Appendix

Water Discharge Rate 7.25 l/s, Water Depth 8 cm , Duration 6 hours, except first experiment: 3 hours.	
Experiment Code	**Appendix Code**
U 3h	E 1
U 6h	E 2
10-R-40	E 3
10-R-30	E 4
10-R-20	E 5
10-R-10	E 6
10-R-40*60	E 7
10-R-40*80	E 8
10-R-20*60	E 9
5-R-40	E 10
5-R-30	E 11
5-R-20	E 12
5-R-10	E 13
5-R-40*60	E 14
5-R-40*80	E 15
5-R-20*60	E 16
10-F-40	E 17
10-F-30	E 18
10-F-20	E 19
10-F-10	E 20
10-F-25*80	E 21
10-F-25*60	E 22
7-F-40	E 23
7-F-30	E 24
7-F-20	E 25
7-F-10	E 26
7-F-40*60	E 27
7-F-40*80	E 28
7-F-20*60	E 29

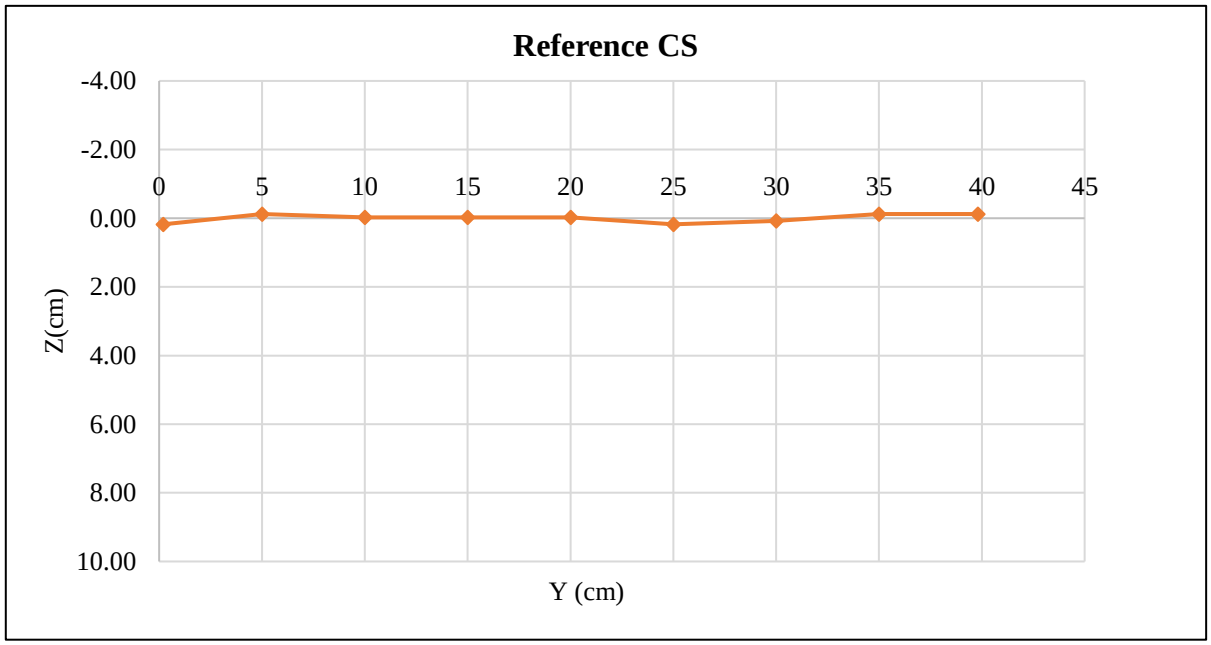
Experiment E1 (Unprotected 3h)

T(min)	0	10	30	60	90	120	150	180
Discharge (l/s)	7.244	7.225	7.202	7.29	7.221	7.234	7.258	7.155
	7.239	7.202	7.251	7.234	7.331	7.268	7.292	7.245
	7.156	7.284	7.288	7.204	7.238	7.133	7.09	7.095
	7.179	7.306	7.145	7.226	7.394	7.21	7.313	7.256
	7.307	7.297	7.263	7.307	7.278	7.279	7.286	7.04
	7.251	7.316	7.199	7.3	7.299	7.301	7.16	7.248
	7.202	7.359	7.13	7.124	7.32	7.209	7.3	7.203
	7.276	7.371	7.205	7.267	7.271	7.101	7.245	7.145
	7.339	7.223	7.231	7.178	7.231	7.243	7.268	7.256
	7.291	7.254	7.259	7.27	7.149	7.144	7.244	7.159
Average	7.248	7.284	7.217	7.240	7.273	7.212	7.246	7.180
Ratio	1.000	1.005	0.995	0.999	1.003	0.995	0.999	0.990

E1.1. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.8	0.18
	13.4	5	26.5	-0.12
	18.4	10	26.6	-0.02
	23.4	15	26.6	-0.02
	28.4	20	26.6	-0.02
	33.4	25	26.8	0.18
	38.4	30	26.7	0.08
	43.4	35	26.5	-0.12
	48.2	39.8	26.5	-0.12
		Average (Reference Elevation)	**26.6**	

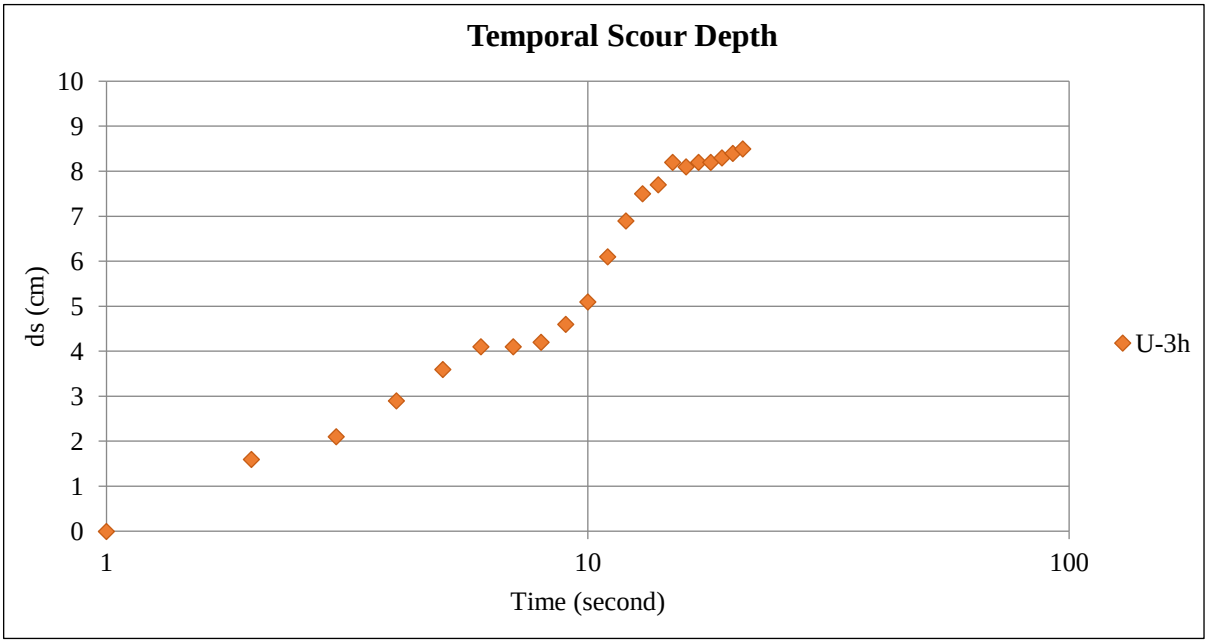
E1.2. Calculated Reference Elevation.



E1.3. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.6
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	20	20	25	1.6
0	0	32	32	24.5	2.1
0	0	40	40	23.7	2.9
0	0	52	52	23	3.6
0	1	3	63	22.5	4.1
0	1	32	92	22.5	4.1
0	2	15	135	22.4	4.2
0	2	40	160	22	4.6
0	4	23	263	21.5	5.1
0	9	48	588	20.5	6.1
0	30	0	1800	19.7	6.9
0	48	0	2880	19.1	7.5
1	0	0	3600	18.9	7.7
1	15	0	4500	18.4	8.2
1	30	0	5400	18.5	8.1
1	45	0	6300	18.4	8.2
2	0	0	7200	18.4	8.2
2	15	0	8100	18.3	8.3
2	30	0	9000	18.2	8.4
2	45	0	9900	18.1	8.5
3	0	0	10800	18	8.6

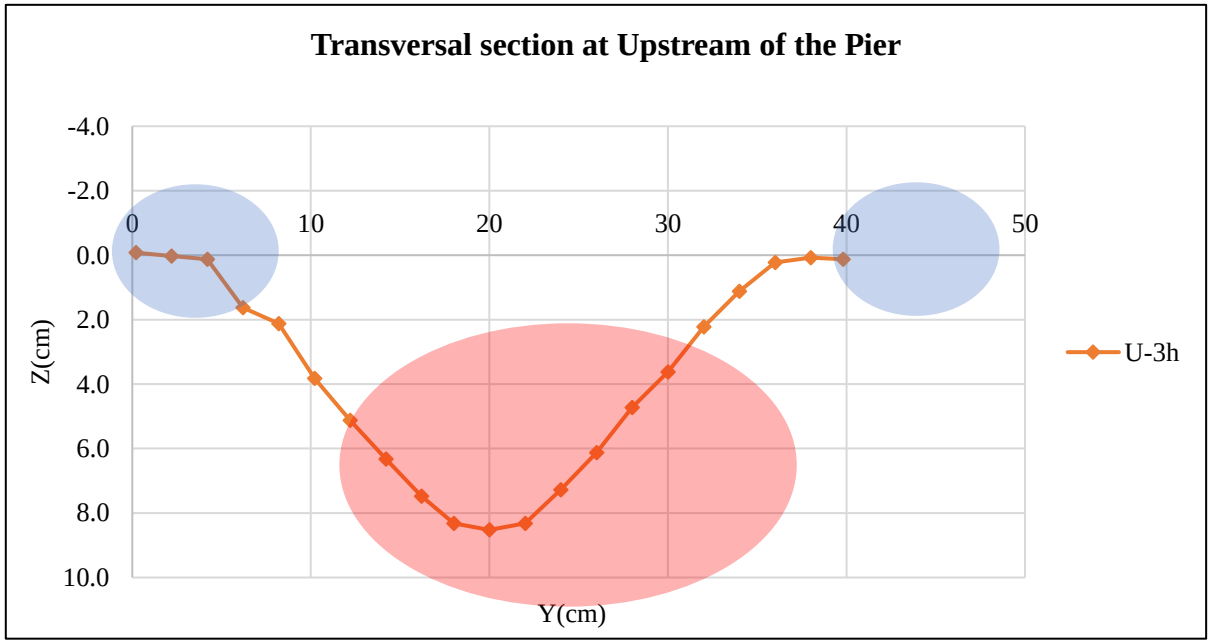
E1.4. Temporal Scour Depth measurements.



E1.5. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.7	-0.1
	10.6	2.2	26.6	0.0
	12.6	4.2	26.5	0.1
	14.6	6.2	25	1.6
	16.6	8.2	24.5	2.1
	18.6	10.2	22.8	3.8
	20.6	12.2	21.5	5.1
	22.6	14.2	20.3	6.3
	24.6	16.2	19.15	7.5
	26.4	18	18.3	8.3
	28.4	20	18.1	8.5
	30.4	22	18.3	8.3
	32.4	24	19.35	7.3
	34.4	26	20.5	6.1
	36.4	28	21.9	4.7
	38.4	30	23	3.6
	40.4	32	24.4	2.2
	42.4	34	25.5	1.1
	44.4	36	26.4	0.2
	46.4	38	26.55	0.1
	48.2	39.8	26.5	0.1

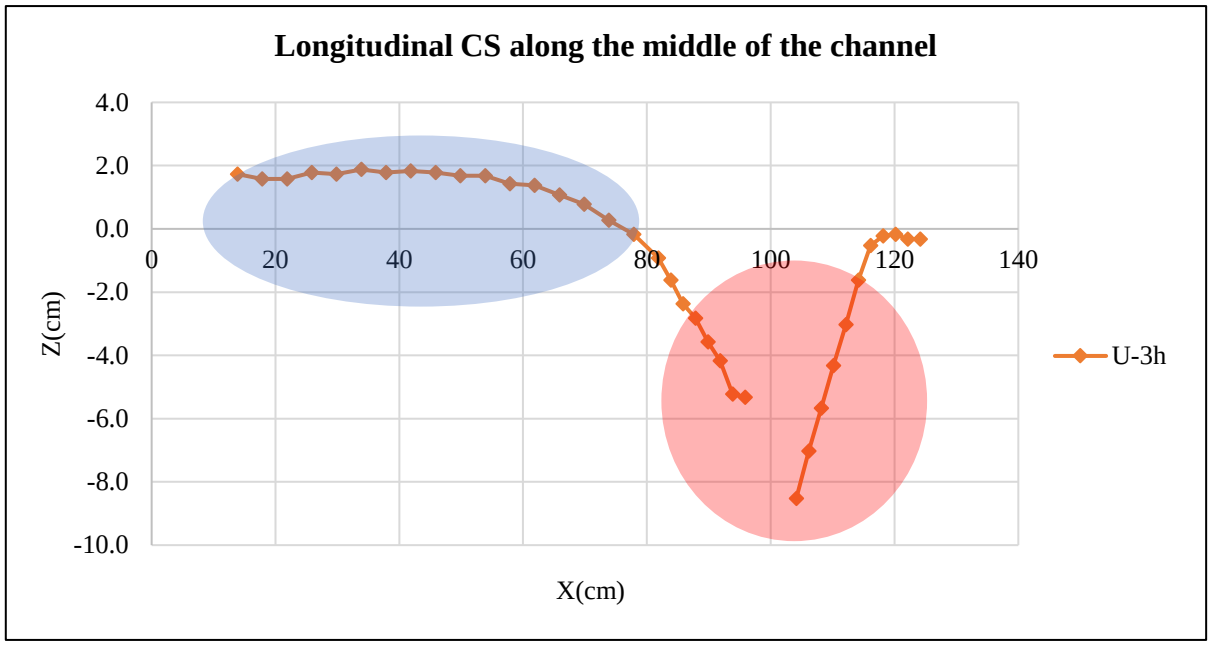
E1.6. Recorded surveyed transversal section measurements.



E17. Visual representation of the surveyed transversal section measurements. The blue circles are representing the side of the channel and the middle part of the channel is representing by the red circle.

X Direction (cm)	Calibrated X direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour depth (cm)
75.7	13.85		28.35	1.73
79.7	17.85		28.2	1.58
83.7	21.85		28.2	1.58
87.7	25.85		28.4	1.78
91.7	29.85		28.35	1.73
95.7	33.85		28.5	1.88
99.7	37.85		28.4	1.78
3.7	41.85		28.45	1.83
7.7	45.85		28.4	1.78
11.7	49.85		28.3	1.68
15.7	53.85		28.3	1.68
19.7	57.85		28.05	1.43
23.7	61.85		28	1.38
27.7	65.85		27.7	1.08
31.7	69.85		27.4	0.78
35.7	73.85		26.9	0.28
39.7	77.85		26.45	-0.17
43.7	81.85		25.7	-0.92
45.7	83.85	28.4	25	-1.62
47.7	85.85		24.25	-2.37
49.7	87.85		23.8	-2.82
51.7	89.85		23.05	-3.57
53.7	91.85		22.45	-4.17
55.7	93.85		21.4	-5.22
57.7	95.85		21.3	-5.32
61.85	100		The Middle of the Pier	
66	104.15		18.1	-8.52
68	106.15		19.6	-7.02
70	108.15		20.95	-5.67
72	110.15		22.3	-4.32
74	112.15		23.6	-3.02
76	114.15		25	-1.62
78	116.15		26.1	-0.52
80	118.15		26.4	-0.22
82	120.15		26.45	-0.17
84	122.15		26.3	-0.32
86	124.15		26.3	-0.32

E1.8. Recorded surveyed longitudinal section measurements.



E1.9. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue circle is indicating the accumulated eroded sediments in the downstream of the pier.

Experiment E2 (Unprotected 6h)

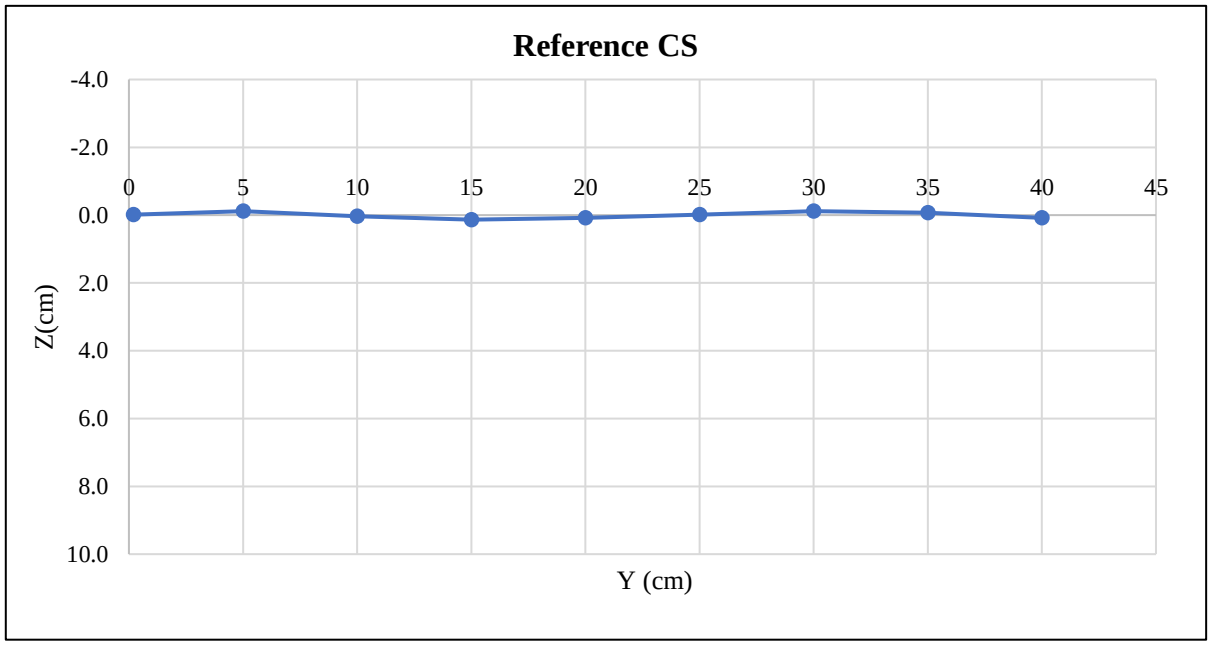
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.304	7.258	7.209	7.130	6.970	7.014	7.080	7.050	6.950	7.200	7.118	7.243	7.190	7.169
	7.210	7.317	7.270	7.122	7.160	7.072	7.014	6.978	6.910	7.260	7.167	7.203	7.328	7.183
	7.334	7.336	7.290	7.210	7.108	7.015	7.039	7.095	7.010	7.170	7.230	7.145	7.185	7.119
	7.254	7.234	7.341	7.198	7.140	7.035	7.020	6.965	6.930	7.130	7.199	7.256	7.298	7.158
	7.199	7.235	7.231	7.144	6.950	7.063	7.147	7.050	7.090	7.110	7.281	7.159	7.195	7.211
	7.279	7.186	7.234	7.110	7.125	7.126	7.074	7.063	6.940	7.240	7.105	7.264	7.215	7.243
	7.345	7.250	7.226	7.124	7.045	7.022	7.199	7.005	7.040	7.190	7.160	7.254	7.230	7.203
	7.146	7.198	7.342	7.208	7.054	7.049	7.012	6.874	6.930	7.100	7.270	7.244	7.183	7.270
	7.148	7.267	7.231	7.185	7.126	6.925	6.969	7.010	6.970	7.220	7.119	7.241	7.324	7.128
	7.229	7.296	7.303	7.165	7.099	7.099	7.033	6.994	7.120	7.260	7.284	7.273	7.127	7.258
Average	7.245	7.258	7.268	7.160	7.078	7.042	7.059	7.008	6.989	7.188	7.193	7.228	7.228	7.194
Ratio	0.999	1.001	1.002	0.988	0.976	0.971	0.974	0.967	0.964	0.991	0.992	0.997	0.997	0.992

E2.1. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.7	0.0
	13.4	5	26.8	-0.1
	18.4	10	26.65	0.0
	23.4	15	26.55	0.1
	28.4	20	26.6	0.1
	33.4	25	26.7	0.0
	38.4	30	26.8	-0.1

	43.4	35	26.75	-0.1
	48.4	40	26.6	0.1
		Average (Reference Elevation)	**26.7**	

E2.2. Calculated Reference Elevation.

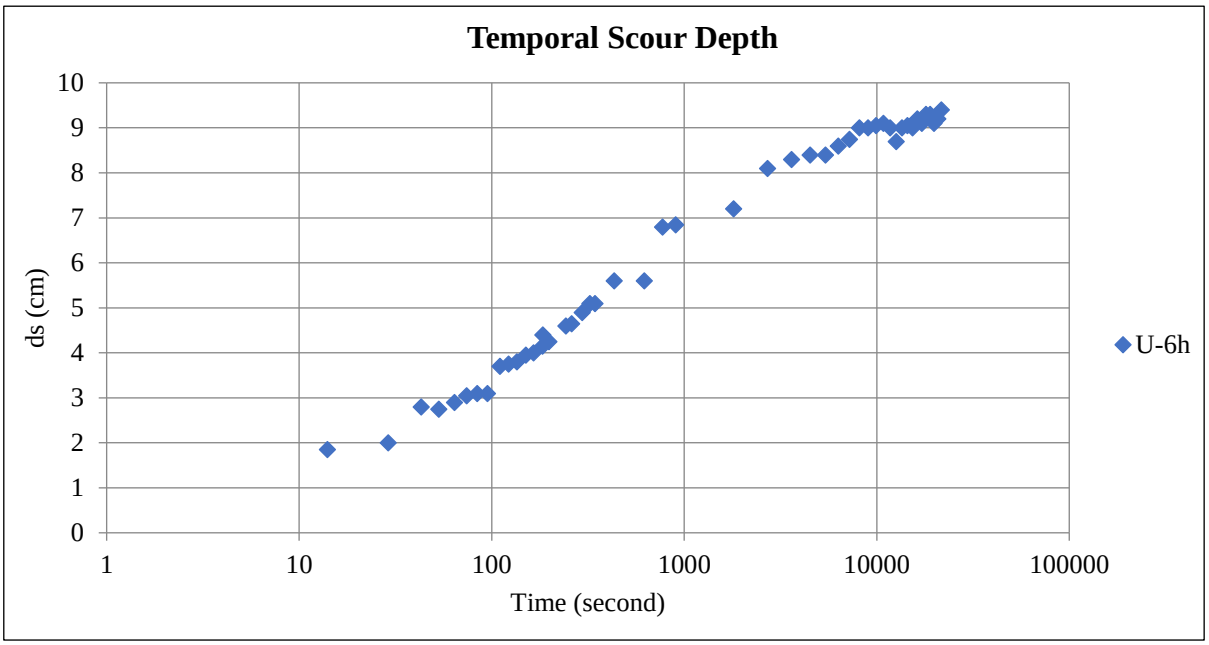


E2.3. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.7**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	14	14	24.85	1.85
0	0	29	29	24.7	2
0	0	43	43	23.9	2.8
0	0	53	53	23.95	2.75
0	1	4	64	23.8	2.9
0	1	14	74	23.65	3.05
0	1	24	84	23.6	3.1
0	1	35	95	23.6	3.1
0	1	50	110	23	3.7
0	2	2	122	22.95	3.75
0	2	15	135	22.9	3.8
0	2	30	150	22.75	3.95
0	2	45	165	22.7	4
0	3	3	183	22.55	4.15
0	3	18	198	22.45	4.25
0	3	4	184	22.3	4.4
0	4	2	242	22.1	4.6
0	4	20	260	22.05	4.65
0	4	55	295	21.8	4.9
0	5	23	323	21.6	5.1
0	5	44	344	21.6	5.1
0	7	13	433	21.1	5.6

0	10	20	620	21.1	5.6
0	12	50	770	19.9	6.8
0	15	0	900	19.85	6.85
0	30	0	1800	19.5	7.2
0	45	0	2700	18.6	8.1
1	0	0	3600	18.4	8.3
1	15	0	4500	18.3	8.4
1	30	0	5400	18.3	8.4
1	45	0	6300	18.1	8.6
2	0	0	7200	17.95	8.75
2	15	0	8100	17.7	9
2	30	0	9000	17.7	9
2	45	0	9900	17.65	9.05
3	0	0	10800	17.6	9.1
3	15	0	11700	17.7	9
3	30	0	12600	18	8.7
3	45	0	13500	17.7	9
4	0	0	14400	17.65	9.05
4	15	0	15300	17.7	9
4	30	0	16200	17.5	9.2
4	45	0	17100	17.6	9.1
5	0	0	18000	17.4	9.3
5	15	0	18900	17.4	9.3
5	30	0	19800	17.6	9.1
5	45	0	20700	17.5	9.2
6	0	0	21600	17.3	9.4

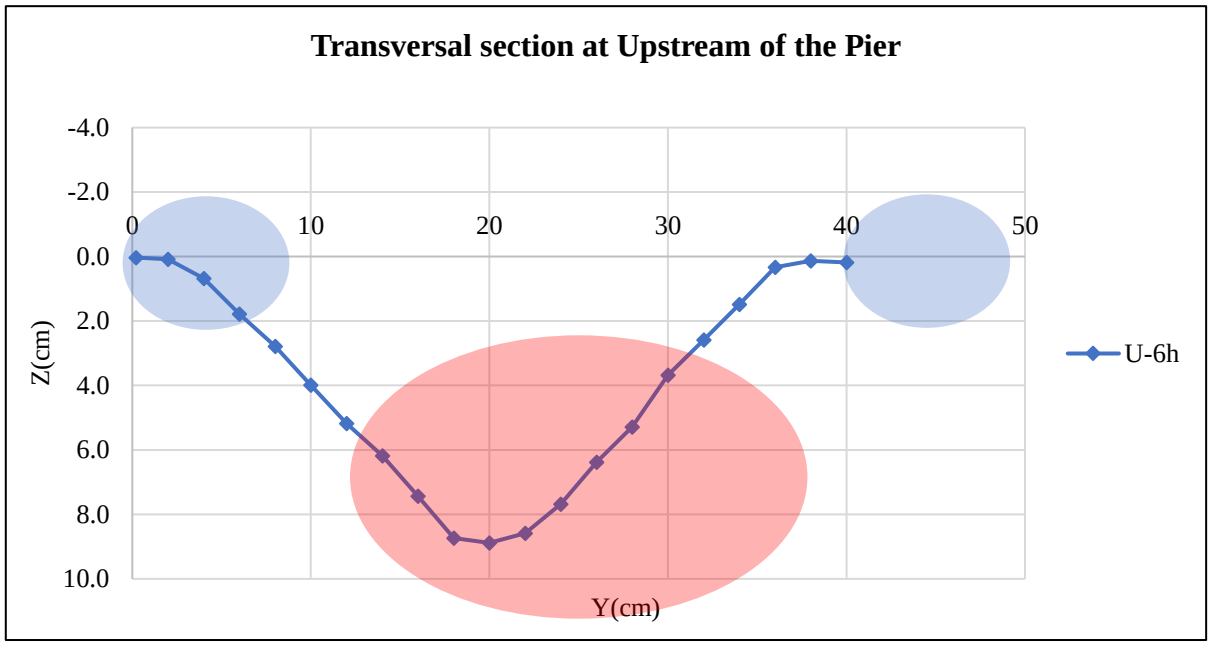
E2.4. Temporal Scour Depth measurements.



E2.5. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.65	0.0
	10.4	2	26.6	0.1
	12.4	4	26	0.7
	14.4	6	24.9	1.8
	16.4	8	23.9	2.8
	18.4	10	22.7	4.0
	20.4	12	21.5	5.2
	22.4	14	20.5	6.2
	24.4	16	19.25	7.4
	26.4	18	17.95	8.7
	28.4	20	17.8	8.9
	30.4	22	18.1	8.6
	32.4	24	19	7.7
	34.4	26	20.3	6.4
	36.4	28	21.4	5.3
	38.4	30	23	3.7
	40.4	32	24.1	2.6
	42.4	34	25.2	1.5
	44.4	36	26.35	0.3
	46.4	38	26.55	0.1
	48.4	40	26.5	0.2

E2.6. Recorded surveyed transversal section measurements.

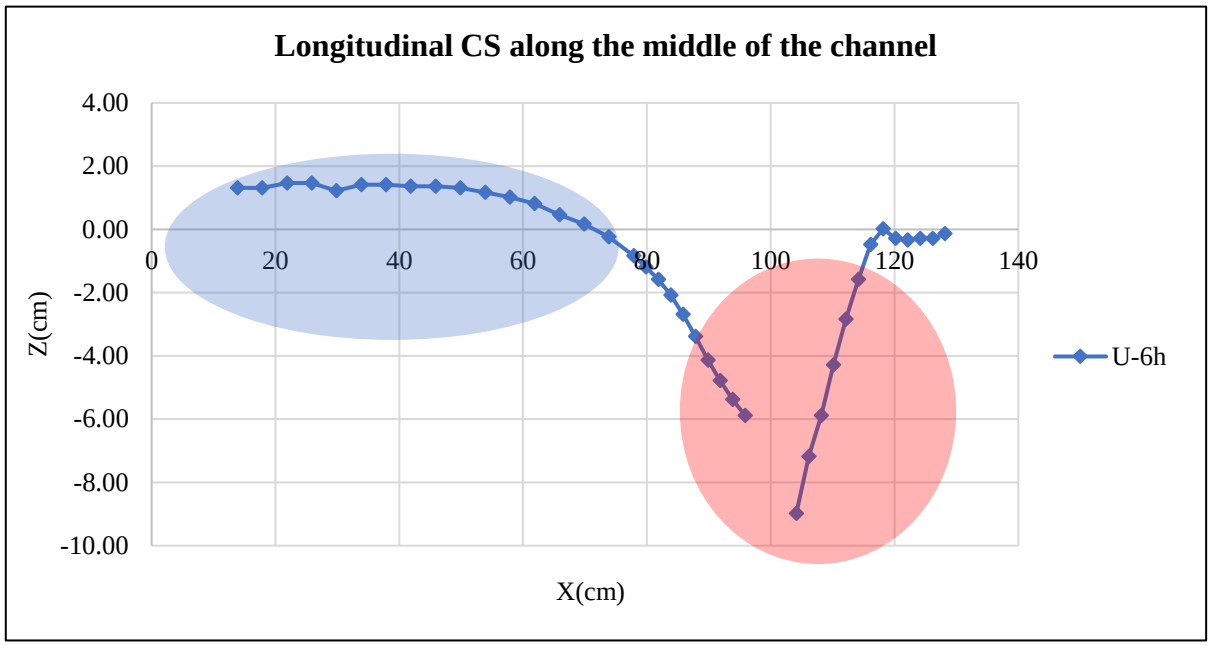


E2.7. Visual representation of the surveyed transversal section measurements. The blue circles represent the side of the channel, and the middle part of the channel is represented by the red circle.

X Direction (cm)	Calibrated X direction (cm)	Y Direction (cm)	Z Direction (cm)	scour depth (cm)
75.7	13.85	28.4	28	1.32
79.7	17.85		28	1.32
83.7	21.85		28.15	1.47

87.7	25.85		28.15	1.47
91.7	29.85		27.9	1.22
95.7	33.85		28.1	1.42
99.7	37.85		28.1	1.42
3.7	41.85		28.05	1.37
7.7	45.85		28.05	1.37
11.7	49.85		28	1.32
15.7	53.85		27.85	1.17
19.7	57.85		27.7	1.02
23.7	61.85		27.5	0.82
27.7	65.85		27.15	0.47
31.7	69.85		26.85	0.17
35.7	73.85		26.45	-0.23
39.7	77.85		25.85	-0.83
41.7	79.85		25.5	-1.18
43.7	81.85		25.1	-1.58
45.7	83.85		24.6	-2.08
47.7	85.85		24	-2.68
49.7	87.85		23.3	-3.38
51.7	89.85		22.55	-4.13
53.7	91.85		21.9	-4.78
55.7	93.85		21.3	-5.38
57.7	95.85		20.8	-5.88
61.85	100		The Middle of the Pier	
66	104.15		17.7	-8.98
68	106.15		19.5	-7.18
70	108.15		20.8	-5.88
72	110.15		22.4	-4.28
74	112.15		23.85	-2.83
76	114.15		25.1	-1.58
78	116.15		26.2	-0.48
80	118.15		26.7	0.02
82	120.15		26.4	-0.28
84	122.15		26.35	-0.33
86	124.15		26.4	-0.28
88	126.15		26.4	-0.28
90	128.15		26.55	-0.13

E2.8. Recorded surveyed longitudinal section measurements.



E2.9. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue circle is indicating the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-9.29	0.00	14.26	-66.24
2	0.00	8.94	13.74	61.41
3	8.94	38.78	24.00	572.60
4	38.78	94.12	13.00	863.80
5	94.12	143.14	6.70	794.80
6	143.14	172.18	4.15	654.28
7	172.18	163.97	4.15	697.51
8	163.97	98.50	5.00	656.17
9	98.50	30.96	5.00	323.65
10	30.96	5.69	10.00	183.27
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
4741.23	4807.47	-66.24	2880.64	1860.59

E2.10. Calculated volumes.

Experiment E3 (10-R-40)

40*40(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*9
	Along the width	2*8
	Around pier	4

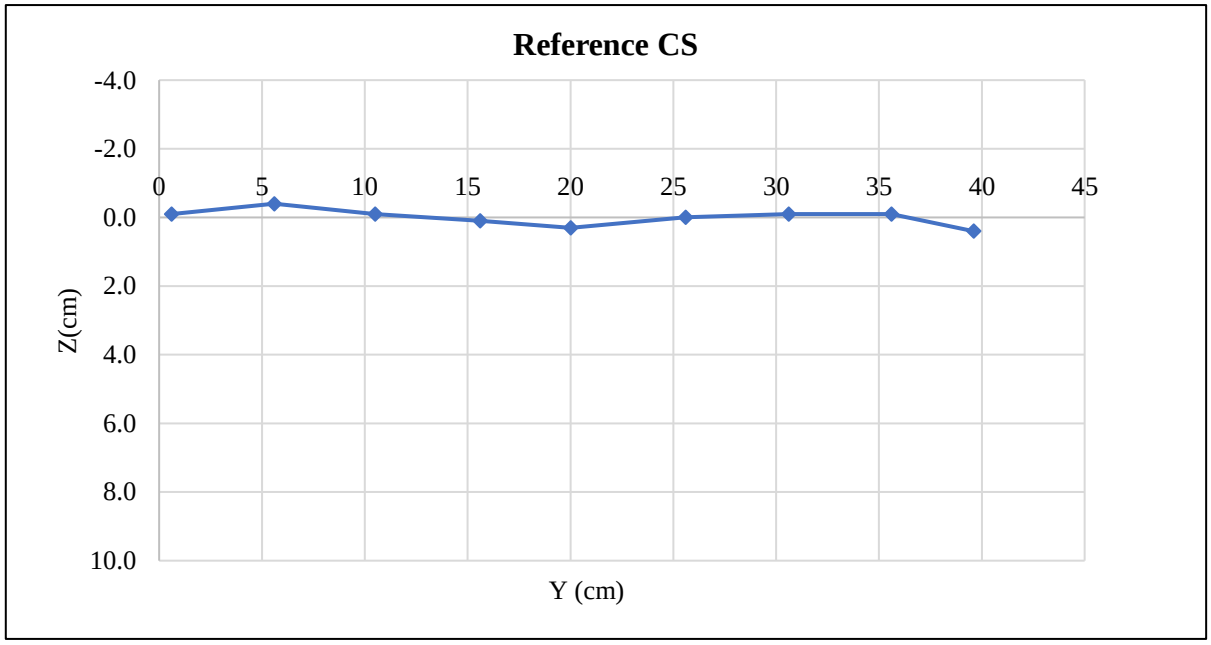
E3.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.132	7.150	7.339	7.166	7.234	7.163	7.260	7.158	7.178	7.130	7.176	7.103	7.203	7.305
	7.229	7.149	7.171	7.309	7.178	7.011	7.298	7.008	7.096	7.232	7.240	7.289	7.160	7.270
	7.220	7.198	7.201	7.201	7.372	7.219	7.181	7.161	7.316	7.283	7.182	7.278	7.121	7.125
	7.334	7.290	7.104	7.085	7.257	7.208	7.202	7.239	7.176	7.163	7.322	7.152	7.161	7.205
	7.191	7.294	7.223	7.064	7.254	7.226	7.186	7.243	7.143	7.211	7.290	7.241	7.227	7.172
	7.270	7.378	7.261	7.077	7.296	7.260	7.031	7.184	7.208	7.226	7.285	7.170	7.149	7.154
	7.290	7.279	7.244	7.226	7.217	7.264	7.248	7.144	7.266	7.198	7.274	7.247	7.189	7.139
	7.250	7.187	7.128	7.240	7.260	7.243	7.191	7.218	7.189	7.199	7.279	7.152	7.239	7.205
	7.370	7.220	7.140	7.180	7.180	7.309	7.080	7.161	7.150	7.215	7.186	7.243	7.114	7.160
	7.241	7.199	7.284	7.137	7.330	7.290	7.172	7.143	7.281	7.156	7.238	7.045	7.159	7.229
Average	7.253	7.234	7.210	7.169	7.258	7.219	7.185	7.166	7.200	7.201	7.247	7.192	7.172	7.196
Ratio	1.000	0.998	0.994	0.989	1.001	0.996	0.991	0.988	0.993	0.993	1.000	0.992	0.989	0.993

E3.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.6	-0.1
	14	5.6	26.9	-0.4
	18.9	10.5	26.6	-0.1
	24	15.6	26.4	0.1
	28.4	20	26.2	0.3
	34	25.6	26.5	0.0
	39	30.6	26.6	-0.1
	44	35.6	26.6	-0.1
	48	39.6	26.1	0.4
		Average (Reference Elevation)	**26.5**	

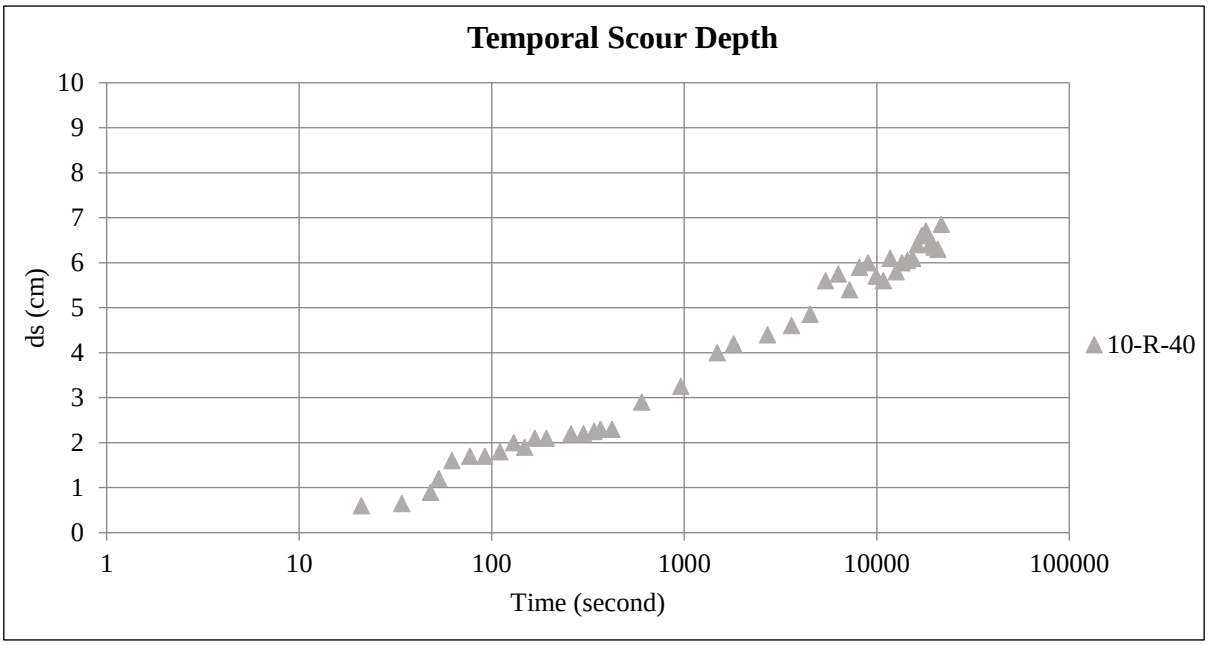
E3.3. Calculated Reference Elevation.



E3.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.5
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	21	21	25.9	0.6
0	0	34	34	25.85	0.65
0	0	48	48	25.6	0.9
0	0	53	53	25.3	1.2
0	1	2	62	24.9	1.6
0	1	17	77	24.8	1.7
0	1	32	92	24.8	1.7
0	1	50	110	24.7	1.8
0	2	10	130	24.5	2
0	2	28	148	24.6	1.9
0	2	47	167	24.4	2.1
0	3	12	192	24.4	2.1
0	4	18	258	24.3	2.2
0	4	59	299	24.3	2.2
0	5	40	340	24.25	2.25
0	6	7	367	24.2	2.3
0	7	0	420	24.2	2.3
0	10	0	600	23.6	2.9
0	16	0	960	23.25	3.25
0	24	42	1482	22.5	4
0	30	0	1800	22.3	4.2
0	45	0	2700	22.1	4.4
1	0	0	3600	21.9	4.6
1	15	0	4500	21.65	4.85
1	30	0	5400	20.9	5.6
1	45	0	6300	20.75	5.75
2	0	0	7200	21.1	5.4
2	15	0	8100	20.6	5.9
2	30	0	9000	20.5	6
2	45	0	9900	20.8	5.7
3	0	0	10800	20.9	5.6
3	15	0	11700	20.4	6.1
3	30	0	12600	20.7	5.8
3	45	0	13500	20.5	6
4	0	0	14400	20.45	6.05
4	15	0	15300	20.4	6.1
4	30	0	16200	20.1	6.4
4	45	0	17100	19.9	6.6
5	0	0	18000	19.8	6.7
5	15	0	18900	20.1	6.4
5	30	0	19800	20.15	6.35
5	45	0	20700	20.2	6.3
6	0	0	21600	19.65	6.85

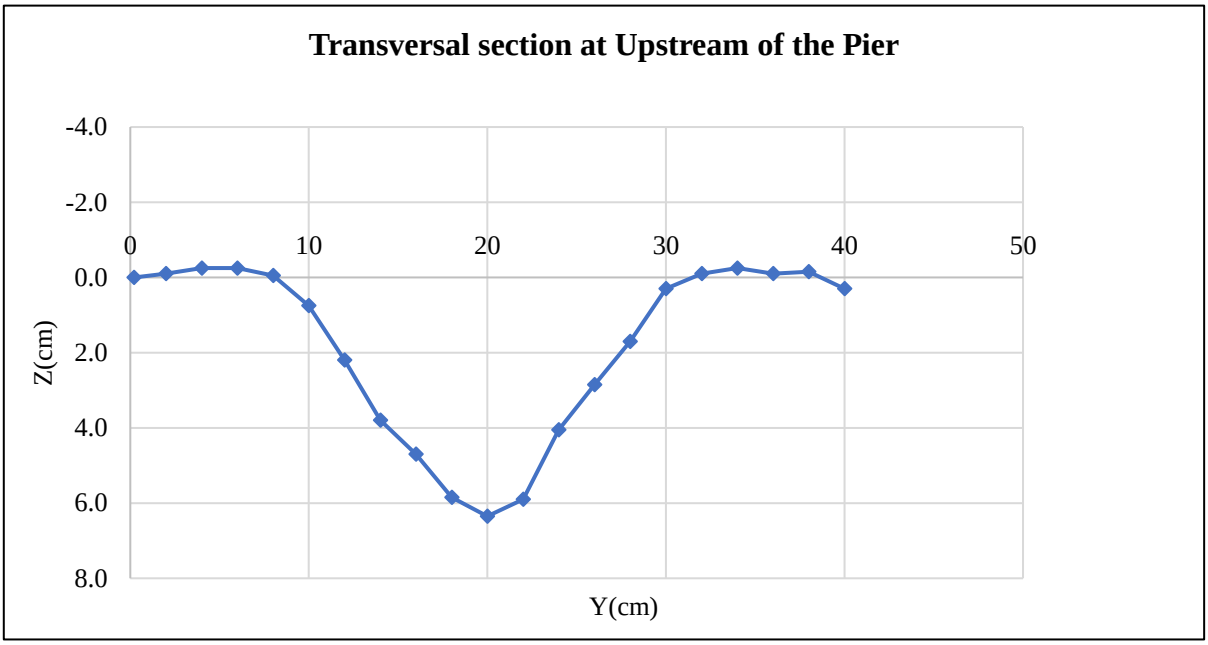
E3.5. Temporal Scour Depth measurements.



E3.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.5	0.0
	10.4	2	26.6	-0.1
	12.4	4	26.75	-0.3
	14.4	6	26.75	-0.3
	16.4	8	26.55	-0.1
	18.4	10	25.75	0.7
	20.4	12	24.3	2.2
	22.4	14	22.7	3.8
	24.4	16	21.8	4.7
	26.4	18	20.65	5.9
104.15	28.4	20	20.15	6.35
	30.4	22	20.6	5.9
	32.4	24	22.45	4.1
	34.4	26	23.65	2.9
	36.4	28	24.8	1.7
	38.4	30	26.2	0.3
	40.4	32	26.6	-0.1
	42.4	34	26.75	-0.3
	44.4	36	26.6	-0.1
	46.4	38	26.65	-0.2
	48.4	40	26.2	0.3

E3.7. Recorded surveyed transversal section measurements.

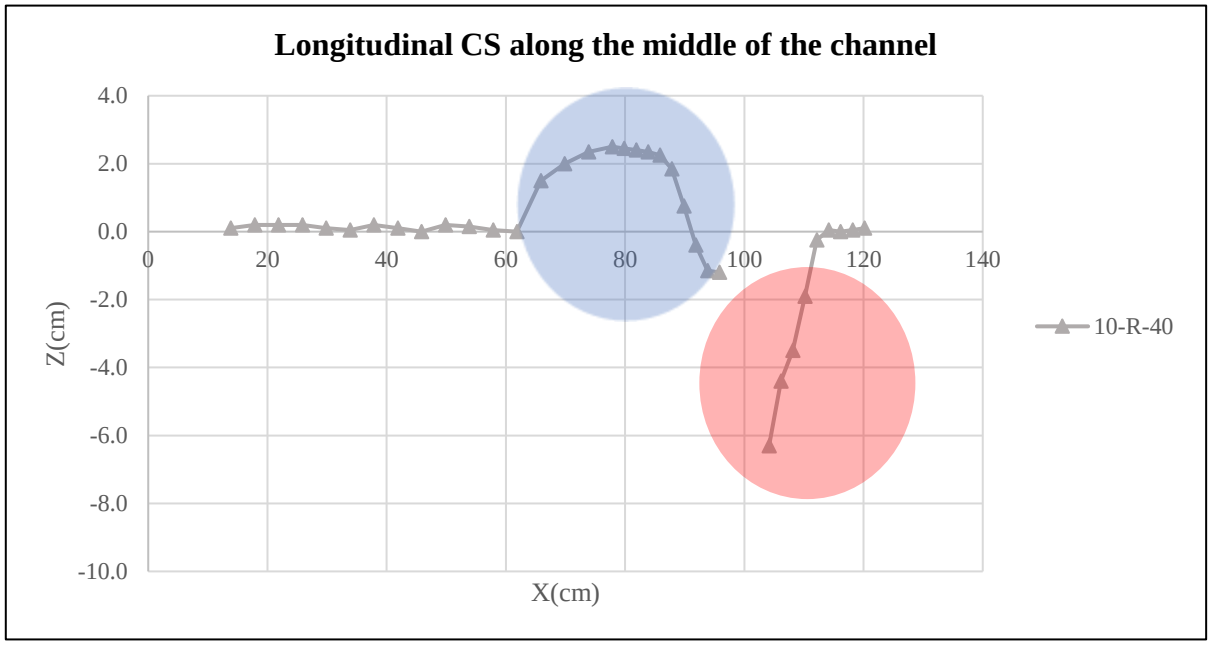


E3.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X direction (cm)	Y Direction (cm)	Z Direction (cm)	scour depth (cm)
75.7	13.85	28.4	26.6	0.1
79.7	17.85		26.7	0.2
83.7	21.85		26.7	0.2
87.7	25.85		26.7	0.2
91.7	29.85		26.6	0.1
95.7	33.85		26.55	0.05
99.7	37.85		26.7	0.2
3.7	41.85		26.6	0.1
7.7	45.85		26.5	0.0
11.7	49.85		26.7	0.2
15.7	53.85		26.65	0.15
19.7	57.85		26.55	0.05
23.7	61.85		26.5	0.0
27.7	65.85		28	1.5
31.7	69.85		28.5	2.0
35.7	73.85		28.85	2.35
39.7	77.85		29	2.5
41.7	79.85		28.95	2.45
43.7	81.85		28.9	2.4
45.7	83.85		28.85	2.35
47.7	85.85		28.75	2.25
49.7	87.85		28.35	1.85
51.7	89.85		27.25	0.75
53.7	91.85		26.1	-0.4
55.7	93.85		25.35	-1.15
57.7	95.85		25.3	-1.20
61.85	100		The Middle of the Pier	
66	104.15		20.2	-6.30

68	106.15		22.1	-4.4
70	108.15		23	-3.5
72	110.15		24.6	-1.9
74	112.15		26.25	-0.25
76	114.15		26.55	0.05
78	116.15		26.5	0.0
80	118.15		26.55	0.05
82	120.15		26.6	0.1

E3.9. Recorded surveyed longitudinal section measurements.



E3.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue circle is indicating the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	2.60	12.29	28.00	208.53
2	12.29	0.00	9.02	55.44
3	0.00	-20.42	14.98	-152.96
4	-20.42	-39.48	13.00	-389.32
5	-39.48	0.00	3.58	-70.66
6	0.00	34.30	3.12	53.51
7	34.30	74.75	4.15	226.28
8	74.75	74.71	4.15	310.13
9	74.71	22.60	5.00	243.29
10	22.60	0.00	3.98	44.96
11	0.00	-5.81	1.02	-2.97
12	-5.81	-0.79	10.00	-33.00
Total volume	**Positive v**	**Negative v**	**Downstream v**	**Upstream V**
493.23	1142.14	-648.90	-69.17	562.40

E3.11. Calculated volume.

