0.5			2.4	0.5	0.95	15
2	0.5	0.5	5.1	16	3.5	3.3	0.95	26
2	1.5	0.5	5.7	15	3.5	3.3	0.95	26
3	1	0.5	15.2	24	3.8	3.3	0.95	14
3	1.1	0.5	9	16	3.8	3.3	0.95	14
3	1	0.5	11.5	23	2.7	1.1	0.95	20
3	0	0.5			2.7	1.1	0.95	20
4	0.6	0.5	5.5	10	3.9	4.3	0.95	23
4	1.1	0.5		25	3.9	4.3	0.95	23
4	1.2	0.5	7.5	22	3.3	1.1	0.95	16
4	0.8	0.5	9.9	15	3.3	1.1	0.95	16
4	1.3	0.5	5.5	19	2.4	3.4	0.95	16
5	2.1	0.5	4.9	18	4.1	6.1	0.95	16
5	1.6	0.5	14.4	18	4.1	6.1	0.95	16
5	1.8	0.5	2.5	9	3.7	1.4	0.95	11
5	1.3	0.5	5.5	16	3.7	1.4	0.95	11
5	1.7	0.5	3.4	11	3.5	2.8	0.95	11
5	1.5	0.5	5.7	16	3.5	2.8	0.95	11
6	2.4	0.5	5.8	30	3.9	8.7	0.95	16
6	2.5	0.5	7.4	37	3.9	8.7	0.95	16
6	1.7	0.5	5.1	16	3.6	1.7	0.95	8
6	1.3	0.5	6.9	15	3.6	1.7	0.95	8
6	2	0.5	2.2	9	3.7	2	0.95	8
6	2	0.5	3.4	16	3.7	2	0.95	8

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

7	1.3	0.5	2.6	8	5.2	9.2	0.95	14
7	1.3	0.5	8.1	17	5.2	9.2	0.95	14
7	1.7	0.5	5.2	14	3.7	2.2	0.95	13
7	1.2	0.5	6.2	17	3.7	2.2	0.95	13
7	1.9	0.5	5.7	20	2.4	2.2	0.95	13
7	3.1	0.5	1.2	8	2.4	2.2	0.95	13
8	0.7	0.5	3.3	10	4.3	9.4	0.95	11
8	2	0.5	7.5	23	4.3	9.4	0.95	11
8	0.6	0.5	7.7	8	2.4	2.6	0.95	11
8	1	0.5	6.6	25	2.4	2.6	0.95	11

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
1	Live-bed	Non-cohesive	Unknown			2.98	Unknown
1	Live-bed	Non-cohesive	Unknown			2.98	Unknown
1	Live-bed	Non-cohesive	Unknown			2.98	Unknown
1	Live-bed	Non-cohesive	Unknown			2.98	Unknown
1	Live-bed	Non-cohesive	Unknown			2.62	Unknown
1	Unknown	Non-cohesive	Unknown			2.62	Unknown
2	Live-bed	Non-cohesive	Unknown			2.98	Substantial
2	Live-bed	Non-cohesive	Unknown			2.98	Substantial
3	Live-bed	Non-cohesive	Unknown			2.98	Unknown
3	Live-bed	NON-COH	Unknown			2.98	Unknown
3	Live-bed	Non-cohesive	Unknown			2.98	Unknown
3	Unknown	Non-cohesive	Unknown			2.98	Unknown
4	Live-bed	Non-cohesive	Unknown			2.98	Substantial
4	Live-bed	Non-cohesive	Unknown			2.98	Substantial
4	Live-bed	Non-cohesive	Unknown			2.98	Unknown
4	Live-bed	Non-cohesive	Unknown			2.98	Unknown
4	Live-bed	Non-cohesive	Unknown			2.62	Unknown
5	Live-bed	Non-cohesive	Unknown			2.98	Unknown
5	Live-bed	Non-cohesive	Unknown			2.98	Unknown

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

5	Live-bed	Non-cohesive	Unknown	2.98	Unknown
5	Live-bed	Non-cohesive	Unknown	2.98	Unknown
5	Live-bed	Non-cohesive	Unknown	2.62	Unknown
5	Live-bed	Non-cohesive	Unknown	2.62	Unknown
6	Live-bed	Non-cohesive	Unknown	2.98	Unknown
6	Live-bed	Non-cohesive	Unknown	2.98	Unknown
6	Live-bed	Non-cohesive	Unknown	2.98	Unknown
6	Live-bed	Non-cohesive	Unknown	2.98	Unknown
6	Live-bed	Non-cohesive	Unknown	2.62	Unknown
6	Live-bed	Non-cohesive	Unknown	2.62	Unknown
7	Live-bed	Non-cohesive	Unknown	2.98	Substantial
7	Live-bed	Non-cohesive	Unknown	2.98	Substantial
7	Live-bed	Non-cohesive	Unknown	2.98	Unknown
7	Live-bed	Non-cohesive	Unknown	2.98	Unknown
7	Live-bed	Non-cohesive	Unknown	2.62	Unknown
7	Live-bed	Non-cohesive	Unknown	2.62	Unknown
8	Live-bed	Non-cohesive	Unknown	2.98	Substantial
8	Live-bed	Non-cohesive	Unknown	2.98	Substantial
8	Live-bed	Non-cohesive	Unknown	2.62	Insignificant
8	Live-bed	Non-cohesive	Unknown	2.62	Unknown

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
1	6.98	3.51	0.94	0.4
1	6.98	3.51	0.94	0.4
1	6.98	3.51	0.94	0.4
1	6.98	3.51	0.94	0.4
1	9.3	2.1	0.67	0.3
1	9.3	2.1	0.67	0.3
2	6.98	3.51	0.94	0.4