Experiment E4 (10-R-30)

30*30(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*5
	Along the width	2*5
	Around pier	4

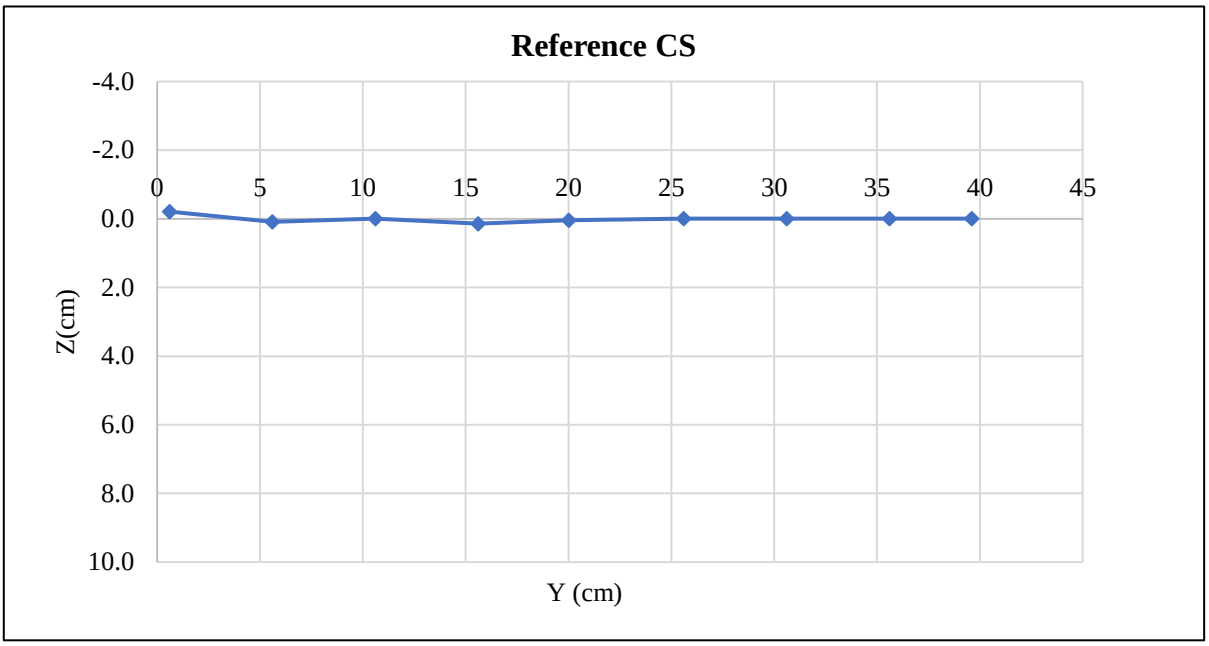
E4.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.167	7.176	7.087	7.194	7.145	7.214	7.14	7.065	7.208	7.198	7.28	7.167	7.022	7.199
	7.21	7.056	7.136	7.249	7.202	7.284	7.196	7.216	7.07	7.273	7.183	7.098	7.134	7.207
	7.088	7.158	7.236	7.058	7.123	7.117	7.22	7.077	7.126	7.033	7.106	7.068	7.202	7.12
	7.125	7.245	7.065	7.132	7.241	7.196	7.119	7.13	7.118	7.149	7.159	7.242	7.215	7.296
	7.27	7.195	7.112	7.26	7.045	7.097	7.126	7.136	7.114	7.158	7.173	7.041	7.116	7.234
	7.185	7.142	7.219	7.141	7.23	7.179	7.12	7.245	7.254	7.243	7.065	7.004	7.115	7.134
	7.123	7.208	7.233	7.1	7.094	7.128	7.188	7.083	7.216	7.054	7.104	7.256	7.105	7.19
	7.159	7.096	7.075	7.294	7.207	7.144	7.226	7.208	7.16	7.108	7.191	7.173	7.168	7.075
	7.245	7.126	7.181	7.184	7.157	7.007	7.14	7.105	7.154	7.241	7.099	7.16	7.117	7.202
	7.244	7.123	7.21	7.16	7.192	7.142	7.104	7.274	7.144	7.229	7.1	7.133	7.263	7.096
Average	7.182	7.153	7.155	7.177	7.164	7.151	7.158	7.154	7.156	7.169	7.146	7.134	7.146	7.175
Ratio	0.991	0.987	0.987	0.990	0.988	0.986	0.987	0.987	0.987	0.989	0.986	0.984	0.986	0.990

E4.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.8	-0.2
	14	5.6	26.5	0.1
	19	10.6	26.6	0.0
	24	15.6	26.45	0.1
	28.4	20	26.55	0.0
	34	25.6	26.6	0.0
	39	30.6	26.6	0.0
	44	35.6	26.6	0.0
	48	39.6	26.6	0.0
		Average (Reference Elevation)	**26.59**	

E4.3. Calculated Reference Elevation.

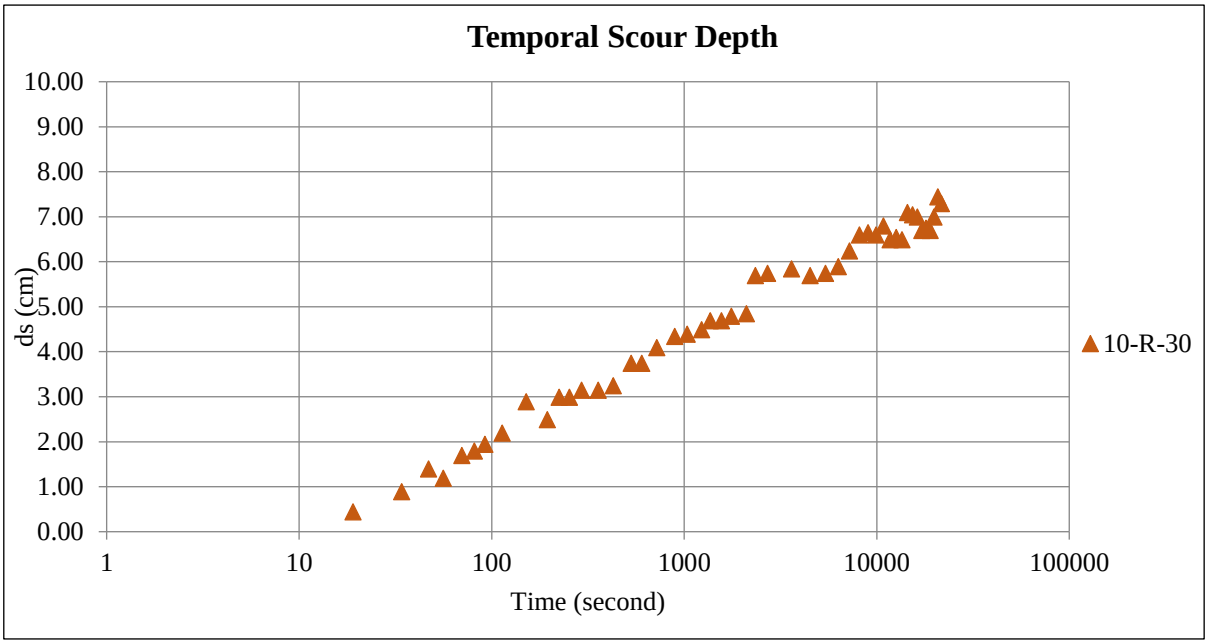


E4.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point	20			Reference	26.6
Hours	Minutes	Seconds	Total seconds	Z direction	Scour Depth
0	0	19	19	26.15	0.44
0	0	34	34	25.7	0.89
0	0	47	47	25.2	1.39
0	0	56	56	25.4	1.19
0	1	10	70	24.9	1.69
0	1	21	81	24.8	1.79
0	1	32	92	24.65	1.94
0	1	53	113	24.4	2.19
0	2	31	151	23.7	2.89
0	3	14	194	24.1	2.49
0	3	44	224	23.6	2.99
0	4	13	253	23.6	2.99
0	4	53	293	23.45	3.14
0	5	57	357	23.45	3.14
0	7	8	428	23.35	3.24
0	8	49	529	22.85	3.74
0	10	0	600	22.85	3.74
0	12	0	720	22.5	4.09
0	14	52	892	22.25	4.34
0	17	13	1033	22.2	4.39
0	20	30	1230	22.1	4.49
0	22	43	1363	21.9	4.69
0	26	0	1560	21.9	4.69
0	29	17	1757	21.8	4.79
0	35	0	2100	21.75	4.84
0	39	0	2340	20.9	5.69
0	45	0	2700	20.85	5.74

1	0	0	3600	20.75	5.84
1	15	0	4500	20.9	5.69
1	30	0	5400	20.85	5.74
1	45	0	6300	20.7	5.89
2	0	0	7200	20.35	6.24
2	15	0	8100	20	6.59
2	30	0	9000	19.95	6.64
2	45	0	9900	20	6.59
3	0	0	10800	19.8	6.79
3	15	0	11700	20.1	6.49
3	30	0	12600	20.05	6.54
3	45	0	13500	20.1	6.49
4	0	0	14400	19.5	7.09
4	15	0	15300	19.55	7.04
4	30	0	16200	19.6	6.99
4	45	0	17100	19.9	6.69
5	0	0	18000	19.85	6.74
5	15	0	18900	19.9	6.69
5	30	0	19800	19.6	6.99
5	45	0	20700	19.15	7.44
6	0	0	21600	19.3	7.29

E4.5. Temporal Scour Depth measurements.

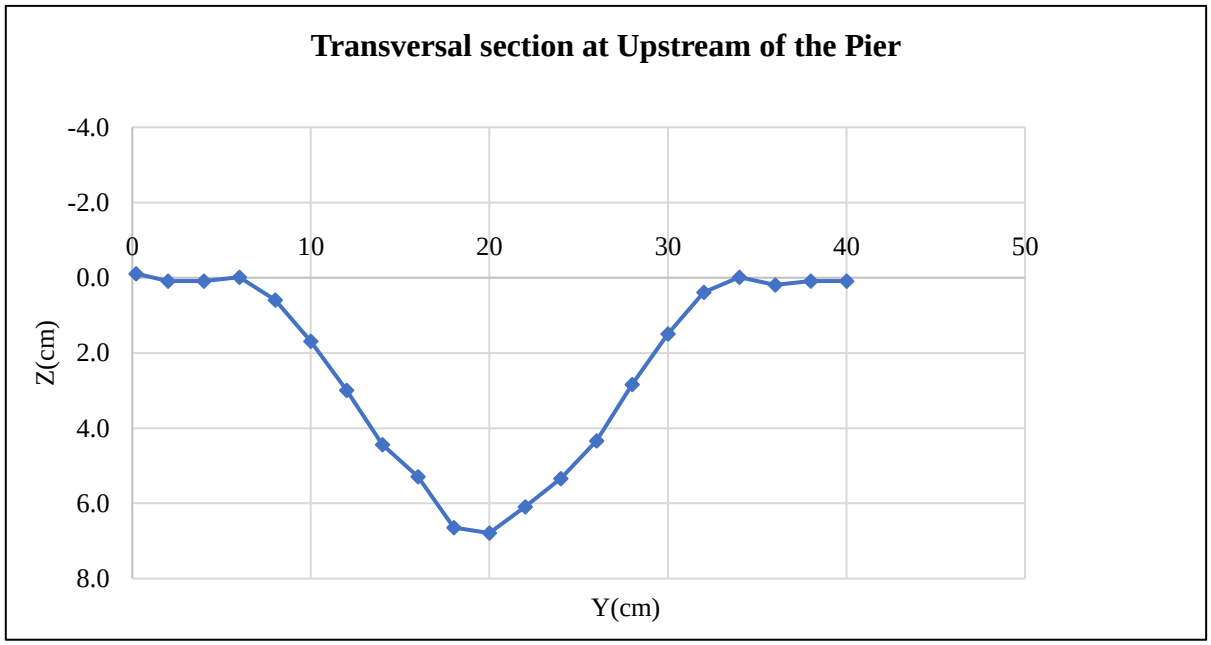


E4.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.7	-0.1
	10.4	2	26.5	0.1
	12.4	4	26.5	0.1
	14.4	6	26.6	0.0
	16.4	8	26	0.6

	18.4	10	24.9	1.7
	20.4	12	23.6	3.0
	22.4	14	22.15	4.4
	24.4	16	21.3	5.3
	26.4	18	19.95	6.6
	28.4	20	19.8	6.79
	30.4	22	20.5	6.1
	32.4	24	21.25	5.3
	34.4	26	22.25	4.3
	36.4	28	23.75	2.8
	38.4	30	25.1	1.5
	40.4	32	26.2	0.4
	42.4	34	26.6	0.0
	44.4	36	26.4	0.2
	46.4	38	26.5	0.1
	48.4	40	26.5	0.1

E4.7. Recorded surveyed transversal section measurements.

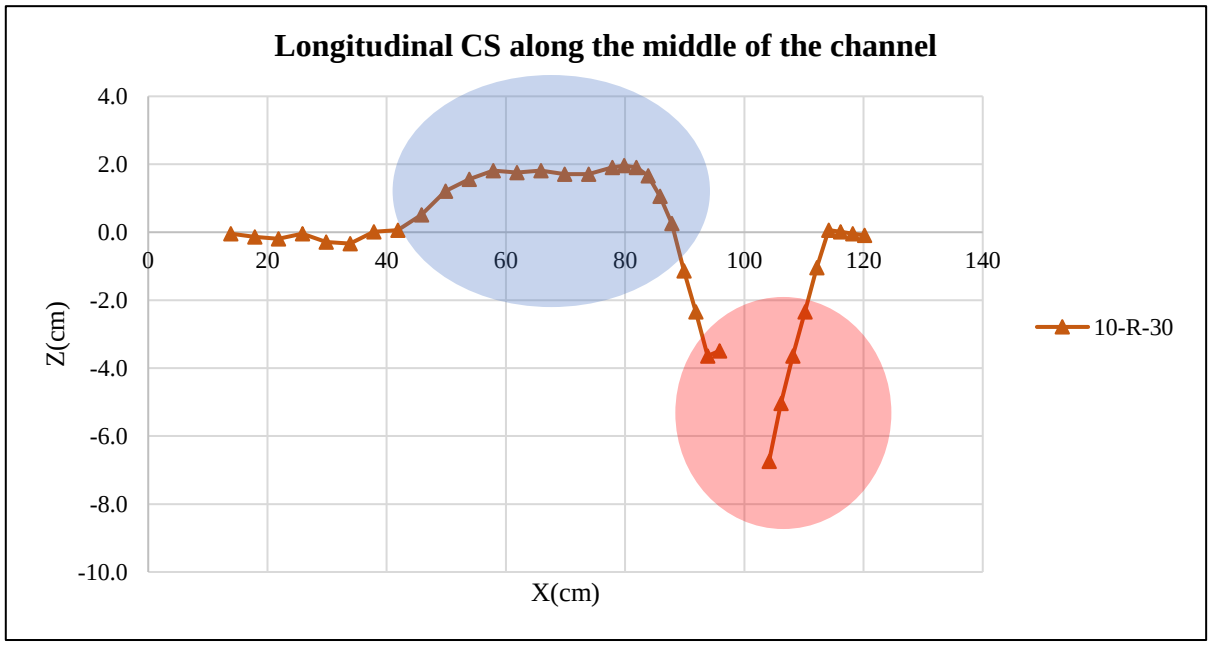


E4.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X direction (cm)	Y Direction (cm)	Z Direction (cm)	scour depth (cm)
75.7	13.85	28.4	26.55	0.0
79.7	17.85		26.45	-0.1
83.7	21.85		26.4	-0.2
87.7	25.85		26.55	0.0
91.7	29.85		26.3	-0.3
95.7	33.85		26.25	-0.34
99.7	37.85		26.6	0.0
3.7	41.85		26.65	0.1
7.7	45.85		27.1	0.5
11.7	49.85		27.8	1.2

15.7	53.85		28.15	1.56
19.7	57.85		28.4	1.81
23.7	61.85		28.35	1.8
27.7	65.85		28.4	1.8
31.7	69.85		28.3	1.7
35.7	73.85		28.3	1.71
39.7	77.85		28.5	1.9
41.7	79.85		28.55	1.96
43.7	81.85		28.5	1.9
45.7	83.85		28.25	1.66
47.7	85.85		27.65	1.06
49.7	87.85		26.85	0.26
51.7	89.85		25.45	-1.14
53.7	91.85		24.25	-2.3
55.7	93.85		22.95	-3.64
57.7	95.85		23.1	-3.49
61.85	100		The Middle of the Pier	
66	104.15		19.85	-6.74
68	106.15		21.55	-5.0
70	108.15		22.95	-3.6
72	110.15		24.25	-2.3
74	112.15		25.55	-1.04
76	114.15		26.65	0.06
78	116.15		26.6	0.0
80	118.15		26.55	-0.04
82	120.15		26.5	-0.1

E4.9. Recorded surveyed longitudinal section measurements.



E4.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue circle indicates the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	1.61	0.00	5.05	4.07
2	0.00	-7.34	22.95	-84.18
3	-7.34	-12.34	24.00	-236.11
4	-12.34	0.00	11.09	-68.44
5	0.00	2.12	0.91	0.96
6	2.12	58.47	6.70	203.00
7	58.47	98.03	4.15	324.74
8	98.03	98.66	4.15	408.12
9	98.66	38.14	5.00	342.00
10	38.14	3.22	5.00	103.40
11	3.22	2.80	10.00	30.08
Total volume	Positive v	Negative v	Downstream v	Upstream V
1027.65	1416.38	-388.72	144.05	883.60

E4.11. Calculated volume.

Experiment E5 (10-R-20)

20*20(10 mm)		
Anchorage	Position	Nails number
	Along the length	2*3
	Along the width	2*3
	Around pier	4

E5.1. Anchorage characteristics, including nail's position and quantity.

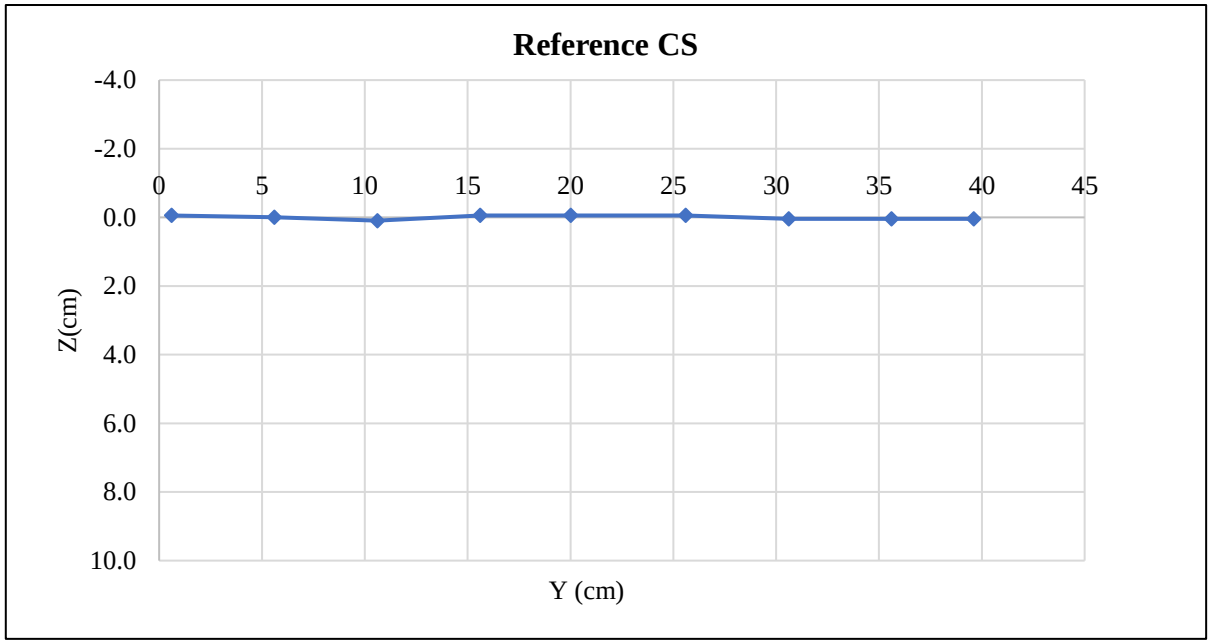
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.155	7.229	7.134	7.197	7.080	7.130	6.950	6.920	7.158	7.168	7.288	7.019	7.185	7.315
	7.123	7.143	7.149	7.225	7.129	6.987	6.975	7.116	7.169	7.246	7.158	7.269	7.280	7.298
	7.234	7.219	7.128	7.349	7.064	7.060	6.987	7.080	7.323	7.215	7.338	7.213	7.179	7.065
	7.225	7.227	7.124	7.179	7.128	7.044	7.008	6.997	7.233	7.115	7.244	7.236	7.139	7.192
	7.292	7.139	7.187	7.148	7.077	7.098	7.003	7.490	7.257	7.183	7.226	7.152	7.203	7.154
	7.153	7.153	7.161	7.127	7.084	7.006	6.920	7.002	7.281	7.245	7.294	7.210	7.152	7.204
	7.261	7.267	7.219	7.146	7.022	7.055	6.940	7.137	7.184	7.154	7.250	7.207	7.304	7.215
	7.147	7.110	7.080	7.052	7.090	7.027	7.013	6.910	7.249	7.270	7.112	7.273	7.169	7.239
	7.123	7.143	7.204	7.096	7.043	7.137	6.959	6.994	7.189	7.077	7.230	7.224	7.327	7.242
	7.180	7.149	7.213	7.108	7.056	6.937	7.003	7.027	7.248	7.134	7.288	7.260	7.235	7.198
Average	7.189	7.178	7.160	7.163	7.077	7.048	6.976	7.067	7.229	7.181	7.243	7.206	7.217	7.212
Ratio	0.992	0.990	0.988	0.988	0.976	0.972	0.962	0.975	0.997	0.990	0.999	0.994	0.995	0.995

E5.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.6	-0.1
	14	5.6	26.55	0.0
	19	10.6	26.45	0.1

	24	15.6	26.6	-0.1
	28.4	20	26.6	-0.1
	34	25.6	26.6	-0.1
	39	30.6	26.5	0.0
	44	35.6	26.5	0.0
	48	39.6	26.5	0.0
		Average (Reference Elevation)	**26.5**	

E5.3. Calculated Reference Elevation.

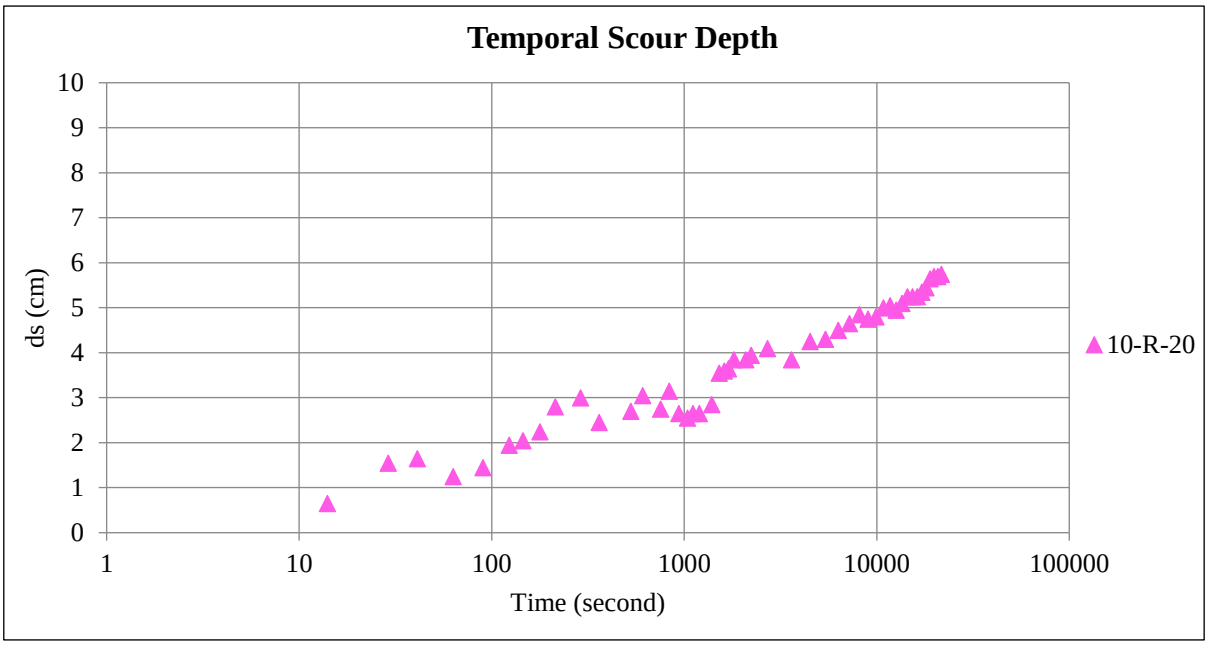


E5.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point	**20**			**Reference**	**26.54**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction**	**Scour Depth**
0	0	14	14	25.9	0.64
0	0	29	29	25	1.54
0	0	41	41	24.9	1.64
0	1	3	63	25.3	1.24
0	1	30	90	25.1	1.44
0	2	3	123	24.6	1.94
0	2	25	145	24.5	2.04
0	2	58	178	24.3	2.24
0	3	34	214	23.75	2.79
0	4	49	289	23.55	2.99
0	6	1	361	24.1	2.44
0	8	47	527	23.85	2.69
0	10	7	607	23.5	3.04
0	12	33	753	23.8	2.74
0	13	56	836	23.4	3.14
0	15	36	936	23.9	2.64
0	17	17	1037	24	2.54
0	18	30	1110	23.9	2.64

0	19	58	1198	23.9	2.64
0	23	8	1388	23.7	2.84
0	25	17	1517	23	3.54
0	26	50	1610	22.95	3.59
0	28	15	1695	22.9	3.64
0	30	10	1810	22.7	3.84
0	34	46	2086	22.7	3.84
0	37	5	2225	22.6	3.94
0	45	0	2700	22.45	4.09
1	0	0	3600	22.7	3.84
1	15	0	4500	22.3	4.24
1	30	0	5400	22.25	4.29
1	45	0	6300	22.05	4.49
2	0	0	7200	21.9	4.64
2	15	0	8100	21.7	4.84
2	30	0	9000	21.8	4.74
2	45	0	9900	21.75	4.79
3	0	0	10800	21.55	4.99
3	15	0	11700	21.5	5.04
3	30	0	12600	21.6	4.94
3	45	0	13500	21.45	5.09
4	0	0	14400	21.3	5.24
4	15	0	15300	21.3	5.24
4	30	0	16200	21.3	5.24
4	45	0	17100	21.2	5.34
5	0	0	18000	21.1	5.44
5	15	0	18900	20.9	5.64
5	30	0	19800	20.85	5.69
5	45	0	20700	20.85	5.69
6	0	0	21600	20.8	5.74

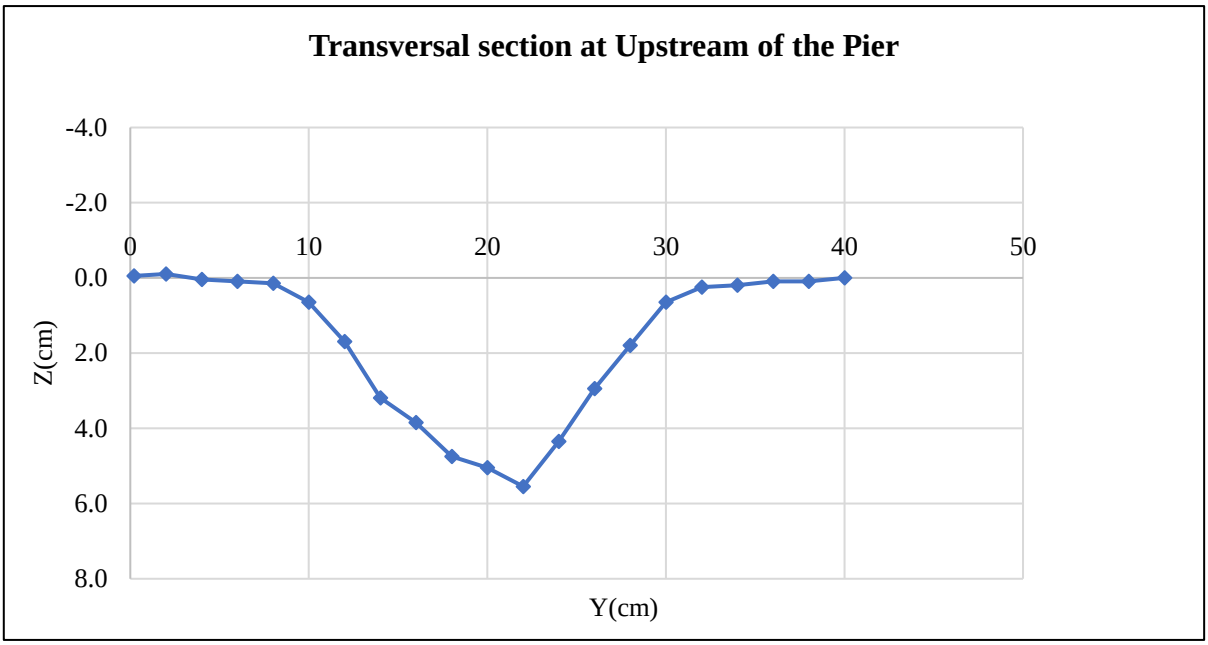
E5.5. Temporal Scour Depth measurements.



E5.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.6	-0.1
	10.4	2	26.65	-0.1
	12.4	4	26.5	0.0
	14.4	6	26.45	0.1
	16.4	8	26.4	0.1
	18.4	10	25.9	0.6
	20.4	12	24.85	1.7
	22.4	14	23.35	3.2
	24.4	16	22.7	3.8
	26.4	18	21.8	4.7
104.15	28.4	20	21.5	5.04
	30.4	22	21	5.5
	32.4	24	22.2	4.3
	34.4	26	23.6	2.9
	36.4	28	24.75	1.8
	38.4	30	25.9	0.6
	40.4	32	26.3	0.2
	42.4	34	26.35	0.2
	44.4	36	26.45	0.1
	46.4	38	26.45	0.1
	48.4	40	26.55	0.0

E5.7. Recorded surveyed transversal section measurements.

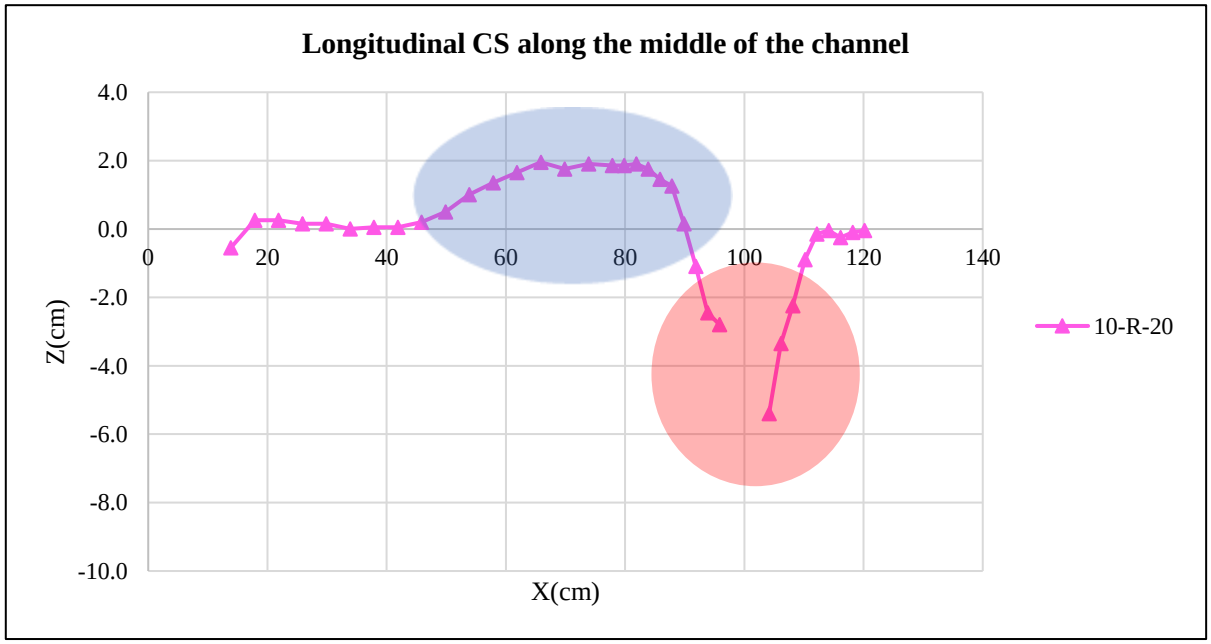


E5.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X direction (cm)	Y Direction (cm)	Z Direction (cm)	scour depth (cm)
75.7	13.85	28.4	26	-0.5
79.7	17.85		26.8	0.3
83.7	21.85		26.8	0.3
87.7	25.85		26.7	0.2
91.7	29.85		26.7	0.2
95.7	33.85		26.55	0.01
99.7	37.85		26.6	0.1
3.7	41.85		26.6	0.1
7.7	45.85		26.75	0.2
11.7	49.85		27.05	0.5
15.7	53.85		27.55	1.01
19.7	57.85		27.9	1.36
23.7	61.85		28.2	1.7
27.7	65.85		28.5	2.0
31.7	69.85		28.3	1.8
35.7	73.85		28.45	1.91
39.7	77.85		28.4	1.9
41.7	79.85		28.4	1.86
43.7	81.85		28.45	1.9
45.7	83.85		28.3	1.76
47.7	85.85		28	1.46
49.7	87.85		27.8	1.26
51.7	89.85		26.7	0.16
53.7	91.85		25.45	-1.1
55.7	93.85		24.1	-2.44
57.7	95.85		23.75	-2.79
61.85	100		The Middle of the Pier	
66	104.15		21.15	-5.39

68	106.15		23.2	-3.3
70	108.15		24.3	-2.2
72	110.15		25.65	-0.9
74	112.15		26.4	-0.14
76	114.15		26.5	-0.04
78	116.15		26.3	-0.2
80	118.15		26.45	-0.09
82	120.15		26.5	0.0

E5.9. Recorded surveyed longitudinal section measurements.



E5.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue circle indicates the accumulated eroded sediments downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-1.84	0.00	14.40	-13.26
2	0.00	1.74	13.60	11.81
3	1.74	0.00	3.36	2.92
4	0.00	-10.66	20.64	-109.94
5	-10.66	0.04	13.00	-68.97
6	0.04	60.77	6.70	203.74
7	60.77	88.88	4.15	310.54
8	88.88	70.44	4.15	330.61
9	70.44	18.38	5.00	222.07
10	18.38	1.83	5.00	50.53
11	1.83	0.00	5.14	4.70
12	0.00	-1.73	4.86	-4.21
Total volume	Positive v	Negative v	Downstream v	Upstream V
940.54	1136.92	-196.37	336.85	603.70

E5.11. Calculated volume.

Experiment E6 (10-R-10)

10*10(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	-
	Along the width	-
	Around pier	6

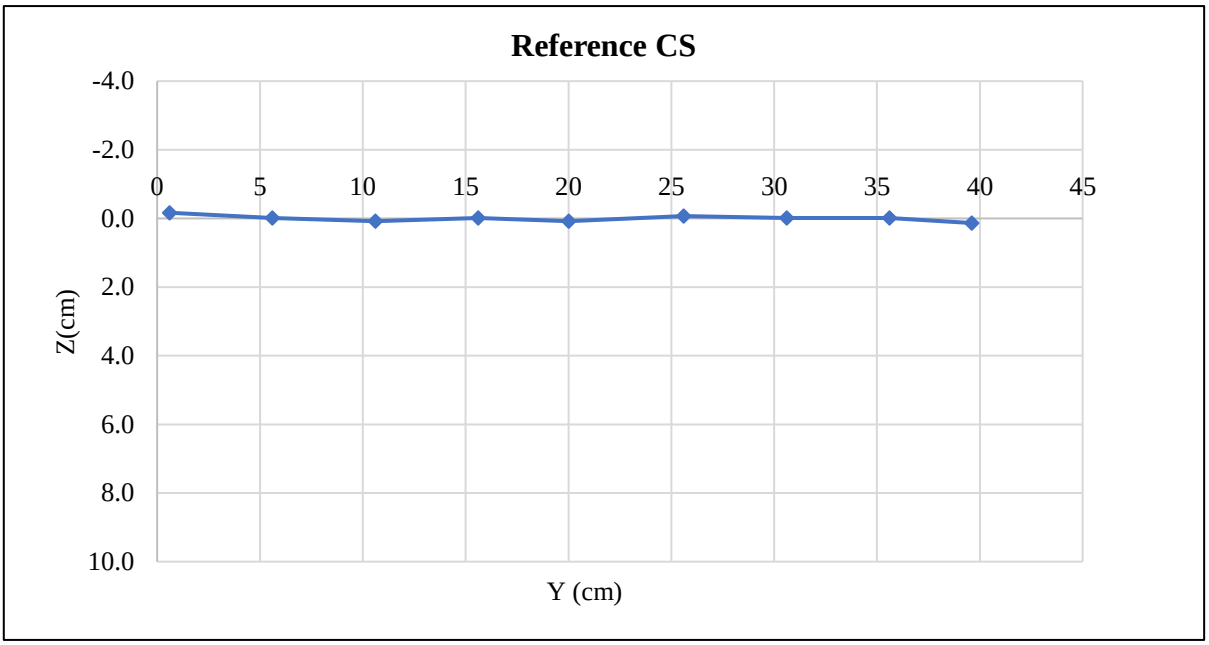
E6.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.186	7.262	7.058	7.118	7.151	7.231	7.175	7.187	7.074	7.308	6.959	7.069	7.112	7.134
	7.196	7.201	7.104	7.078	7.032	7.252	7.214	7.219	6.951	7.313	7.038	7.036	7.147	7.114
	7.287	7.219	7.13	7.046	6.969	7.224	7.219	7.254	6.94	7.34	7.052	7.061	7.078	7.121
	7.193	7.239	7.061	7.08	7.198	7.228	7.205	7.203	7.16	7.303	7.063	7.017	7.181	7.185
	7.127	7.281	7.159	7.115	7.143	7.249	7.186	7.249	6.868	7.214	7.004	6.96	7.143	7.064
	7.215	7.179	7.074	7.049	7.056	7.12	7.245	7.361	6.974	7.363	6.95	6.984	7.146	7.086
	7.249	7.307	7.141	7.113	7.011	7.327	7.277	7.124	7.045	7.252	7.2	7.109	7.127	7.076
	7.148	7.225	7.087	7.1	7.165	7.275	7.329	7.256	7.003	7.278	7.157	7.11	7.132	7.089
	7.076	7.248	7.141	7.232	7.036	7.219	7.244	7.203	6.936	7.322	7.143	7.07	7.118	7.206
	7.256	7.157	7.111	7.181	7.045	7.296	7.229	7.324	6.988	7.253	7.001	6.945	7.134	7.051
Average	7.193	7.232	7.107	7.111	7.081	7.242	7.232	7.238	6.994	7.295	7.057	7.036	7.132	7.113
Ratio	0.992	0.997	0.980	0.981	0.977	0.999	0.998	0.998	0.965	1.006	0.973	0.970	0.984	0.981

E6.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.75	-0.2
	14	5.6	26.6	0.0
	19	10.6	26.5	0.1
	24	15.6	26.6	0.0
	28.4	20	26.5	0.1
	34	25.6	26.65	-0.1
	39	30.6	26.6	0.0
	44	35.6	26.6	0.0
	48	39.6	26.45	0.1
		Average (Reference Elevation)	26.6	

E6.3. Calculated Reference Elevation.

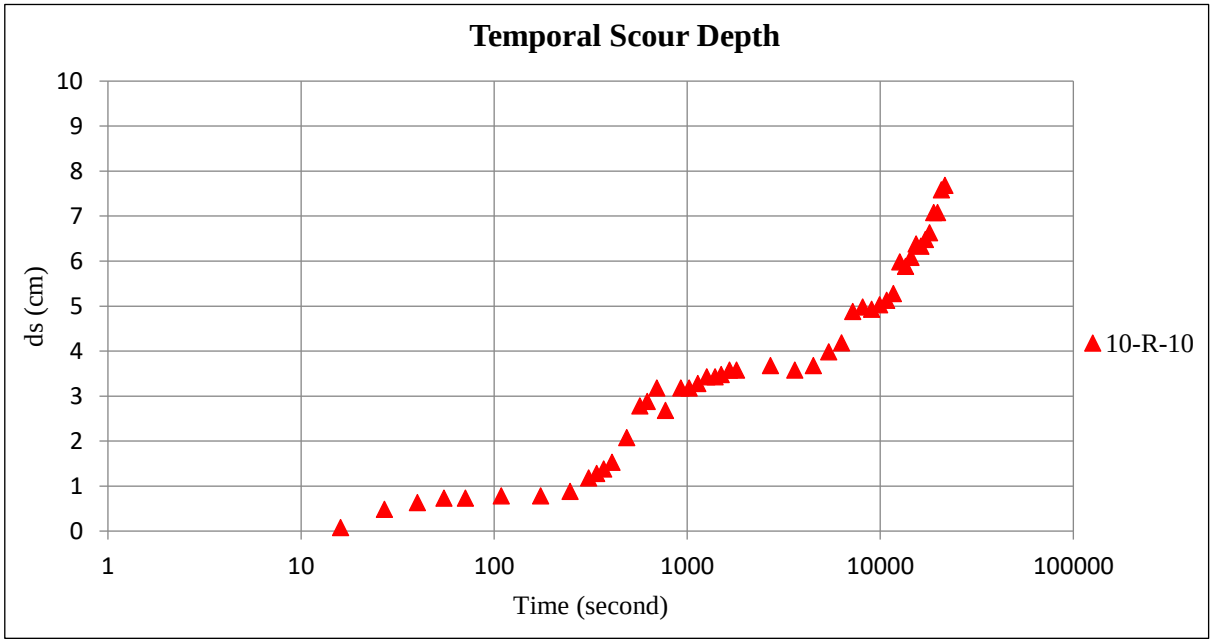


E6.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.58
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	16	16	26.5	0.08
0	0	27	27	26.1	0.48
0	0	40	40	25.95	0.63
0	0	55	55	25.85	0.73
0	1	11	71	25.85	0.73
0	1	49	109	25.8	0.78
0	2	54	174	25.8	0.78
0	4	7	247	25.7	0.88
0	5	9	309	25.4	1.18
0	5	39	339	25.3	1.28
0	6	9	369	25.2	1.38
0	6	48	408	25.05	1.53
0	8	6	486	24.5	2.08
0	9	28	568	23.8	2.78
0	10	20	620	23.7	2.88
0	11	35	695	23.4	3.18
0	12	50	770	23.9	2.68
0	15	25	925	23.4	3.18
0	17	5	1025	23.4	3.18
0	18	53	1133	23.3	3.28
0	21	0	1260	23.15	3.43
0	23	15	1395	23.15	3.43
0	25	0	1500	23.1	3.48
0	27	32	1652	23	3.58
0	30	0	1800	23	3.58
0	45	0	2700	22.9	3.68
1	0	0	3600	23	3.58

1	15	0	4500	22.9	3.68
1	30	0	5400	22.6	3.98
1	45	0	6300	22.4	4.18
2	0	0	7200	21.7	4.88
2	15	0	8100	21.6	4.98
2	30	0	9000	21.65	4.93
2	45	0	9900	21.55	5.03
3	0	0	10800	21.45	5.13
3	15	0	11700	21.3	5.28
3	30	0	12600	20.6	5.98
3	45	0	13500	20.7	5.88
4	0	0	14400	20.5	6.08
4	15	0	15300	20.2	6.38
4	30	0	16200	20.25	6.33
4	45	0	17100	20.1	6.48
5	0	0	18000	19.95	6.63
5	15	0	18900	19.5	7.08
5	30	0	19800	19.5	7.08
5	45	0	20700	19	7.58
6	0	0	21600	18.9	7.68

E6.5. Temporal Scour Depth measurements.

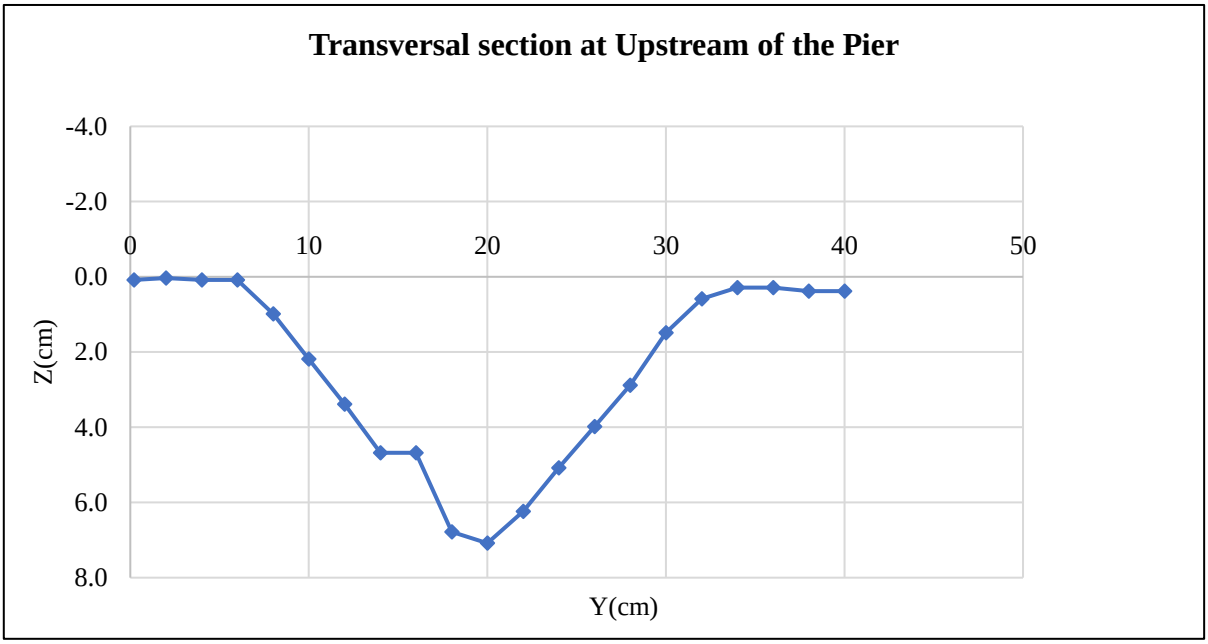


E6.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.5	0.1
	10.4	2	26.55	0.0
	12.4	4	26.5	0.1
	14.4	6	26.5	0.1
	16.4	8	25.6	1.0
	18.4	10	24.4	2.2

	20.4	12	23.2	3.4
	22.4	14	21.9	4.7
	24.4	16	21.9	4.7
	26.4	18	19.8	6.8
	28.4	20	19.5	7.08
	30.4	22	20.35	6.2
	32.4	24	21.5	5.1
	34.4	26	22.6	4.0
	36.4	28	23.7	2.9
	38.4	30	25.1	1.5
	40.4	32	26	0.6
	42.4	34	26.3	0.3
	44.4	36	26.3	0.3
	46.4	38	26.2	0.4
	48.4	40	26.2	0.4

E6.7. Recorded surveyed transversal section measurements.

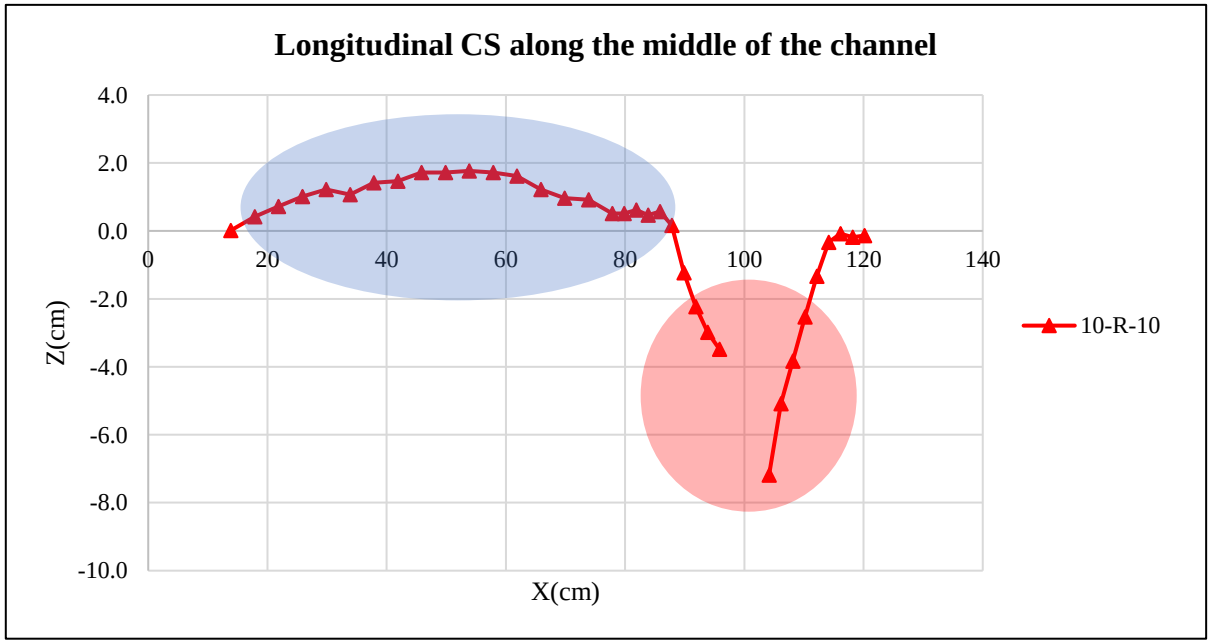


E6.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.6	0.0
79.7	17.85		27	0.4
83.7	21.85		27.3	0.7
87.7	25.85		27.6	1.0
91.7	29.85		27.8	1.2
95.7	33.85		27.65	1.07
99.7	37.85		28	1.4
3.7	41.85		28.05	1.5
7.7	45.85		28.3	1.7
11.7	49.85		28.3	1.7
15.7	53.85		28.35	1.77

19.7	57.85		28.3	1.72
23.7	61.85		28.2	1.6
27.7	65.85		27.8	1.2
31.7	69.85		27.55	1.0
35.7	73.85		27.5	0.92
39.7	77.85		27.1	0.5
41.7	79.85		27.1	0.52
43.7	81.85		27.2	0.6
45.7	83.85		27.05	0.47
47.7	85.85		27.15	0.57
49.7	87.85		26.75	0.17
51.7	89.85		25.35	-1.23
53.7	91.85		24.35	-2.2
55.7	93.85		23.6	-2.98
57.7	95.85		23.1	-3.48
61.85	100		The Middle of the Pier	
66	104.15		19.4	-7.18
68	106.15		21.5	-5.1
70	108.15		22.75	-3.8
72	110.15		24.05	-2.5
74	112.15		25.25	-1.33
76	114.15		26.25	-0.33
78	116.15		26.5	-0.1
80	118.15		26.4	-0.18
82	120.15		26.45	-0.1

E6.9. Recorded surveyed longitudinal section measurements.



E6.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue circle indicates the accumulated eroded sediments downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-15.50	-15.24	28.00	-430.43
2	-15.24	0.00	20.64	-157.28
3	0.00	2.48	3.36	4.18
4	2.48	33.15	13.00	231.61
5	33.15	82.99	6.70	389.05
6	82.99	114.57	4.15	409.93
7	114.57	102.82	4.15	451.09
8	102.82	43.27	5.00	365.22
9	43.27	5.32	5.00	121.46
10	5.32	3.81	10.00	45.64
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
1430.47	2018.18	-587.71	447.06	983.41

E6.11. Calculated volume.

Experiment E7 (10-R-40*60)

40*60(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*10
	Along the width	2*7
	Around pier	4

E7.1. Anchorage characteristics, including nail's position and quantity.

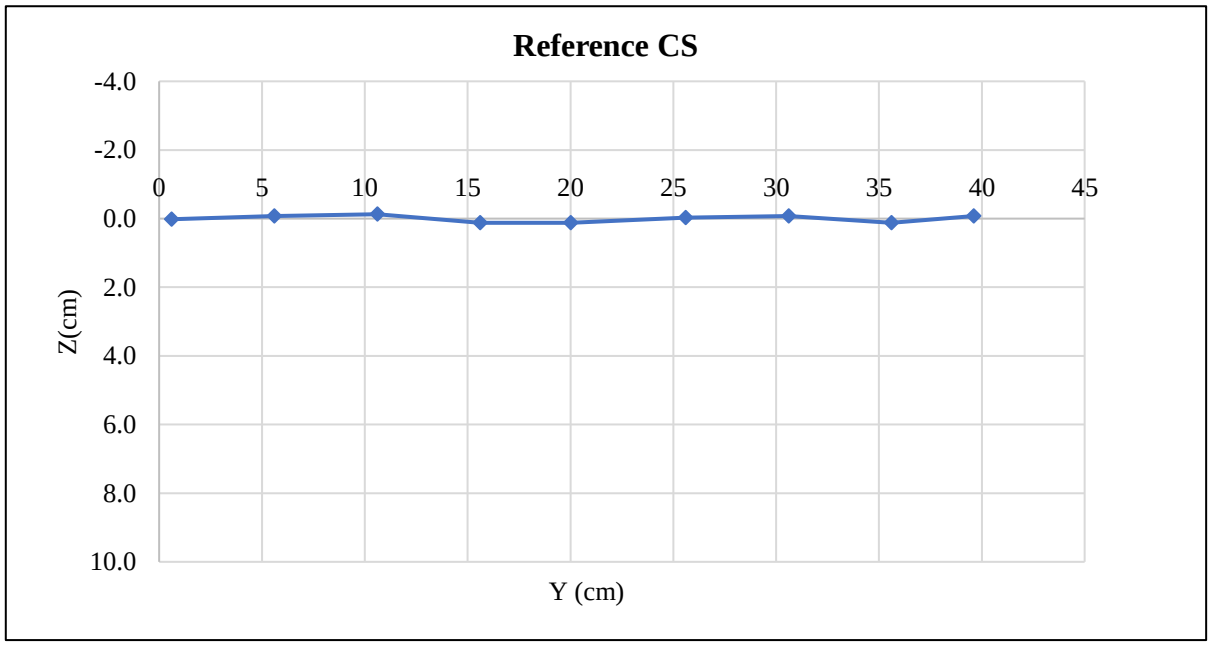
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.136	7.010	6.601	7.290	7.083	7.221	7.141	7.354	7.216	7.311	7.299	7.268	7.218	7.307
	7.145	6.970	6.914	7.196	7.055	7.398	7.316	7.334	7.157	7.237	7.277	7.302	7.344	7.336
	7.212	6.870	6.887	7.123	7.227	7.289	7.280	7.270	7.318	7.221	7.133	7.229	7.266	7.252
	7.231	7.037	6.935	7.099	7.254	7.300	7.373	7.256	7.307	7.195	7.318	7.293	7.295	7.385
	7.252	6.966	6.898	7.303	7.137	7.266	7.372	7.360	7.191	7.353	7.471	7.339	7.244	7.244
	7.233	6.898	6.999	7.150	7.078	7.197	7.270	7.204	7.254	7.348	7.398	7.195	7.248	7.183
	7.115	7.027	6.902	7.064	7.096	7.301	7.279	7.376	7.224	7.255	7.188	7.408	7.300	7.309
	7.117	6.931	6.887	7.227	7.163	7.147	7.292	7.349	7.376	7.400	7.269	7.357	7.264	7.210
	7.089	6.937	6.954	7.194	7.244	7.327	7.264	7.294	7.247	7.233	7.339	7.313	7.273	7.206
	7.194	7.001	6.756	7.242	7.223	7.339	7.318	7.364	7.311	7.200	7.213	7.187	7.148	7.277
Average	7.172	6.965	6.873	7.189	7.156	7.279	7.291	7.316	7.260	7.275	7.291	7.289	7.260	7.271
Ratio	0.989	0.961	0.948	0.992	0.987	1.004	1.006	1.009	1.001	1.003	1.006	1.005	1.001	1.003

E7.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.0
	14	5.6	26.6	-0.1
	19	10.6	26.65	-0.1

	24	15.6	26.4	0.1
	28.4	20	26.4	0.1
	34	25.6	26.55	0.0
	39	30.6	26.6	-0.1
	44	35.6	26.4	0.1
	48	39.6	26.6	-0.1
		Average (Reference Elevation)	26.52	

E7.3. Calculated Reference Elevation.

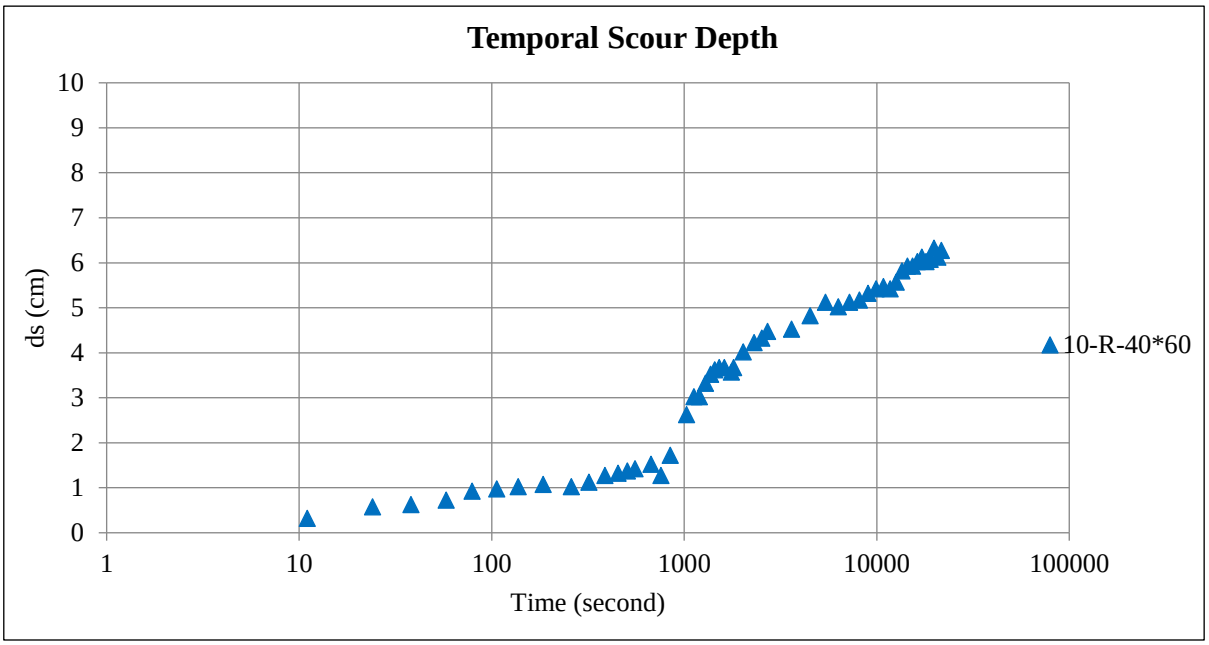


E7.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point	**20**			**Reference**	**26.6**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction**	**Scour Depth**
0	0	11	11	26.2	0.32
0	0	24	24	25.95	0.57
0	0	38	38	25.9	0.62
0	0	58	58	25.8	0.72
0	1	19	79	25.6	0.92
0	1	46	106	25.55	0.97
0	2	17	137	25.5	1.02
0	3	5	185	25.45	1.07
0	4	19	259	25.5	1.02
0	5	19	319	25.4	1.12
0	6	27	387	25.25	1.27
0	7	32	452	25.2	1.32
0	8	25	505	25.15	1.37
0	9	15	555	25.1	1.42
0	11	10	670	25	1.52
0	12	35	755	25.25	1.27
0	14	4	844	24.8	1.72
0	17	5	1025	23.9	2.62

0	18	43	1123	23.5	3.02
0	19	58	1198	23.5	3.02
0	21	27	1287	23.2	3.32
0	22	48	1368	23	3.52
0	24	0	1440	22.9	3.62
0	25	15	1515	22.85	3.67
0	26	55	1615	22.85	3.67
0	29	12	1752	22.95	3.57
0	30	0	1800	22.85	3.67
0	33	45	2025	22.5	4.02
0	38	26	2306	22.3	4.22
0	42	5	2525	22.2	4.32
0	45	0	2700	22.05	4.47
1	0	0	3600	22	4.52
1	15	0	4500	21.7	4.82
1	30	0	5400	21.4	5.12
1	45	0	6300	21.5	5.02
2	0	0	7200	21.4	5.12
2	15	0	8100	21.35	5.17
2	30	0	9000	21.2	5.32
2	45	0	9900	21.1	5.42
3	0	0	10800	21.05	5.47
3	15	0	11700	21.1	5.42
3	30	0	12600	20.95	5.57
3	45	0	13500	20.7	5.82
4	0	0	14400	20.6	5.92
4	15	0	15300	20.6	5.92
4	30	0	16200	20.5	6.02
4	45	0	17100	20.4	6.12
5	0	0	18000	20.5	6.02
5	15	0	18900	20.45	6.07
5	30	0	19800	20.2	6.32
5	45	0	20700	20.4	6.12
6	0	0	21600	20.25	6.27

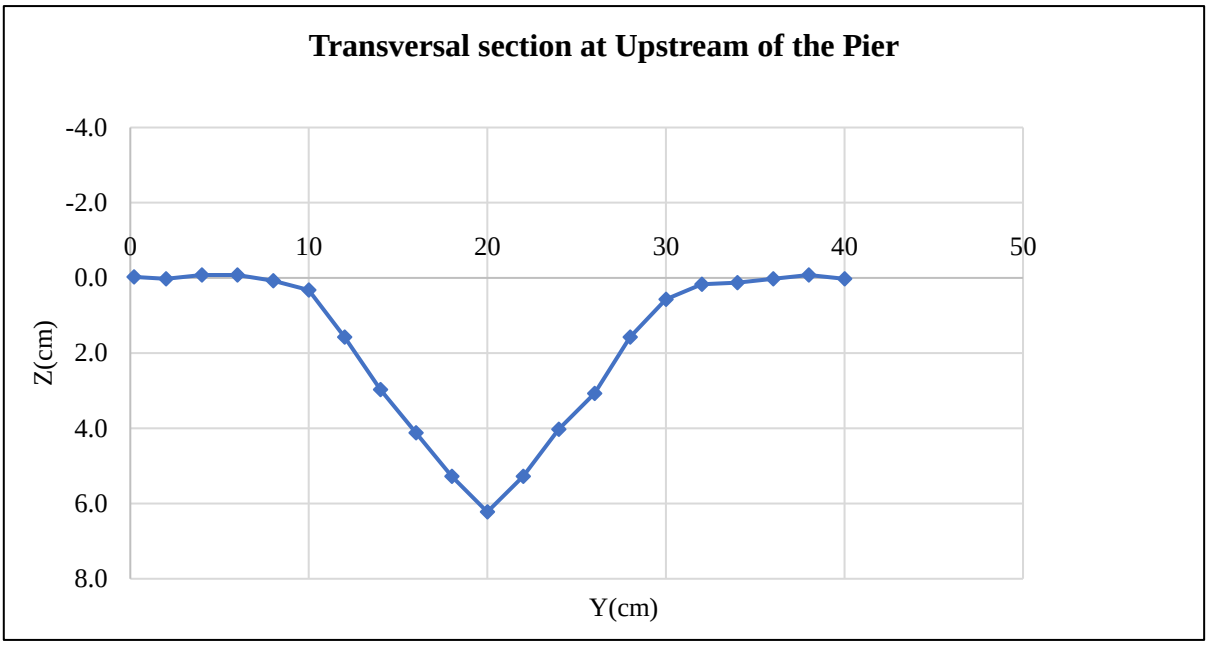
E7.5. Temporal Scour Depth measurements.



E7.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.55	0.0
	10.4	2	26.5	0.0
	12.4	4	26.6	-0.1
	14.4	6	26.6	-0.1
	16.4	8	26.45	0.1
	18.4	10	26.2	0.3
	20.4	12	24.95	1.6
	22.4	14	23.55	3.0
	24.4	16	22.4	4.1
	26.4	18	21.25	5.3
104.15	28.4	20	20.3	6.2
	30.4	22	21.25	5.3
	32.4	24	22.5	4.0
	34.4	26	23.45	3.1
	36.4	28	24.95	1.6
	38.4	30	25.95	0.6
	40.4	32	26.35	0.2
	42.4	34	26.4	0.1
	44.4	36	26.5	0.0
	46.4	38	26.6	-0.1
	48.4	40	26.5	0.0

E7.7. Recorded surveyed transversal section measurements.

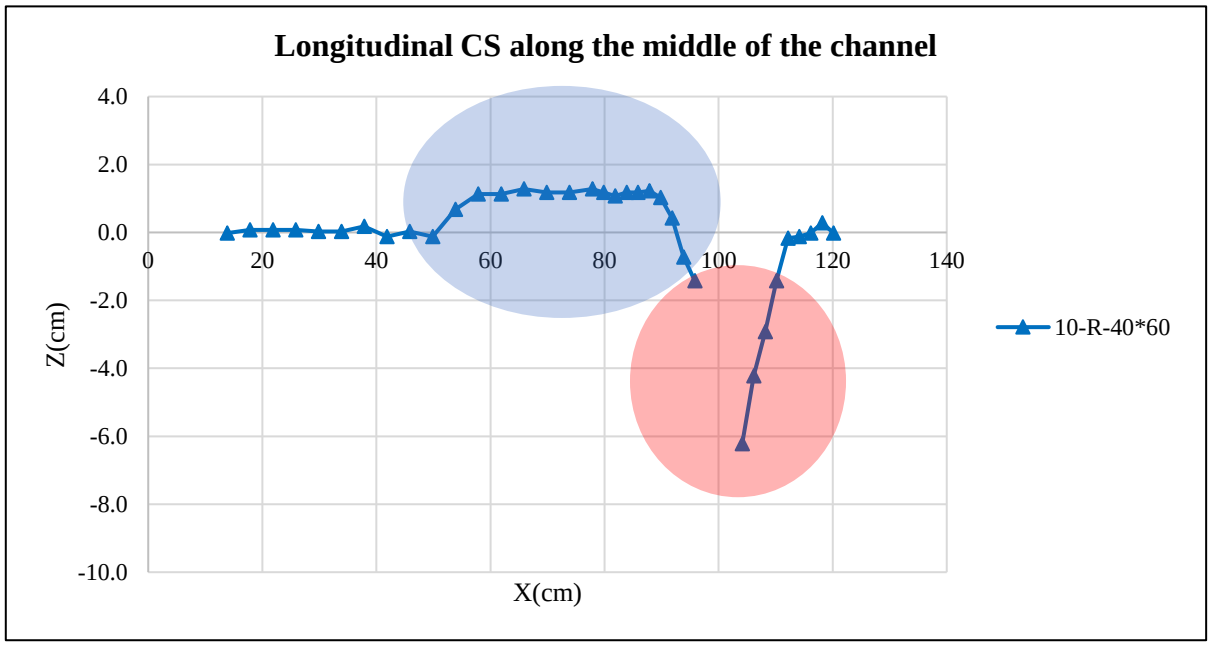


E7.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.5	0.0
79.7	17.85		26.6	0.1
83.7	21.85		26.6	0.1
87.7	25.85		26.6	0.1
91.7	29.85		26.55	0.0
95.7	33.85		26.55	0.03
99.7	37.85		26.7	0.2
3.7	41.85		26.4	-0.1
7.7	45.85		26.55	0.0
11.7	49.85		26.4	-0.1
15.7	53.85		27.2	0.68
19.7	57.85		27.65	1.13
23.7	61.85		27.65	1.1
27.7	65.85		27.8	1.3
31.7	69.85		27.7	1.2
35.7	73.85		27.7	1.18
39.7	77.85		27.8	1.3
41.7	79.85		27.7	1.18
43.7	81.85		27.6	1.1
45.7	83.85		27.7	1.18
47.7	85.85		27.7	1.18
49.7	87.85		27.75	1.23
51.7	89.85		27.55	1.03
53.7	91.85		26.95	0.4
55.7	93.85		25.8	-0.72
57.7	95.85		25.1	-1.42
61.85	100		The Middle of the Pier	
66	104.15		20.3	-6.22

68	106.15		22.3	-4.2
70	108.15		23.6	-2.9
72	110.15		25.1	-1.4
74	112.15		26.35	-0.17
76	114.15		26.4	-0.12
78	116.15		26.5	0.0
80	118.15		26.8	0.28
82	120.15		26.5	0.0

E7.9. Recorded surveyed longitudinal section measurements.



E7.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue circle is indicating the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	2.29	3.53	28.00	81.39
2	3.53	0.00	4.88	8.60
3	0.00	-13.82	19.12	-132.19
4	-13.82	-12.36	13.00	-170.21
5	-12.36	0.00	1.90	-11.72
6	0.00	31.30	4.80	75.18
7	31.30	75.18	4.15	220.95
8	75.18	70.34	4.15	301.95
9	70.34	15.73	5.00	215.17
10	15.73	0.00	4.18	32.84
11	0.00	-3.11	0.82	-1.28
12	-3.11	-2.22	10.00	-26.63
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
594.06	936.09	-342.02	72.01	522.05

E7.11. Calculated volume.

Experiment E8 (10-R-40*80)

40*80(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*10
	Along the width	2*7
	Around pier	4

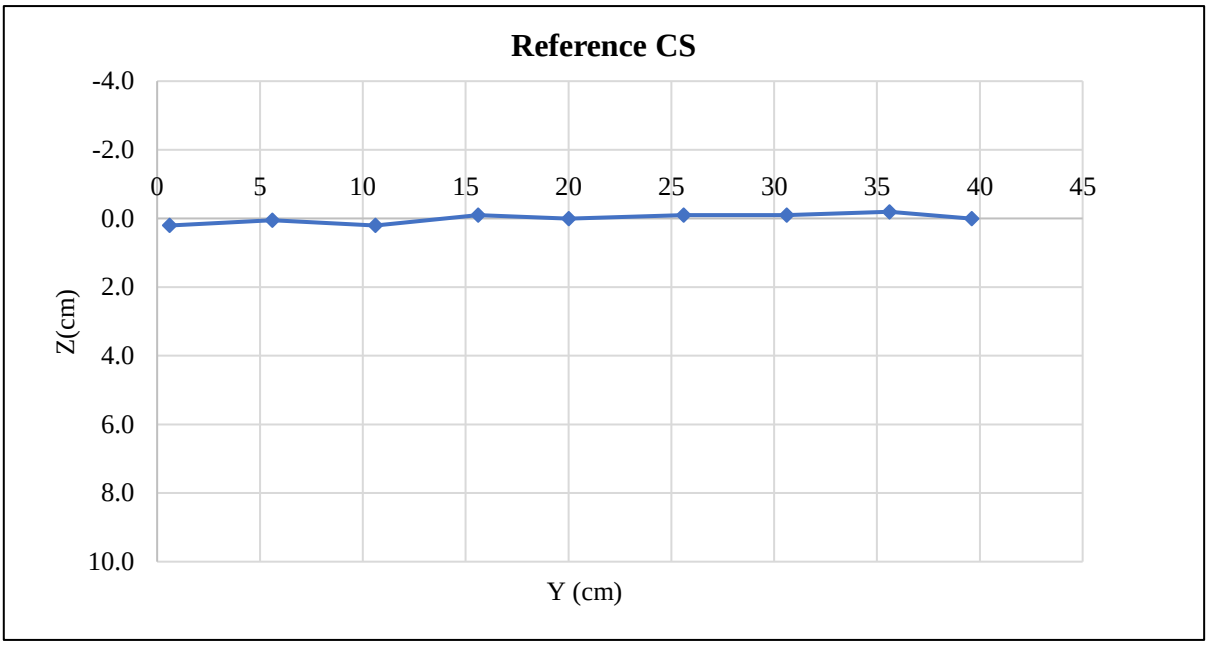
E8.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.193	7.136	7.094	7.195	7.174	7.190	7.050	7.257	7.257	7.210	6.999	7.169	7.245	7.066
	7.317	7.145	7.211	7.229	7.231	7.203	7.081	7.292	7.322	7.186	7.203	7.175	7.277	7.039
	7.315	7.212	7.135	7.174	7.175	7.197	7.180	7.171	7.202	7.218	7.319	7.228	7.023	7.037
	7.234	7.231	7.165	7.294	7.082	7.317	7.020	7.206	7.278	7.116	7.386	7.223	7.136	7.093
	7.190	7.252	7.225	7.053	7.215	7.149	7.111	7.225	7.291	7.066	7.111	7.173	7.303	7.123
	7.144	7.233	7.230	7.182	7.177	7.143	7.208	7.167	7.104	7.259	7.113	7.157	7.247	7.230
	7.307	7.115	7.158	7.167	7.229	7.113	7.207	7.259	7.148	7.208	7.184	7.092	7.123	7.066
	7.184	7.117	7.214	7.028	7.196	7.120	7.092	7.287	7.066	7.072	7.171	7.065	7.169	7.090
	7.211	7.089	7.314	7.152	7.184	7.148	7.231	7.124	7.242	7.139	7.215	7.233	7.323	7.222
	7.220	7.194	7.057	7.118	7.339	7.056	7.123	7.211	7.067	7.168	7.217	7.132	7.194	7.185
Average	7.232	7.172	7.180	7.159	7.200	7.164	7.130	7.220	7.198	7.164	7.192	7.165	7.204	7.115
Ratio	0.997	0.989	0.990	0.987	0.993	0.988	0.983	0.996	0.993	0.988	0.992	0.988	0.994	0.981

E8.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.2
	14	5.6	26.45	0.1
	19	10.6	26.3	0.2
	24	15.6	26.6	-0.1
	28.4	20	26.5	0.0
	34	25.6	26.6	-0.1
	39	30.6	26.6	-0.1
	44	35.6	26.7	-0.2
	48	39.6	26.5	0.0
		Average (Reference Elevation)	26.51	

E8.3. Calculated Reference Elevation.

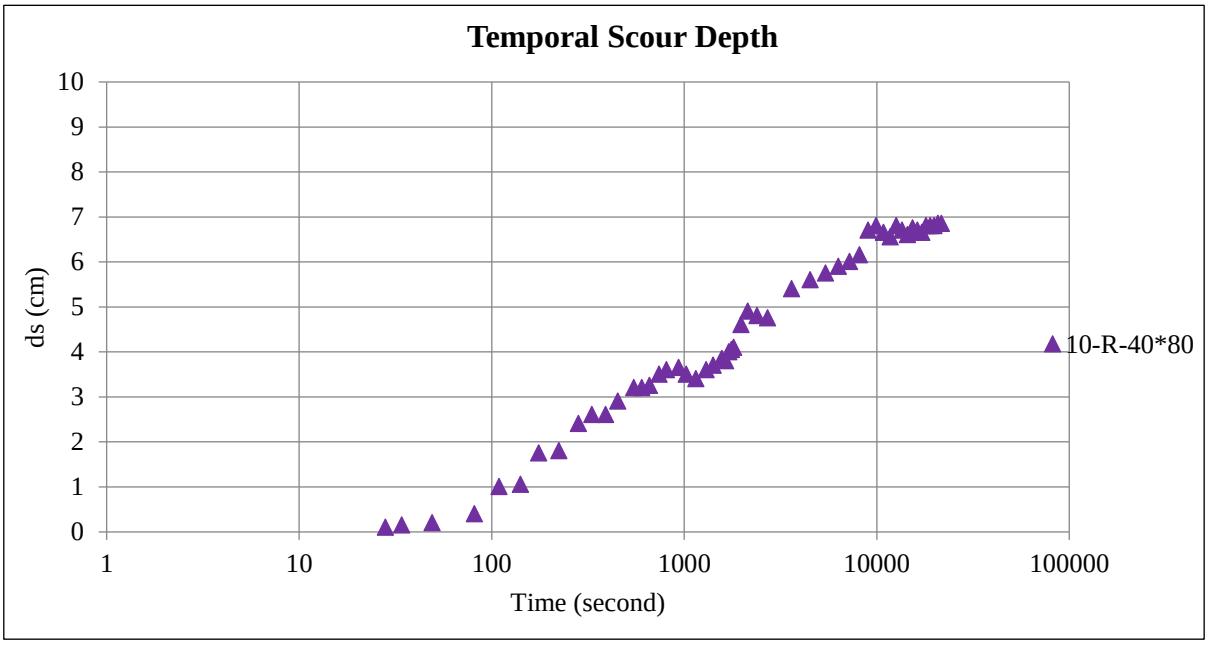


E8.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.51
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	28	28	26.4	0.11
0	0	34	34	26.35	0.16
0	0	49	49	26.3	0.21
0	1	21	81	26.1	0.41
0	1	49	109	25.5	1.01
0	2	21	141	25.45	1.06
0	2	55	175	24.75	1.76
0	3	43	223	24.7	1.81
0	4	41	281	24.1	2.41
0	5	31	331	23.9	2.61
0	6	30	390	23.9	2.61
0	7	31	451	23.6	2.91
0	9	5	545	23.3	3.21
0	10	0	600	23.3	3.21
0	10	59	659	23.25	3.26
0	12	20	740	23	3.51
0	13	26	806	22.9	3.61
0	15	32	932	22.85	3.66
0	17	3	1023	23	3.51
0	19	7	1147	23.1	3.41
0	21	35	1295	22.9	3.61
0	23	30	1410	22.8	3.71
0	26	7	1567	22.65	3.86
0	27	20	1640	22.7	3.81
0	28	23	1703	22.5	4.01
0	29	16	1756	22.45	4.06

0	30	0	1800	22.4	4.11
0	32	52	1972	21.9	4.61
0	35	34	2134	21.6	4.91
0	39	45	2385	21.7	4.81
0	45	0	2700	21.75	4.76
1	0	0	3600	21.1	5.41
1	15	0	4500	20.9	5.61
1	30	0	5400	20.75	5.76
1	45	0	6300	20.6	5.91
2	0	0	7200	20.5	6.01
2	15	0	8100	20.35	6.16
2	30	0	9000	19.8	6.71
2	45	0	9900	19.7	6.81
3	0	0	10800	19.85	6.66
3	15	0	11700	19.95	6.56
3	30	0	12600	19.7	6.81
3	45	0	13500	19.8	6.71
4	0	0	14400	19.9	6.61
4	15	0	15300	19.75	6.76
4	30	0	16200	19.8	6.71
4	45	0	17100	19.85	6.66
5	0	0	18000	19.7	6.81
5	15	0	18900	19.7	6.81
5	30	0	19800	19.7	6.81
5	45	0	20700	19.65	6.86
6	0	0	21600	19.65	6.86

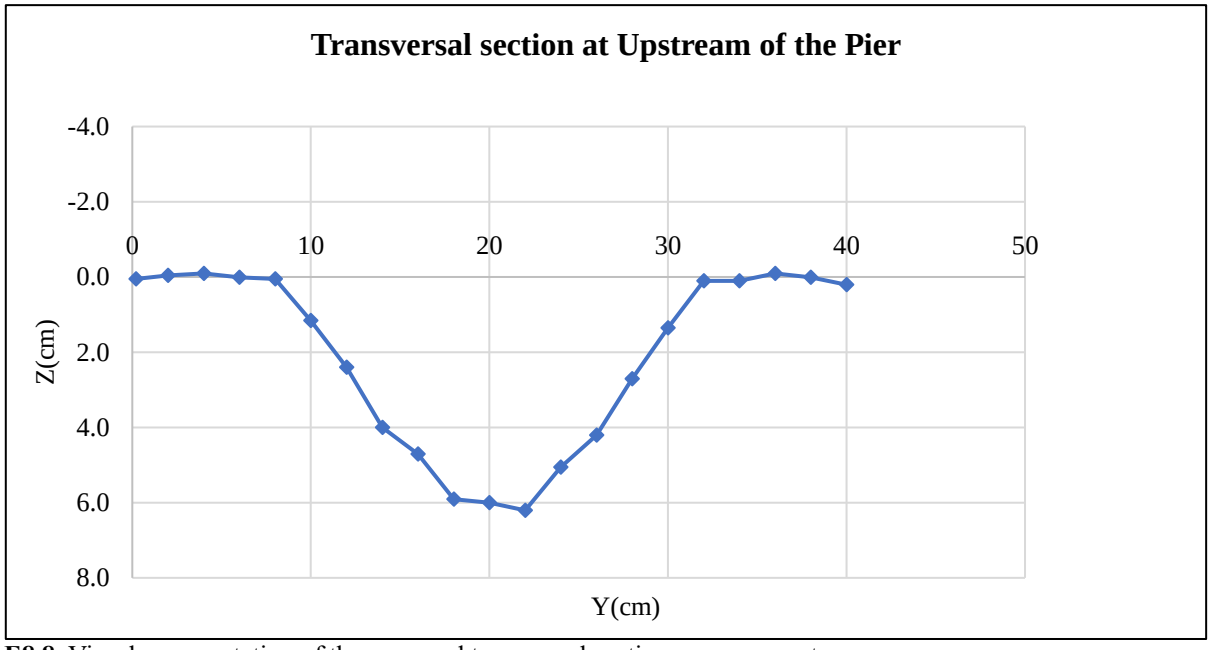
E8.5. Temporal Scour Depth measurements.



E8.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.45	0.1
	10.4	2	26.55	0.0
	12.4	4	26.6	-0.1
	14.4	6	26.5	0.0
	16.4	8	26.45	0.1
	18.4	10	25.35	1.2
	20.4	12	24.1	2.4
	22.4	14	22.5	4.0
	24.4	16	21.8	4.7
	26.4	18	20.6	5.9
	28.4	20	20.5	6.0
	30.4	22	20.3	6.2
	32.4	24	21.45	5.1
	34.4	26	22.3	4.2
	36.4	28	23.8	2.7
	38.4	30	25.15	1.4
	40.4	32	26.4	0.1
	42.4	34	26.4	0.1
	44.4	36	26.6	-0.1
	46.4	38	26.5	0.0
	48.4	40	26.3	0.2

E8.7. Recorded surveyed transversal section measurements.

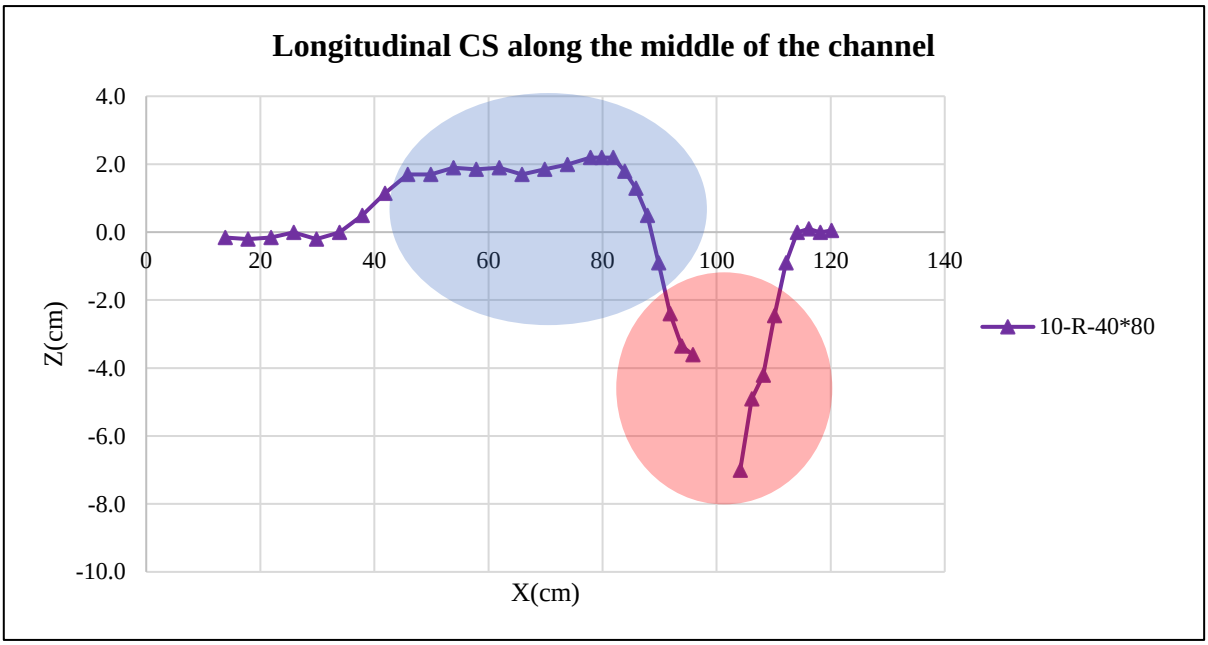


E8.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.35	-0.2
79.7	17.85		26.3	-0.2
83.7	21.85		26.35	-0.2

87.7	25.85		26.5	0.0
91.7	29.85		26.3	-0.2
95.7	33.85		26.5	-0.01
99.7	37.85		27	0.5
3.7	41.85		27.65	1.1
7.7	45.85		28.2	1.7
11.7	49.85		28.2	1.7
15.7	53.85		28.4	1.89
19.7	57.85		28.35	1.84
23.7	61.85		28.4	1.9
27.7	65.85		28.2	1.7
31.7	69.85		28.35	1.8
35.7	73.85		28.5	1.99
39.7	77.85		28.7	2.2
41.7	79.85		28.7	2.19
43.7	81.85		28.7	2.2
45.7	83.85		28.3	1.79
47.7	85.85		27.8	1.29
49.7	87.85		27	0.49
51.7	89.85		25.6	-0.91
53.7	91.85		24.1	-2.4
55.7	93.85		23.15	-3.36
57.7	95.85		22.9	-3.61
61.85	100		The Middle of the Pier	
66	104.15		19.5	-7.0
68	106.15		21.6	-4.9
70	108.15		22.3	-4.2
72	110.15		24.05	-2.5
74	112.15		25.6	-0.91
76	114.15		26.5	-0.01
78	116.15		26.6	0.1
80	118.15		26.5	-0.01
82	120.15		26.55	0.0

E8.9. Recorded surveyed longitudinal section measurements.



E8.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue circle indicates the accumulated eroded sediments downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-3.02	-18.56	28.00	-302.21
2	-18.56	-25.45	24.00	-528.09
3	-25.45	-5.26	13.00	-199.61
4	-5.26	0.00	0.55	-1.46
5	0.00	58.45	6.15	179.62
6	58.45	96.24	4.15	320.97
7	96.24	87.77	4.15	381.81
8	87.77	36.41	5.00	310.46
9	36.41	0.00	4.24	77.12
10	0.00	-6.56	0.76	-2.51
11	-6.56	-2.26	10.00	-44.11
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
191.99	1269.98	-1077.99	-530.78	722.77

E8.11. Calculated volume.

Experiment E9 (10-R-20*60)

20*60(10 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*8
	Along the width	2*3
	Around pier	4

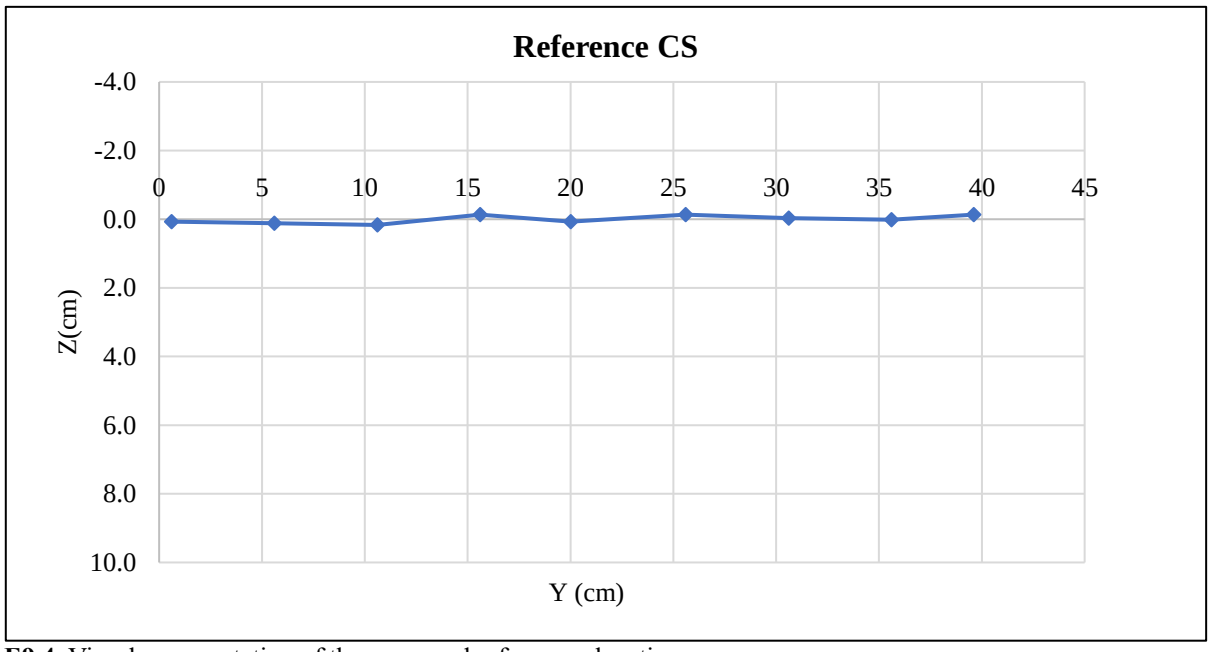
E9.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.173	7.440	7.231	7.273	7.190	7.249	7.256	7.276	7.417	7.250	7.164	7.248	7.159	7.132
	7.136	7.337	7.271	7.260	7.264	7.050	7.212	7.153	7.265	7.138	7.218	7.209	7.194	7.163
	7.083	7.424	7.379	7.293	7.213	7.298	7.228	7.208	7.280	7.162	7.182	7.308	7.011	7.219
	7.202	7.506	7.258	7.215	7.134	7.143	7.262	7.348	7.151	7.235	7.076	7.376	7.054	7.121
	7.116	7.499	7.367	7.310	7.115	7.195	7.186	7.202	7.199	7.221	7.308	7.351	7.251	7.319
	7.214	7.537	7.163	7.163	7.401	7.207	7.341	7.326	7.147	7.286	7.305	7.273	7.143	7.169
	7.179	7.447	7.247	7.204	7.275	7.167	7.267	7.178	7.187	7.140	7.134	7.197	7.256	7.263
	7.184	7.487	7.312	7.198	7.065	7.132	7.133	7.245	7.254	7.234	7.252	7.272	7.212	7.107
	7.188	7.362	7.096	7.199	7.266	7.159	7.209	7.271	7.313	7.116	7.241	7.371	7.290	7.153
	7.218	7.520	7.224	7.245	7.299	7.249	7.242	7.121	7.155	7.142	7.177	7.105	7.378	7.274
Average	7.169	7.456	7.255	7.236	7.222	7.185	7.234	7.233	7.237	7.192	7.206	7.271	7.195	7.192
Ratio	0.989	1.028	1.001	0.998	0.996	0.991	0.998	0.998	0.998	0.992	0.994	1.003	0.992	0.992

E9.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.4	0.1
	14	5.6	26.35	0.1
	19	10.6	26.3	0.2
	24	15.6	26.6	-0.1
	28.4	20	26.4	0.1
	34	25.6	26.6	-0.1
	39	30.6	26.5	0.0
	44	35.6	26.45	0.0
	48	39.6	26.6	-0.1
		Average (Reference Elevation)	26.47	

E9.3. Calculated Reference Elevation.

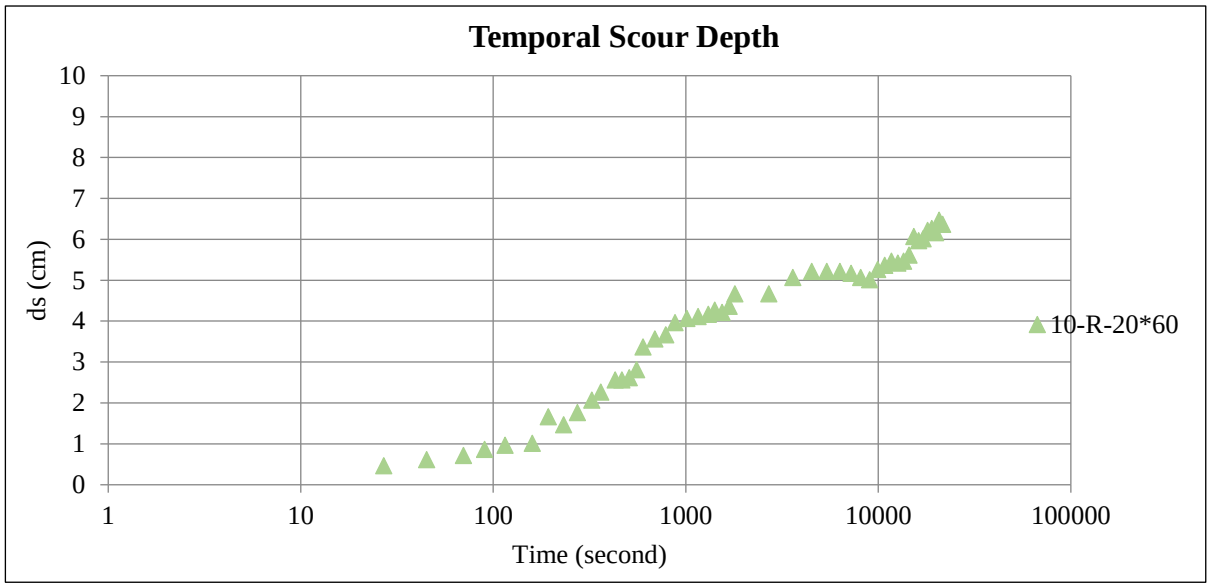


E9.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.47
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	27	27	26	0.47
0	0	45	45	25.85	0.62
0	1	10	70	25.75	0.72
0	1	30	90	25.6	0.87
0	1	55	115	25.5	0.97
0	2	39	159	25.45	1.02
0	3	13	193	24.8	1.67
0	3	52	232	25	1.47
0	4	33	273	24.7	1.77
0	5	25	325	24.4	2.07
0	6	2	362	24.2	2.27
0	7	10	430	23.9	2.57
0	7	45	465	23.9	2.57
0	8	28	508	23.85	2.62
0	9	15	555	23.65	2.82
0	10	0	600	23.1	3.37
0	11	30	690	22.9	3.57
0	13	5	785	22.8	3.67
0	14	38	878	22.5	3.97
0	16	53	1013	22.4	4.07
0	19	15	1155	22.35	4.12
0	21	49	1309	22.3	4.17
0	23	30	1410	22.2	4.27
0	25	45	1545	22.25	4.22
0	28	0	1680	22.1	4.37
0	30	0	1800	21.8	4.67
0	45	0	2700	21.8	4.67
1	0	0	3600	21.4	5.07
1	15	0	4500	21.25	5.22
1	30	0	5400	21.25	5.22
1	45	0	6300	21.25	5.22
2	0	0	7200	21.3	5.17
2	15	0	8100	21.4	5.07
2	30	0	9000	21.45	5.02
2	45	0	9900	21.2	5.27
3	0	0	10800	21.1	5.37
3	15	0	11700	21	5.47
3	30	0	12600	21.05	5.42
3	45	0	13500	21	5.47
4	0	0	14400	20.85	5.62
4	15	0	15300	20.4	6.07
4	30	0	16200	20.5	5.97

4	45	0	17100	20.45	6.02
5	0	0	18000	20.25	6.22
5	15	0	18900	20.2	6.27
5	30	0	19800	20.3	6.17
5	45	0	20700	20	6.47
6	0	0	21600	20.1	6.37

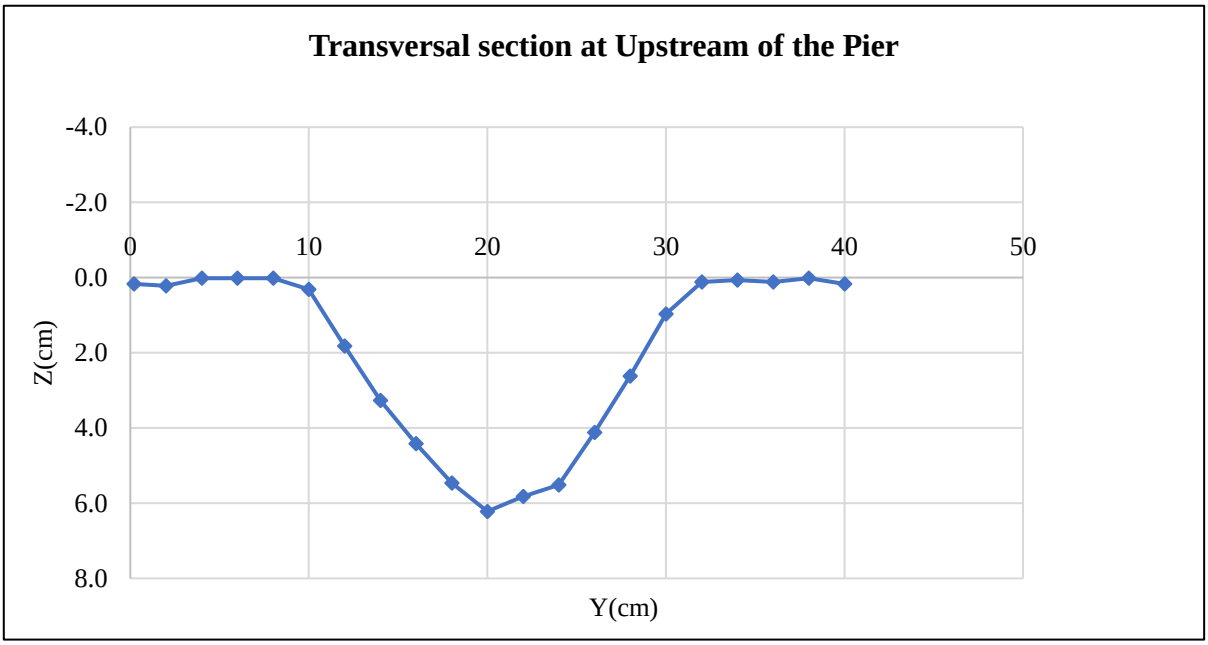
E9.5. Temporal Scour Depth measurements.



E9.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.3	0.2
	10.4	2	26.25	0.2
	12.4	4	26.45	0.0
	14.4	6	26.45	0.0
	16.4	8	26.45	0.0
	18.4	10	26.15	0.3
	20.4	12	24.65	1.8
	22.4	14	23.2	3.3
	24.4	16	22.05	4.4
	26.4	18	21	5.5
104.15	28.4	20	20.25	6.2
	30.4	22	20.65	5.8
	32.4	24	20.95	5.5
	34.4	26	22.35	4.1
	36.4	28	23.85	2.6
	38.4	30	25.5	1.0
	40.4	32	26.35	0.1
	42.4	34	26.4	0.1
	44.4	36	26.35	0.1
	46.4	38	26.45	0.0
	48.4	40	26.3	0.2

E9.7. Recorded surveyed transversal section measurements.

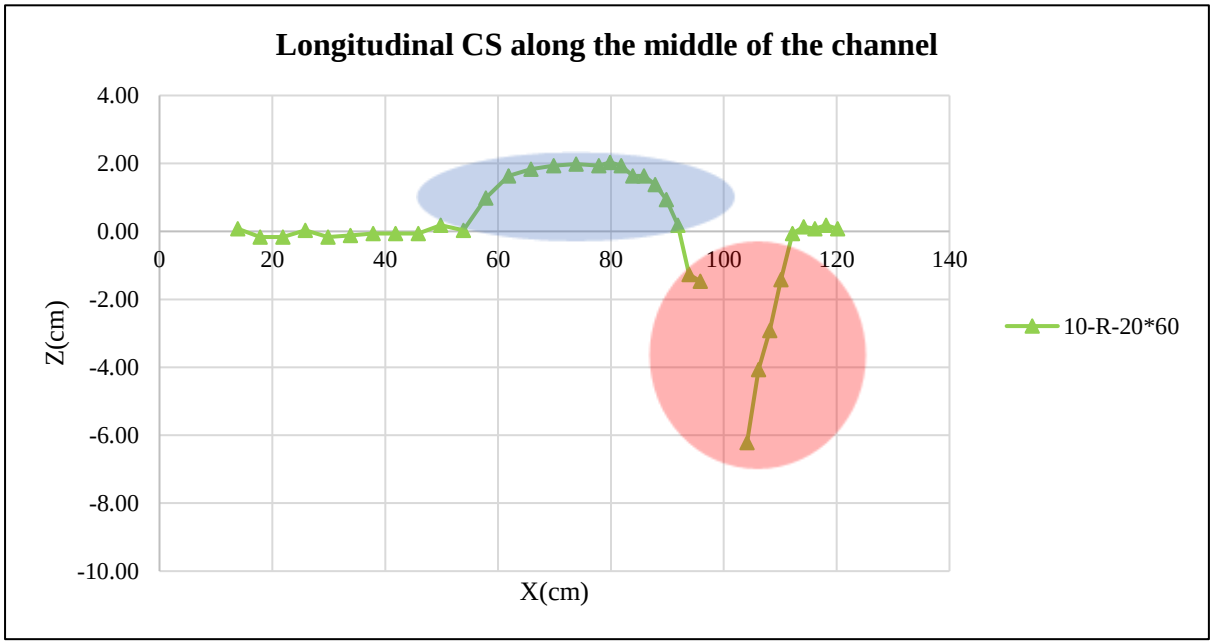


E9.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.55	0.08
79.7	17.85		26.3	-0.17
83.7	21.85		26.3	-0.17
87.7	25.85		26.5	0.03
91.7	29.85		26.3	-0.17
95.7	33.85		26.35	-0.12
99.7	37.85		26.4	-0.07
3.7	41.85		26.4	-0.07
7.7	45.85		26.4	-0.07
11.7	49.85		26.65	0.18
15.7	53.85		26.5	0.03
19.7	57.85		27.45	0.98
23.7	61.85		28.1	1.63
27.7	65.85		28.3	1.83
31.7	69.85		28.4	1.93
35.7	73.85		28.45	1.98
39.7	77.85		28.4	1.93
41.7	79.85		28.5	2.03
43.7	81.85		28.4	1.93
45.7	83.85		28.1	1.63
47.7	85.85		28.1	1.63
49.7	87.85		27.85	1.38
51.7	89.85		27.4	0.93
53.7	91.85		26.65	0.18
55.7	93.85		25.2	-1.27
57.7	95.85		25	-1.47
61.85	100		The Middle of the Pier	
66	104.15		20.25	-6.22

68	106.15		22.4	-4.07
70	108.15		23.55	-2.92
72	110.15		25.05	-1.42
74	112.15		26.4	-0.07
76	114.15		26.6	0.13
78	116.15		26.55	0.08
80	118.15		26.65	0.18
82	120.15		26.55	0.08

E9.9. Recorded surveyed longitudinal section measurements.