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

2	6.98	3.51	0.94	0.4
3	6.98	3.51	0.94	0.4
3	6.98	3.51	0.94	0.4
3	6.98	3.51	0.94	0.4
3	6.98	3.51	0.94	0.4
4	6.98	3.51	0.94	0.4
4	6.98	3.51	0.94	0.4
4	6.98	3.51	0.94	0.4
4	6.98	3.51	0.94	0.4
4	9.3	2.1	0.67	0.3
5	6.98	3.51	0.94	0.4
5	6.98	3.51	0.94	0.4
5	6.98	3.51	0.94	0.4
5	6.98	3.51	0.94	0.4
5	6.98	3.51	0.94	0.4
5	6.98	3.51	0.94	0.4
6	6.98	3.51	0.94	0.4
6	6.98	3.51	0.94	0.4
6	6.98	3.51	0.94	0.4
6	6.98	3.51	0.94	0.4
6	9.3	2.1	0.67	0.3
6	9.3	2.1	0.67	0.3
7	6.98	3.51	0.94	0.4
7	6.98	3.51	0.94	0.4
7	6.98	3.51	0.94	0.4
7	6.98	3.51	0.94	0.4
7	9.3	2.1	0.67	0.3
7	9.3	2.1	0.67	0.3

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 3 Time: 11:00 US/DS: Upstream

Pier ID 3 Time: 13:30 US/DS: Downstream

The maximum scour-hole depth is to the right of the pier.

Pier ID 3 Time: 14:00 US/DS: Upstream

Pier ID 3 Time: 16:30 US/DS: Downstream

Channel bottom rises in vicinity of the pier.

Pier ID 4 Time: 11:00 US/DS: Upstream

Pier ID 4 Time: 13:30 US/DS: Downstream

The maximum scour-hole depth is to the right of the pier.

Pier ID 4 Time: 14:00 US/DS: Upstream

Pier ID 4 Time: 16:30 US/DS: Downstream

Pier ID 4 Time: 14:00 US/DS: Upstream

The reported velocity is the average velocity of the approach section. The reference surface was difficult to determine at this pier, which is located at the channel thalweg.

There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 5 Time: 11:00 US/DS: Upstream

Pier ID 5 Time: 13:30 US/DS: Downstream

The maximum scour-hole depth is to the right of the pier.

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 5 **Time:** 14:00 **US/DS:** Upstream

Pier ID 5 **Time:** 16:30 **US/DS:** Downstream

Pier ID 5 **Time:** 14:00 **US/DS:** Upstream

There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 5 **Time:** 16:00 **US/DS:** Downstream

The maximum scour-hole depth is to the left of the pier.
There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 6 **Time:** 11:00 **US/DS:** Upstream

High velocity prevented depth measurement at the pier nose. Scour depth estimated based on nearby measurements. Actual scour depth may be larger than the estimate.

Pier ID 6 **Time:** 13:30 **US/DS:** Downstream

The maximum scour-hole depth is to the right of the pier.

Pier ID 6 **Time:** 14:00 **US/DS:** Upstream

Pier ID 6 **Time:** 16:30 **US/DS:** Downstream

Pier ID 6 **Time:** 14:00 **US/DS:** Upstream

There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 6 **Time:** 16:00 **US/DS:** Downstream

There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 7 **Time:** 11:00 **US/DS:** Upstream

High velocity and debris accumulation prevented depth measurement at the pier nose. Scour depth estimated based on nearby measurements. Actual scour depth may be larger than the estimate.

Pier ID 7 **Time:** 13:30 **US/DS:** Downstream

The maximum scour-hole depth is to the right of the pier.

Pier ID 7 **Time:** 14:00 **US/DS:** Upstream

Pier ID 7 **Time:** 16:30 **US/DS:** Downstream

Pier ID 7 **Time:** 14:00 **US/DS:** Upstream

The velocity reported is the average velocity of the approach cross section. There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 7 **Time:** 16:00 **US/DS:** Downstream

The velocity reported is the average velocity of the approach cross section. There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 8 **Time:** 11:00 **US/DS:** Upstream

Debris pile prevented measurement of depth at pier nose. Scour depth estimated based on nearby measurements. Actual scour depth may be larger than the estimate.

Pier ID 8 **Time:** 13:30 **US/DS:** Downstream

The maximum scour depth is to the right of the pier.

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Pier ID 8

Time: 14:00

US/DS: Upstream

The reported velocity is the average velocity in the approach cross section. There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Pier ID 8

Time: 16:00

US/DS: Downstream

The maximum scour-hole depth is to the left of the pier. The velocity reported is the average velocity in the approach cross section. There was no skew measured during the October measurement, however, based on all previous measurements it is anticipated that skew would be present. Skew was evident in an approach section collected in October but the stationing could not be aligned with the bridge. The skew reported is that of the previous measurement

Abutment Scour

Contraction Scour

BSDMS Summary Report

12 South Platte River at C.R. 87 near Masters, CO

Stage and Discharge Data

Peak Discharge					Flow (cfs)	Qacc	Peak Stage					Stage (ft)	Water Temp (C)	Return Period(yr)
year	mo	dy	hr	mi			year	mo	dy	hr	mi			
1984	5	18	11:00	0	8010	10	1984	5	18	11:00	0	8.04		
1984	6	25	14:00	0	2750	10	1984	6	25	14:00	0	5.33		
1984	10	1	15:30	30	1570	10	1984	10	1	15:30	30	4.57		
1984	10	2	14:00	0	1450	10	1984	10	2	14:00	0	4.5		

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)
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Supporting Files