E9.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue circle is indicating the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	3.26	0.00	13.80	22.47
2	0.00	-3.35	14.20	-23.80
3	-3.35	-20.87	24.00	-290.66
4	-20.87	-10.84	13.00	-206.09
5	-10.84	0.00	1.41	-7.66
6	0.00	44.62	5.29	117.92
7	44.62	86.29	4.15	271.63
8	86.29	82.53	4.15	350.29
9	82.53	22.06	5.00	261.47
10	22.06	0.00	4.15	45.72
11	0.00	-4.55	0.85	-1.94
12	-4.55	0.00	8.35	-18.98
13	0.00	0.90	1.65	0.74
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
521.10	952.32	-549.14	-116.20	637.30

E9.11. Calculated volume.

Experiment E10 (5-R-40)

40*40(5 mm)		
Anchorage	Position	Nails number
	Along the length	2*7
	Along the width	2*7
	Around pier	4

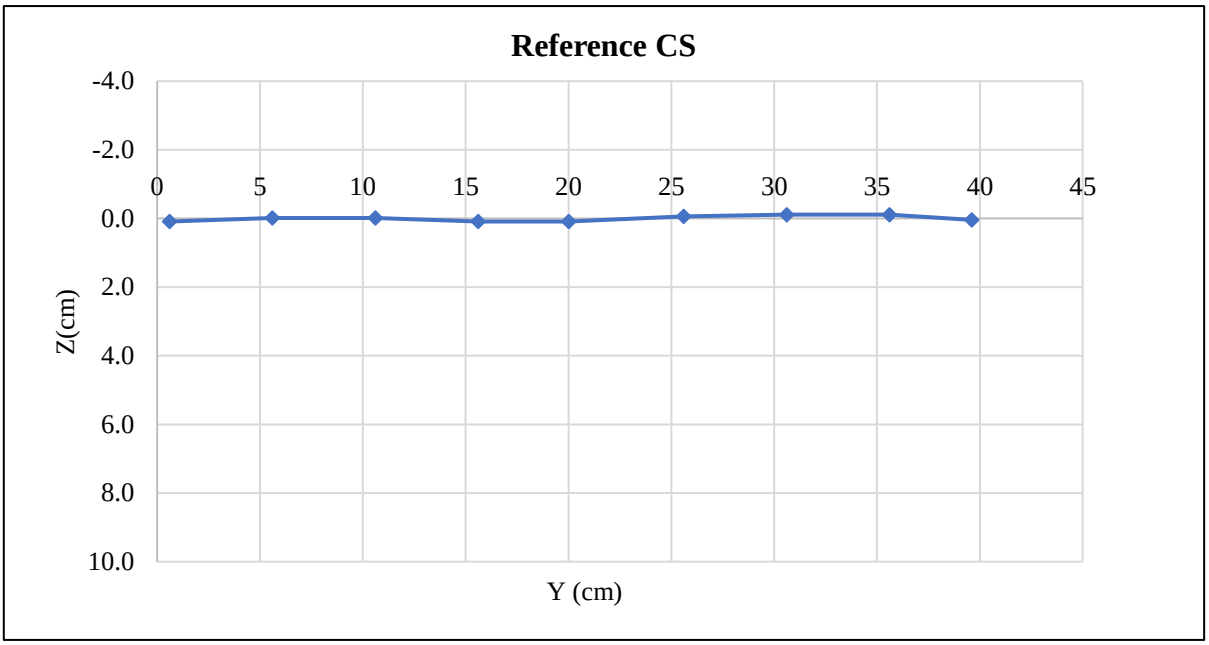
E10.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.173	7.258	7.372	7.343	7.27	7.359	7.155	7.251	7.149	7.209	7.348	7.193	7.247	7.28
	7.187	7.212	7.407	7.377	7.362	7.381	7.284	7.394	7.143	7.175	7.371	7.211	7.306	7.203
	7.294	7.276	7.296	7.212	7.323	7.404	7.278	7.306	7.072	7.358	7.235	7.19	7.042	7.167
	7.263	7.237	7.356	7.384	7.28	7.273	7.342	7.402	7.051	7.216	7.279	7.246	7.201	7.27
	7.19	7.156	7.426	7.284	7.336	7.37	7.275	7.449	7.109	7.316	7.254	7.316	7.196	7.269
	7.128	7.31	7.385	7.39	7.24	7.299	7.32	7.234	7.088	7.278	7.285	7.229	7.263	7.318
	7.272	7.3	7.277	7.253	7.399	7.377	7.25	7.406	7.252	7.326	7.434	7.205	7.125	7.176
	7.114	7.273	7.39	7.357	7.284	7.487	7.172	7.253	7.195	7.337	7.204	7.172	7.251	7.244
	7.19	7.363	7.442	7.26	7.316	7.181	7.216	7.282	7.136	7.165	7.236	7.086	7.287	7.161
	7.323	7.258	7.799	7.325	7.372	7.175	7.201	7.311	7.172	7.223	7.225	7.224	7.197	7.305
Average	7.213	7.264	7.415	7.319	7.318	7.331	7.249	7.329	7.137	7.260	7.287	7.207	7.212	7.239
Ratio	0.995	1.002	1.023	1.009	1.009	1.011	1.000	1.011	0.984	1.001	1.005	0.994	0.995	0.999

E10.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.1
	14	5.6	26.6	0.0
	19	10.6	26.6	0.0
	24	15.6	26.5	0.1
	28.4	20	26.5	0.1
	34	25.6	26.65	-0.1
	39	30.6	26.7	-0.1
	44	35.6	26.7	-0.1
	48	39.6	26.55	0.0
		Average (Reference Elevation)	26.59	

E10.3. Calculated Reference Elevation.

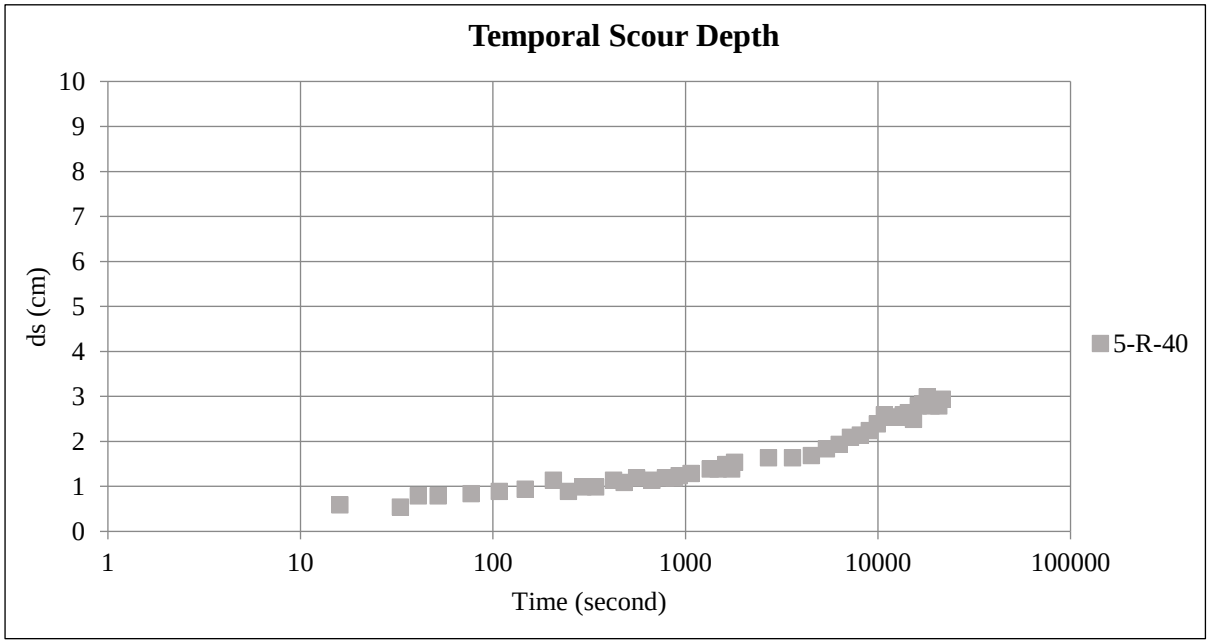


E10.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.59
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	16	16	26	0.59
0	0	33	33	26.05	0.54
0	0	41	41	25.8	0.79
0	0	52	52	25.8	0.79
0	1	17	77	25.75	0.84
0	1	48	108	25.7	0.89
0	2	27	147	25.65	0.94
0	3	26	206	25.45	1.14
0	4	7	247	25.7	0.89
0	4	53	293	25.6	0.99
0	5	42	342	25.6	0.99
0	7	3	423	25.45	1.14
0	8	0	480	25.5	1.09
0	9	17	557	25.4	1.19
0	11	9	669	25.45	1.14
0	13	7	787	25.4	1.19
0	14	32	872	25.4	1.19
0	15	29	929	25.35	1.24
0	17	47	1067	25.3	1.29
0	22	23	1343	25.2	1.39
0	24	40	1480	25.2	1.39
0	27	0	1620	25.1	1.49
0	29	0	1740	25.2	1.39
0	30	0	1800	25.05	1.54
0	45	0	2700	24.95	1.64
1	0	0	3600	24.95	1.64

1	15	0	4500	24.9	1.69
1	30	0	5400	24.75	1.84
1	45	0	6300	24.65	1.94
2	0	0	7200	24.5	2.09
2	15	0	8100	24.45	2.14
2	30	0	9000	24.35	2.24
2	45	0	9900	24.2	2.39
3	0	0	10800	24	2.59
3	15	0	11700	24.05	2.54
3	30	0	12600	24.05	2.54
3	45	0	13500	24	2.59
4	0	0	14400	23.95	2.64
4	15	0	15300	24.1	2.49
4	30	0	16200	23.8	2.79
4	45	0	17100	23.75	2.84
5	0	0	18000	23.6	2.99
5	15	0	18900	23.8	2.79
5	30	0	19800	23.7	2.89
5	45	0	20700	23.8	2.79
6	0	0	21600	23.65	2.94

E10.5. Temporal Scour Depth measurements.

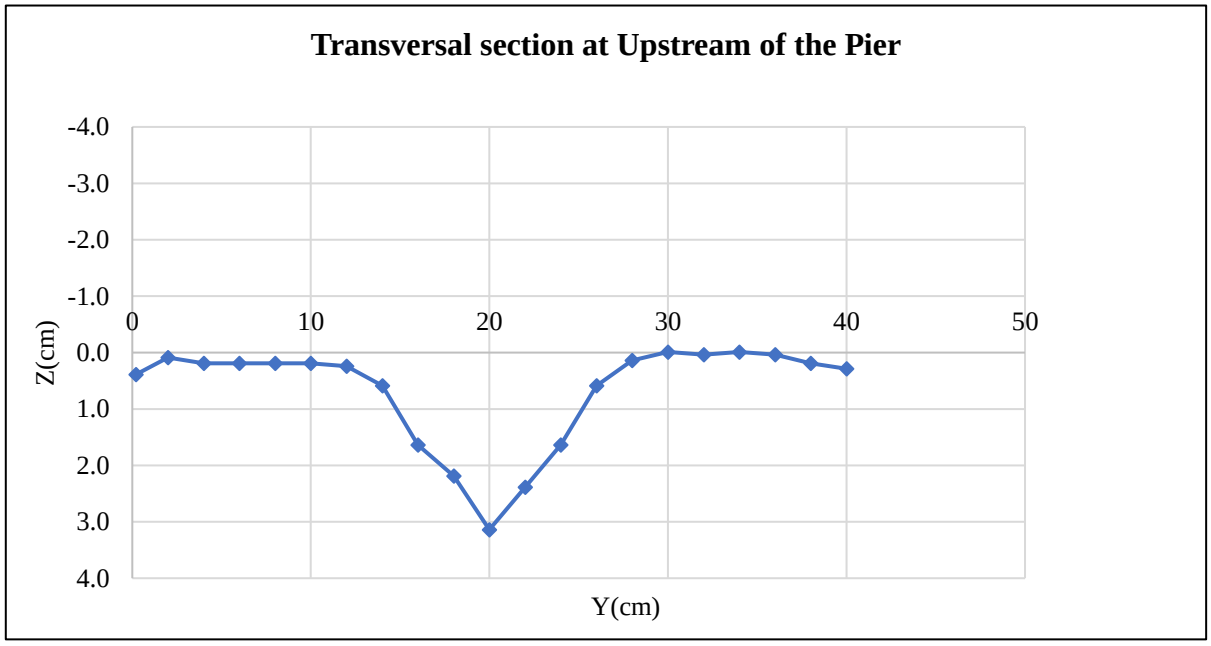


E10.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.2	0.4
	10.4	2	26.5	0.1
	12.4	4	26.4	0.2
	14.4	6	26.4	0.2
	16.4	8	26.4	0.2
	18.4	10	26.4	0.2

	20.4	12	26.35	0.2
	22.4	14	26	0.6
	24.4	16	24.95	1.6
	26.4	18	24.4	2.2
	28.4	20	23.45	3.14
	30.4	22	24.2	2.4
	32.4	24	24.95	1.6
	34.4	26	26	0.6
	36.4	28	26.45	0.1
	38.4	30	26.6	0.0
	40.4	32	26.55	0.0
	42.4	34	26.6	0.0
	44.4	36	26.55	0.0
	46.4	38	26.4	0.2
	48.4	40	26.3	0.3

E10.7. Recorded surveyed transversal section measurements.

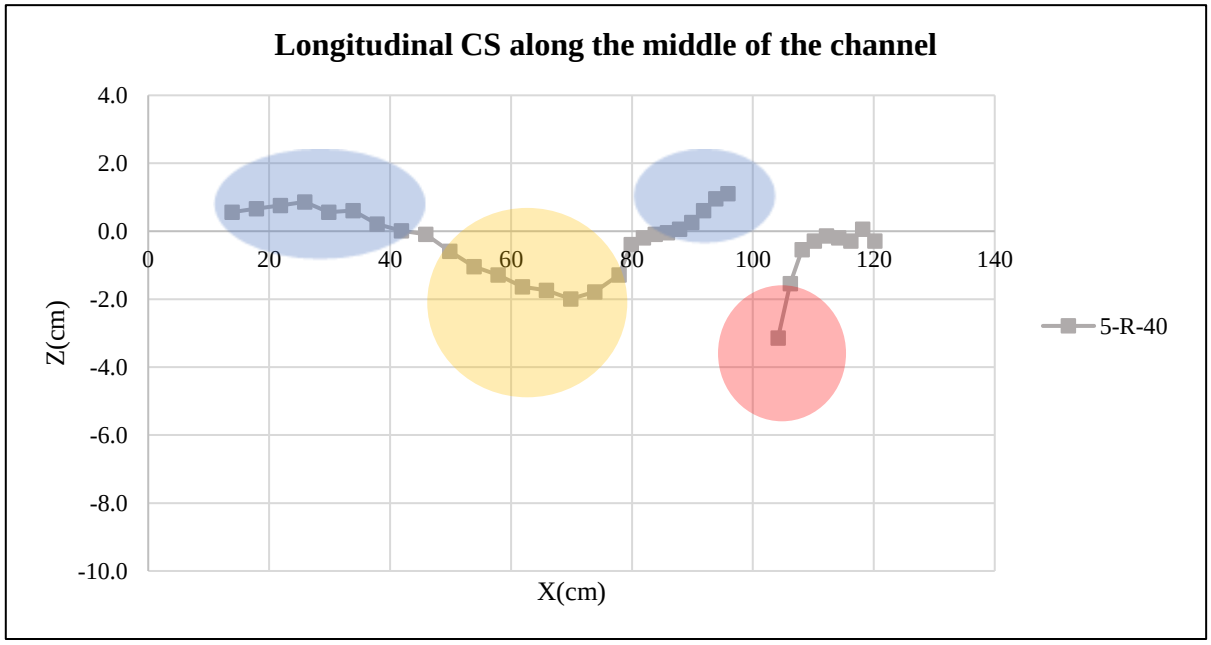


E10.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		27.15	0.6
79.7	17.85		27.25	0.7
83.7	21.85		27.35	0.8
87.7	25.85		27.45	0.9
91.7	29.85		27.15	0.6
95.7	33.85	28.4	27.2	0.61
99.7	37.85		26.8	0.2
3.7	41.85		26.6	0.0
7.7	45.85		26.5	-0.1
11.7	49.85		26	-0.6
15.7	53.85		25.55	-1.04

19.7	57.85		25.3	-1.29
23.7	61.85		24.95	-1.6
27.7	65.85		24.85	-1.7
31.7	69.85		24.6	-1.99
35.7	73.85		24.8	-1.79
39.7	77.85		25.3	-1.3
41.7	79.85		26.2	-0.39
43.7	81.85		26.4	-0.2
45.7	83.85		26.5	-0.09
47.7	85.85		26.55	-0.04
49.7	87.85		26.65	0.06
51.7	89.85		26.85	0.26
53.7	91.85		27.2	0.6
55.7	93.85		27.55	0.96
57.7	95.85		27.7	1.1
61.85	100		The Middle of the Pier	
66	104.15		23.45	-3.1
68	106.15		25.05	-1.5
70	108.15		26.05	-0.5
72	110.15		26.3	-0.3
74	112.15		26.45	-0.14
76	114.15		26.4	-0.19
78	116.15		26.3	-0.3
80	118.15		26.65	0.06
82	120.15		26.3	-0.3

E10.9. Recorded surveyed longitudinal section measurements.



E10.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	9.48	46.81	28.00	788.04
2	46.81	139.00	12.00	1114.86
3	139.00	37.91	12.00	1061.43
4	37.91	0.23	13.00	247.86
5	0.23	-15.37	6.70	-50.73
6	-15.37	0.00	1.49	-11.44
7	0.00	27.51	2.66	36.62
8	27.51	27.91	4.15	114.99
9	27.91	7.33	5.00	88.09
10	7.33	4.93	5.00	30.64
11	4.93	4.04	10.00	44.83
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
3465.18	3527.35	-62.17	3186.63	278.54

E10.11. Calculated volume.

Experiment E11 (5-R-30)

30*30(5 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*3
	Along the width	2*5
	Around pier	4

E11.1. Anchorage characteristics, including nail's position and quantity.

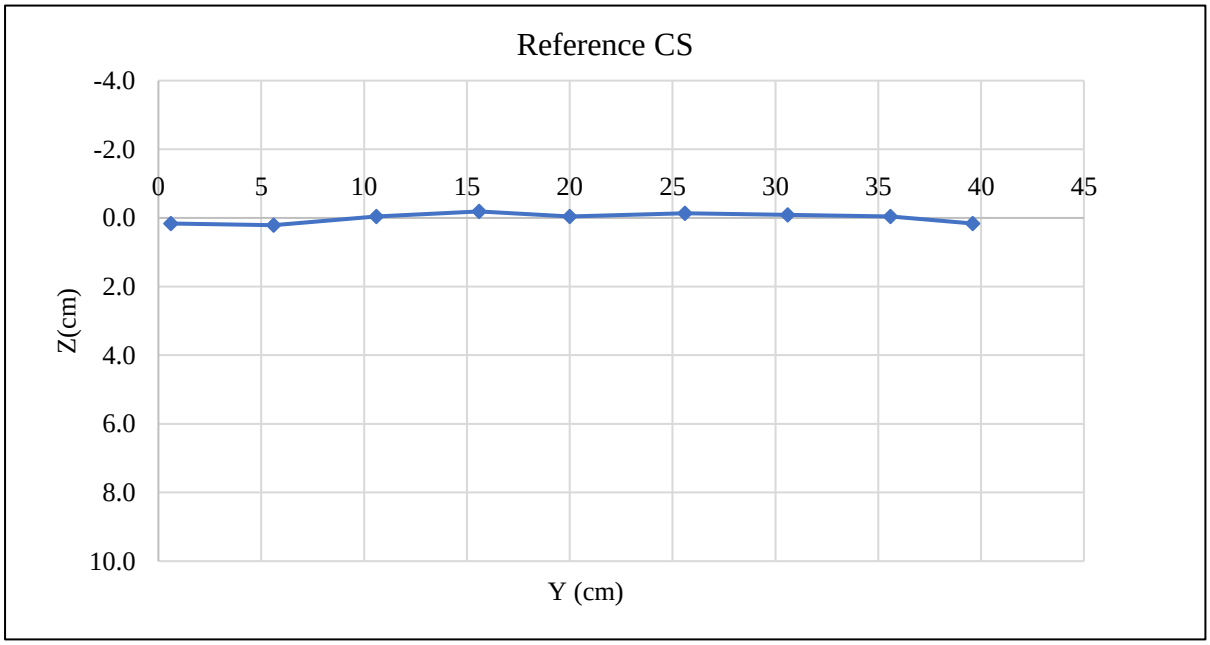
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.28	7.189	7.248	7.315	7.289	7.53	7.353	7.306	7.25	7.334	7.354	7.27	7.217	7.247
	7.26	7.271	6.998	7.266	7.135	7.451	7.407	7.337	7.365	7.284	7.312	7.262	7.255	7.238
	7.405	7.221	6.959	7.25	7.221	7.51	7.447	7.419	7.384	7.193	7.288	7.221	7.196	7.17
	7.269	7.213	6.972	7.277	7.185	7.425	7.513	7.436	7.436	7.284	7.306	7.196	7.189	7.163
	7.358	7.216	6.992	7.246	7.196	7.483	7.498	7.328	7.277	7.365	7.195	7.224	7.191	7.17
	7.253	7.203	7.012	7.323	7.319	7.391	7.308	7.327	7.439	7.217	7.283	7.226	7.179	7.247
	7.29	7.133	7.041	7.291	7.283	7.414	7.371	7.347	7.253	7.207	7.248	7.165	7.189	7.156
	7.204	7.206	7.025	7.292	7.271	7.437	7.434	7.352	7.337	7.415	7.165	7.263	7.213	7.226
	7.303	7.278	6.977	7.223	7.142	7.546	7.394	7.49	7.42	7.24	7.194	7.198	7.275	7.24
	7.26	7.258	6.94	7.294	7.281	7.534	7.361	7.445	7.3	7.112	7.31	7.314	7.291	7.262
Average	7.288	7.219	7.016	7.278	7.232	7.472	7.409	7.379	7.346	7.265	7.266	7.234	7.220	7.212
Ratio	1.005	0.996	0.968	1.004	0.998	1.031	1.022	1.018	1.013	1.002	1.002	0.998	0.996	0.995

E11.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.2
	14	5.6	26.25	0.2

	19	10.6	26.5	0.0
	24	15.6	26.65	-0.2
	28.4	20	26.5	0.0
	34	25.6	26.6	-0.1
	39	30.6	26.55	-0.1
	44	35.6	26.5	0.0
	48	39.6	26.3	0.2
		Average (Reference Elevation)	26.46	0.0

E11.3. Calculated Reference Elevation.

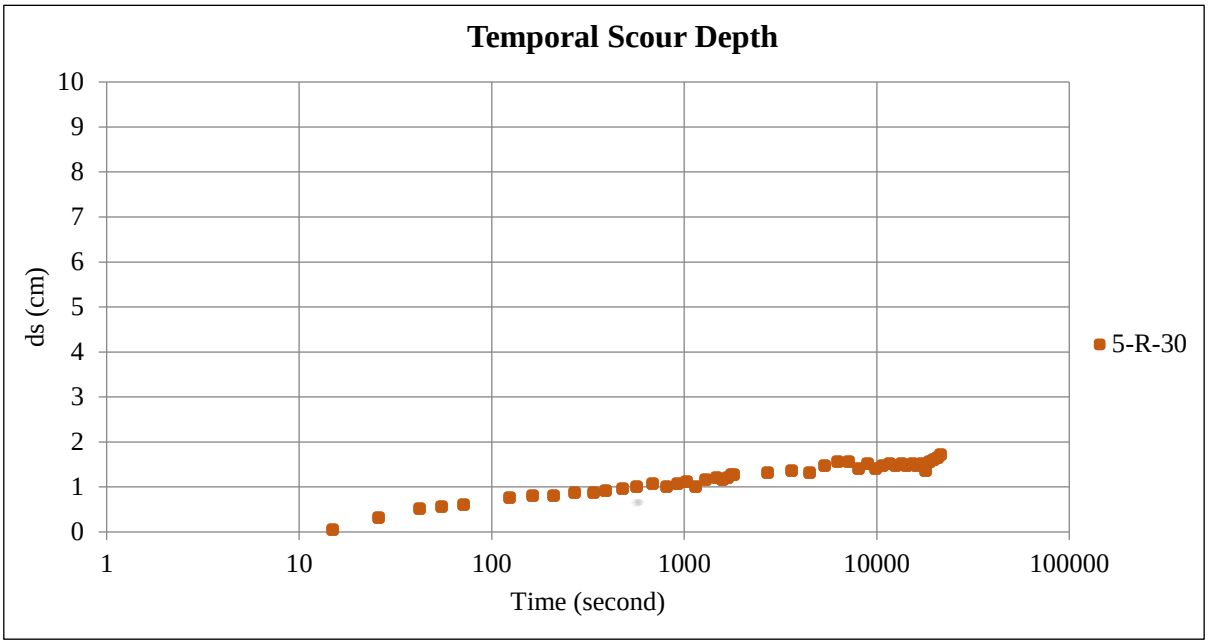


E11.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.46**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	15	15	26.4	0.06
0	0	26	26	26.15	0.31
0	0	42	42	25.95	0.51
0	0	55	55	25.9	0.56
0	1	12	72	25.85	0.61
0	2	4	124	25.7	0.76
0	2	43	163	25.65	0.81
0	3	30	210	25.65	0.81
0	4	31	271	25.6	0.86
0	5	39	339	25.6	0.86
0	6	29	389	25.55	0.91
0	8	2	482	25.5	0.96
0	9	23	563	25.45	1.01
0	11	22	682	25.4	1.06
0	13	30	810	25.45	1.01
0	15	21	921	25.4	1.06
0	17	9	1029	25.35	1.11

0	19	5	1145	25.45	1.01
0	21	32	1292	25.3	1.16
0	24	38	1478	25.25	1.21
0	26	20	1580	25.3	1.16
0	28	12	1692	25.25	1.21
0	29	15	1755	25.2	1.26
0	30	0	1800	25.2	1.26
0	45	0	2700	25.15	1.31
1	0	0	3600	25.1	1.36
1	15	0	4500	25.15	1.31
1	30	0	5400	25	1.46
1	45	0	6300	24.9	1.56
2	0	0	7200	24.9	1.56
2	15	0	8100	25.05	1.41
2	30	0	9000	24.95	1.51
2	45	0	9900	25.05	1.41
3	0	0	10800	25	1.46
3	15	0	11700	24.95	1.51
3	30	0	12600	25	1.46
3	45	0	13500	24.95	1.51
4	0	0	14400	25	1.46
4	15	0	15300	24.95	1.51
4	30	0	16200	25	1.46
4	45	0	17100	24.95	1.51
5	0	0	18000	25.1	1.36
5	15	0	18900	24.9	1.56
5	30	0	19800	24.85	1.61
5	45	0	20700	24.8	1.66
6	0	0	21600	24.75	1.71

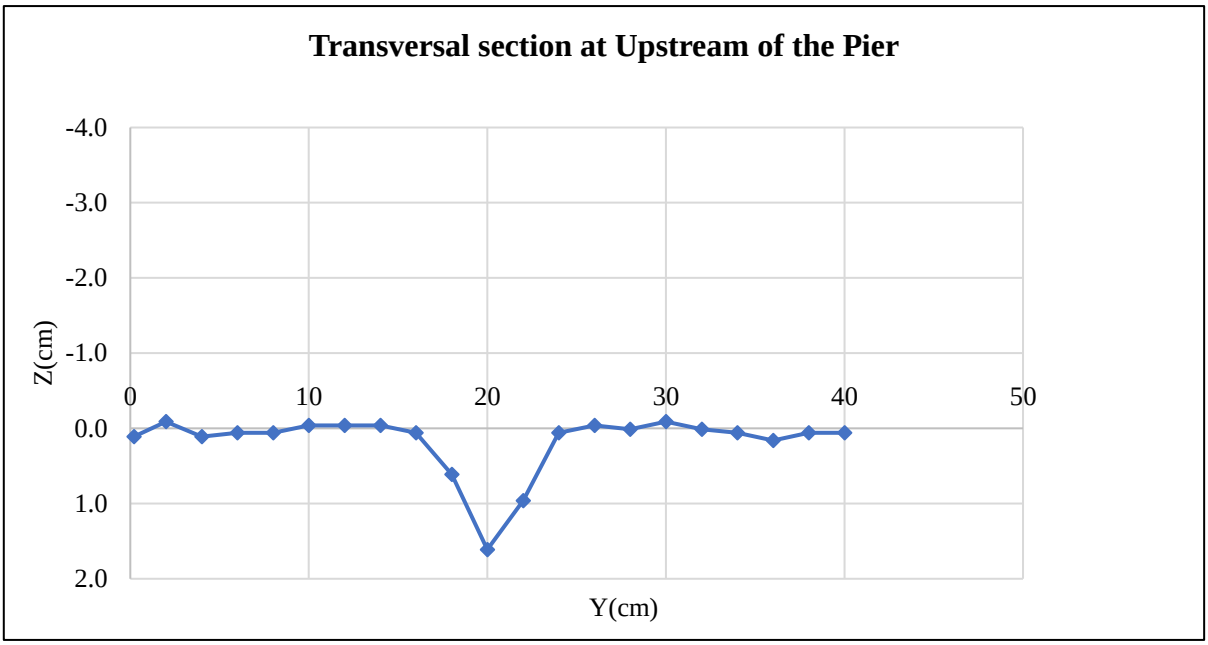
E11.5. Temporal Scour Depth measurements.



E11.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)	
104.15		8.6	0.2	26.35	0.1
		10.4	2	26.55	-0.1
		12.4	4	26.35	0.1
		14.4	6	26.4	0.1
		16.4	8	26.4	0.1
		18.4	10	26.5	0.0
		20.4	12	26.5	0.0
		22.4	14	26.5	0.0
		24.4	16	26.4	0.1
		26.4	18	25.85	0.6
		28.4	20	24.85	1.61
		30.4	22	25.5	1.0
		32.4	24	26.4	0.1
		34.4	26	26.5	0.0
		36.4	28	26.45	0.0
		38.4	30	26.55	-0.1
		40.4	32	26.45	0.0
		42.4	34	26.4	0.1
		44.4	36	26.3	0.2
		46.4	38	26.4	0.1
		48.4	40	26.4	0.1

E11.7. Recorded surveyed transversal section measurements.

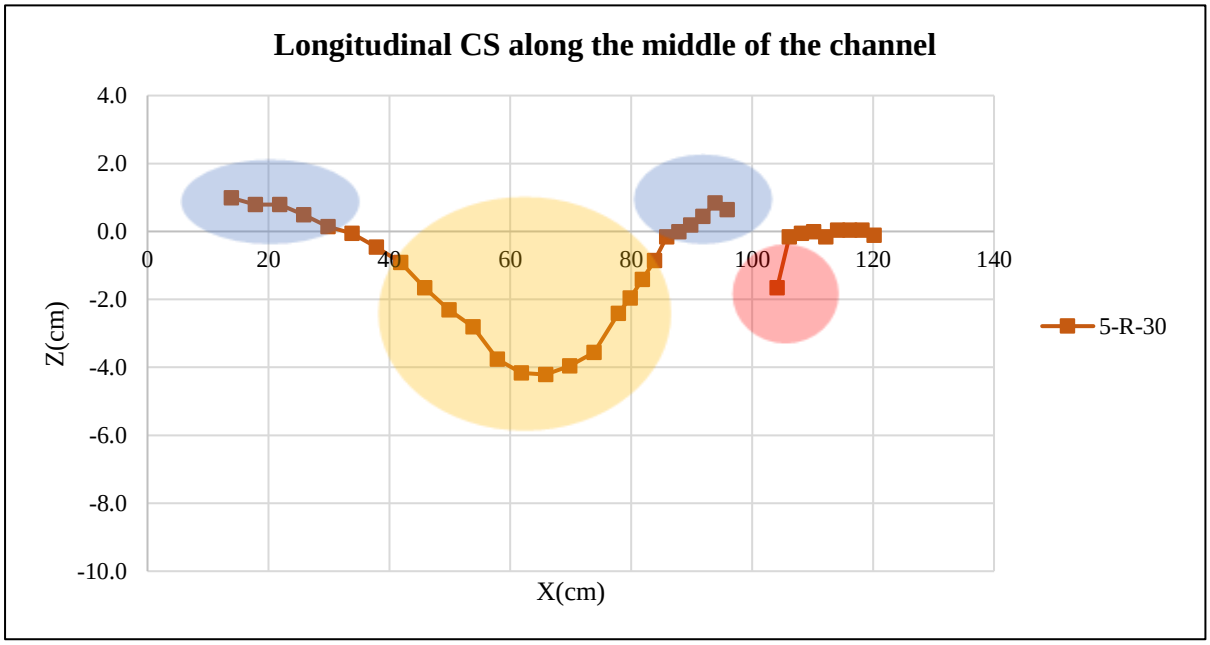


E11.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	27.45	1.0
79.7	17.85		27.25	0.8
83.7	21.85		27.25	0.8
87.7	25.85		26.95	0.5
91.7	29.85		26.6	0.1
95.7	33.85		26.4	-0.06
99.7	37.85		26	-0.5
3.7	41.85		25.55	-0.9
7.7	45.85		24.8	-1.7
11.7	49.85		24.15	-2.3
15.7	53.85		23.65	-2.81
19.7	57.85		22.7	-3.76
23.7	61.85		22.3	-4.16
27.7	65.85		22.25	-4.21
31.7	69.85		22.5	-4.0
35.7	73.85		22.9	-3.56
39.7	77.85		24.05	-2.4
41.7	79.85		24.5	-1.96
43.7	81.85		25.05	-1.4
45.7	83.85		25.6	-0.86
47.7	85.85		26.3	-0.16
49.7	87.85		26.45	-0.01
51.7	89.85		26.65	0.19
53.7	91.85		26.9	0.4
55.7	93.85		27.3	0.84
57.7	95.85		27.1	0.6
61.85	100		The Middle of the Pier	
66	104.15		24.8	-1.7

68	106.15		26.3	-0.2
70	108.15		26.4	-0.1
72	110.15		26.45	0.0
74	112.15		26.3	-0.16
76	114.15		26.5	0.04
78	116.15		26.5	0.0
80	118.15		26.5	0.04
82	120.15		26.35	-0.1

E11.9. Recorded surveyed longitudinal section measurements.



E11.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	9.58	106.81	28.00	1629.41
2	106.81	234.97	12.00	2050.68
3	234.97	69.08	12.00	1824.27
4	69.08	1.55	13.00	459.04
5	1.55	0.53	6.70	6.97
6	0.53	2.13	4.15	5.52
7	2.13	7.19	4.15	19.34
8	7.19	0.00	3.54	12.74
9	0.00	-2.96	1.46	-2.15
10	-2.96	-1.66	5.00	-11.55
11	-1.66	-1.70	10.00	-16.80
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
5977.47	5996.42	-30.51	5975.90	1.57

E11.11. Calculated volume.

Experiment E12 (5-R-20)

20*20(5 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*3
	Along the width	2*3
	Around pier	4

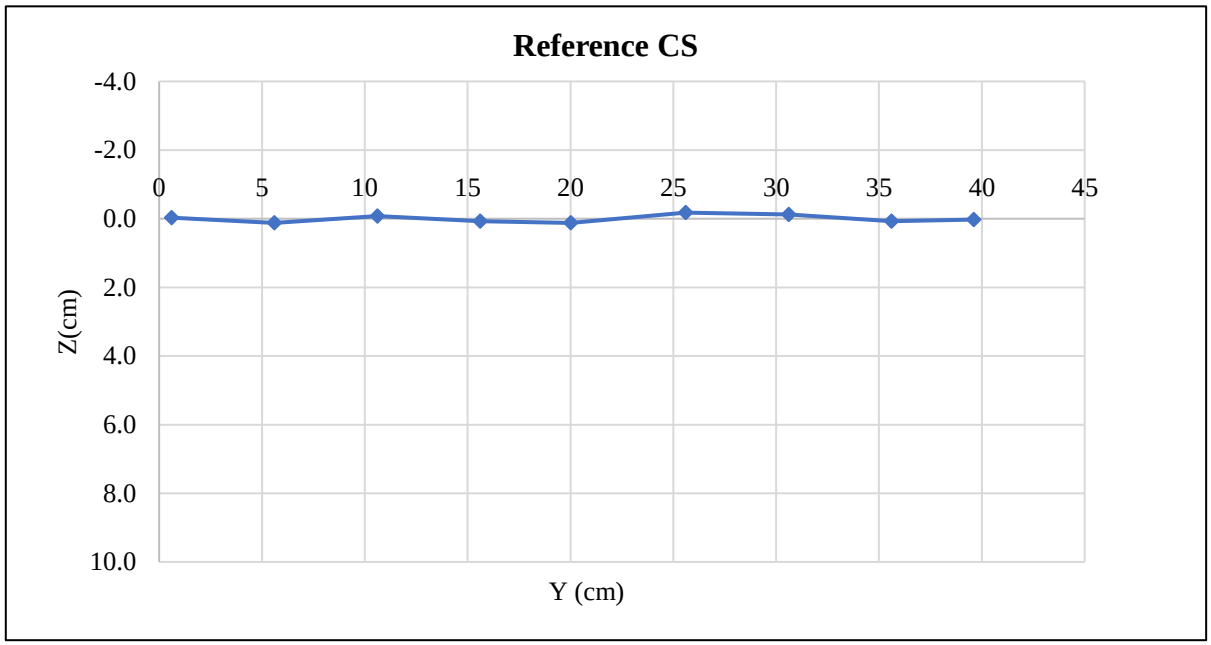
E12.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.13	7.12	7.11	7.15	7.23	7.13	7.00	7.14	6.93	7.06	7.12	7.26	7.11	7.19
	7.21	7.09	7.15	7.06	7.02	7.22	7.13	7.01	6.95	7.23	7.15	7.10	7.17	7.08
	7.18	7.11	7.13	7.20	7.13	7.21	7.02	7.02	6.97	7.05	7.19	7.09	7.09	7.07
	7.16	7.22	7.16	7.03	7.15	7.01	7.13	6.95	6.90	7.19	7.20	7.22	7.20	7.05
	7.24	7.24	7.15	7.12	7.15	7.00	7.00	7.06	6.90	7.19	7.11	7.18	7.34	7.23
	7.16	7.02	7.07	7.20	7.10	7.10	7.06	7.09	6.92	7.18	7.18	7.13	7.13	7.21
	7.21	7.19	7.25	7.11	7.13	7.05	7.15	7.06	7.08	7.08	7.10	7.10	7.06	7.15
	7.22	7.15	7.13	7.11	7.06	7.03	7.06	7.04	7.03	7.21	7.11	7.16	7.08	7.34
	7.30	7.17	7.12	7.10	7.17	7.04	7.21	7.11	7.11	7.18	7.17	7.03	7.13	7.02
	7.13	7.09	7.22	7.19	7.06	7.13	7.10	7.01	7.01	7.13	7.24	7.18	7.12	7.13
Average	7.19	7.14	7.15	7.13	7.12	7.09	7.09	7.05	6.98	7.15	7.16	7.14	7.14	7.15
Ratio	0.99	0.98	0.99	0.98	0.98	0.98	0.98	0.97	0.96	0.99	0.99	0.99	0.99	0.99

E12.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.55	0.0
	14	5.6	26.4	0.1
	19	10.6	26.6	-0.1
	24	15.6	26.45	0.1
	28.4	20	26.4	0.1
	34	25.6	26.7	-0.2
	39	30.6	26.65	-0.1
	44	35.6	26.45	0.1
	48	39.6	26.5	0.0
		Average (Reference Elevation)	26.52	

E12.3. Calculated Reference Elevation.

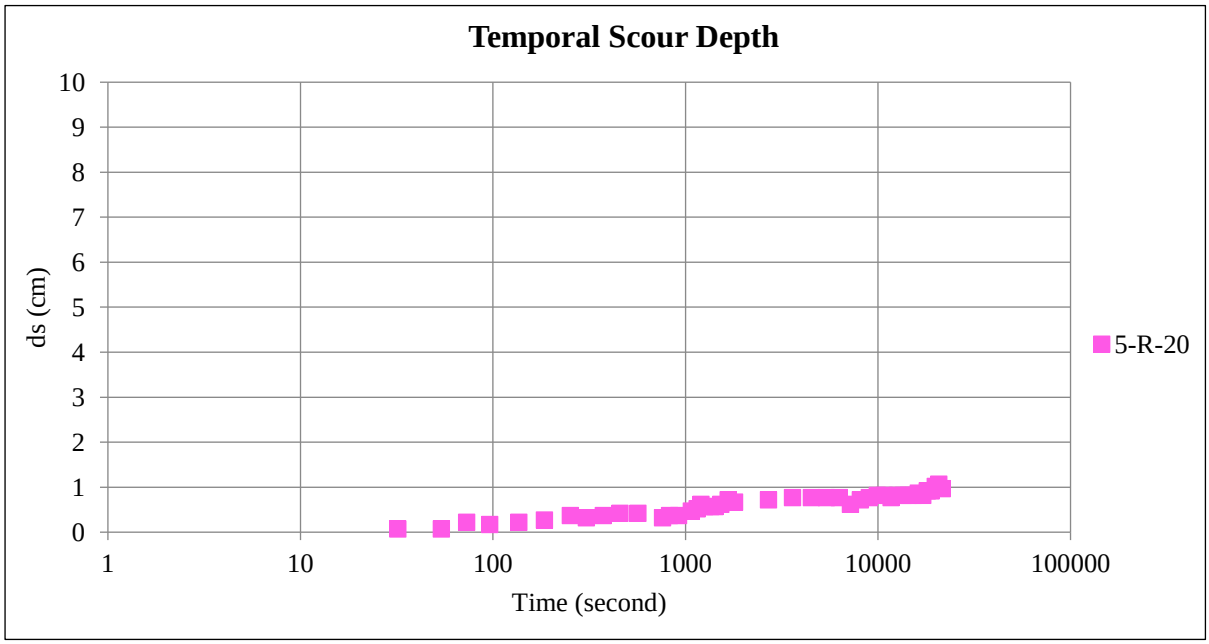


E12.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.52
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	14	14	26.6	-0.08
0	0	32	32	26.45	0.07
0	0	54	54	26.45	0.07
0	1	13	73	26.3	0.22
0	1	36	96	26.35	0.17
0	2	16	136	26.3	0.22
0	3	5	185	26.25	0.27
0	4	12	252	26.15	0.37
0	5	6	306	26.2	0.32
0	6	15	375	26.15	0.37
0	7	36	456	26.1	0.42
0	9	26	566	26.1	0.42
0	12	40	760	26.2	0.32
0	13	48	828	26.15	0.37
0	15	20	920	26.15	0.37
0	17	53	1073	26.05	0.47
0	19	10	1150	26	0.52
0	20	4	1204	25.9	0.62
0	21	0	1260	25.95	0.57
0	22	33	1353	25.95	0.57
0	23	45	1425	25.95	0.57
0	25	26	1526	25.9	0.62
0	27	49	1669	25.8	0.72
0	30	0	1800	25.85	0.67
0	45	0	2700	25.8	0.72
1	0	0	3600	25.75	0.77

1	15	0	4500	25.75	0.77
1	30	0	5400	25.75	0.77
1	45	0	6300	25.75	0.77
2	0	0	7200	25.9	0.62
2	15	0	8100	25.8	0.72
2	30	0	9000	25.75	0.77
2	45	0	9900	25.7	0.82
3	0	0	10800	25.7	0.82
3	15	0	11700	25.75	0.77
3	30	0	12600	25.7	0.82
3	45	0	13500	25.7	0.82
4	0	0	14400	25.7	0.82
4	15	0	15300	25.7	0.82
4	30	0	16200	25.65	0.87
4	45	0	17100	25.7	0.82
5	0	0	18000	25.6	0.92
5	15	0	18900	25.6	0.92
5	30	0	19800	25.5	1.02
5	45	0	20700	25.45	1.07
6	0	0	21600	25.55	0.97

E12.5. Temporal Scour Depth measurements.

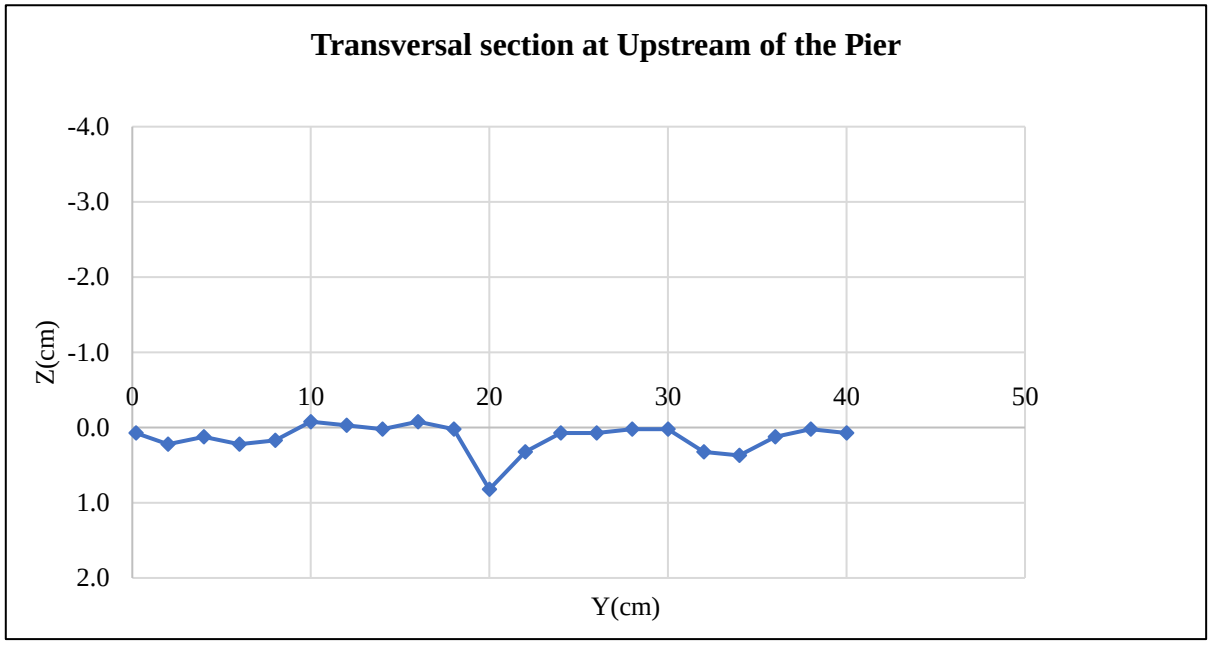


E12.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.45	0.1
	10.4	2	26.3	0.2
	12.4	4	26.4	0.1
	14.4	6	26.3	0.2
	16.4	8	26.35	0.2
	18.4	10	26.6	-0.1

	20.4	12	26.55	0.0
	22.4	14	26.5	0.0
	24.4	16	26.6	-0.1
	26.4	18	26.5	0.0
	28.4	20	25.7	0.8
	30.4	22	26.2	0.3
	32.4	24	26.45	0.1
	34.4	26	26.45	0.1
	36.4	28	26.5	0.0
	38.4	30	26.5	0.0
	40.4	32	26.2	0.3
	42.4	34	26.15	0.4
	44.4	36	26.4	0.1
	46.4	38	26.5	0.0
	48.4	40	26.45	0.1

E12.7. Recorded surveyed transversal section measurements.

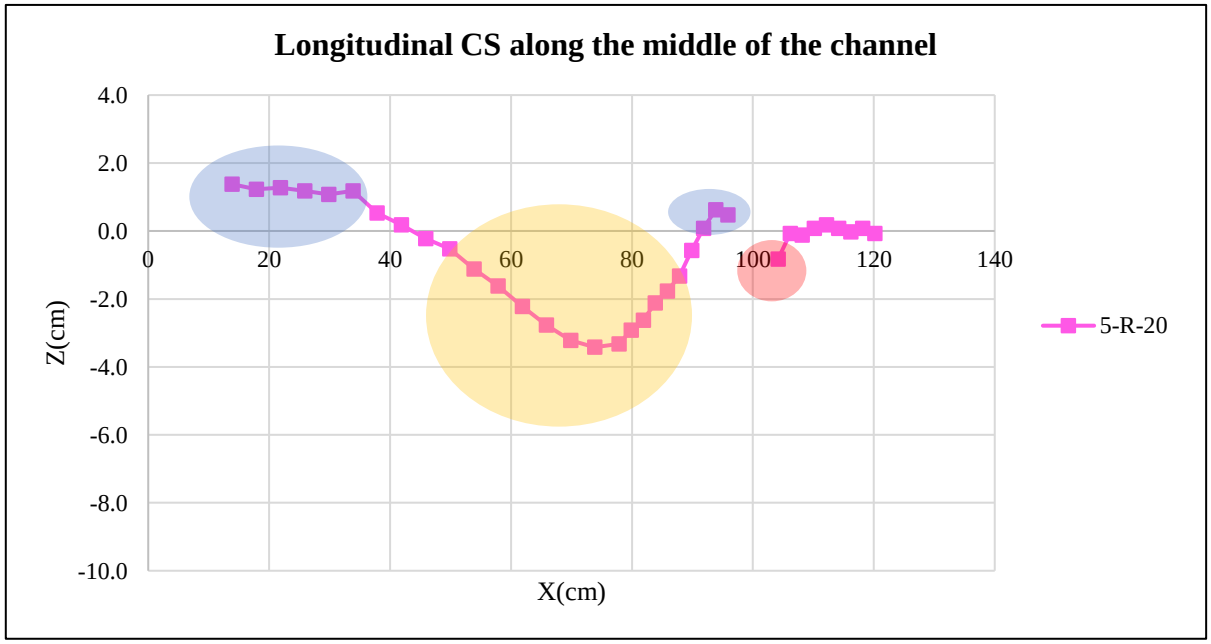


E12.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		27.9	1.4
79.7	17.85		27.75	1.2
83.7	21.85		27.8	1.3
87.7	25.85		27.7	1.2
91.7	29.85		27.6	1.1
95.7	33.85	28.4	27.7	1.18
99.7	37.85		27.05	0.5
3.7	41.85		26.7	0.2
7.7	45.85		26.3	-0.2
11.7	49.85		26	-0.5
15.7	53.85		25.4	-1.12

19.7	57.85		24.9	-1.62
23.7	61.85		24.3	-2.2
27.7	65.85		23.75	-2.8
31.7	69.85		23.3	-3.2
35.7	73.85		23.1	-3.42
39.7	77.85		23.2	-3.3
41.7	79.85		23.6	-2.92
43.7	81.85		23.9	-2.6
45.7	83.85		24.4	-2.12
47.7	85.85		24.75	-1.77
49.7	87.85		25.2	-1.32
51.7	89.85		25.95	-0.57
53.7	91.85		26.6	0.1
55.7	93.85		27.15	0.63
57.7	95.85		27	0.48
61.85	100		The Middle of the Pier	
66	104.15		25.7	-0.8
68	106.15		26.45	-0.1
70	108.15		26.4	-0.1
72	110.15		26.6	0.1
74	112.15		26.7	0.18
76	114.15		26.6	0.08
78	116.15		26.5	0.0
80	118.15		26.6	0.08
82	120.15		26.45	-0.1

E12.9. Recorded surveyed longitudinal section measurements.



E12.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	5.11	113.66	28.00	1662.83
2	113.66	355.27	12.00	2813.59
3	355.27	166.01	12.00	3127.65
4	166.01	50.42	13.00	1406.79
5	50.42	10.15	6.70	202.94
6	10.15	7.96	4.15	37.59
7	7.96	5.66	4.15	28.26
8	5.66	2.99	5.00	21.63
9	2.99	0.00	3.25	2.61
10	0.00	-1.61	1.75	-1.40
11	-1.61	0.00	3.69	-2.96
12	0.00	2.75	6.31	8.68
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
9308.21	9312.57	-4.36	9251.38	56.83

E12.11. Calculated volume.

Experiment E13 (5-R-10)

10*10(5 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	-
	Along the width	-
	Around pier	4

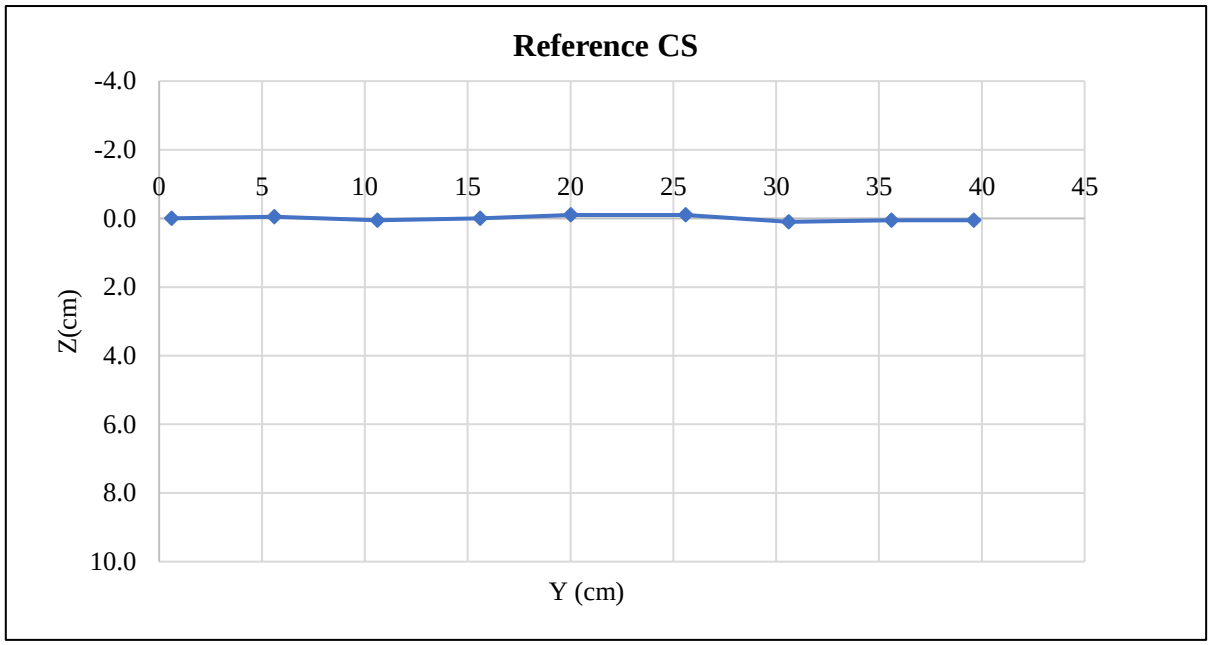
E13.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.207	7.158	7.244	7.197	7.278	7.256	7.273	7.285	7.230	7.180	7.182	7.144	7.196	7.151
	7.333	7.212	7.118	7.168	7.196	7.085	7.261	7.246	7.207	7.183	7.222	7.233	7.148	7.145
	7.279	7.229	7.201	7.249	7.144	7.258	7.220	7.231	7.312	7.173	7.189	7.259	7.358	7.152
	7.363	7.181	7.319	7.206	7.275	7.086	7.096	7.216	7.244	7.166	7.038	7.313	7.241	7.234
	7.311	7.324	7.261	7.196	7.263	7.330	7.280	7.251	7.185	7.208	7.079	7.305	7.233	7.139
	7.385	7.297	7.153	7.005	7.206	7.253	7.283	7.185	7.220	7.177	7.294	7.155	7.193	7.197
	7.218	7.193	7.122	7.075	7.243	7.214	7.227	7.213	7.302	7.251	7.157	7.143	7.179	7.136
	7.466	7.258	7.342	7.177	7.216	7.167	7.212	7.143	7.145	7.166	7.110	7.237	7.264	7.116
	7.299	7.189	7.219	7.221	7.223	7.134	7.252	7.228	7.162	7.195	7.202	7.291	7.083	7.123
	7.288	7.085	7.251	7.165	7.129	7.095	7.247	7.193	7.177	7.274	7.256	7.135	7.212	7.229
Average	7.315	7.213	7.223	7.166	7.217	7.188	7.235	7.219	7.218	7.197	7.173	7.222	7.211	7.162
Ratio	1.009	0.995	0.996	0.988	0.995	0.991	0.998	0.996	0.996	0.993	0.989	0.996	0.995	0.988

E13.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.0
	14	5.6	26.55	-0.1
	19	10.6	26.45	0.0
	24	15.6	26.5	0.0
	28.4	20	26.6	-0.1
	34	25.6	26.6	-0.1
	39	30.6	26.4	0.1
	44	35.6	26.45	0.0
	48	39.6	26.45	0.0
		Average (Reference Elevation)	26.50	

E13.3. Calculated Reference Elevation.

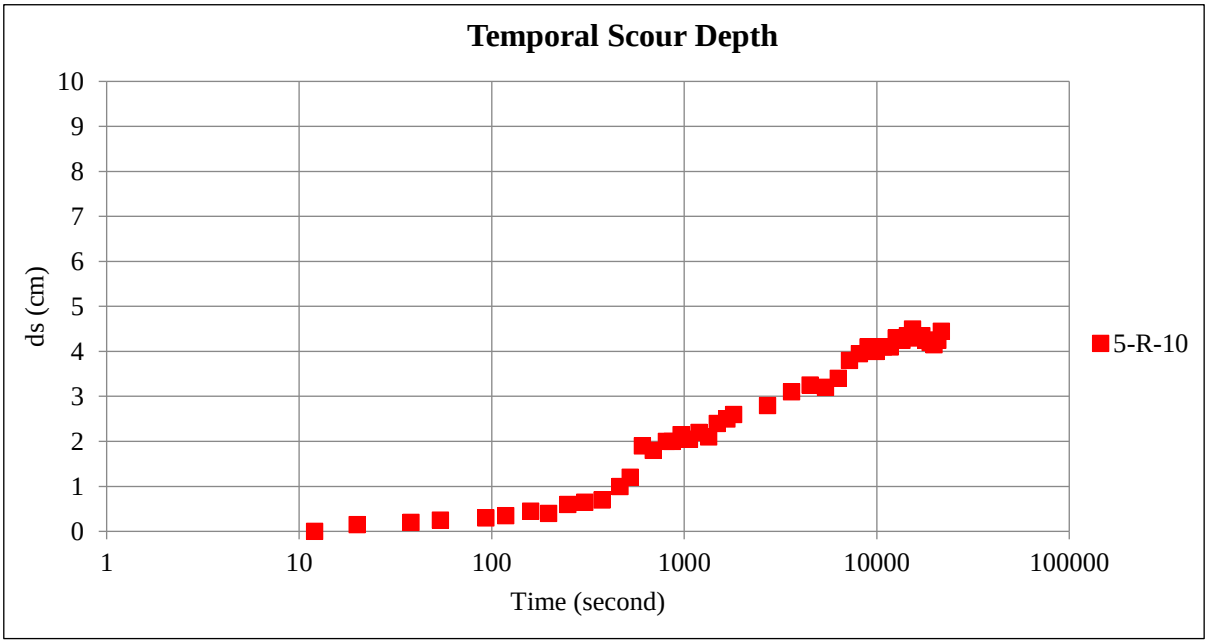


E13.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.50
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	12	12	26.5	0.00
0	0	20	20	26.35	0.15
0	0	38	38	26.3	0.20
0	0	54	54	26.25	0.25
0	1	33	93	26.2	0.30
0	1	58	118	26.15	0.35
0	2	39	159	26.05	0.45
0	3	17	197	26.1	0.40
0	4	8	248	25.9	0.60
0	5	4	304	25.85	0.65
0	6	14	374	25.8	0.70
0	7	43	463	25.5	1.00
0	8	44	524	25.3	1.20
0	10	6	606	24.6	1.90

0	11	30	690	24.7	1.80
0	13	26	806	24.5	2.00
0	14	25	865	24.5	2.00
0	16	2	962	24.35	2.15
0	17	44	1064	24.45	2.05
0	19	50	1190	24.3	2.20
0	22	19	1339	24.4	2.10
0	24	45	1485	24.1	2.40
0	27	42	1662	24	2.50
0	30	0	1800	23.9	2.60
0	45	0	2700	23.7	2.80
1	0	0	3600	23.4	3.10
1	15	0	4500	23.25	3.25
1	30	0	5400	23.3	3.20
1	45	0	6300	23.1	3.40
2	0	0	7200	22.7	3.80
2	15	0	8100	22.55	3.95
2	30	0	9000	22.4	4.10
2	45	0	9900	22.5	4.00
3	0	0	10800	22.4	4.10
3	15	0	11700	22.4	4.10
3	30	0	12600	22.2	4.30
3	45	0	13500	22.25	4.25
4	0	0	14400	22.15	4.35
4	15	0	15300	22	4.50
4	30	0	16200	22.2	4.30
4	45	0	17100	22.15	4.35
5	0	0	18000	22.25	4.25
5	15	0	18900	22.3	4.20
5	30	0	19800	22.35	4.15
5	45	0	20700	22.25	4.25
6	0	0	21600	22.05	4.45

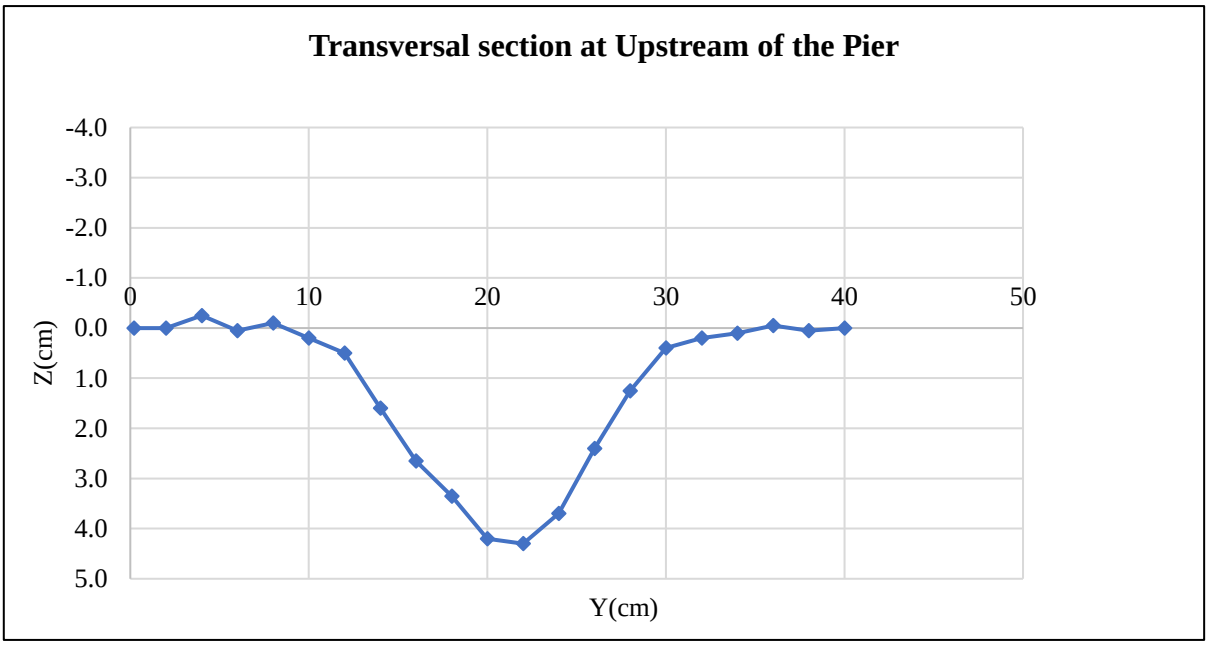
E13.5. Temporal Scour Depth measurements.



E13.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.5	0.0
	10.4	2	26.5	0.0
	12.4	4	26.75	-0.3
	14.4	6	26.45	0.0
	16.4	8	26.6	-0.1
	18.4	10	26.3	0.2
	20.4	12	26	0.5
	22.4	14	24.9	1.6
	24.4	16	23.85	2.7
	26.4	18	23.15	3.4
104.15	28.4	20	22.3	4.20
	30.4	22	22.2	4.3
	32.4	24	22.8	3.7
	34.4	26	24.1	2.4
	36.4	28	25.25	1.3
	38.4	30	26.1	0.4
	40.4	32	26.3	0.2
	42.4	34	26.4	0.1
	44.4	36	26.55	-0.1
	46.4	38	26.45	0.0
	48.4	40	26.5	0.0

E13.7. Recorded surveyed transversal section measurements.

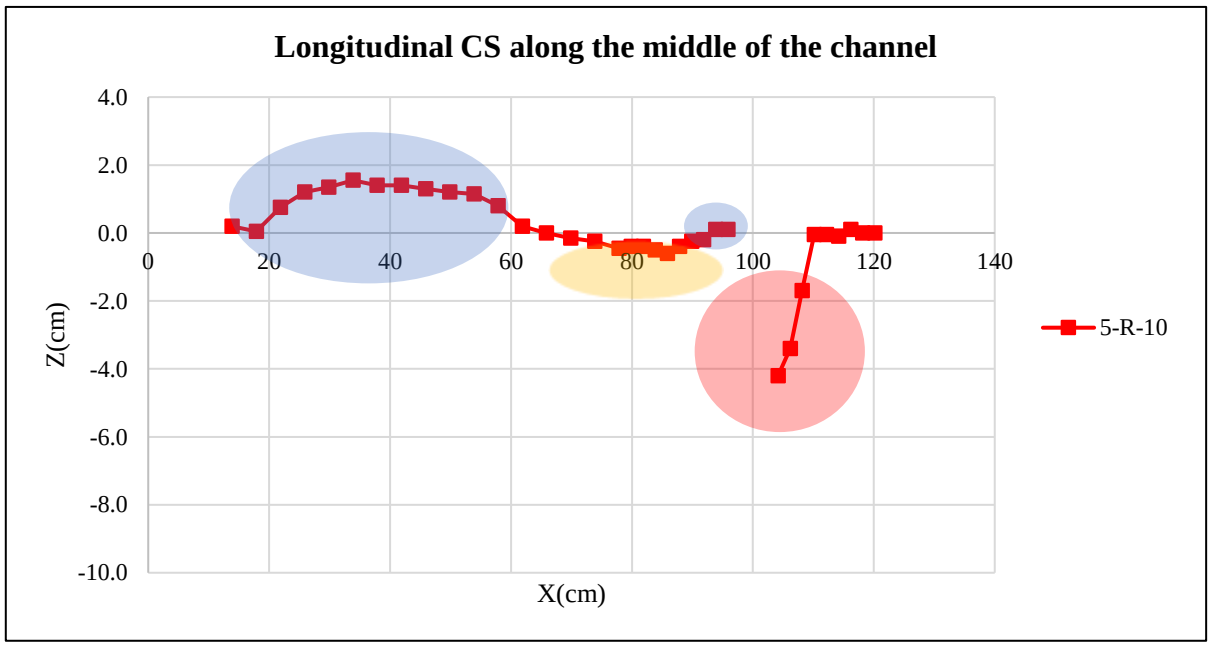


E13.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.7	0.2
79.7	17.85		26.55	0.1
83.7	21.85		27.25	0.8
87.7	25.85		27.7	1.2
91.7	29.85		27.85	1.4
95.7	33.85		28.05	1.55
99.7	37.85		27.9	1.4
3.7	41.85		27.9	1.4
7.7	45.85		27.8	1.3
11.7	49.85		27.7	1.2
15.7	53.85		27.65	1.15
19.7	57.85		27.3	0.80
23.7	61.85		26.7	0.2
27.7	65.85		26.5	0.0
31.7	69.85		26.35	-0.1
35.7	73.85		26.25	-0.25
39.7	77.85		26.05	-0.4
41.7	79.85		26.1	-0.40
43.7	81.85		26.1	-0.4
45.7	83.85		26	-0.50
47.7	85.85		25.9	-0.6000
49.7	87.85		26.1	-0.40
51.7	89.85		26.25	-0.25
53.7	91.85		26.3	-0.2
55.7	93.85		26.6	0.10
57.7	95.85		26.6	0.10
61.85	100		The Middle of the Pier	
66	104.15		22.3	-4.2

68	106.15		23.1	-3.4
70	108.15		24.8	-1.7
72	110.15		26.45	0.0
74	112.15		26.45	-0.05
76	114.15		26.4	-0.10
78	116.15		26.6	0.1
80	118.15		26.5	0.00
82	120.15		26.5	0.0

E13.9. Recorded surveyed longitudinal section measurements.



E13.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow oval is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-15.95	-12.56	28.00	-399.07
2	-12.56	0.00	14.67	-92.07
3	0.00	7.99	9.33	37.29
4	7.99	26.62	13.00	225.00
5	26.62	29.55	6.70	188.19
6	29.55	56.57	4.15	178.71
7	56.57	49.10	4.15	219.28
8	49.10	7.78	5.00	142.21
9	7.78	0.41	5.00	20.49
10	0.41	-1.88	10.00	-7.33
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
512.69	1011.16	-498.46	138.04	374.65

E13.11. Calculated volume.

Experiment E14 (5-R-40*60)

40*60(5 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*6
	Along the width	2*5
	Around pier	4

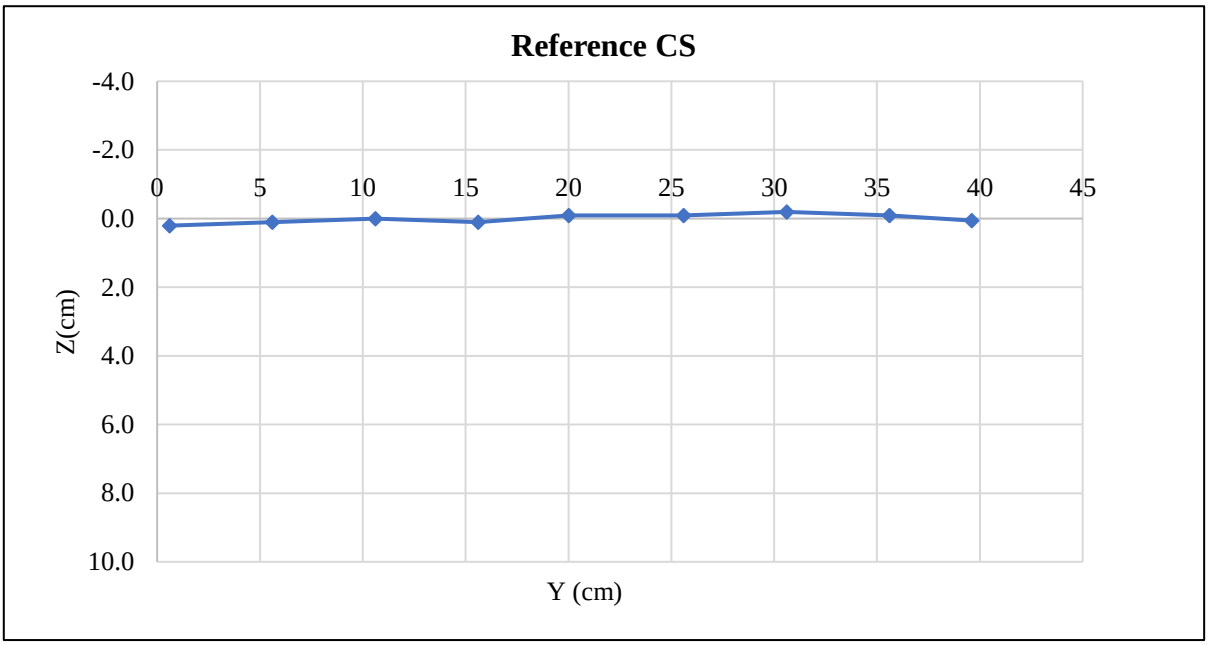
E14.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.224	7.184	7.215	7.251	7.174	7.199	7.257	7.125	7.119	7.012	7.070	7.078	7.056	7.045
	7.270	7.186	7.056	7.259	7.231	7.202	7.292	7.127	6.989	6.998	6.950	7.063	6.996	6.935
	7.250	7.021	7.259	7.104	7.175	7.047	7.171	7.163	7.025	7.144	6.953	7.077	7.054	7.125
	7.241	7.096	7.241	7.234	7.082	7.119	7.206	7.224	7.045	7.137	6.935	7.015	6.961	6.895
	7.373	7.214	7.166	7.097	7.215	7.152	7.225	7.059	7.129	7.044	7.081	7.045	6.954	7.017
	7.165	7.292	7.268	7.033	7.177	7.042	7.167	7.060	7.180	7.181	7.134	6.789	7.087	7.089
	7.367	7.185	7.023	7.124	7.229	7.127	7.259	7.086	7.060	7.180	7.073	7.066	7.045	6.900
	7.315	7.244	7.210	7.236	7.196	6.911	7.287	7.141	7.125	6.920	7.179	7.085	7.196	7.101
	7.211	7.153	7.175	7.403	7.184	7.117	7.124	7.045	7.163	7.129	7.154	7.119	7.165	7.131
	7.466	7.168	7.115	7.261	7.339	7.277	7.211	7.117	7.017	7.236	7.057	7.277	7.149	7.150
Average	7.288	7.174	7.173	7.200	7.200	7.119	7.220	7.115	7.085	7.098	7.059	7.061	7.066	7.039
Ratio	1.005	0.990	0.989	0.993	0.993	0.982	0.996	0.981	0.977	0.979	0.974	0.974	0.975	0.971

E14.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.2
	14	5.6	26.4	0.1
	19	10.6	26.5	0.0
	24	15.6	26.4	0.1
	28.4	20	26.6	-0.1
	34	25.6	26.6	-0.1
	39	30.6	26.7	-0.2
	44	35.6	26.6	-0.1
	48	39.6	26.45	0.1
		Average (Reference Elevation)	26.51	

E14.3. Calculated Reference Elevation.

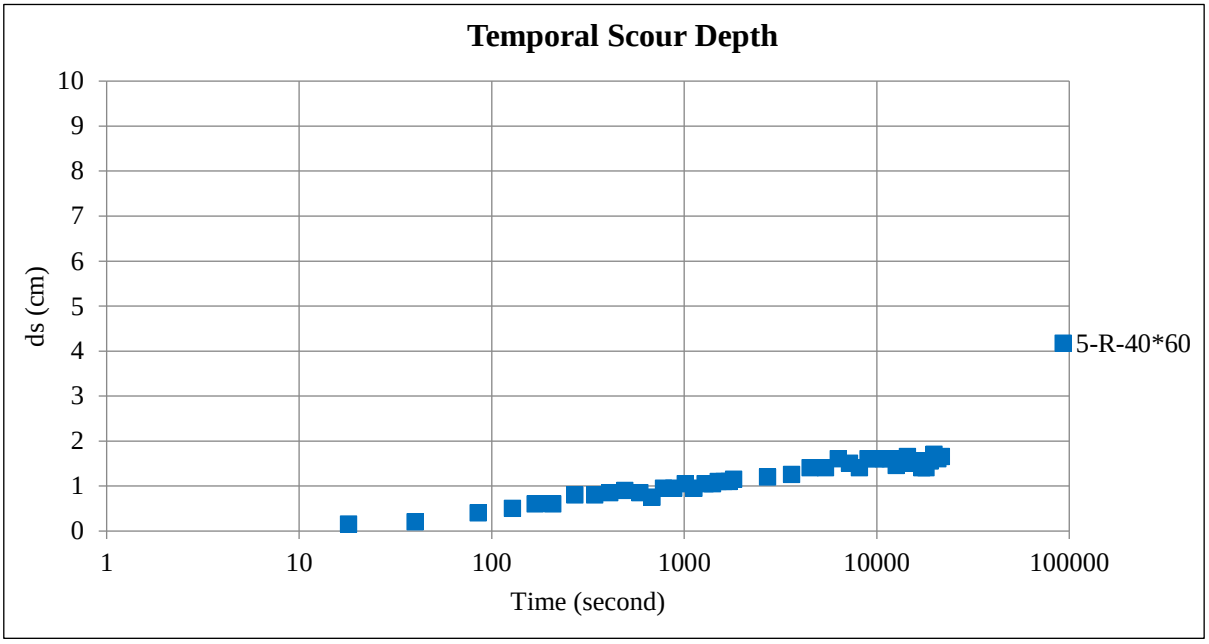


E14.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.51
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	18	18	26.35	0.16
0	0	40	40	26.3	0.21
0	1	25	85	26.1	0.41
0	2	8	128	26	0.51
0	2	48	168	25.9	0.61
0	3	27	207	25.9	0.61
0	4	30	270	25.7	0.81
0	5	42	342	25.7	0.81
0	6	49	409	25.65	0.86
0	8	10	490	25.6	0.91
0	9	48	588	25.65	0.86
0	11	20	680	25.75	0.76
0	13	0	780	25.55	0.96
0	14	42	882	25.55	0.96
0	16	53	1013	25.45	1.06
0	18	40	1120	25.55	0.96
0	21	20	1280	25.45	1.06
0	23	18	1398	25.45	1.06
0	25	1	1501	25.4	1.11
0	26	45	1605	25.4	1.11
0	28	29	1709	25.4	1.11
0	30	0	1800	25.35	1.16
0	45	0	2700	25.3	1.21
1	0	0	3600	25.25	1.26
1	15	0	4500	25.1	1.41
1	30	0	5400	25.1	1.41

1	45	0	6300	24.9	1.61
2	0	0	7200	25	1.51
2	15	0	8100	25.1	1.41
2	30	0	9000	24.9	1.61
2	45	0	9900	24.9	1.61
3	0	0	10800	24.9	1.61
3	15	0	11700	24.9	1.61
3	30	0	12600	25.05	1.46
3	45	0	13500	24.95	1.56
4	0	0	14400	24.85	1.66
4	15	0	15300	25	1.51
4	30	0	16200	24.95	1.56
4	45	0	17100	25.1	1.41
5	0	0	18000	25.1	1.41
5	15	0	18900	24.95	1.56
5	30	0	19800	24.8	1.71
5	45	0	20700	24.9	1.61
6	0	0	21600	24.85	1.66

E14.5. Temporal Scour Depth measurements.

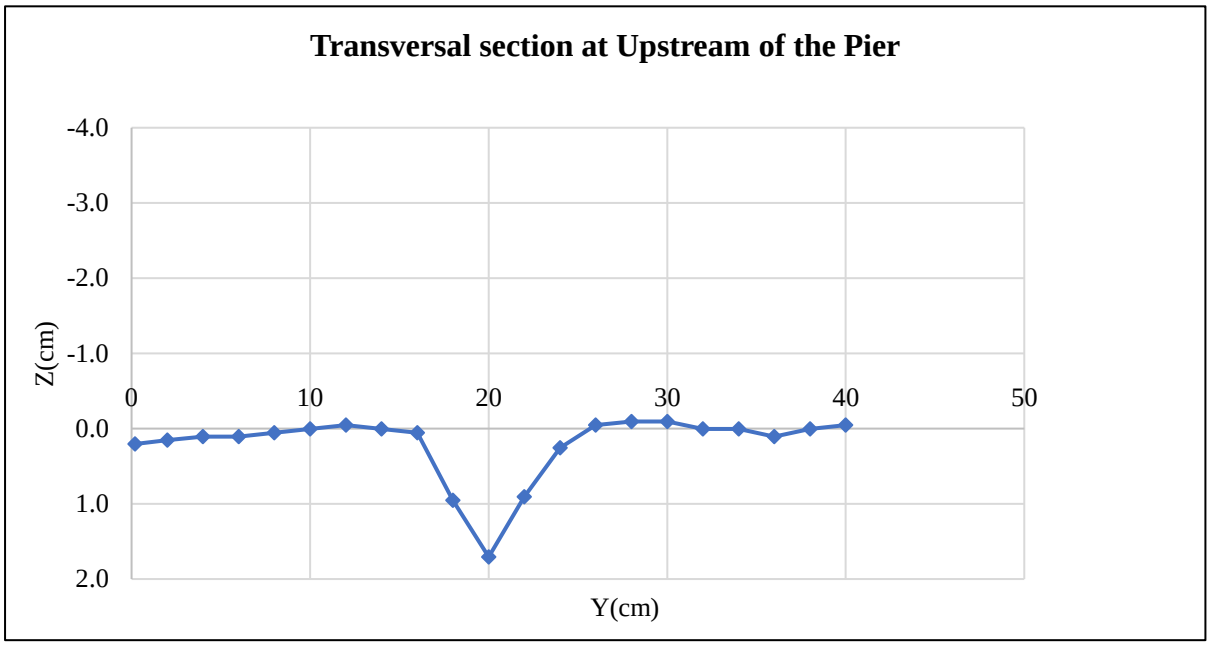


E14.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.3	0.2
	10.4	2	26.35	0.2
	12.4	4	26.4	0.1
	14.4	6	26.4	0.1
	16.4	8	26.45	0.1
	18.4	10	26.5	0.0
	20.4	12	26.55	0.0
	22.4	14	26.5	0.0

	24.4	16	26.45	0.1
	26.4	18	25.55	1.0
	28.4	20	24.8	1.7
	30.4	22	25.6	0.9
	32.4	24	26.25	0.3
	34.4	26	26.55	0.0
	36.4	28	26.6	-0.1
	38.4	30	26.6	-0.1
	40.4	32	26.5	0.0
	42.4	34	26.5	0.0
	44.4	36	26.4	0.1
	46.4	38	26.5	0.0
	48.4	40	26.55	0.0

E14.7. Recorded surveyed transversal section measurements.

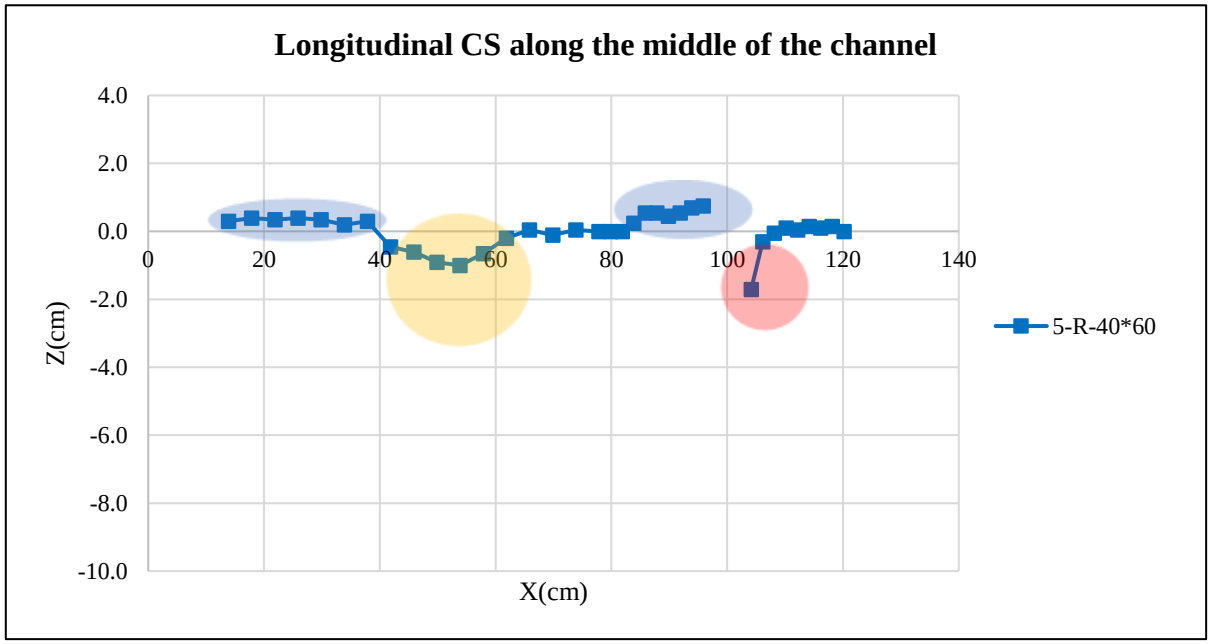


E14.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.8	0.3
79.7	17.85		26.9	0.4
83.7	21.85		26.85	0.3
87.7	25.85		26.9	0.4
91.7	29.85		26.85	0.3
95.7	33.85		26.7	0.19
99.7	37.85		26.8	0.3
3.7	41.85		26.05	-0.5
7.7	45.85		25.9	-0.6
11.7	49.85		25.6	-0.9
15.7	53.85		25.5	-1.01
19.7	57.85		25.85	-0.66
23.7	61.85		26.3	-0.2

27.7	65.85		26.55	0.0
31.7	69.85		26.4	-0.1
35.7	73.85		26.55	0.04
39.7	77.85		26.5	0.0
41.7	79.85		26.5	-0.01
43.7	81.85		26.5	0.0
45.7	83.85		26.75	0.24
47.7	85.85		27.05	0.54
49.7	87.85		27.05	0.54
51.7	89.85		26.95	0.44
53.7	91.85		27.05	0.5
55.7	93.85		27.2	0.69
57.7	95.85		27.25	0.74
61.85	100		The Middle of the Pier	
66	104.15		24.8	-1.7
68	106.15		26.2	-0.3
70	108.15		26.45	-0.1
72	110.15		26.6	0.1
74	112.15		26.55	0.04
76	114.15		26.65	0.14
78	116.15		26.6	0.1
80	118.15		26.65	0.14
82	120.15		26.5	0.0

E14.9. Recorded surveyed longitudinal section measurements.



E14.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-1.65	0.00	1.58	-1.30
2	0.00	27.64	26.42	365.14
3	27.64	0.00	22.32	308.44
4	0.00	-2.08	1.68	-1.75
5	-2.08	-3.98	13.00	-39.38
6	-3.98	-3.65	6.70	-25.57
7	-3.65	0.00	1.84	-3.36
8	0.00	4.58	2.31	5.29
9	4.58	8.44	4.15	27.01
10	8.44	0.00	5.00	21.09
11	0.00	-3.28	5.00	-8.21
12	-3.28	-1.27	10.00	-22.76
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
624.63	726.97	-102.34	607.50	17.13

E14.11. Calculated volume.

Experiment E15 (5-R-40*80)

40*80(5 mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*6
	Along the width	2*5
	Around pier	4

E15.1. Anchorage characteristics, including nail's position and quantity.

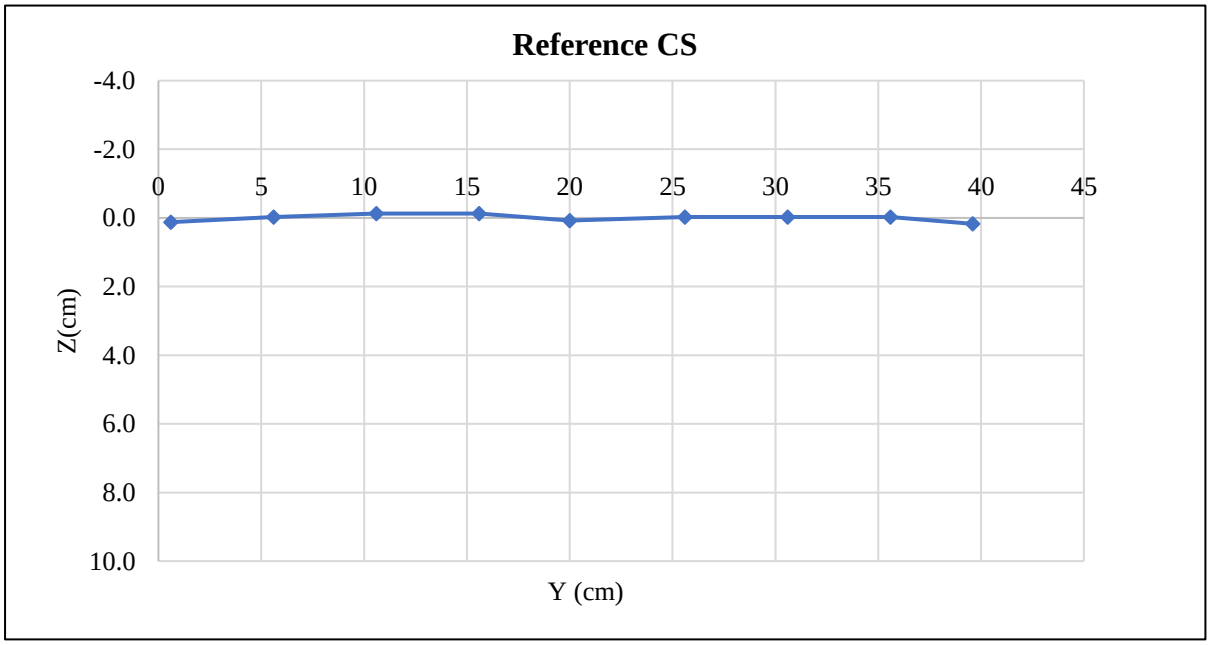
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.156	7.015	7.112	7.145	7.085	7.116	7.101	7.111	7.129	7.132	7.080	7.035	7.158	7.165
	7.203	7.930	7.056	7.010	7.036	7.008	7.045	7.028	7.154	7.075	7.192	7.046	7.047	7.116
	7.145	7.158	7.127	7.054	6.958	7.042	7.016	7.147	7.123	7.065	7.118	7.076	7.066	7.001
	7.135	7.175	6.976	7.193	7.045	7.048	7.098	7.159	7.096	7.059	7.146	7.052	7.021	7.099
	7.182	7.210	7.087	7.176	7.145	7.137	7.096	7.201	7.033	7.118	7.188	7.109	7.048	7.128
	7.131	7.147	7.056	7.073	7.082	7.099	7.078	7.110	6.968	7.148	7.118	7.048	7.076	7.072
	7.262	7.077	7.034	7.115	7.151	6.978	7.008	7.194	7.059	7.053	7.182	7.103	7.087	7.048
	7.184	7.029	7.151	7.113	7.148	7.155	6.968	7.060	6.998	7.019	7.069	7.091	7.101	7.048
	7.257	7.245	7.003	7.138	7.098	7.022	7.053	7.112	7.146	6.986	7.024	7.065	7.215	7.024
	7.162	7.187	7.110	7.245	7.111	7.110	7.025	7.116	7.169	7.005	6.969	7.019	7.184	7.114
Average	7.182	7.217	7.071	7.126	7.086	7.072	7.049	7.124	7.088	7.066	7.109	7.064	7.100	7.082
Ratio	0.991	0.995	0.975	0.983	0.977	0.975	0.972	0.983	0.978	0.975	0.980	0.974	0.979	0.977

E15.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)

	9	0.6	26.45	0.1
	14	5.6	26.6	0.0
	19	10.6	26.7	-0.1
	24	15.6	26.7	-0.1
104.15	28.4	20	26.5	0.1
	34	25.6	26.6	0.0
	39	30.6	26.6	0.0
	44	35.6	26.6	0.0
	48	39.6	26.4	0.2
		Average (Reference Elevation)	26.57	

E15.3. Calculated Reference Elevation.

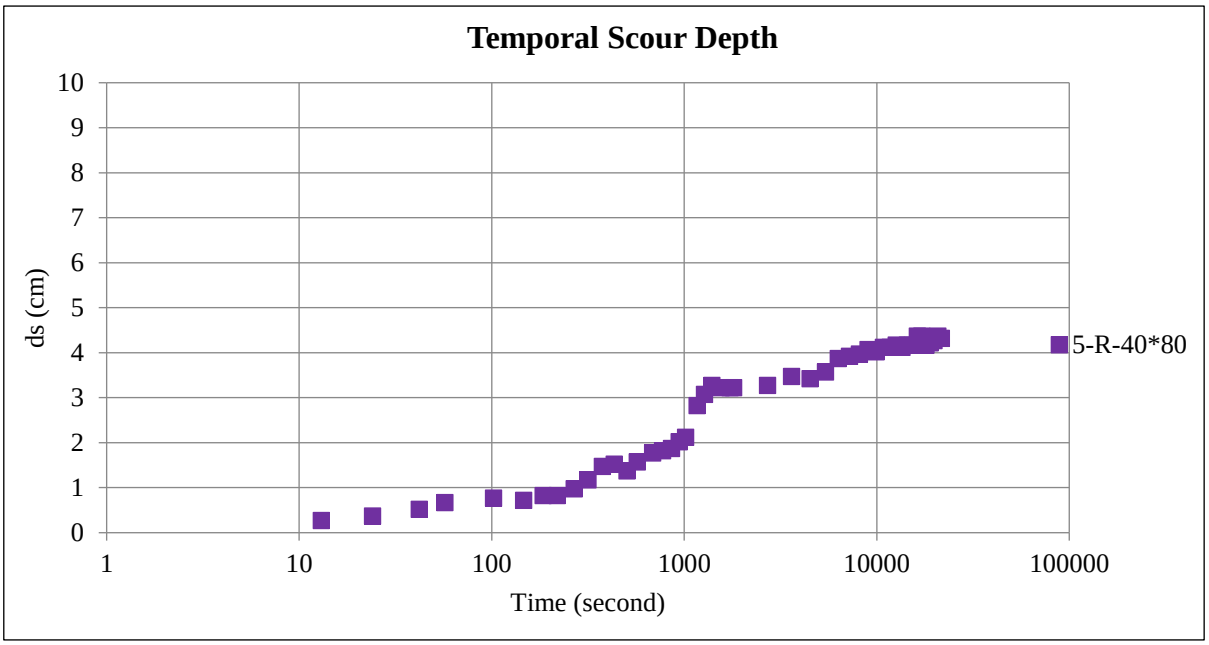


E15.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.57**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	13	13	26.3	0.27
0	0	24	24	26.2	0.37
0	0	42	42	26.05	0.52
0	0	57	57	25.9	0.67
0	1	42	102	25.8	0.77
0	2	26	146	25.85	0.72
0	3	5	185	25.75	0.82
0	3	39	219	25.75	0.82
0	4	28	268	25.6	0.97
0	5	16	316	25.4	1.17
0	6	15	375	25.1	1.47
0	7	13	433	25.05	1.52
0	8	24	504	25.2	1.37
0	9	30	570	25	1.57
0	11	25	685	24.8	1.77

0	12	49	769	24.75	1.82
0	14	19	859	24.7	1.87
0	15	40	940	24.55	2.02
0	16	56	1016	24.45	2.12
0	19	24	1164	23.75	2.82
0	21	14	1274	23.5	3.07
0	23	8	1388	23.3	3.27
0	25	53	1553	23.35	3.22
0	28	45	1725	23.35	3.22
0	30	0	1800	23.35	3.22
0	45	0	2700	23.3	3.27
1	0	0	3600	23.1	3.47
1	15	0	4500	23.15	3.42
1	30	0	5400	23	3.57
1	45	0	6300	22.7	3.87
2	0	0	7200	22.65	3.92
2	15	0	8100	22.6	3.97
2	30	0	9000	22.5	4.07
2	45	0	9900	22.55	4.02
3	0	0	10800	22.45	4.12
3	15	0	11700	22.45	4.12
3	30	0	12600	22.4	4.17
3	45	0	13500	22.45	4.12
4	0	0	14400	22.4	4.17
4	15	0	15300	22.4	4.17
4	30	0	16200	22.2	4.37
4	45	0	17100	22.2	4.37
5	0	0	18000	22.4	4.17
5	15	0	18900	22.35	4.22
5	30	0	19800	22.3	4.27
5	45	0	20700	22.2	4.37
6	0	0	21600	22.25	4.32

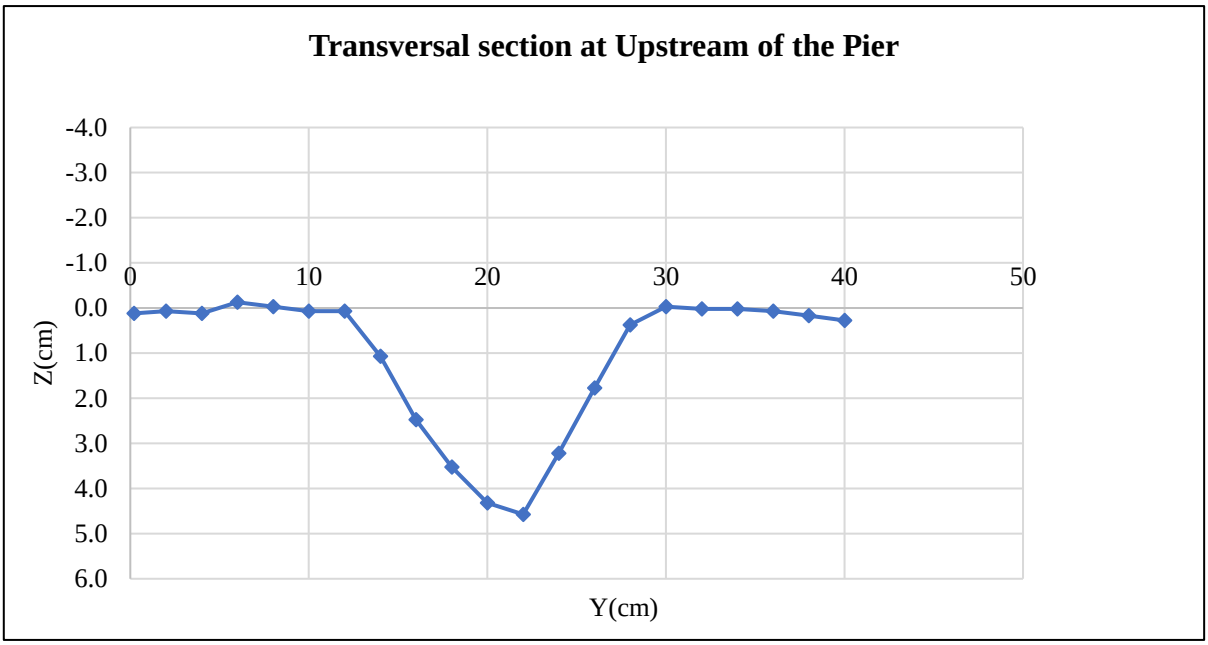
E15.5. Temporal Scour Depth measurements.



E15.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.45	0.1
	10.4	2	26.5	0.1
	12.4	4	26.45	0.1
	14.4	6	26.7	-0.1
	16.4	8	26.6	0.0
	18.4	10	26.5	0.1
	20.4	12	26.5	0.1
	22.4	14	25.5	1.1
	24.4	16	24.1	2.5
	26.4	18	23.05	3.5
104.15	28.4	20	22.25	4.3
	30.4	22	22	4.6
	32.4	24	23.35	3.2
	34.4	26	24.8	1.8
	36.4	28	26.2	0.4
	38.4	30	26.6	0.0
	40.4	32	26.55	0.0
	42.4	34	26.55	0.0
	44.4	36	26.5	0.1
	46.4	38	26.4	0.2
	48.4	40	26.3	0.3

E15.7. Recorded surveyed transversal section measurements.

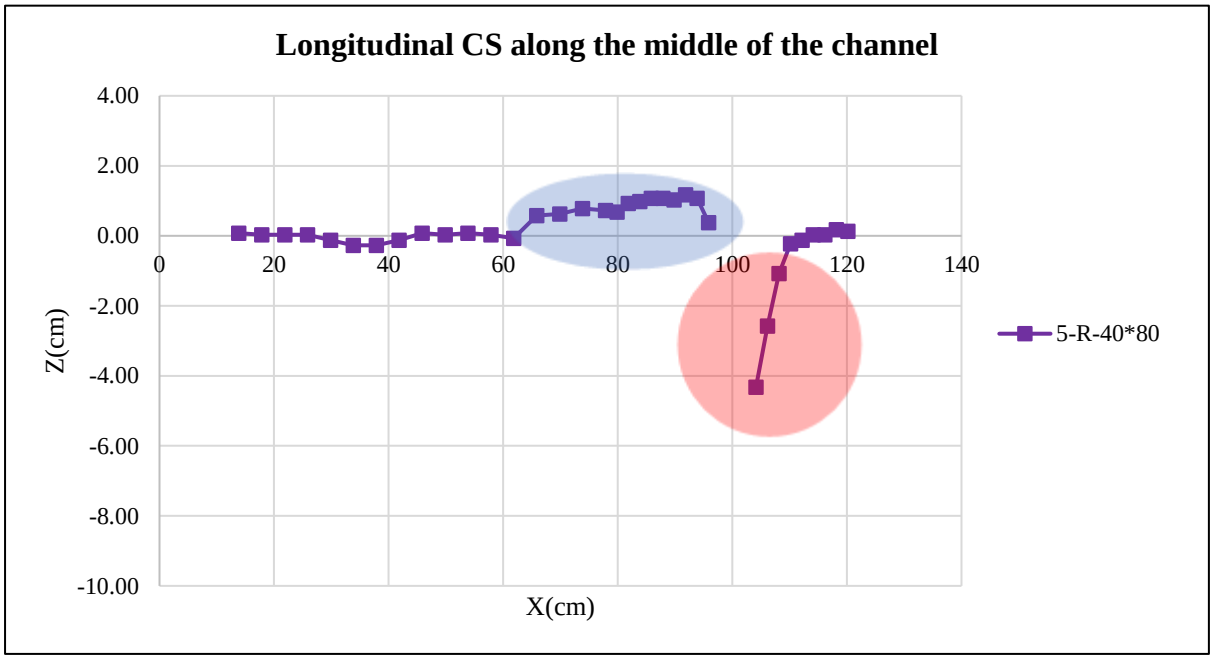


E15.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.65	0.08
79.7	17.85		26.6	0.0
83.7	21.85		26.6	0.0
87.7	25.85		26.6	0.0
91.7	29.85		26.45	-0.1
95.7	33.85		26.3	-0.272
99.7	37.85		26.3	-0.272
3.7	41.85		26.45	-0.1
7.7	45.85		26.65	0.1
11.7	49.85		26.6	0.0
15.7	53.85		26.65	0.08
19.7	57.85		26.6	0.03
23.7	61.85		26.5	-0.1
27.7	65.85		27.15	0.6
31.7	69.85		27.2	0.6
35.7	73.85		27.35	0.78
39.7	77.85		27.3	0.7
41.7	79.85		27.25	0.68
43.7	81.85		27.5	0.9
45.7	83.85		27.55	0.98
47.7	85.85		27.65	1.08
49.7	87.85		27.65	1.08
51.7	89.85		27.6	1.03
53.7	91.85		27.75	1.2
55.7	93.85		27.65	1.08
57.7	95.85		26.95	0.38
61.85	100		The Middle of the Pier	
66	104.15		22.25	-4.3

68	106.15		24	-2.6
70	108.15		25.5	-1.1
72	110.15		26.35	-0.2
74	112.15		26.45	-0.12
76	114.15		26.6	0.03
78	116.15		26.6	0.0
80	118.15		26.75	0.18
82	120.15		26.7	0.1

E15.9. Recorded surveyed longitudinal section measurements.



E15.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue oval is indicating the accumulated eroded sediments in the downstream of the pier.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	5.86	0.10	28.00	83.49
2	0.10	-5.95	24.00	-70.19
3	-5.95	-15.51	13.00	-139.46
4	-15.51	-1.59	6.70	-57.27
5	-1.59	0.00	0.14	-0.11
6	0.00	45.87	4.01	91.99
7	45.87	43.92	4.15	186.31
8	43.92	1.65	5.00	113.93
9	1.65	1.75	5.00	8.52
10	1.75	1.88	10.00	18.19
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
235.41	502.44	-267.03	-91.55	326.96

E15.11. Calculated volume.

Experiment E16 (5-R-20*60)

20*60(5mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*8
	Along the width	2*3
	Around pier	4

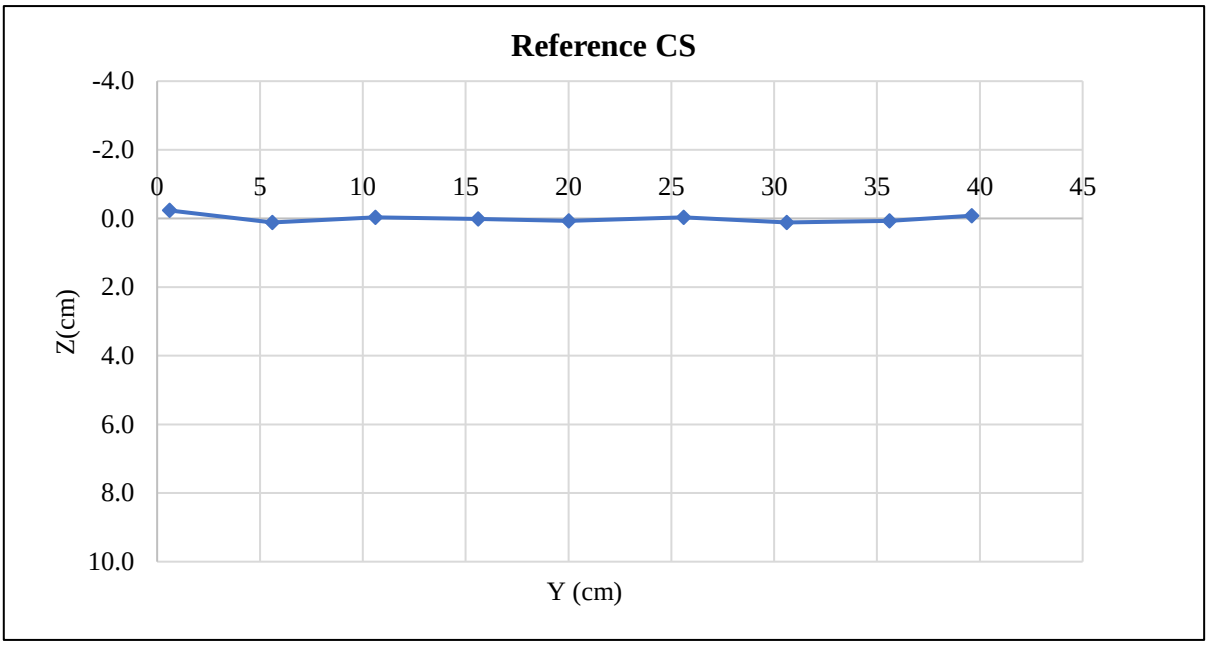
E16.1. Anchorage characteristics, including nail' position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.170	7.148	7.166	7.174	7.143	7.135	7.118	7.088	7.109	7.249	7.351	7.343	7.239	7.272
	7.192	7.056	7.117	7.139	7.095	7.075	7.185	7.103	7.180	7.222	7.219	7.284	7.287	7.336
	7.032	7.040	7.014	7.003	7.066	7.043	7.095	7.039	7.168	7.247	7.305	7.360	7.329	7.351
	7.134	7.014	7.077	7.067	7.174	7.059	7.086	7.055	7.089	7.232	7.140	7.428	7.348	7.246
	7.127	6.934	7.100	7.089	7.142	7.114	7.090	7.112	7.049	7.343	7.266	7.230	7.264	7.298
	7.154	7.041	7.158	7.133	7.132	7.110	7.052	7.085	7.095	7.250	7.303	7.160	7.421	7.311
	7.204	7.004	7.003	7.012	7.173	7.181	7.113	7.167	7.121	7.370	7.297	7.307	7.134	7.386
	7.053	7.011	7.130	6.996	7.244	7.097	7.134	7.146	7.101	7.329	7.311	7.450	7.228	7.183
	7.112	7.136	7.066	7.152	7.204	7.157	7.087	7.129	7.077	7.282	7.266	7.289	7.410	7.294
	7.073	7.099	7.158	7.118	7.159	7.112	7.149	7.004	7.111	7.259	7.356	7.326	7.425	7.343
Average	7.125	7.048	7.099	7.088	7.153	7.108	7.111	7.093	7.110	7.278	7.281	7.318	7.309	7.302
Ratio	0.983	0.972	0.979	0.978	0.987	0.980	0.981	0.978	0.981	1.004	1.004	1.009	1.008	1.007

E16.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.7	-0.2
	14	5.6	26.35	0.1
	19	10.6	26.5	0.0
	24	15.6	26.45	0.0
	28.4	20	26.4	0.1
	34	25.6	26.5	0.0
	39	30.6	26.35	0.1
	44	35.6	26.4	0.1
	48	39.6	26.55	-0.1
		Average (Reference Elevation)	26.47	

E16.3. Calculated Reference Elevation.

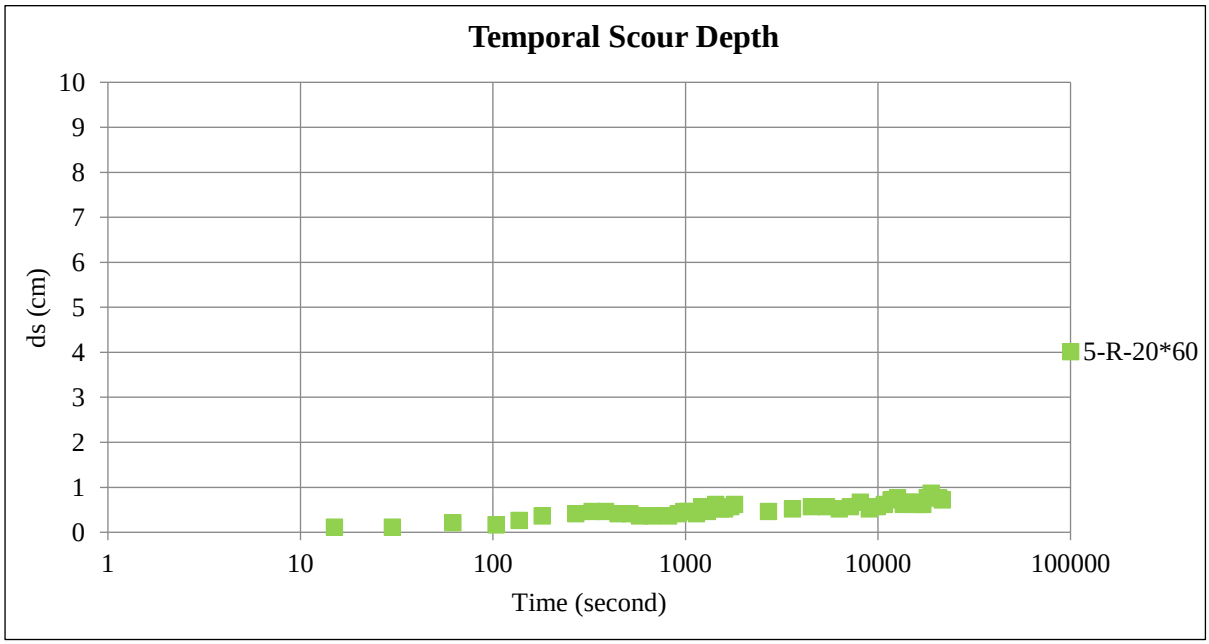


E16.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.47
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	15	15	26.35	0.12
0	0	30	30	26.35	0.12
0	1	2	62	26.25	0.22
0	1	44	104	26.3	0.17
0	2	17	137	26.2	0.27
0	3		180	26.1	0.37
0	4	29	269	26.05	0.42
0	5	27	327	26	0.47
0	6	25	385	26	0.47
0	7	27	447	26.05	0.42
0	8	35	515	26.05	0.42
0	9	37	577	26.1	0.37
0	11	16	676	26.1	0.37
0	13	36	816	26.1	0.37
0	15	18	918	26.05	0.42
0	16	22	982	26	0.47
0	17	22	1042	26	0.47
0	19	0	1140	26.05	0.42
0	20	12	1212	25.9	0.57
0	21	35	1295	26	0.47
0	22	50	1370	25.9	0.57
0	23	53	1433	25.85	0.62
0	25	20	1520	25.95	0.52
0	26	35	1595	25.95	0.52
0	28	40	1720	25.9	0.57
0	30	0	1800	25.85	0.62

0	45	0	2700	26	0.47
1	0	0	3600	25.95	0.52
1	15	0	4500	25.9	0.57
1	30	0	5400	25.9	0.57
1	45	0	6300	25.95	0.52
2	0	0	7200	25.9	0.57
2	15	0	8100	25.8	0.67
2	30	0	9000	25.95	0.52
2	45	0	9900	25.9	0.57
3	0	0	10800	25.85	0.62
3	15	0	11700	25.75	0.72
3	30	0	12600	25.7	0.77
3	45	0	13500	25.85	0.62
4	0	0	14400	25.8	0.67
4	15	0	15300	25.8	0.67
4	30	0	16200	25.85	0.62
4	45	0	17100	25.85	0.62
5	0	0	18000	25.7	0.77
5	15	0	18900	25.6	0.87
5	30	0	19800	25.7	0.77
5	45	0	20700	25.7	0.77
6	0	0	21600	25.75	0.72

E16.5. Temporal Scour Depth measurements.

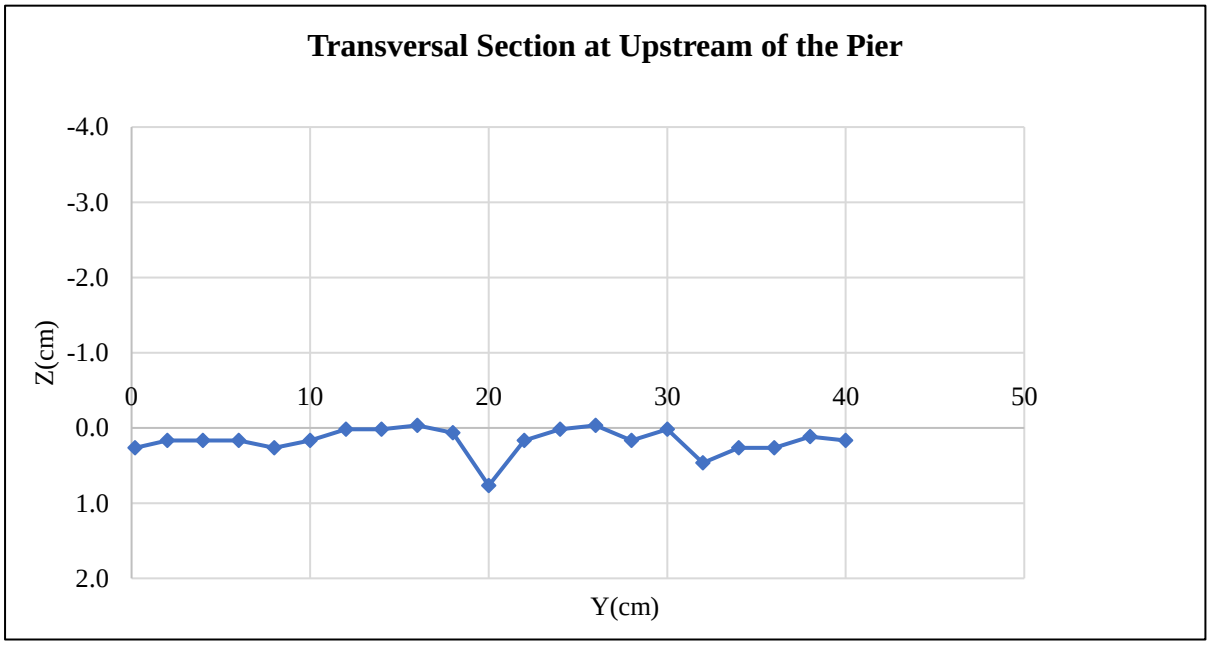


E16.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.2	0.3
	10.4	2	26.3	0.2
	12.4	4	26.3	0.2
	14.4	6	26.3	0.2

	16.4	8	26.2	0.3
	18.4	10	26.3	0.2
	20.4	12	26.45	0.0
	22.4	14	26.45	0.0
	24.4	16	26.5	0.0
	26.4	18	26.4	0.1
	28.4	20	25.7	0.8
	30.4	22	26.3	0.2
	32.4	24	26.45	0.0
	34.4	26	26.5	0.0
	36.4	28	26.3	0.2
	38.4	30	26.45	0.0
	40.4	32	26	0.5
	42.4	34	26.2	0.3
	44.4	36	26.2	0.3
	46.4	38	26.35	0.1
	48.4	40	26.3	0.2

E16.7. Recorded surveyed transversal section measurements.

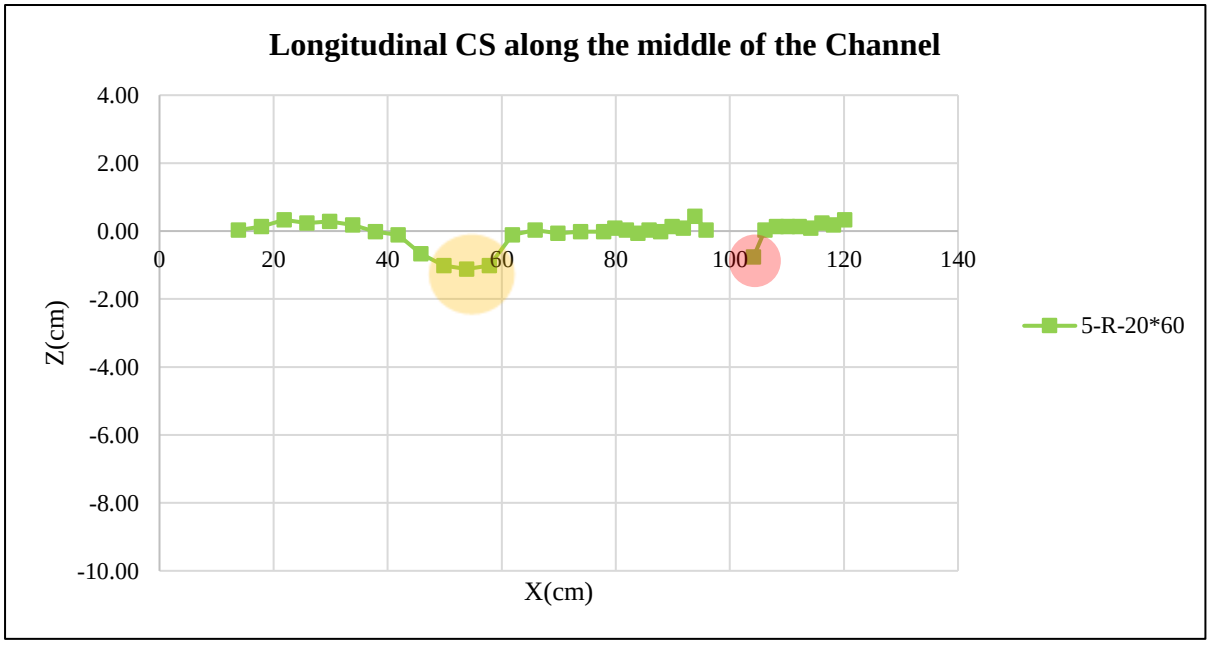


E16.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.5	0.03
79.7	17.85		26.6	0.13
83.7	21.85		26.8	0.33
87.7	25.85		26.7	0.23
91.7	29.85		26.75	0.28
95.7	33.85		26.65	0.18
99.7	37.85		26.45	-0.02
3.7	41.85		26.35	-0.12
7.7	45.85		25.8	-0.67

11.7	49.85		25.45	-1.02
15.7	53.85		25.35	-1.12
19.7	57.85		25.45	-1.02
23.7	61.85		26.35	-0.12
27.7	65.85		26.5	0.03
31.7	69.85		26.4	-0.07
35.7	73.85		26.45	-0.02
39.7	77.85		26.45	-0.02
41.7	79.85		26.55	0.08
43.7	81.85		26.5	0.03
45.7	83.85		26.4	-0.07
47.7	85.85		26.5	0.03
49.7	87.85		26.45	-0.02
51.7	89.85		26.6	0.13
53.7	91.85		26.55	0.08
55.7	93.85		26.9	0.43
57.7	95.85		26.5	0.03
61.85	100		The Middle of the Pier	
66	104.15		25.7	-0.77
68	106.15		26.5	0.03
70	108.15		26.6	0.13
72	110.15		26.6	0.13
74	112.15		26.6	0.13
76	114.15		26.55	0.08
78	116.15		26.7	0.23
80	118.15		26.65	0.18
82	120.15		26.8	0.33

E16.9. Recorded surveyed longitudinal section measurements.



E16.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-0.12	15.50	28.00	215.25
2	15.50	11.71	12.00	163.27
3	11.71	-1.18	12.00	63.17
4	-1.18	7.75	13.00	42.69
5	7.75	9.93	6.70	59.25
6	9.93	10.03	4.15	41.43
7	10.03	6.82	4.15	34.98
8	6.82	0.43	5.00	18.14
9	0.43	-1.84	5.00	-3.51
10	-1.84	-0.83	10.00	-13.32
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
621.36	638.18	-16.82	585.07	36.29

E16.11. Calculated volume.

Experiment E17 (10-F-40)

40*40 (10mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*6
	Along the width	2*7
	Around pier	4

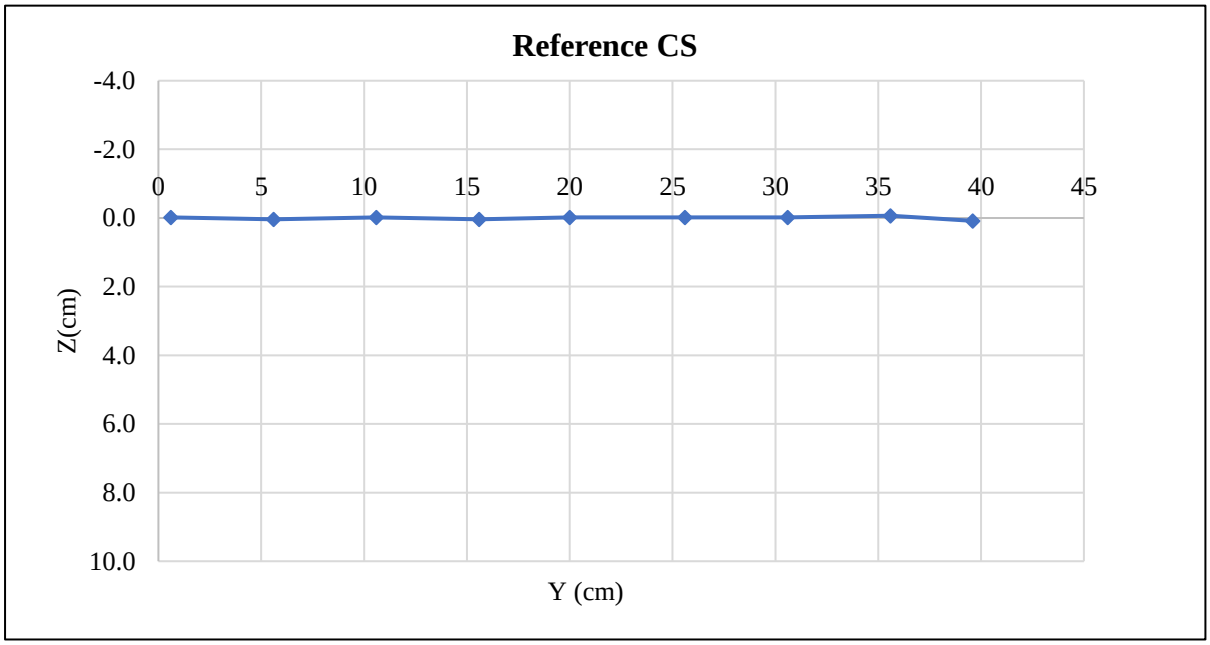
E17.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.276	7.143	7.046	7.108	7.005	7.098	7.125	7.241	7.012	7.244	7.093	7.118	7.162	7.224
	7.312	7.151	7.238	7.111	7.014	7.026	6.977	7.230	6.989	7.113	7.153	7.137	7.165	7.209
	7.302	7.037	7.096	7.159	7.152	7.159	7.083	7.045	7.055	7.202	7.094	6.975	7.275	7.155
	7.225	7.062	7.081	7.115	7.155	7.150	6.987	7.175	7.115	7.191	7.084	6.976	7.263	7.049
	7.267	7.136	7.155	7.119	7.104	7.124	7.224	7.056	7.184	7.146	7.101	7.059	7.127	7.145
	7.241	7.022	7.234	7.940	7.028	7.225	7.054	7.078	7.136	7.097	7.075	7.123	7.135	7.153
	7.318	7.119	7.132	7.014	7.126	7.203	7.167	7.096	7.114	7.154	7.089	7.016	7.129	7.164
	7.241	7.056	7.072	7.159	7.130	7.120	7.000	7.158	7.120	7.185	7.093	7.096	7.068	7.071
	7.349	7.033	7.098	7.249	7.096	7.230	7.111	7.076	7.138	7.218	7.082	7.113	7.137	7.143
	7.319	7.078	7.019	7.088	7.116	7.188	7.044	7.147	7.070	7.266	7.056	7.144	7.146	7.119
Average	7.285	7.084	7.117	7.206	7.093	7.152	7.077	7.130	7.093	7.182	7.092	7.076	7.161	7.143
Ratio	1.005	0.977	0.982	0.994	0.978	0.987	0.976	0.983	0.978	0.991	0.978	0.976	0.988	0.985

E17.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.0
	14	5.6	26.45	0.0
	19	10.6	26.5	0.0
	24	15.6	26.45	0.0
	28.4	20	26.5	0.0
	34	25.6	26.5	0.0
	39	30.6	26.5	0.0
	44	35.6	26.55	-0.1
	48	39.6	26.4	0.1
		Average (Reference Elevation)	26.48	

E17.3. Calculated Reference Elevation.

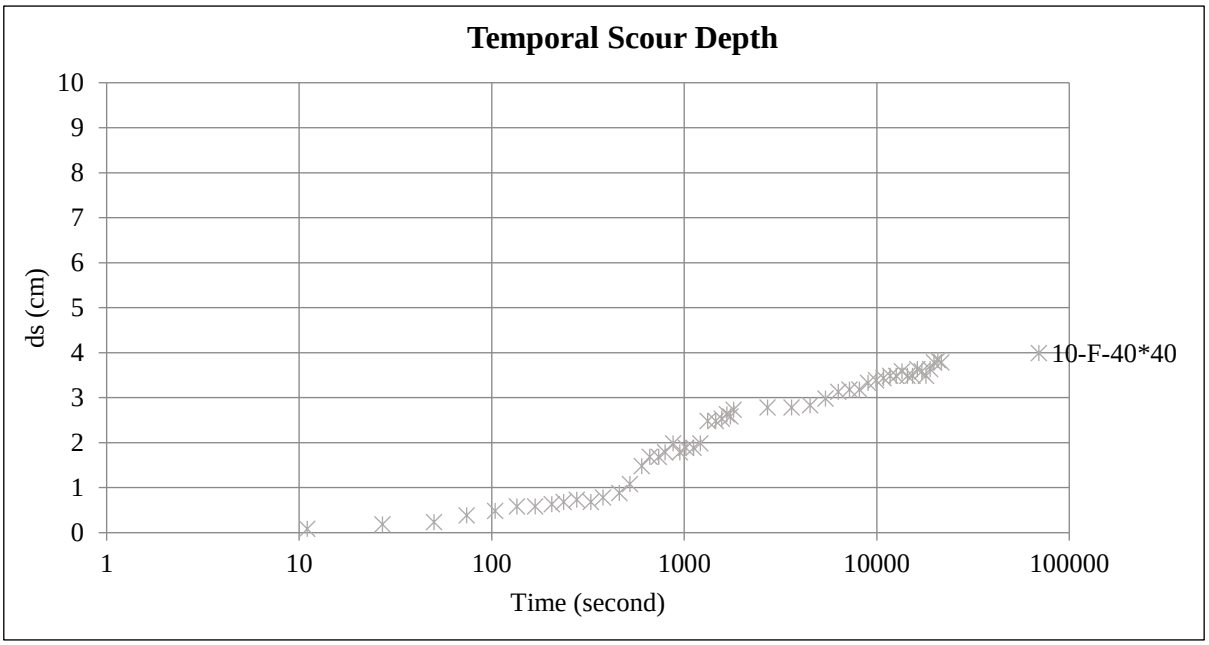


E17.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.48
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	11	11	26.4	0.08
0	0	27	27	26.3	0.18
0	0	50	50	26.25	0.23
0	1	14	74	26.1	0.38
0	1	44	104	26	0.48
0	2	15	135	25.9	0.58
0	2	48	168	25.9	0.58
0	3	25	205	25.85	0.63
0	3	56	236	25.8	0.68
0	4	36	276	25.75	0.73
0	5	27	327	25.8	0.68
0	6	18	378	25.7	0.78
0	7	40	460	25.6	0.88
0	8	41	521	25.4	1.08

0	10	0	600	25	1.48
0	11	0	660	24.8	1.68
0	12	17	737	24.8	1.68
0	13	13	793	24.7	1.78
0	14	34	874	24.5	1.98
0	15	48	948	24.7	1.78
0	16	58	1018	24.6	1.88
0	18	38	1118	24.6	1.88
0	20	9	1209	24.5	1.98
0	22	2	1322	24	2.48
0	24	15	1455	24	2.48
0	26	3	1563	23.95	2.53
0	27	46	1666	23.85	2.63
0	28	55	1735	23.9	2.58
0	30	0	1800	23.75	2.73
0	45	0	2700	23.7	2.78
1	0	0	3600	23.7	2.78
1	15	0	4500	23.65	2.83
1	30	0	5400	23.5	2.98
1	45	0	6300	23.35	3.13
2	0	0	7200	23.3	3.18
2	15	0	8100	23.3	3.18
2	30	0	9000	23.15	3.33
2	45	0	9900	23.1	3.38
3	0	0	10800	23.05	3.43
3	15	0	11700	23	3.48
3	30	0	12600	23	3.48
3	45	0	13500	22.9	3.58
4	0	0	14400	23	3.48
4	15	0	15300	23	3.48
4	30	0	16200	22.85	3.63
4	45	0	17100	22.9	3.58
5	0	0	18000	23	3.48
5	15	0	18900	22.85	3.63
5	30	0	19800	22.7	3.78
5	45	0	20700	22.65	3.83
6	0	0	21600	22.7	3.78

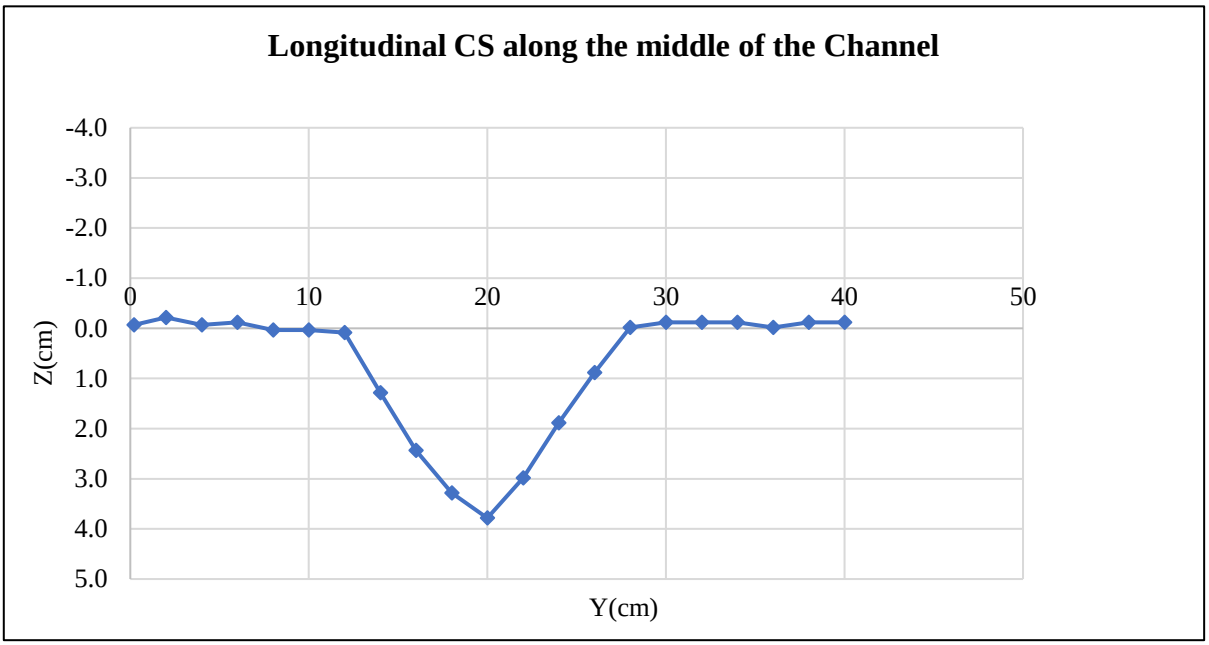
E17.5. Temporal Scour Depth measurements.



E17.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.55	-0.1
	10.4	2	26.7	-0.2
	12.4	4	26.55	-0.1
	14.4	6	26.6	-0.1
	16.4	8	26.45	0.0
	18.4	10	26.45	0.0
	20.4	12	26.4	0.1
	22.4	14	25.2	1.3
	24.4	16	24.05	2.4
	26.4	18	23.2	3.3
104.15	28.4	20	22.7	3.8
	30.4	22	23.5	3.0
	32.4	24	24.6	1.9
	34.4	26	25.6	0.9
	36.4	28	26.5	0.0
	38.4	30	26.6	-0.1
	40.4	32	26.6	-0.1
	42.4	34	26.6	-0.1
	44.4	36	26.5	0.0
	46.4	38	26.6	-0.1
	48.4	40	26.6	-0.1

E17.7. Recorded surveyed transversal section measurements.

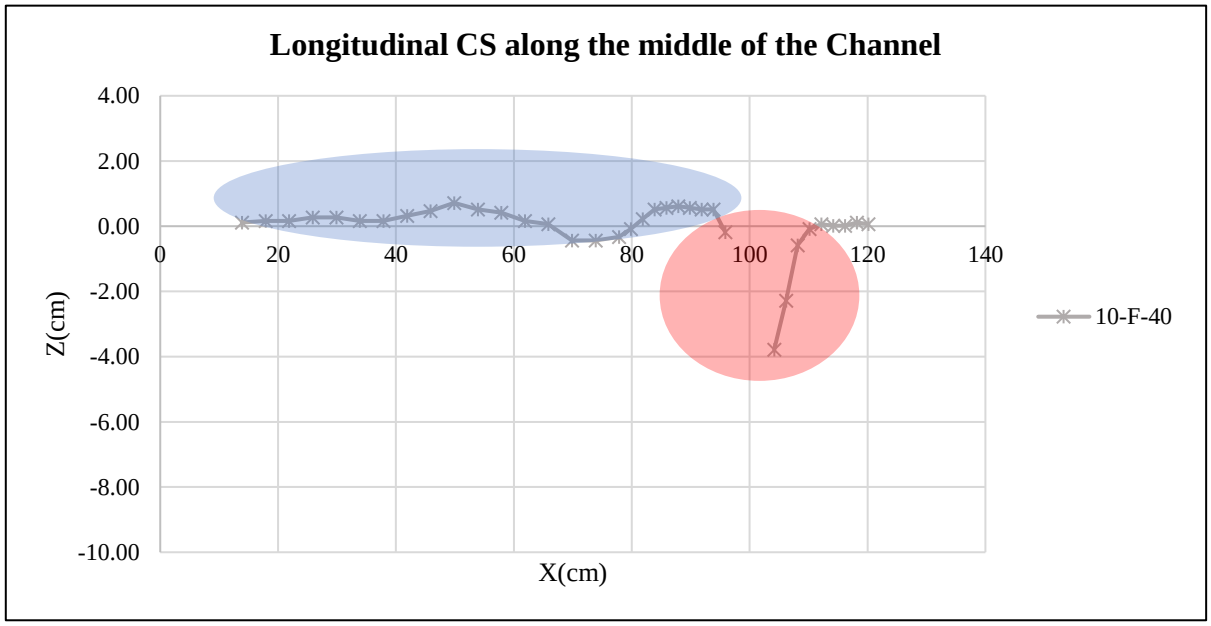


E17.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		26.6	0.12
79.7	17.85		26.65	0.17
83.7	21.85		26.65	0.17
87.7	25.85		26.75	0.27
91.7	29.85		26.75	0.27
95.7	33.85		26.65	0.17
99.7	37.85		26.65	0.17
3.7	41.85		26.8	0.32
7.7	45.85		26.95	0.47
11.7	49.85		27.2	0.72
15.7	53.85		27	0.52
19.7	57.85		26.9	0.42
23.7	61.85		26.65	0.17
27.7	65.85	28.4	26.55	0.07
31.7	69.85		26.05	-0.43
35.7	73.85		26.05	-0.43
39.7	77.85		26.15	-0.33
41.7	79.85		26.4	-0.08
43.7	81.85		26.7	0.22
45.7	83.85		27	0.52
47.7	85.85		27.05	0.57
49.7	87.85		27.1	0.62
51.7	89.85		27.05	0.57
53.7	91.85		27	0.52
55.7	93.85		27	0.52
57.7	95.85		26.3	-0.18
61.85	100		The Middle of the Pier	

66	104.15		22.7	-3.78
68	106.15		24.2	-2.28
70	108.15		25.9	-0.58
72	110.15		26.4	-0.08
74	112.15		26.55	0.07
76	114.15		26.5	0.02
78	116.15		26.5	0.02
80	118.15		26.6	0.12
82	120.15		26.55	0.07

E17.9. Recorded surveyed longitudinal section measurements.



E17.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue oval is indicating the cyclic sediment scouring and sediment accumulation along the flume channel.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-1.87	0.00	12.82	-12.00
2	0.00	2.22	15.18	16.83
3	2.22	11.52	24.00	164.84
4	11.52	0.00	5.88	33.87
5	0.00	-13.95	7.12	-49.65
6	-13.95	0.00	5.82	-40.60
7	0.00	2.11	0.88	0.93
8	2.11	40.05	4.15	87.47
9	40.05	31.41	4.15	148.28
10	31.41	0.00	4.78	75.05
11	0.00	-1.46	0.22	-0.16
12	-1.46	-1.95	5.00	-8.52
13	-1.95	-0.16	10.00	-10.56
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
405.77	527.25	-121.48	201.68	204.08

E17.11. Calculated volume.

Experiment E18 (10-F-30)

30*30 (10mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*5
	Along the width	2*5
	Around pier	4

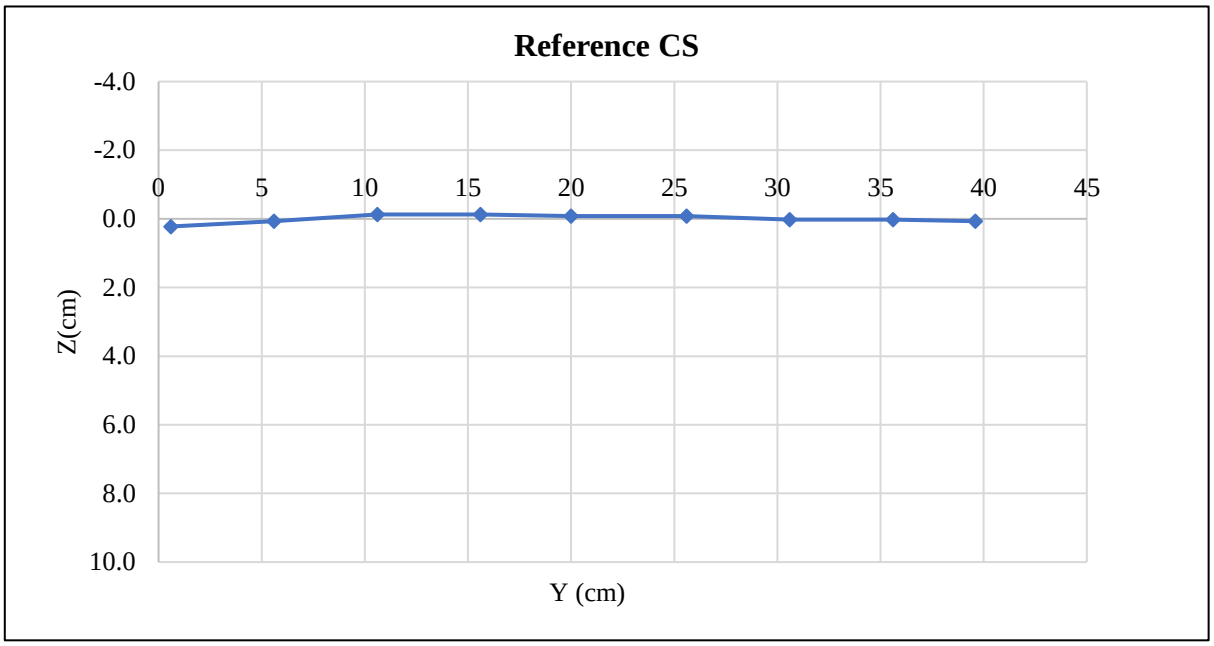
E18.1. Anchorage characteristics, including nail' position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.176	7.163	7.156	6.956	7.180	7.273	7.128	7.113	7.096	7.132	7.150	7.187	7.119	7.165
	7.145	7.109	7.142	7.018	7.148	7.165	7.170	7.186	7.025	7.101	7.140	7.150	7.148	7.208
	7.180	7.025	7.154	6.923	7.229	7.211	7.122	7.028	7.006	7.107	7.029	7.196	7.149	7.114
	7.176	7.074	7.156	7.067	7.117	7.212	7.064	7.120	7.108	7.136	7.009	7.143	7.065	7.221
	7.070	7.049	7.075	7.064	7.168	7.187	7.151	7.253	7.091	7.171	7.047	7.083	7.124	7.078
	7.102	7.086	7.165	6.965	7.078	7.139	7.198	7.176	7.056	7.164	7.038	7.075	7.116	7.111
	7.197	7.054	7.049	6.996	7.193	7.157	7.051	7.110	7.132	7.201	7.046	7.144	7.153	7.132
	7.053	7.063	7.068	7.085	7.148	7.241	7.115	7.137	7.035	7.094	7.134	7.211	7.216	7.135
	7.165	7.180	7.023	7.089	7.066	7.139	7.141	7.163	7.097	7.116	7.099	7.146	7.192	7.056
	7.144	7.016	7.150	7.035	7.129	7.079	7.128	7.237	7.126	7.155	7.125	7.049	7.182	7.018
Average	7.141	7.082	7.114	7.020	7.146	7.180	7.127	7.152	7.077	7.138	7.082	7.138	7.146	7.124
Ratio	0.985	0.977	0.981	0.968	0.986	0.990	0.983	0.987	0.976	0.985	0.977	0.985	0.986	0.983

E18.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.2
	14	5.6	26.45	0.1
	19	10.6	26.65	-0.1
	24	15.6	26.65	-0.1
	28.4	20	26.6	-0.1
	34	25.6	26.6	-0.1
	39	30.6	26.5	0.0
	44	35.6	26.5	0.0
	48	39.6	26.45	0.1
		Average (Reference Elevation)	26.52	

E18.3. Calculated Reference Elevation.

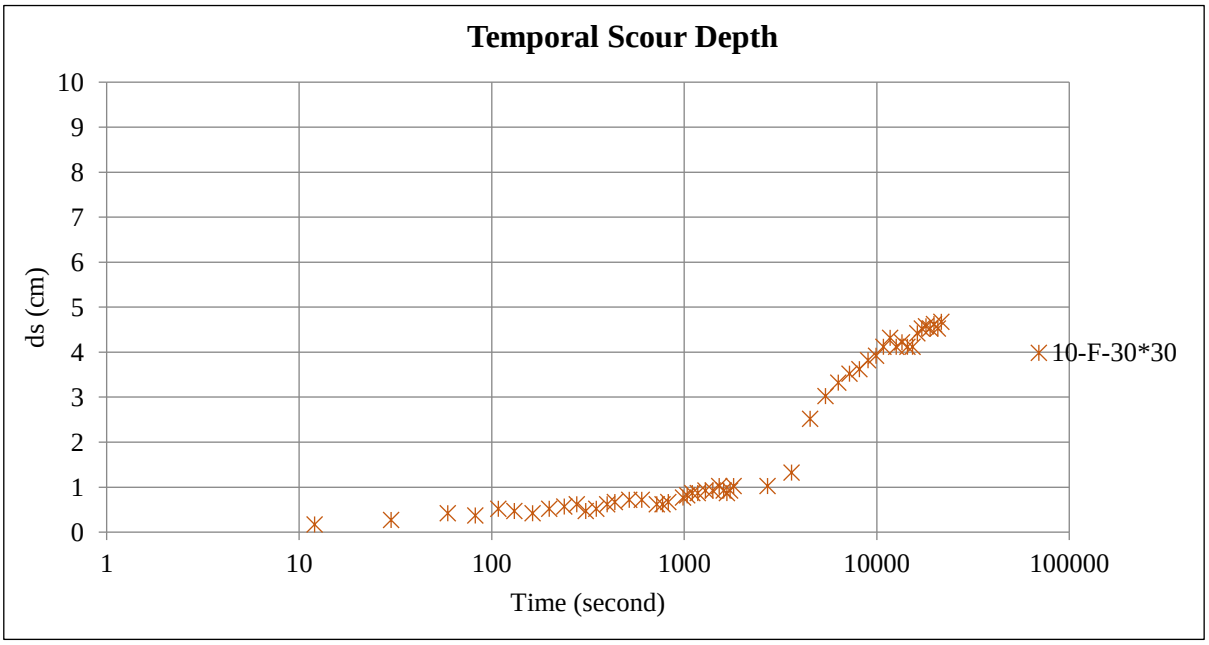


E18.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.52
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	12	12	26.35	0.17
0	0	30	30	26.25	0.27
0	0	59	59	26.1	0.42
0	1	22	82	26.15	0.37
0	1	48	108	26	0.52
0	2	11	131	26.05	0.47
0	2	43	163	26.1	0.42
0	3	19	199	26	0.52
0	3	58	238	25.95	0.57
0	4	36	276	25.9	0.62
0	5	8	308	26.05	0.47
0	5	49	349	26	0.52
0	6	37	397	25.9	0.62
0	7	15	435	25.85	0.67
0	8	37	517	25.8	0.72
0	10	0	600	25.8	0.72
0	11	58	718	25.9	0.62
0	12	49	769	25.9	0.62
0	13	47	827	25.85	0.67
0	16	24	984	25.75	0.77
0	17	14	1034	25.7	0.82
0	18	18	1098	25.65	0.87
0	19	35	1175	25.65	0.87
0	21	29	1289	25.6	0.92
0	23	28	1408	25.6	0.92
0	25	15	1515	25.5	1.02

0	26	42	1602	25.6	0.92
0	27	46	1666	25.65	0.87
0	28	50	1730	25.6	0.92
0	30	0	1800	25.5	1.02
0	45	0	2700	25.5	1.02
1	0	0	3600	25.2	1.32
1	15	0	4500	24	2.52
1	30	0	5400	23.5	3.02
1	45	0	6300	23.2	3.32
2	0	0	7200	23	3.52
2	15	0	8100	22.9	3.62
2	30	0	9000	22.7	3.82
2	45	0	9900	22.6	3.92
3	0	0	10800	22.4	4.12
3	15	0	11700	22.2	4.32
3	30	0	12600	22.4	4.12
3	45	0	13500	22.3	4.22
4	0	0	14400	22.4	4.12
4	15	0	15300	22.4	4.12
4	30	0	16200	22.1	4.42
4	45	0	17100	22	4.52
5	0	0	18000	21.95	4.57
5	15	0	18900	22	4.52
5	30	0	19800	21.9	4.62
5	45	0	20700	22	4.52
6	0	0	21600	21.85	4.67

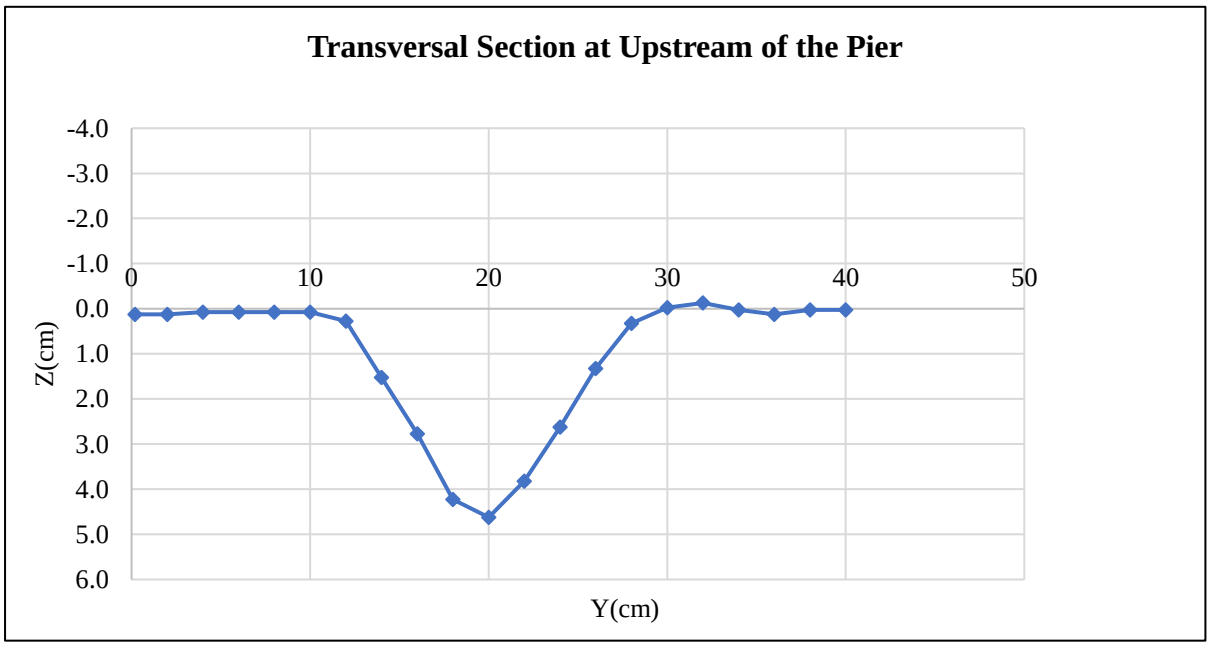
E18.5. Temporal Scour Depth measurements.



E18.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.4	0.1
	10.4	2	26.4	0.1
	12.4	4	26.45	0.1
	14.4	6	26.45	0.1
	16.4	8	26.45	0.1
	18.4	10	26.45	0.1
	20.4	12	26.25	0.3
	22.4	14	25	1.5
	24.4	16	23.75	2.8
	26.4	18	22.3	4.2
104.15	28.4	20	21.9	4.6
	30.4	22	22.7	3.8
	32.4	24	23.9	2.6
	34.4	26	25.2	1.3
	36.4	28	26.2	0.3
	38.4	30	26.55	0.0
	40.4	32	26.65	-0.1
	42.4	34	26.5	0.0
	44.4	36	26.4	0.1
	46.4	38	26.5	0.0
	48.4	40	26.5	0.0

E18.7. Recorded surveyed transversal section measurements.

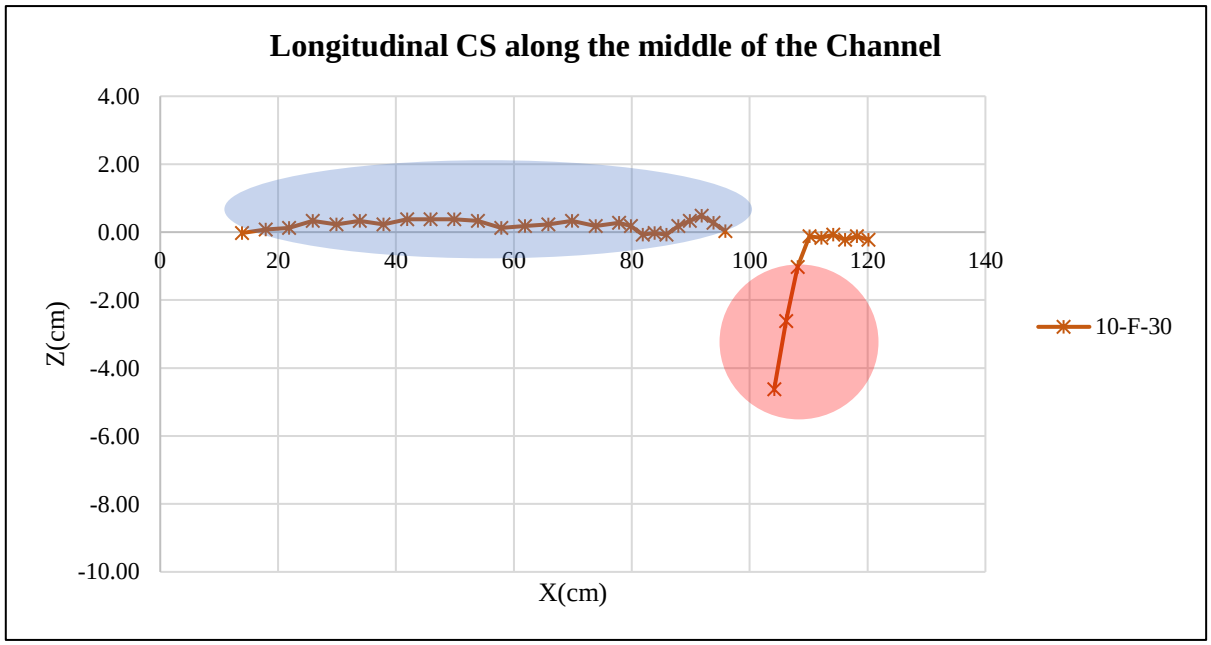


E18.8. Visual representation of the surveyed transversal section measurements.

X Direction	X direction Calibration	Y Direction	Z Direction	Scour Depth
75.7	13.85	28.4	26.5	-0.02
79.7	17.85		26.6	0.08
83.7	21.85		26.65	0.13
87.7	25.85		26.85	0.33

91.7	29.85		26.75	0.23
95.7	33.85		26.85	0.33
99.7	37.85		26.75	0.23
3.7	41.85		26.9	0.38
7.7	45.85		26.9	0.38
11.7	49.85		26.9	0.38
15.7	53.85		26.85	0.33
19.7	57.85		26.65	0.13
23.7	61.85		26.7	0.18
27.7	65.85		26.75	0.23
31.7	69.85		26.85	0.33
35.7	73.85		26.7	0.18
39.7	77.85		26.8	0.28
41.7	79.85		26.7	0.18
43.7	81.85		26.45	-0.07
45.7	83.85		26.5	-0.02
47.7	85.85		26.45	-0.07
49.7	87.85		26.7	0.18
51.7	89.85		26.85	0.33
53.7	91.85		27	0.48
55.7	93.85		26.8	0.28
57.7	95.85		26.55	0.03
61.85	100		The Middle of the Pier	
66	104.15		21.9	-4.62
68	106.15		23.9	-2.62
70	108.15		25.5	-1.02
72	110.15		26.4	-0.12
74	112.15		26.35	-0.17
76	114.15		26.45	-0.07
78	116.15		26.3	-0.22
80	118.15		26.4	-0.12
82	120.15		26.3	-0.22

E18.9. Recorded surveyed longitudinal section measurements.



E18.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring at 1 cm upstream of the pier, the blue oval represents the subtle cyclical pattern of sediment scouring and sediment accumulation along the channel of the flume.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-2.73	0.00	8.72	-11.89
2	0.00	6.04	19.28	58.20
3	6.04	8.69	24.00	176.77
4	8.69	0.00	7.63	33.17
5	0.00	-6.12	5.37	-16.44
6	-6.12	0.00	3.03	-9.28
7	0.00	7.41	3.67	13.59
8	7.41	42.27	4.15	103.09
9	42.27	43.96	4.15	178.95
10	43.96	4.98	5.00	122.36
11	4.98	1.15	5.00	15.33
12	1.15	4.48	10.00	28.19
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
692.07	729.67	-37.60	347.24	344.83

E18.2. Calculated volume.

Experiment E19 (10-F-20)

20*20 (10mm)		
Anchorage	Position	Nails number
	Along the length	2*3
	Along the width	2*3
	Around pier	4

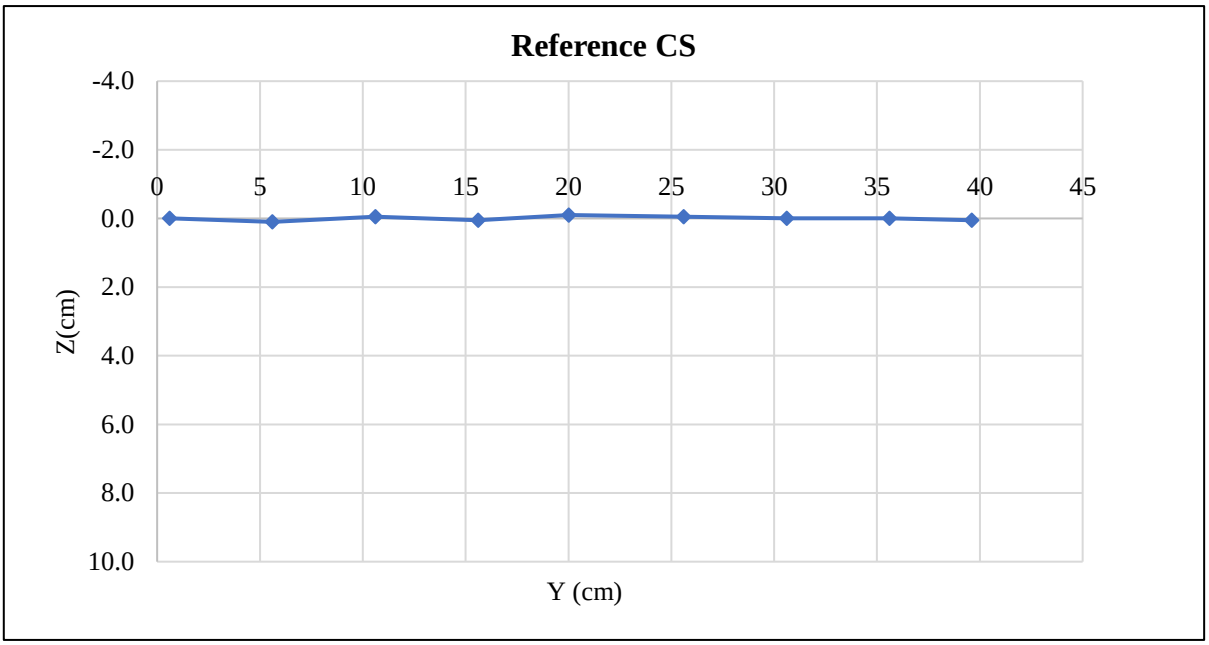
E19.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.176	7.163	7.156	6.956	7.180	7.273	7.128	7.113	7.096	7.132	7.150	7.187	7.119	7.165
	7.145	7.109	7.142	7.018	7.148	7.165	7.170	7.186	7.025	7.101	7.140	7.150	7.148	7.208
	7.180	7.025	7.154	6.923	7.229	7.211	7.122	7.028	7.006	7.107	7.029	7.196	7.149	7.114
	7.176	7.074	7.156	7.067	7.117	7.212	7.064	7.120	7.108	7.136	7.009	7.143	7.065	7.221
	7.070	7.049	7.075	7.064	7.168	7.187	7.151	7.253	7.091	7.171	7.047	7.083	7.124	7.078
	7.102	7.086	7.165	6.965	7.078	7.139	7.198	7.176	7.056	7.164	7.038	7.075	7.116	7.111
	7.197	7.054	7.049	6.996	7.193	7.157	7.051	7.110	7.132	7.201	7.046	7.144	7.153	7.132
	7.053	7.063	7.068	7.085	7.148	7.241	7.115	7.137	7.035	7.094	7.134	7.211	7.216	7.135
	7.165	7.180	7.023	7.089	7.066	7.139	7.141	7.163	7.097	7.116	7.099	7.146	7.192	7.056
	7.144	7.016	7.150	7.035	7.129	7.079	7.128	7.237	7.126	7.155	7.125	7.049	7.182	7.018
Average	7.141	7.082	7.114	7.020	7.146	7.180	7.127	7.152	7.077	7.138	7.082	7.138	7.146	7.124
Ratio	0.985	0.977	0.981	0.968	0.986	0.990	0.983	0.987	0.976	0.985	0.977	0.985	0.986	0.983

E19.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.45	0.0
	14	5.6	26.35	0.1
	19	10.6	26.5	-0.1
	24	15.6	26.4	0.1
	28.4	20	26.55	-0.1
	34	25.6	26.5	-0.1
	39	30.6	26.45	0.0
	44	35.6	26.45	0.0
	48	39.6	26.4	0.1
		Average (Reference Elevation)	26.45	

E19.3. Calculated Reference Elevation.

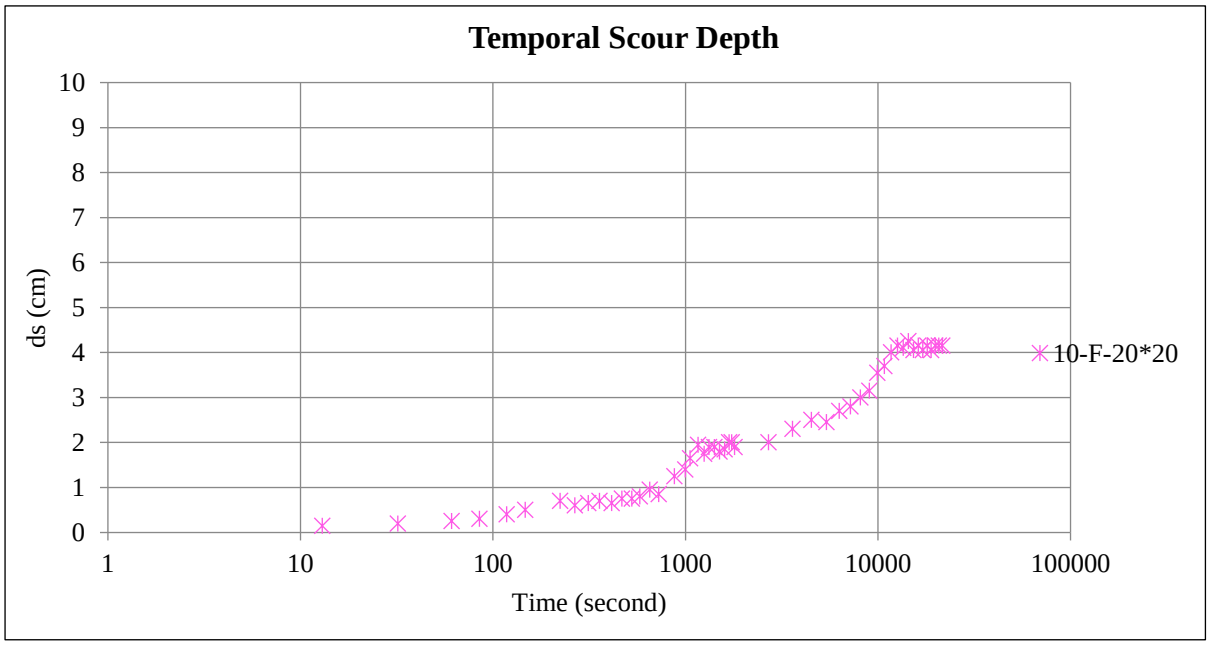


E19.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.45
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	13	13	26.3	0.15
0	0	32	32	26.25	0.20
0	1	1	61	26.2	0.25
0	1	25	85	26.15	0.30
0	1	58	118	26.05	0.40
0	2	27	147	25.95	0.50
0	3	0	180	26.85	-0.40
0	3	43	223	25.75	0.70
0	4	26	266	25.85	0.60
0	5	13	313	25.8	0.65
0	5	58	358	25.75	0.70
0	6	53	413	25.8	0.65
0	7	47	467	25.7	0.75
0	8	47	527	25.7	0.75
0	9	38	578	25.65	0.80
0	10	53	653	25.5	0.95
0	12	6	726	25.6	0.85
0	14	37	877	25.2	1.25
0	16	38	998	25.05	1.40
0	17	35	1055	24.8	1.65
0	19	24	1164	24.5	1.95
0	20	52	1252	24.7	1.75
0	22	6	1326	24.55	1.90
0	23	31	1411	24.55	1.90
0	25	0	1500	24.65	1.80
0	26	38	1598	24.6	1.85

0	28	5	1685	24.45	2.00
0	28	56	1736	24.45	2.00
0	30	0	1800	24.55	1.90
0	45	0	2700	24.45	2.00
1	0	0	3600	24.15	2.30
1	15	0	4500	23.95	2.50
1	30	0	5400	24	2.45
1	45	0	6300	23.75	2.70
2	0	0	7200	23.65	2.80
2	15	0	8100	23.45	3.00
2	30	0	9000	23.3	3.15
2	45	0	9900	22.9	3.55
3	0	0	10800	22.75	3.70
3	15	0	11700	22.45	4.00
3	30	0	12600	22.3	4.15
3	45	0	13500	22.35	4.10
4	0	0	14400	22.2	4.25
4	15	0	15300	22.4	4.05
4	30	0	16200	22.3	4.15
4	45	0	17100	22.4	4.05
5	0	0	18000	22.3	4.15
5	15	0	18900	22.4	4.05
5	30	0	19800	22.3	4.15
5	45	0	20700	22.3	4.15
6	0	0	21600	22.3	4.15

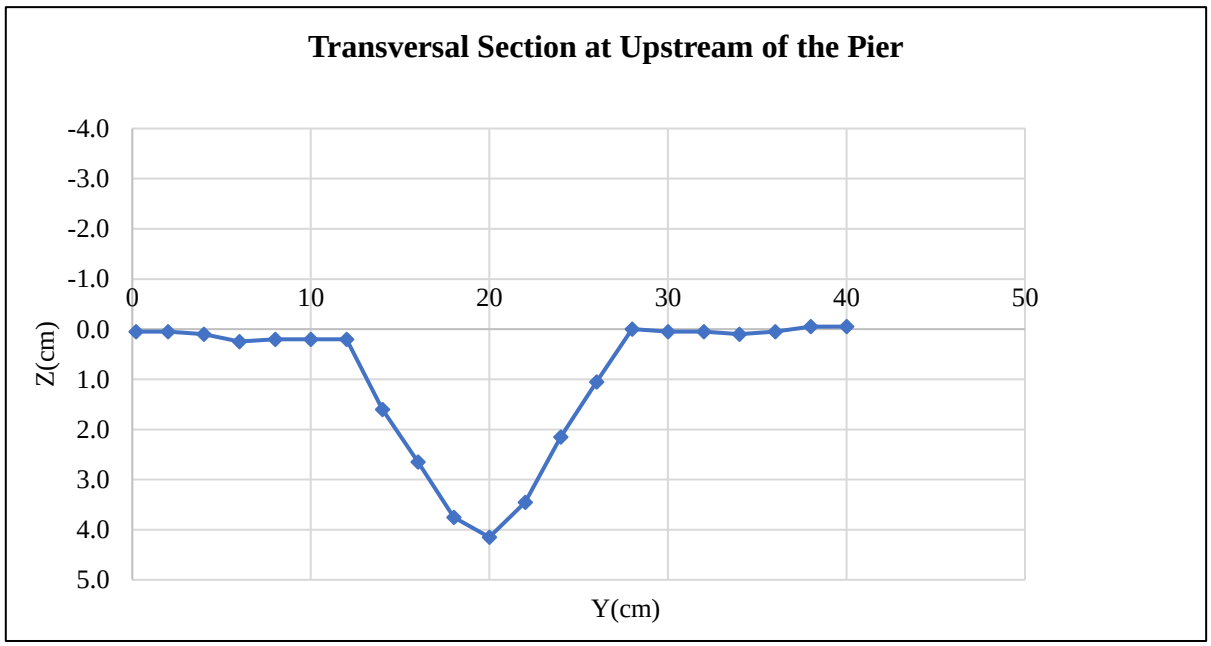
E19.5. Temporal Scour Depth measurements



E19.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.4	0.1
	10.4	2	26.4	0.1
	12.4	4	26.35	0.1
	14.4	6	26.2	0.3
	16.4	8	26.25	0.2
	18.4	10	26.25	0.2
	20.4	12	26.25	0.2
	22.4	14	24.85	1.6
	24.4	16	23.8	2.7
	26.4	18	22.7	3.8
	28.4	20	22.3	4.2
	30.4	22	23	3.5
	32.4	24	24.3	2.2
	34.4	26	25.4	1.1
	36.4	28	26.45	0.0
	38.4	30	26.4	0.1
	40.4	32	26.4	0.1
	42.4	34	26.35	0.1
	44.4	36	26.4	0.1
	46.4	38	26.5	-0.1
	48.4	40	26.5	-0.1

E19.7. Recorded surveyed transversal section measurements.

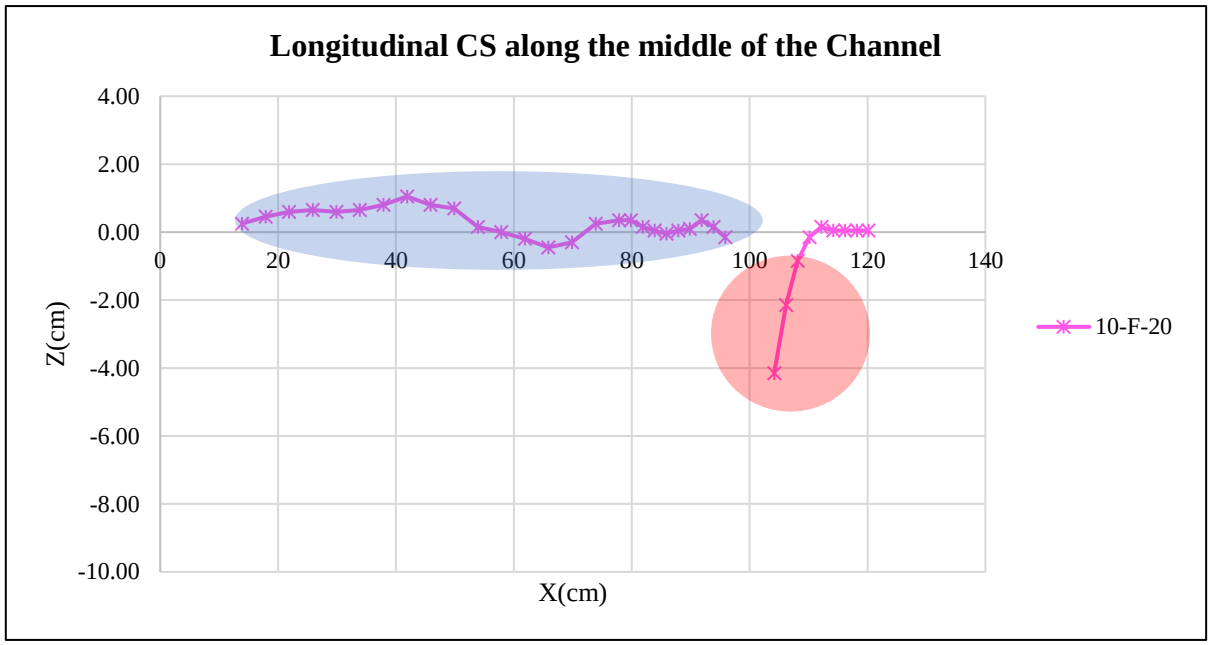


E19.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.7	0.25
79.7	17.85		26.9	0.45
83.7	21.85		27.05	0.60
87.7	25.85		27.1	0.65

91.7	29.85		27.05	0.60
95.7	33.85		27.1	0.65
99.7	37.85		27.25	0.80
3.7	41.85		27.5	1.05
7.7	45.85		27.25	0.80
11.7	49.85		27.15	0.70
15.7	53.85		26.6	0.15
19.7	57.85		26.45	0.00
23.7	61.85		26.25	-0.20
27.7	65.85		26	-0.45
31.7	69.85		26.15	-0.30
35.7	73.85		26.7	0.25
39.7	77.85		26.8	0.35
41.7	79.85		26.8	0.35
43.7	81.85		26.6	0.15
45.7	83.85		26.5	0.05
47.7	85.85		26.4	-0.05
49.7	87.85		26.5	0.05
51.7	89.85		26.55	0.10
53.7	91.85		26.8	0.35
55.7	93.85		26.6	0.15
57.7	95.85		26.3	-0.15
61.85	100		The Middle of the Pier	
66	104.15		22.3	-4.15
68	106.15		24.3	-2.15
70	108.15		25.6	-0.85
72	110.15		26.3	-0.15
74	112.15		26.6	0.15
76	114.15		26.5	0.05
78	116.15		26.5	0.05
80	118.15		26.5	0.05
82	120.15		26.5	0.05

E19.9. Recorded surveyed longitudinal section measurements.



E19.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream of the pier, the blue oval represents the cyclical pattern of sediment scouring and sediment accumulation along the channel of the flume.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-11.24	0.00	18.71	-105.13
2	0.00	5.57	9.29	25.89
3	5.57	7.01	24.00	150.96
4	7.01	0.60	13.00	49.43
5	0.60	10.45	6.70	37.02
6	10.45	45.75	4.15	116.62
7	45.75	39.99	4.15	177.91
8	39.99	2.28	5.00	105.68
9	2.28	0.29	5.00	6.44
10	0.29	0.00	3.66	0.54
11	0.00	-0.51	6.34	-1.62
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
563.73	670.47	-106.74	274.78	288.95

E19.11. Calculated volume.

Experiment 20 (10-F-10)

10*10 (10mm)		
Anchorage	**Position**	**Nails number**
	Along the length	-
	Along the width	-
	Around pier	4

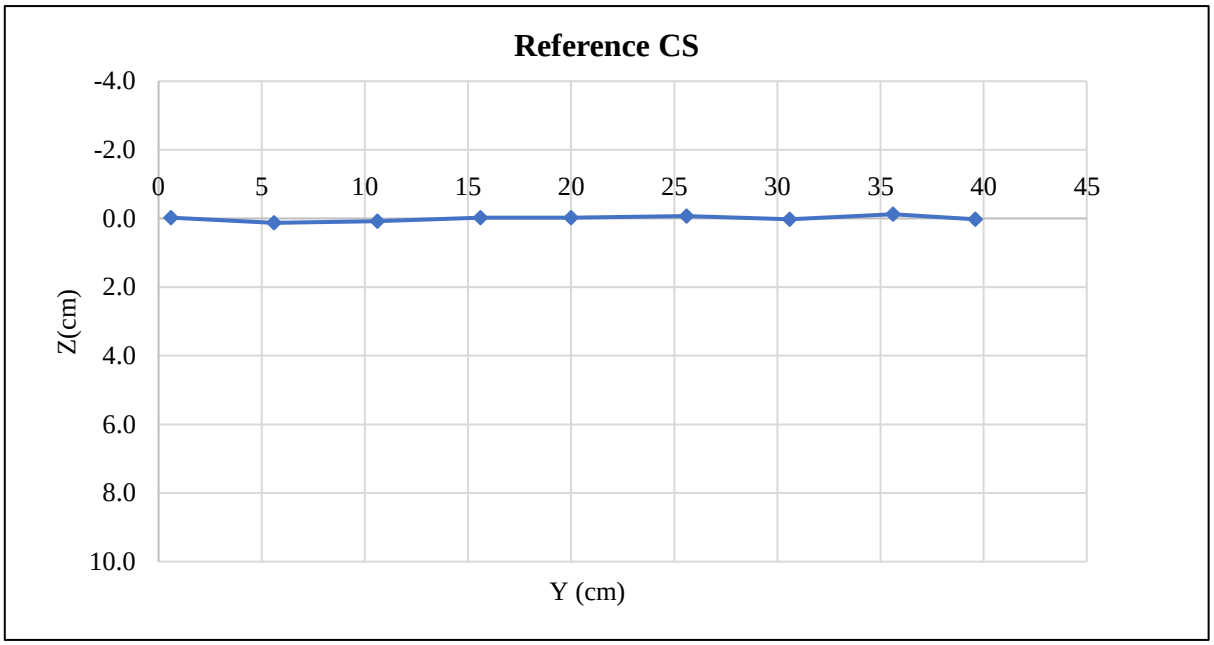
E20.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.104	7.067	7.022	7.079	7.085	7.129	7.065	7.136	7.060	7.128	7.119	7.128	7.197	7.123
	7.119	7.003	7.058	7.285	7.053	7.123	7.152	7.101	7.046	7.197	7.113	7.219	7.050	7.090
	7.161	7.045	7.118	7.187	7.129	7.135	7.032	7.028	7.069	7.144	7.066	7.116	7.108	7.243
	7.245	7.161	7.041	7.152	7.056	7.215	7.125	7.098	7.047	7.164	7.219	7.059	7.122	7.008
	7.181	7.008	7.158	7.148	7.167	7.149	7.177	6.919	7.113	7.153	7.207	7.133	7.102	7.098
	7.242	7.006	7.098	7.268	7.021	7.104	7.145	7.116	7.126	7.126	7.185	7.071	7.116	7.234
	7.343	7.121	7.054	7.199	7.214	7.003	7.110	7.159	7.109	7.108	7.088	7.132	7.201	7.007
	7.067	7.111	7.076	7.004	7.181	7.134	7.014	7.004	7.128	7.094	7.177	7.197	7.081	6.999
	7.023	7.128	7.159	7.004	7.089	7.121	7.156	7.198	7.038	7.142	7.237	7.000	7.126	6.987
	7.075	7.158	7.216	7.067	7.133	6.970	7.174	7.018	7.145	7.146	7.185	7.152	7.247	7.211
Average	7.156	7.081	7.100	7.139	7.113	7.108	7.115	7.078	7.088	7.140	7.160	7.121	7.135	7.100
Ratio	0.987	0.977	0.979	0.985	0.981	0.980	0.981	0.976	0.978	0.985	0.988	0.982	0.984	0.979

E20.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.0
	14	5.6	26.35	0.1
	19	10.6	26.4	0.1
	24	15.6	26.5	0.0
	28.4	20	26.5	0.0
	34	25.6	26.55	-0.1
	39	30.6	26.45	0.0
	44	35.6	26.6	-0.1
	48	39.6	26.45	0.0
		Average (Reference Elevation)	26.48	

E20.3. Calculated Reference Elevation.

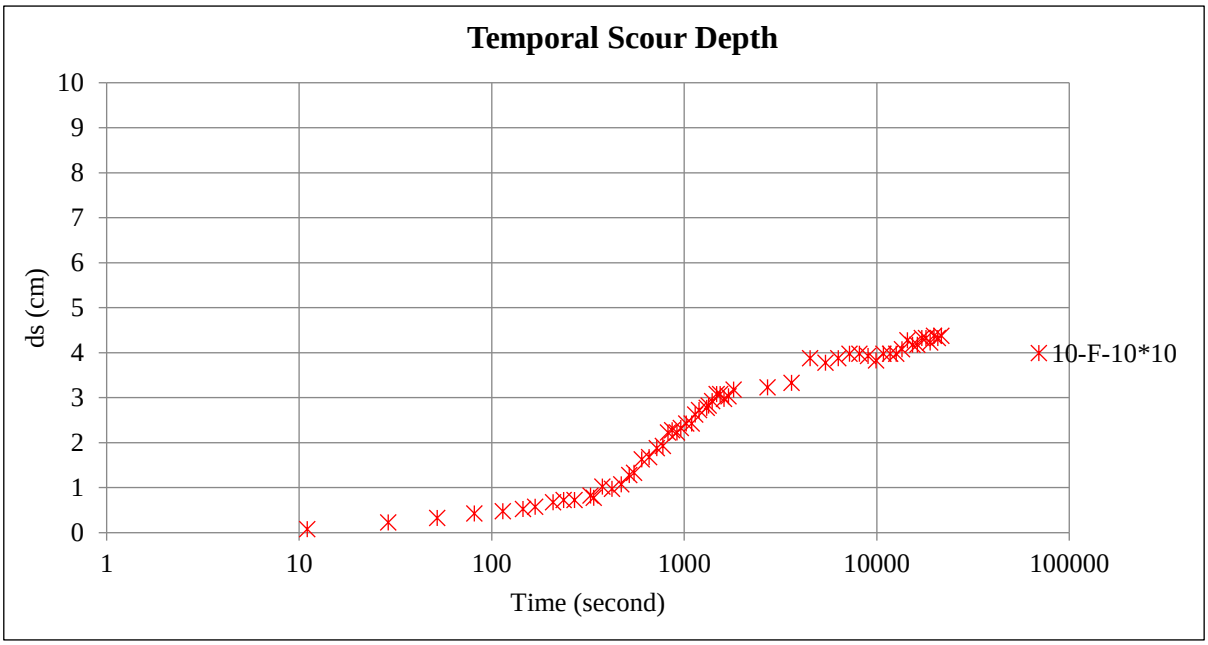


E20.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.48
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	11	11	26.4	0.08
0	0	29	29	26.25	0.23
0	0	52	52	26.15	0.33
0	1	21	81	26.05	0.43
0	1	54	114	26	0.48
0	2	25	145	25.95	0.53
0	2	48	168	25.9	0.58
0	3	28	208	25.8	0.68
0	3	56	236	25.75	0.73
0	4	29	269	25.75	0.73
0	5	25	325	25.65	0.83
0	5	38	338	25.7	0.78
0	6	15	375	25.45	1.03
0	7	0	420	25.5	0.98
0	7	51	471	25.4	1.08
0	8	37	517	25.2	1.28
0	9	8	548	25.15	1.33
0	10	0	600	24.85	1.63
0	10	57	657	24.8	1.68
0	12	0	720	24.6	1.88
0	12	54	774	24.55	1.93
0	13	41	821	24.25	2.23
0	14	23	863	24.2	2.28
0	15	16	916	24.25	2.23
0	15	57	957	24.15	2.33
0	17	4	1024	24.05	2.43

0	18	12	1092	24.05	2.43
0	18	57	1137	23.85	2.63
0	19	50	1190	23.75	2.73
0	21	0	1308	23.7	2.78
0	22	48	1336	23.65	2.83
0	23	16	1392	23.55	2.93
0	24	12	1474	23.4	3.08
0	25	34	1534	23.4	3.08
0	26	46	1606	23.5	2.98
0	28	16	1696	23.45	3.03
0	30	0	1800	23.3	3.18
0	45	0	2700	23.25	3.23
1	0	0	3600	23.15	3.33
1	15	0	4500	22.6	3.88
1	30	0	5400	22.7	3.78
1	45	0	6300	22.6	3.88
2	0	0	7200	22.5	3.98
2	15	0	8100	22.5	3.98
2	30	0	9000	22.55	3.93
2	45	0	9900	22.65	3.83
3	0	0	10800	22.5	3.98
3	15	0	11700	22.5	3.98
3	30	0	12600	22.5	3.98
3	45	0	13500	22.4	4.08
4	0	0	14400	22.2	4.28
4	15	0	15300	22.3	4.18
4	30	0	16200	22.3	4.18
4	45	0	17100	22.15	4.33
5	0	0	18000	22.15	4.33
5	15	0	18900	22.25	4.23
5	30	0	19800	22.1	4.38
5	45	0	20700	22.15	4.33
6	0	0	21600	22.1	4.38

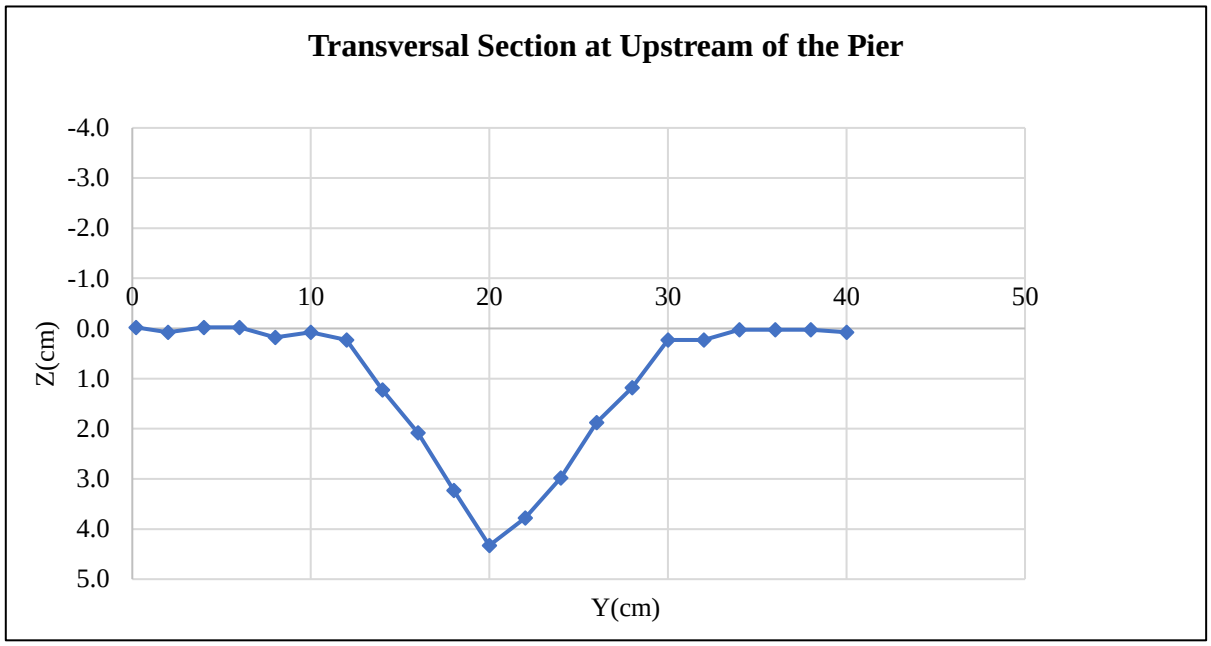
E20.5. Temporal Scour Depth measurements.



E20.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.5	0.0
	10.4	2	26.4	0.1
	12.4	4	26.5	0.0
	14.4	6	26.5	0.0
	16.4	8	26.3	0.2
	18.4	10	26.4	0.1
	20.4	12	26.25	0.2
	22.4	14	25.25	1.2
	24.4	16	24.4	2.1
	26.4	18	23.25	3.2
104.15	28.4	20	22.15	4.3
	30.4	22	22.7	3.8
	32.4	24	23.5	3.0
	34.4	26	24.6	1.9
	36.4	28	25.3	1.2
	38.4	30	26.25	0.2
	40.4	32	26.25	0.2
	42.4	34	26.45	0.0
	44.4	36	26.45	0.0
	46.4	38	26.45	0.0
	48.4	40	26.4	0.1

E20.7. Visual representation of the temporal scour depth. Recorded surveyed transversal section measurements.

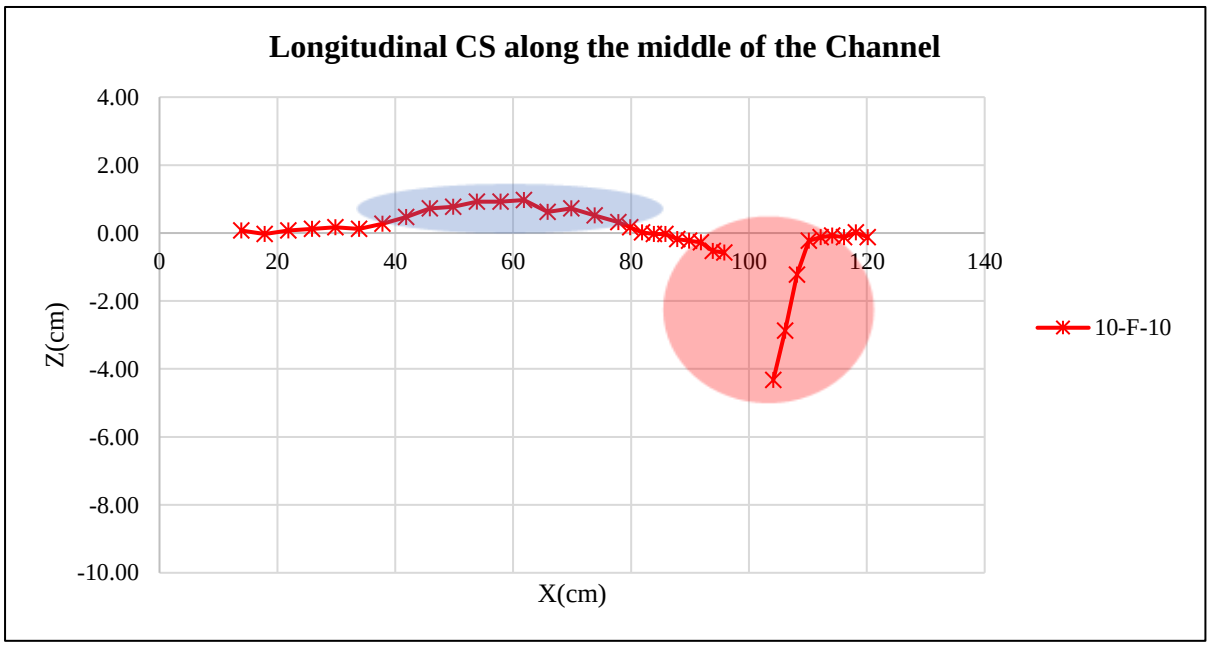


E20.8. Visual representation of the temporal scour depth. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		26.55	0.07
79.7	17.85		26.45	-0.03
83.7	21.85		26.55	0.07
87.7	25.85		26.6	0.12
91.7	29.85		26.65	0.17
95.7	33.85		26.6	0.12
99.7	37.85		26.75	0.27
3.7	41.85		26.95	0.47
7.7	45.85		27.2	0.72
11.7	49.85		27.25	0.77
15.7	53.85		27.4	0.92
19.7	57.85		27.4	0.92
23.7	61.85		27.45	0.97
27.7	65.85	28.4	27.1	0.62
31.7	69.85		27.2	0.72
35.7	73.85		27	0.52
39.7	77.85		26.8	0.32
41.7	79.85		26.65	0.17
43.7	81.85		26.5	0.02
45.7	83.85		26.45	-0.03
47.7	85.85		26.45	-0.03
49.7	87.85		26.3	-0.18
51.7	89.85		26.25	-0.23
53.7	91.85		26.2	-0.28
55.7	93.85		25.95	-0.53
57.7	95.85		25.9	-0.58
61.85	100		The Middle of the Pier	

66	104.15		22.15	-4.33
68	106.15		23.6	-2.88
70	108.15		25.25	-1.23
72	110.15		26.25	-0.23
74	112.15		26.35	-0.13
76	114.15		26.4	-0.08
78	116.15		26.35	-0.13
80	118.15		26.5	0.02
82	120.15		26.35	-0.13

E20.9. Visual representation of the temporal scour depth. Recorded surveyed longitudinal section measurements.



E20.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the blue oval represents the sediment accumulation along the channel of the flume.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-0.05	0.00	0.92	-0.02
2	0.00	1.38	27.08	18.74
3	1.38	0.00	3.81	2.64
4	0.00	-7.33	20.19	-73.93
5	-7.33	0.00	6.99	-25.61
6	0.00	6.29	6.01	18.89
7	6.29	27.14	6.70	111.99
8	27.14	49.95	4.15	159.96
9	49.95	43.51	4.15	193.92
10	43.51	4.92	5.00	121.05
11	4.92	2.01	5.00	17.30
12	2.01	0.99	10.00	14.98
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
559.91	659.48	-99.57	212.65	347.26

E20.11. Calculated volume.

Experiment 21 (10-F-25*80)

25*80 (10mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*9
	Along the width	2*3
	Around pier	4

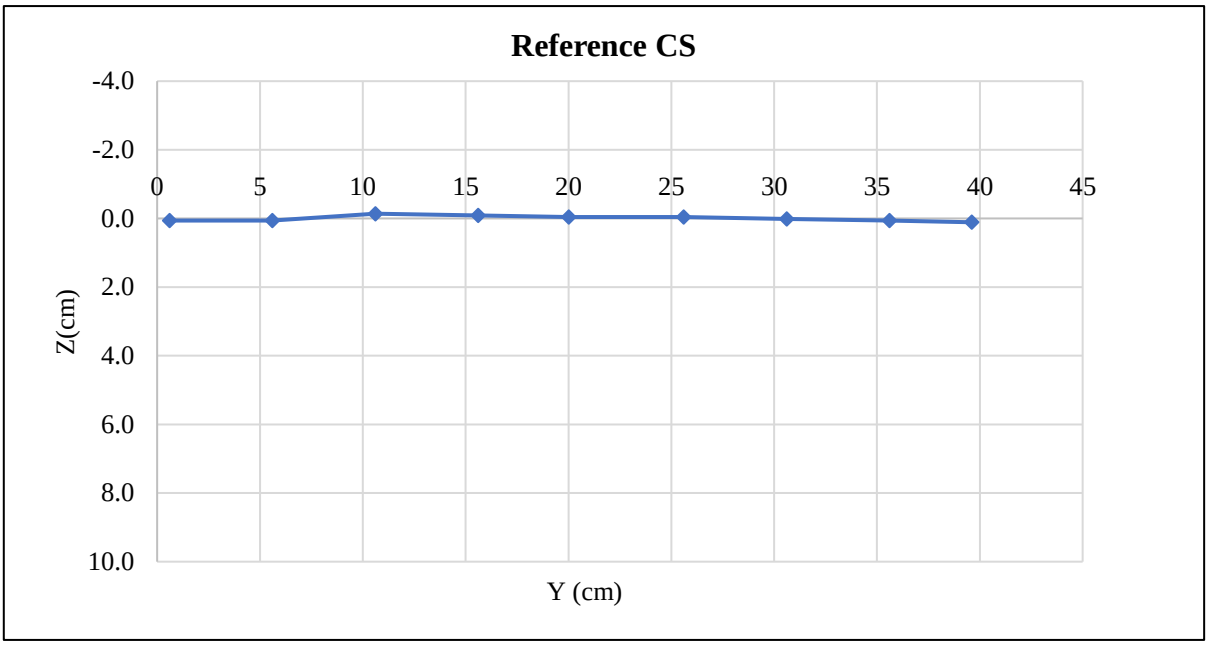
E21.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.133	7.105	7.228	7.056	7.025	7.117	7.168	7.165	7.096	7.096	7.111	7.143	7.132	7.276
	7.283	7.035	7.202	7.185	7.084	7.141	7.158	7.035	7.116	7.118	7.171	7.195	7.179	7.233
	7.217	6.998	7.117	7.125	7.024	7.097	7.104	7.023	7.117	7.183	7.215	7.047	7.143	7.286
	7.254	7.006	7.113	7.066	7.094	7.105	7.095	7.046	7.140	7.158	7.175	7.057	7.156	7.322
	7.163	7.084	7.590	7.005	7.115	7.068	7.131	7.177	7.152	7.132	7.120	7.024	7.179	7.299
	7.245	7.238	7.177	7.122	7.168	7.076	7.088	7.155	7.139	7.079	7.202	7.237	7.256	7.358
	7.188	7.233	7.232	7.173	7.229	7.027	7.112	7.095	7.213	7.097	7.241	7.216	7.132	7.231
	7.298	7.154	7.164	7.047	7.096	7.159	7.108	7.155	7.244	7.188	7.089	7.114	7.141	7.220
	7.245	7.171	7.046	7.079	7.084	7.148	7.073	7.161	7.025	7.125	7.235	7.089	7.064	7.299
	7.175	7.096	7.096	7.121	7.120	7.127	7.122	7.094	7.139	7.138	7.129	7.177	7.110	7.246
Average	7.220	7.112	7.197	7.098	7.104	7.107	7.116	7.111	7.138	7.131	7.169	7.130	7.149	7.277
Ratio	0.996	0.981	0.993	0.979	0.980	0.980	0.982	0.981	0.985	0.984	0.989	0.983	0.986	1.004

E21.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.5	0.1
	14	5.6	26.5	0.1
	19	10.6	26.7	-0.1
	24	15.6	26.65	-0.1
	28.4	20	26.6	0.0
	34	25.6	26.6	0.0
	39	30.6	26.55	0.0
	44	35.6	26.5	0.1
	48	39.6	26.45	0.1
		Average (Reference Elevation)	26.56	

E21.3. Calculated Reference Elevation.

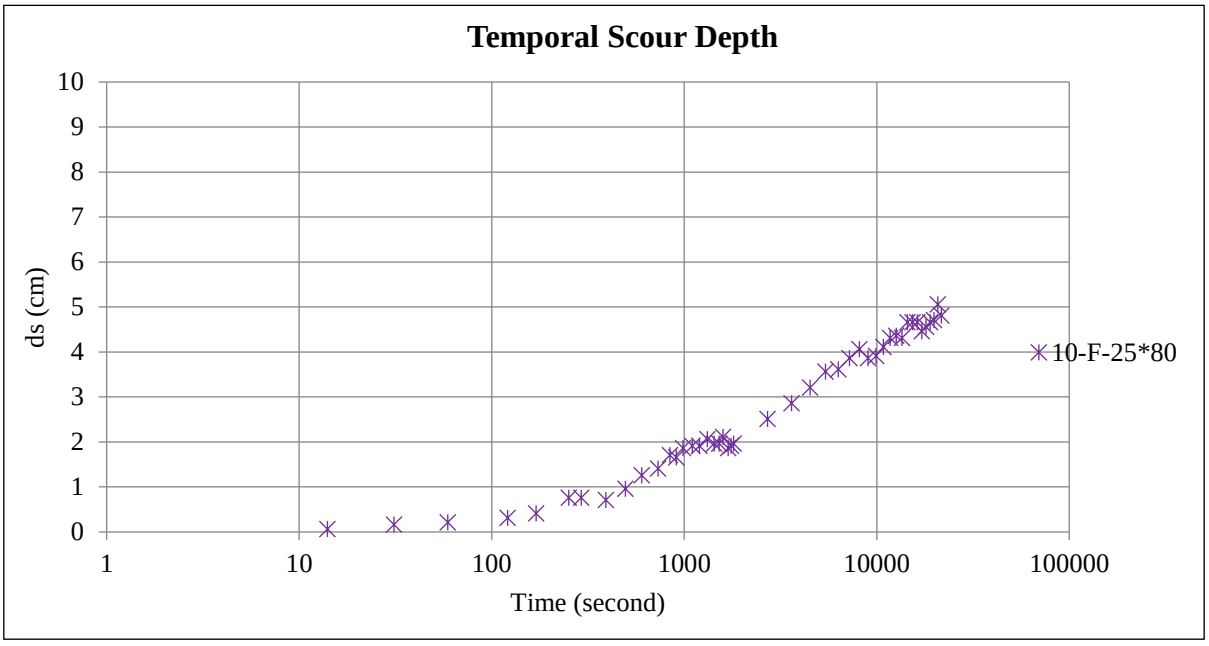


E21.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.56
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	14	14	26.5	0.06
0	0	31	31	26.4	0.16
0	0	59	59	26.35	0.21
0	2	1	121	26.25	0.31
0	2	50	170	26.15	0.41
0	4	11	251	25.8	0.76
0	4	51	291	25.8	0.76
0	6	31	391	25.85	0.71
0	8	14	494	25.6	0.96
0	10	0	600	25.3	1.26
0	12	10	730	25.15	1.41
0	14	0	840	24.85	1.71
0	15	9	909	24.9	1.66
0	16	25	985	24.7	1.86
0	18	21	1101	24.65	1.91
0	19	55	1195	24.65	1.91
0	21	58	1318	24.5	2.06
0	23	47	1427	24.6	1.96
0	25	20	1520	24.6	1.96
0	26	29	1589	24.45	2.11
0	28	7	1687	24.7	1.86
0	29	5	1745	24.65	1.91
0	30	0	1800	24.6	1.96
0	45	0	2700	24.05	2.51
1	0	0	3600	23.7	2.86
1	15	0	4500	23.35	3.21

1	30	0	5400	23	3.56
1	45	0	6300	22.95	3.61
2	0	0	7200	22.7	3.86
2	15	0	8100	22.5	4.06
2	30	0	9000	22.7	3.86
2	45	0	9900	22.65	3.91
3	0	0	10800	22.45	4.11
3	15	0	11700	22.25	4.31
3	30	0	12600	22.2	4.36
3	45	0	13500	22.25	4.31
4	0	0	14400	21.9	4.66
4	15	0	15300	21.9	4.66
4	30	0	16200	21.9	4.66
4	45	0	17100	22.1	4.46
5	0	0	18000	22	4.56
5	15	0	18900	21.9	4.66
5	30	0	19800	21.85	4.71
5	45	0	20700	21.5	5.06
6	0	0	21600	21.75	4.81

E21.5. Temporal Scour Depth measurements.

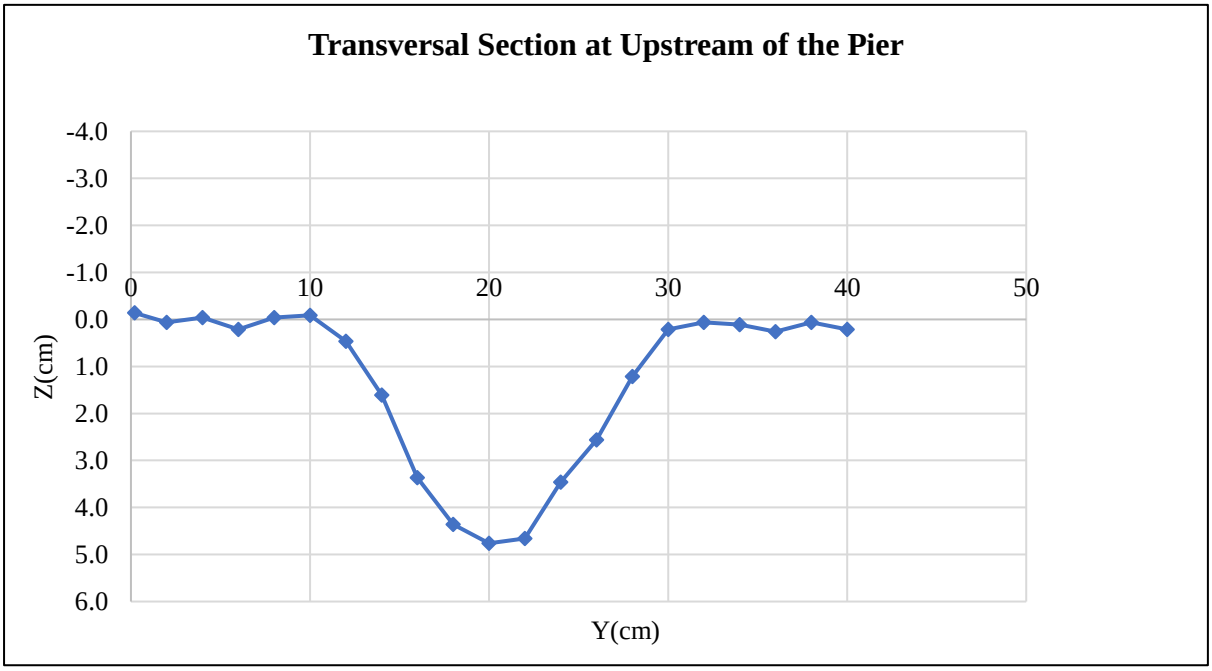


E21.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.7	-0.1
	10.4	2	26.5	0.1
	12.4	4	26.6	0.0
	14.4	6	26.35	0.2
	16.4	8	26.6	0.0
	18.4	10	26.65	-0.1
	20.4	12	26.1	0.5

	22.4	14	24.95	1.6
	24.4	16	23.2	3.4
	26.4	18	22.2	4.4
	28.4	20	21.8	4.8
	30.4	22	21.9	4.7
	32.4	24	23.1	3.5
	34.4	26	24	2.6
	36.4	28	25.35	1.2
	38.4	30	26.35	0.2
	40.4	32	26.5	0.1
	42.4	34	26.45	0.1
	44.4	36	26.3	0.3
	46.4	38	26.5	0.1
	48.4	40	26.35	0.2

E21.7. Recorded surveyed transversal section measurements.

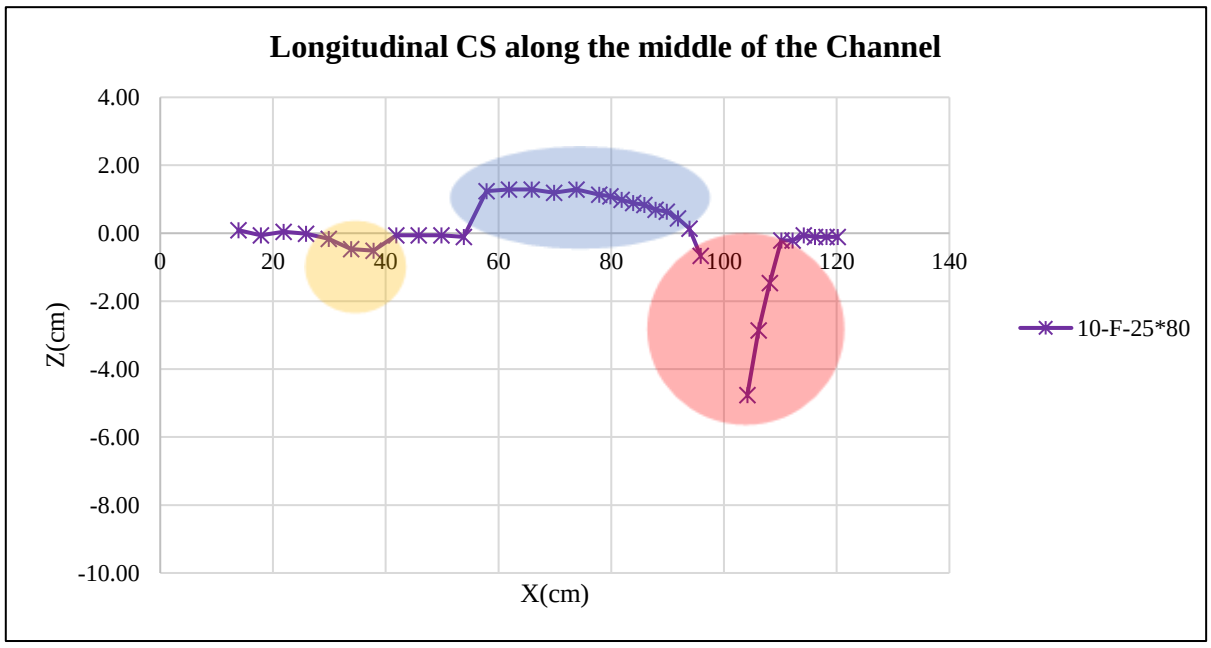


E21.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.65	0.09
79.7	17.85		26.5	-0.06
83.7	21.85		26.6	0.04
87.7	25.85		26.55	-0.01
91.7	29.85		26.4	-0.16
95.7	33.85		26.1	-0.46
99.7	37.85		26.05	-0.51
3.7	41.85		26.5	-0.06
7.7	45.85		26.5	-0.06
11.7	49.85		26.5	-0.06
15.7	53.85		26.45	-0.11
19.7	57.85		27.8	1.24

23.7	61.85		27.85	1.29
27.7	65.85		27.85	1.29
31.7	69.85		27.75	1.19
35.7	73.85		27.85	1.29
39.7	77.85		27.7	1.14
41.7	79.85		27.65	1.09
43.7	81.85		27.55	0.99
45.7	83.85		27.45	0.89
47.7	85.85		27.4	0.84
49.7	87.85		27.25	0.69
51.7	89.85		27.2	0.64
53.7	91.85		27	0.44
55.7	93.85		26.7	0.14
57.7	95.85		25.9	-0.66
61.85	100		The Middle of the Pier	
66	104.15		21.8	-4.76
68	106.15		23.7	-2.86
70	108.15		25.1	-1.46
72	110.15		26.35	-0.21
74	112.15		26.35	-0.21
76	114.15		26.5	-0.06
78	116.15		26.45	-0.11
80	118.15		26.45	-0.11
82	120.15		26.45	-0.11

E21.9. Recorded surveyed longitudinal section measurements.



E21.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue oval represents the sediment accumulation along the channel of the flume, the yellow circle indicates a slight scouring after the net in the downstream.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	5.41	6.50	28.00	166.69
2	6.50	0.00	7.10	23.04
3	0.00	-15.48	16.90	-130.80
4	-15.48	-8.78	13.00	-157.64
5	-8.78	0.00	1.97	-8.65
6	0.00	21.05	4.73	49.77
7	21.05	60.75	4.15	169.74
8	60.75	54.60	4.15	239.36
9	54.60	10.33	5.00	162.32
10	10.33	5.00	5.00	38.32
11	5.00	6.29	10.00	56.45
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
608.62	905.71	-297.09	112.16	496.45

E21.11. Calculated volume.

Experiment 22 (10-F-25*60)

25*60 (10mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*7
	Along the width	2*3
	Around pier	4

E22.1. Anchorage characteristics, including nail's position and quantity.

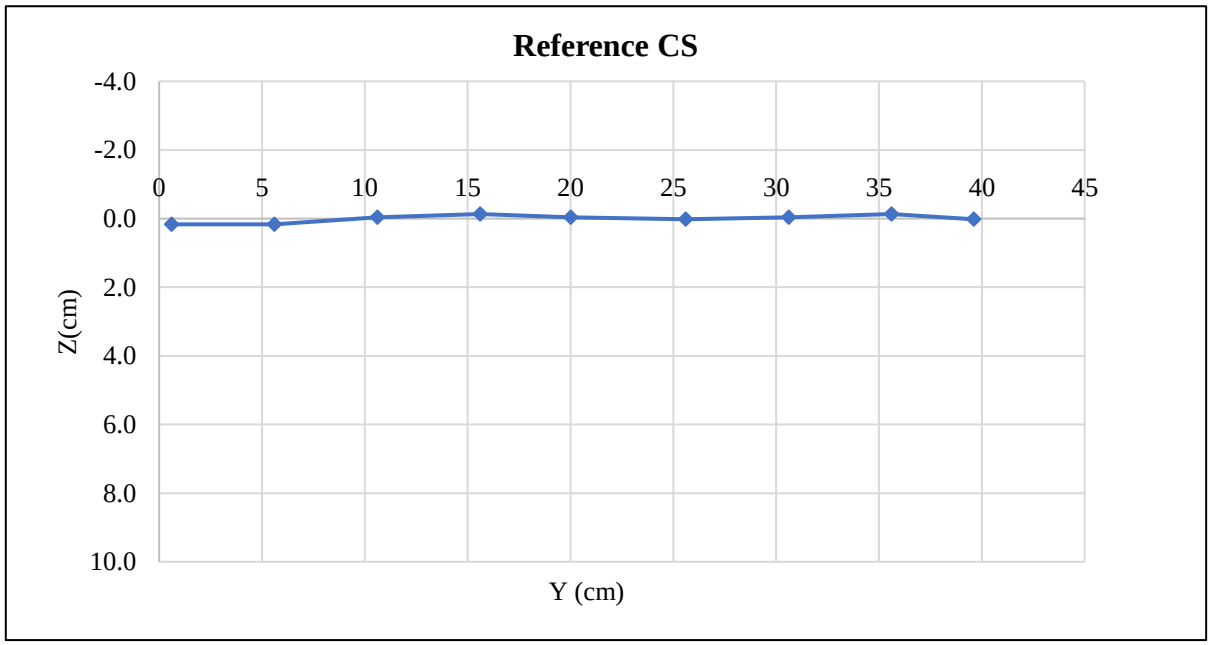
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.147	7.093	7.140	7.022	7.127	7.094	7.025	7.089	7.245	7.176	7.181	7.184	7.150	7.063
	7.165	7.024	7.069	7.054	7.220	7.153	7.049	7.142	6.987	7.138	7.117	7.020	7.056	7.093
	7.307	7.026	7.114	7.039	7.119	7.050	7.112	6.933	6.988	7.136	7.154	7.000	7.140	7.138
	7.290	7.048	7.079	7.087	7.011	7.144	7.123	7.128	7.095	7.148	7.149	7.101	7.060	7.096
	7.336	7.047	7.065	7.039	7.139	7.028	7.028	7.205	7.131	7.167	7.049	7.175	7.048	7.075
	7.332	7.026	7.137	7.041	7.074	7.018	7.063	7.131	7.080	7.028	7.075	7.037	7.055	7.112
	7.357	7.047	7.159	7.069	7.111	7.127	7.115	7.077	7.054	7.059	7.112	7.036	7.160	7.273
	7.262	7.034	7.131	7.094	7.114	7.047	7.076	7.158	7.098	7.156	7.130	7.117	7.112	7.256
	7.032	6.989	7.071	7.121	7.187	7.132	7.045	7.049	7.016	7.072	7.114	7.005	7.178	7.199
	7.315	7.155	7.055	7.158	7.161	7.178	7.161	7.121	7.054	7.141	7.128	7.158	7.173	7.070
Average	7.254	7.049	7.102	7.072	7.126	7.097	7.080	7.103	7.075	7.122	7.121	7.083	7.113	7.138
Ratio	1.001	0.972	0.980	0.976	0.983	0.979	0.977	0.980	0.976	0.982	0.982	0.977	0.981	0.984

E22.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.2
	14	5.6	26.3	0.2
	19	10.6	26.5	0.0

	24	15.6	26.6	-0.1
	28.4	20	26.5	0.0
	34	25.6	26.45	0.0
	39	30.6	26.5	0.0
	44	35.6	26.6	-0.1
	48	39.6	26.45	0.0
		Average (Reference Elevation)	26.47	

E22.3. Calculated Reference Elevation.

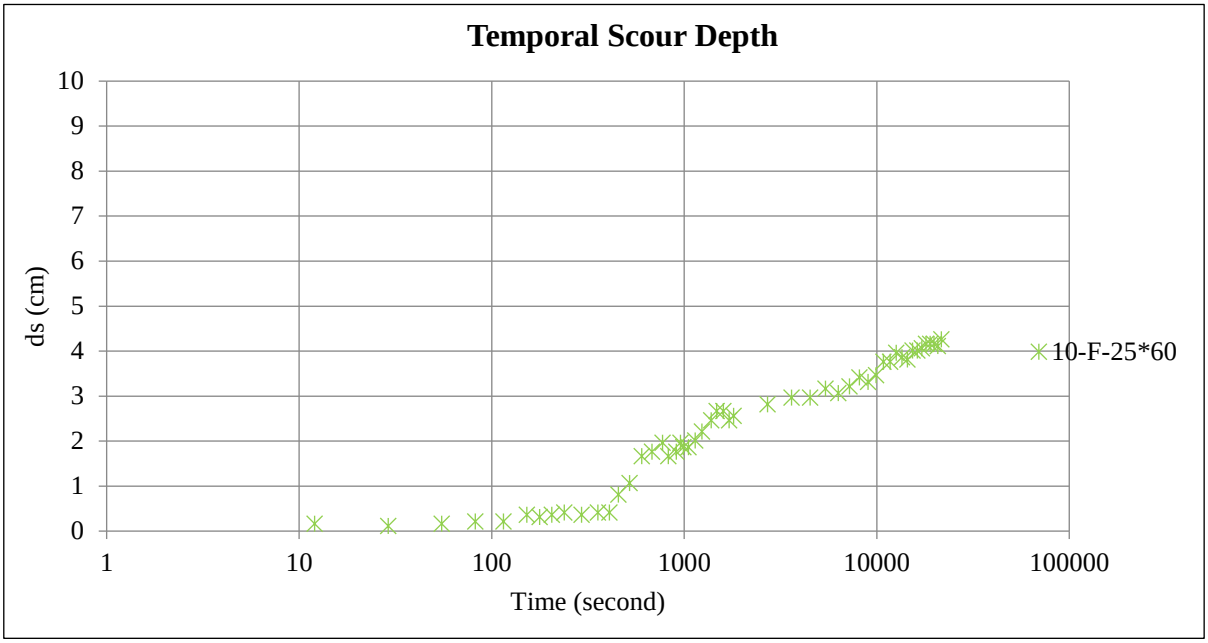


E22.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.47**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	12	12	26.3	0.17
0	0	29	29	26.35	0.12
0	0	55	55	26.3	0.17
0	1	22	82	26.25	0.22
0	1	55	115	26.25	0.22
0	2	32	152	26.1	0.37
0	2	57	177	26.15	0.32
0	3	25	205	26.1	0.37
0	3	58	238	26.05	0.42
0	4	53	293	26.1	0.37
0	5	56	356	26.05	0.42
0	6	48	408	26.05	0.42
0	7	34	454	25.65	0.82
0	8	40	520	25.4	1.07
0	10	0	600	24.8	1.67
0	11	19	679	24.7	1.77
0	12	49	769	24.5	1.97
0	13	47	827	24.8	1.67

0	15	7	907	24.7	1.77
0	15	54	954	24.5	1.97
0	16	29	989	24.6	1.87
0	17	31	1051	24.6	1.87
0	19	0	1140	24.45	2.02
0	20	34	1234	24.25	2.22
0	22	58	1378	24	2.47
0	24	32	1472	23.8	2.67
0	26	32	1592	23.8	2.67
0	28	30	1710	24	2.47
0	30	0	1800	23.9	2.57
0	45	0	2700	23.65	2.82
1	0	0	3600	23.5	2.97
1	15	0	4500	23.5	2.97
1	30	0	5400	23.3	3.17
1	45	0	6300	23.4	3.07
2	0	0	7200	23.25	3.22
2	15	0	8100	23.05	3.42
2	30	0	9000	23.15	3.32
2	45	0	9900	23	3.47
3	0	0	10800	22.7	3.77
3	15	0	11700	22.7	3.77
3	30	0	12600	22.5	3.97
3	45	0	13500	22.6	3.87
4	0	0	14400	22.65	3.82
4	15	0	15300	22.45	4.02
4	30	0	16200	22.45	4.02
4	45	0	17100	22.4	4.07
5	0	0	18000	22.3	4.17
5	15	0	18900	22.3	4.17
5	30	0	19800	22.3	4.17
5	45	0	20700	22.35	4.12
6	0	0	21600	22.2	4.27

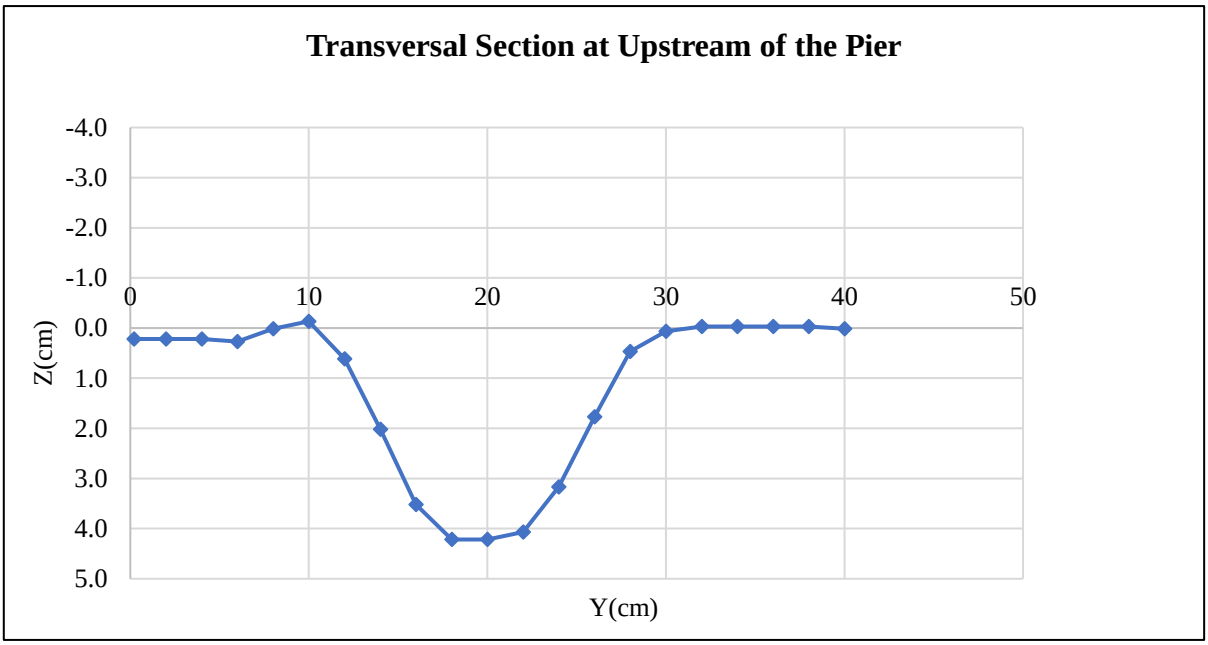
E22.5. Temporal Scour Depth measurements.



E22.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.25	0.2
	10.4	2	26.25	0.2
	12.4	4	26.25	0.2
	14.4	6	26.2	0.3
	16.4	8	26.45	0.0
	18.4	10	26.6	-0.1
	20.4	12	25.85	0.6
	22.4	14	24.45	2.0
	24.4	16	22.95	3.5
	26.4	18	22.25	4.2
104.15	28.4	20	22.25	4.2
	30.4	22	22.4	4.1
	32.4	24	23.3	3.2
	34.4	26	24.7	1.8
	36.4	28	26	0.5
	38.4	30	26.4	0.1
	40.4	32	26.5	0.0
	42.4	34	26.5	0.0
	44.4	36	26.5	0.0
	46.4	38	26.5	0.0
	48.4	40	26.45	0.0

E22.7. Recorded surveyed transversal section measurements.

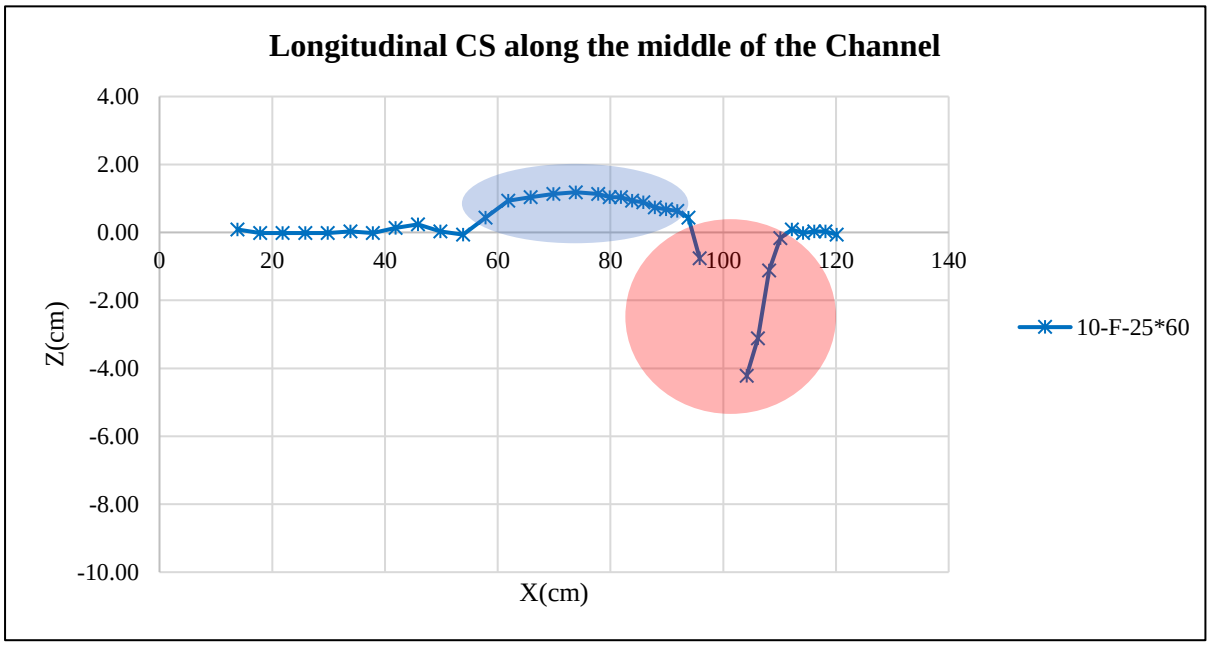


E22.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.55	0.08
79.7	17.85		26.45	-0.02
83.7	21.85		26.45	-0.02
87.7	25.85		26.45	-0.02
91.7	29.85		26.45	-0.02
95.7	33.85		26.5	0.03
99.7	37.85		26.45	-0.02
3.7	41.85		26.6	0.13
7.7	45.85		26.7	0.23
11.7	49.85		26.5	0.03
15.7	53.85		26.4	-0.07
19.7	57.85		26.9	0.43
23.7	61.85		27.4	0.93
27.7	65.85		27.5	1.03
31.7	69.85		27.6	1.13
35.7	73.85		27.65	1.18
39.7	77.85		27.6	1.13
41.7	79.85		27.5	1.03
43.7	81.85		27.5	1.03
45.7	83.85		27.4	0.93
47.7	85.85		27.35	0.88
49.7	87.85		27.2	0.73
51.7	89.85		27.15	0.68
53.7	91.85		27.1	0.63
55.7	93.85		26.9	0.43
57.7	95.85		25.7	-0.77
61.85	100		The Middle of the Pier	
66	104.15		22.25	-4.22

68	106.15		23.35	-3.12
70	108.15		25.35	-1.12
72	110.15		26.3	-0.17
74	112.15		26.55	0.08
76	114.15		26.45	-0.02
78	116.15		26.5	0.03
80	118.15		26.5	0.03
82	120.15		26.4	-0.07

E22.9. Recorded surveyed longitudinal section measurements.



E22.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring around the pier, the blue oval represents sediment accumulation along the channel of the flume downstream.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	0.20	9.28	28.00	132.72
2	9.28	0.00	9.44	43.83
3	0.00	-14.31	14.56	-104.15
4	-14.31	-8.22	13.00	-146.46
5	-8.22	0.00	2.57	-10.56
6	0.00	13.23	4.13	27.33
7	13.23	48.26	4.15	127.60
8	48.26	49.32	4.15	202.49
9	49.32	1.27	5.00	126.48
10	1.27	0.00	2.44	1.55
11	0.00	-1.33	2.56	-1.70
12	-1.33	0.00	7.60	-5.04
13	0.00	0.42	2.40	0.50
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
394.60	662.50	-267.90	70.31	324.28

E22.11. Calculated volume.

Experiment 23 (7-F-40)

40*40 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*5
	Along the width	2*5
	Around pier	4

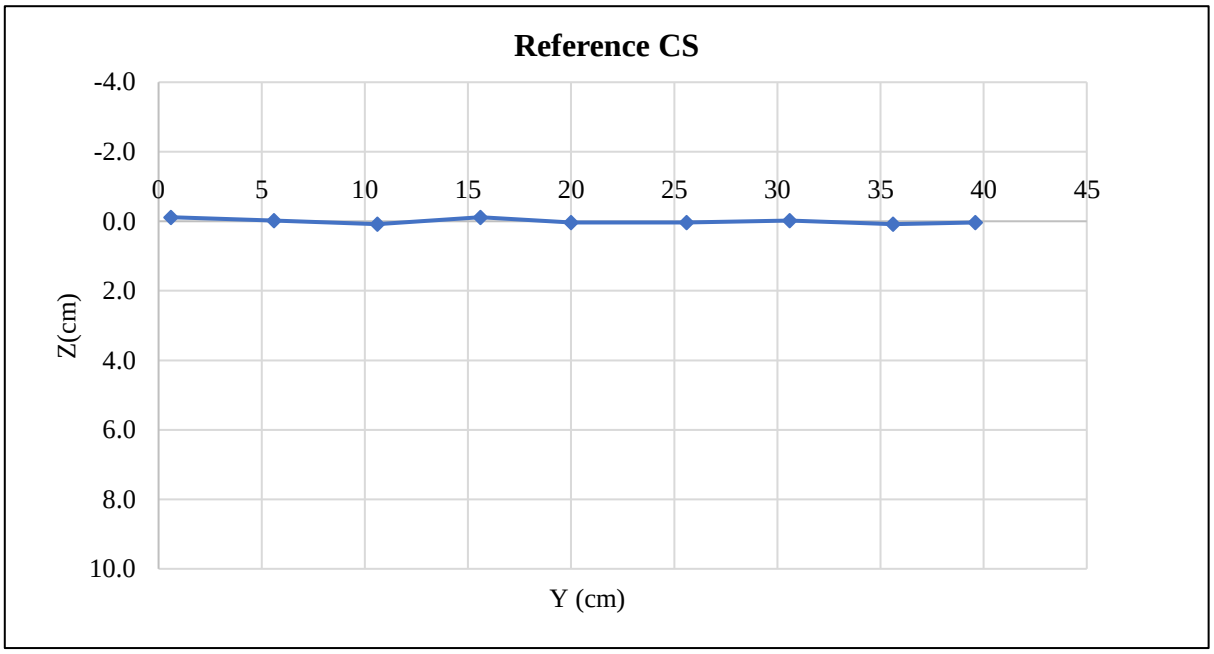
E23.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.190	7.222	7.196	7.153	7.171	7.052	7.202	7.120	7.112	6.980	7.267	7.217	7.318	7.277
	7.186	7.256	7.188	7.144	7.218	7.063	7.318	7.192	7.117	6.933	7.336	7.396	7.339	7.300
	7.146	7.356	7.160	7.077	7.217	7.131	7.136	7.193	7.083	7.163	7.430	7.270	7.228	7.217
	7.172	7.108	7.117	7.194	7.141	7.146	7.164	7.223	7.059	7.078	7.352	7.302	7.376	7.340
	7.155	7.143	7.296	7.222	7.189	7.180	7.187	7.286	7.250	7.359	7.230	7.438	7.276	7.213
	7.125	7.261	7.265	7.157	7.279	7.153	7.186	7.206	7.188	7.340	7.347	7.302	7.247	7.276
	7.115	7.294	7.197	7.168	7.220	7.135	7.174	7.239	7.211	7.211	7.410	7.411	7.367	7.318
	7.033	7.312	7.182	7.277	7.109	7.249	7.024	7.178	7.288	7.219	7.344	7.202	7.418	7.335
	7.003	7.245	7.237	7.287	7.034	7.311	7.217	7.083	7.206	7.373	7.247	7.329	7.369	7.257
	7.065	7.265	7.218	7.196	7.128	7.036	7.088	7.195	7.177	7.273	7.251	7.253	7.397	7.333
Average	7.119	7.246	7.206	7.188	7.171	7.146	7.170	7.192	7.169	7.193	7.321	7.312	7.334	7.287
Ratio	0.982	0.999	0.994	0.991	0.989	0.986	0.989	0.992	0.989	0.992	1.010	1.009	1.012	1.005

E23.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.6	-0.1
	14	5.6	26.5	0.0
	19	10.6	26.4	0.1
	24	15.6	26.6	-0.1
	28.4	20	26.45	0.0
	34	25.6	26.45	0.0
	39	30.6	26.5	0.0
	44	35.6	26.4	0.1
	48	39.6	26.45	0.0
		Average (Reference Elevation)	26.48	

E23.3. Calculated Reference Elevation.

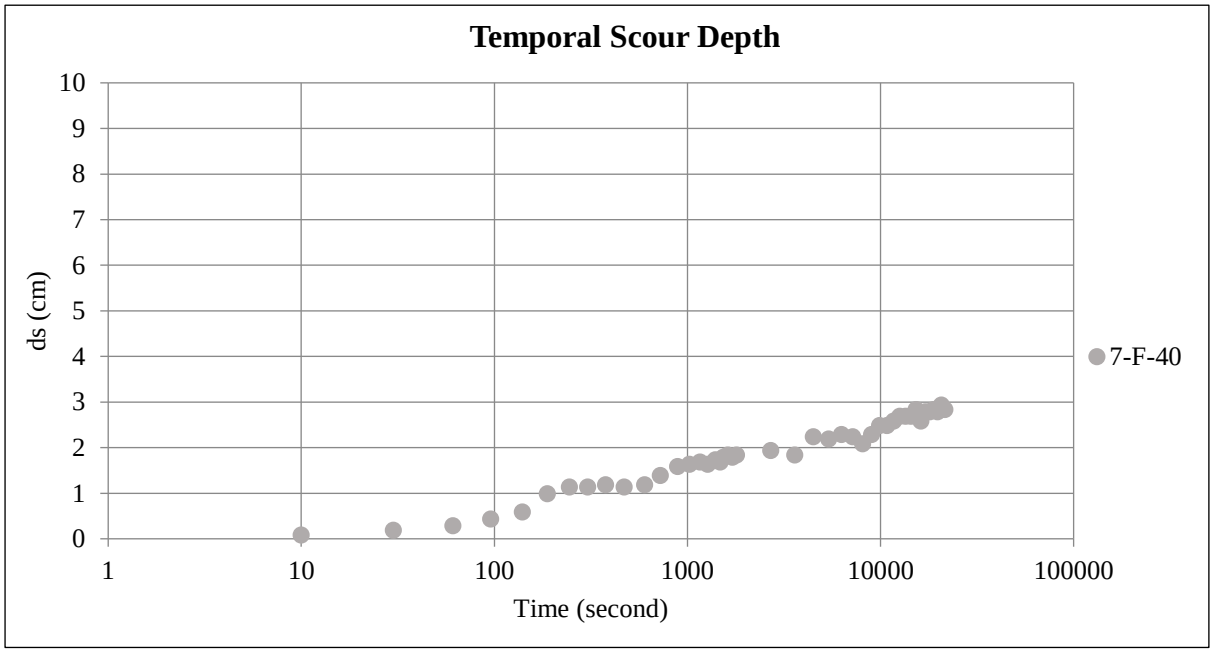


E23.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.48
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	10	10	26.4	0.08
0	0	30	30	26.3	0.18
0	1	1	61	26.2	0.28
0	1	36	96	26.05	0.43
0	2	20	140	25.9	0.58
0	3	8	188	25.5	0.98
0	4	5	245	25.35	1.13
0	5	5	305	25.35	1.13
0	6	18	378	25.3	1.18
0	7	50	470	25.35	1.13
0	10	0	600	25.3	1.18
0	12	5	725	25.1	1.38
0	14	49	889	24.9	1.58
0	17	4	1024	24.85	1.63
0	19	22	1162	24.8	1.68
0	21	13	1273	24.85	1.63
0	23	20	1400	24.75	1.73
0	24	40	1480	24.8	1.68
0	25	37	1537	24.7	1.78
0	26	59	1619	24.65	1.83
0	28	28	1708	24.7	1.78
0	30	0	1800	24.65	1.83
0	45	0	2700	24.55	1.93
1	0	0	3600	24.65	1.83
1	15	0	4500	24.25	2.23
1	30	0	5400	24.3	2.18

1	45	0	6300	24.2	2.28
2	0	0	7200	24.25	2.23
2	15	0	8100	24.4	2.08
2	30	0	9000	24.2	2.28
2	45	0	9900	24	2.48
3	0	0	10800	24	2.48
3	15	0	11700	23.9	2.58
3	30	0	12600	23.8	2.68
3	45	0	13500	23.8	2.68
4	0	0	14400	23.8	2.68
4	15	0	15300	23.65	2.83
4	30	0	16200	23.9	2.58
4	45	0	17100	23.7	2.78
5	0	0	18000	23.7	2.78
5	15	0	18900	23.65	2.83
5	30	0	19800	23.7	2.78
5	45	0	20700	23.55	2.93
6	0	0	21600	23.65	2.83

E23.5. Temporal Scour Depth measurements.

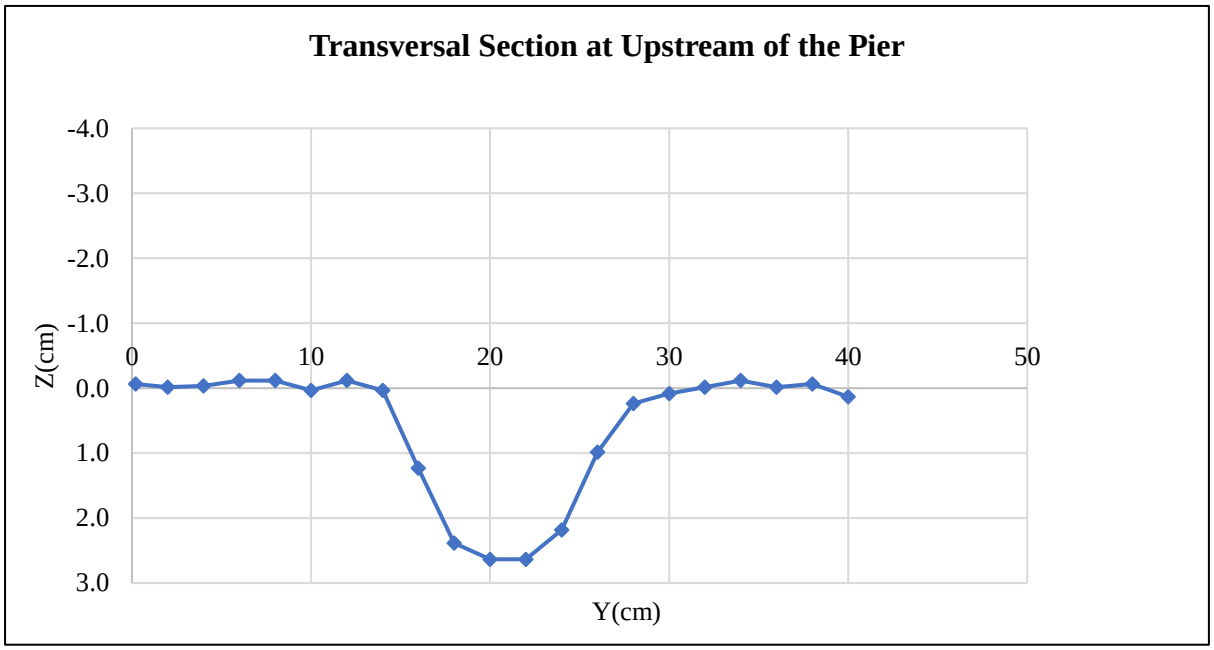


E23.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.55	-0.1
	10.4	2	26.5	0.0
	12.4	4	26.52	0.0
	14.4	6	26.6	-0.1
	16.4	8	26.6	-0.1
	18.4	10	26.45	0.0
	20.4	12	26.6	-0.1
	22.4	14	26.45	0.0

	24.4	16	25.25	1.2
	26.4	18	24.1	2.4
	28.4	20	23.85	2.6
	30.4	22	23.85	2.6
	32.4	24	24.3	2.2
	34.4	26	25.5	1.0
	36.4	28	26.25	0.2
	38.4	30	26.4	0.1
	40.4	32	26.5	0.0
	42.4	34	26.6	-0.1
	44.4	36	26.5	0.0
	46.4	38	26.55	-0.1
	48.4	40	26.35	0.1

E23.7. Recorded surveyed transversal section measurements.

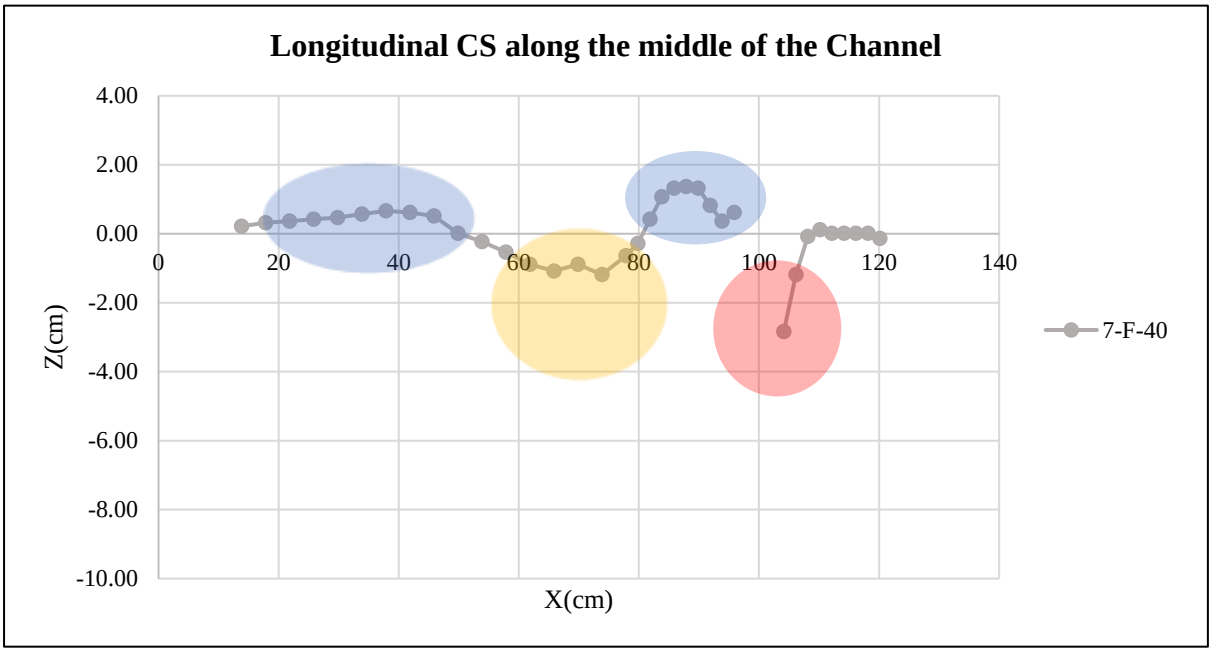


E23.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.7	0.22
79.7	17.85		26.8	0.32
83.7	21.85		26.85	0.37
87.7	25.85		26.9	0.42
91.7	29.85		26.95	0.47
95.7	33.85		27.05	0.57
99.7	37.85		27.15	0.67
3.7	41.85		27.1	0.62
7.7	45.85		27	0.52
11.7	49.85		26.5	0.02
15.7	53.85		26.25	-0.23
19.7	57.85		25.95	-0.53
23.7	61.85		25.6	-0.88

27.7	65.85		25.4	-1.08
31.7	69.85		25.6	-0.88
35.7	73.85		25.3	-1.18
39.7	77.85		25.85	-0.63
41.7	79.85		26.2	-0.28
43.7	81.85		26.9	0.42
45.7	83.85		27.55	1.07
47.7	85.85		27.8	1.32
49.7	87.85		27.85	1.37
51.7	89.85		27.8	1.32
53.7	91.85		27.3	0.82
55.7	93.85		26.85	0.37
57.7	95.85		27.1	0.62
61.85	100		The Middle of the Pier	
66	104.15		23.65	-2.83
68	106.15		25.3	-1.18
70	108.15		26.4	-0.08
72	110.15		26.6	0.12
74	112.15		26.5	0.02
76	114.15		26.5	0.02
78	116.15		26.5	0.02
80	118.15		26.5	0.02
82	120.15		26.35	-0.13

E23.9. Recorded surveyed longitudinal section measurements.



E23.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	13.37	31.01	28.00	621.39
2	31.01	24.63	24.00	667.70
3	24.63	0.00	6.42	79.08
4	0.00	-25.23	6.58	-83.00
5	-25.23	0.00	5.19	-65.47
6	0.00	7.35	1.51	5.55
7	7.35	35.94	4.15	89.82
8	35.94	23.70	4.15	123.76
9	23.70	0.00	4.97	58.94
10	0.00	-1.75	0.03	-0.02
11	-1.75	0.00	4.06	-3.56
12	0.00	2.57	5.94	7.62
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
1501.81	1653.86	-152.05	1315.07	186.74

E23.11. Calculated volume.

Experiment 24 (7-F-30)

30*30 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	**2*3**
	Along the width	**2*5**
	Around pier	**4**

E24.1. Anchorage characteristics, including nail's position and quantity.

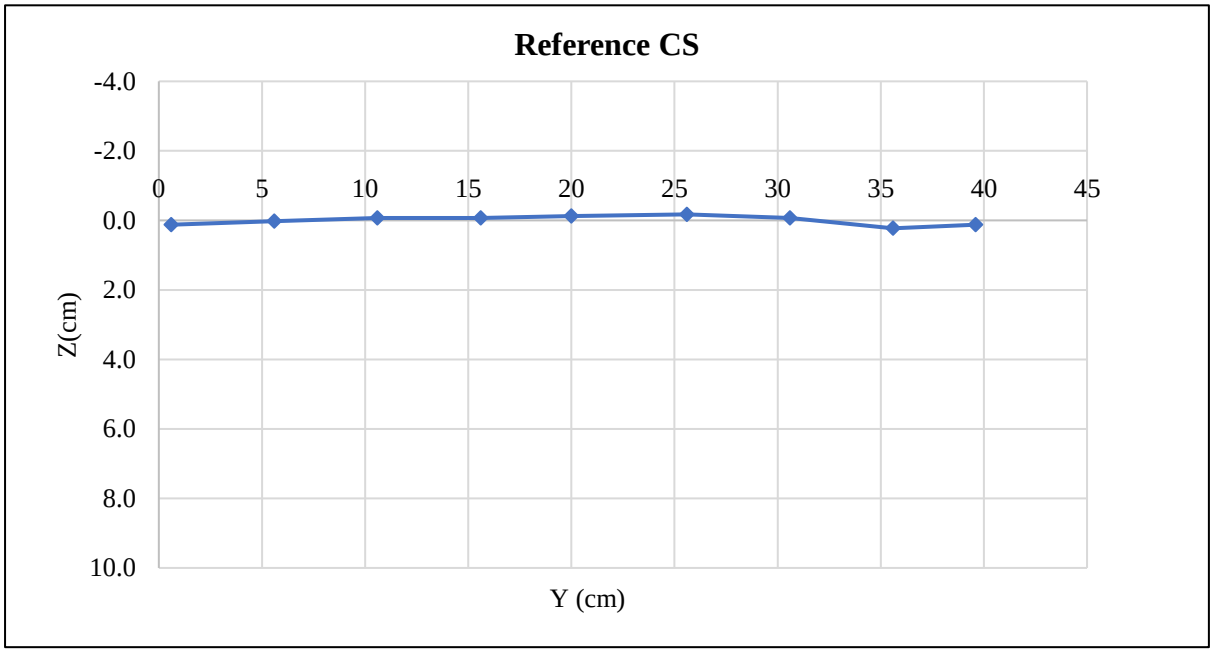
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.245	7.269	7.271	7.299	7.181	7.341	7.184	7.291	7.253	7.199	7.237	7.280	7.247	7.237
	7.222	7.361	7.303	7.291	7.213	7.302	7.402	7.314	7.384	7.249	7.229	7.236	7.289	7.234
	7.269	7.347	7.313	7.324	7.166	7.264	7.316	7.288	7.364	7.319	7.288	7.334	7.181	7.232
	7.248	7.364	7.285	7.255	7.252	7.206	7.260	7.346	7.244	7.286	7.236	7.261	7.270	7.178
	7.297	7.263	7.323	7.363	7.324	7.143	7.275	7.347	7.414	7.212	7.275	7.315	7.293	7.241
	7.263	7.346	7.343	7.383	7.241	7.264	7.309	7.294	7.334	7.323	7.309	7.253	7.180	7.277
	7.316	7.343	7.285	7.285	7.216	7.275	7.291	7.326	7.232	7.296	7.234	7.267	7.173	7.285
	7.336	7.238	7.275	7.303	7.283	7.332	7.375	7.348	7.276	7.267	7.325	7.274	7.256	7.210
	7.293	7.213	7.269	7.253	7.287	7.334	7.343	7.323	7.318	7.399	7.355	7.305	7.202	7.225
	7.287	7.283	7.249	7.246	7.235	7.267	7.302	7.335	7.212	7.271	7.389	7.298	7.204	7.187
Average	7.278	7.303	7.292	7.300	7.240	7.273	7.306	7.321	7.303	7.282	7.288	7.282	7.230	7.231
Ratio	1.004	1.007	1.006	1.007	0.999	1.003	1.008	1.010	1.007	1.004	1.005	1.004	0.997	0.997

E24.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.1
	14	5.6	26.4	0.0

	19	10.6	26.5	-0.1
	24	15.6	26.5	-0.1
	28.4	20	26.55	-0.1
	34	25.6	26.6	-0.2
	39	30.6	26.5	-0.1
	44	35.6	26.2	0.2
	48	39.6	26.3	0.1
		Average (Reference Elevation)	26.43	

E24.3. Calculated Reference Elevation.

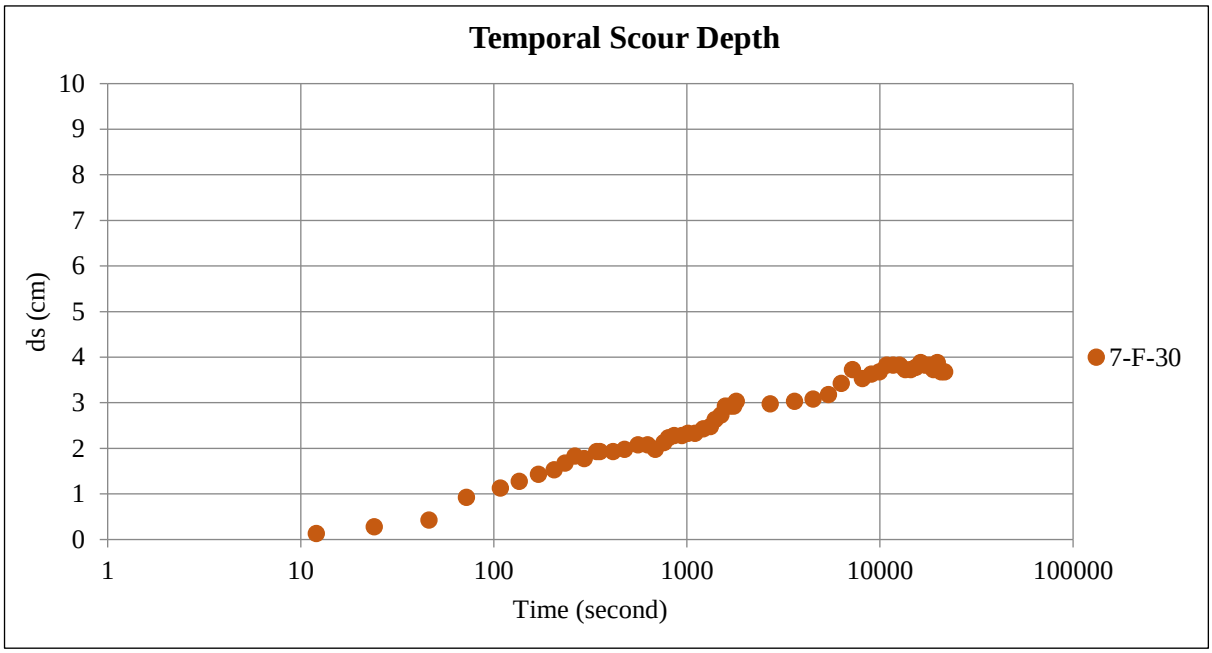


E24.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.43**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	12	12	26.3	0.13
0	0	24	24	26.15	0.28
0	0	46	46	26	0.43
0	1	12	72	25.5	0.93
0	1	48	108	25.3	1.13
0	2	15	135	25.15	1.28
0	2	50	170	25	1.43
0	3	25	205	24.9	1.53
0	3	53	233	24.75	1.68
0	4	27	293	24.65	1.78
0	4	53	263	24.6	1.83
0	5	23	354	24.5	1.93
0	5	54	340	24.5	1.93
0	6	40	414	24.5	1.93
0	7	54	474	24.45	1.98
0	9	20	557	24.35	2.08

0	10	17	626	24.35	2.08
0	11	26	686	24.45	1.98
0	12	38	758	24.3	2.13
0	13	22	802	24.2	2.23
0	14	19	859	24.15	2.28
0	15	39	939	24.15	2.28
0	16	50	1010	24.1	2.33
0	18	18	1098	24.1	2.33
0	20	13	1213	24	2.43
0	22	0	1320	23.95	2.48
0	23	17	1397	23.8	2.63
0	25	0	1500	23.7	2.73
0	26	20	1580	23.5	2.93
0	27	45	1665	23.5	2.93
0	29	2	1742	23.5	2.93
0	30	0	1800	23.4	3.03
0	45	0	2700	23.45	2.98
1	0	0	3600	23.4	3.03
1	15	0	4500	23.35	3.08
1	30	0	5400	23.25	3.18
1	45	0	6300	23	3.43
2	0	0	7200	22.7	3.73
2	15	0	8100	22.9	3.53
2	30	0	9000	22.8	3.63
2	45	0	9900	22.75	3.68
3	0	0	10800	22.6	3.83
3	15	0	11700	22.6	3.83
3	30	0	12600	22.6	3.83
3	45	0	13500	22.7	3.73
4	0	0	14400	22.7	3.73
4	15	0	15300	22.65	3.78
4	30	0	16200	22.55	3.88
4	45	0	17100	22.6	3.83
5	0	0	18000	22.6	3.83
5	15	0	18900	22.7	3.73
5	30	0	19800	22.55	3.88
5	45	0	20700	22.75	3.68
6	0	0	21600	22.75	3.68

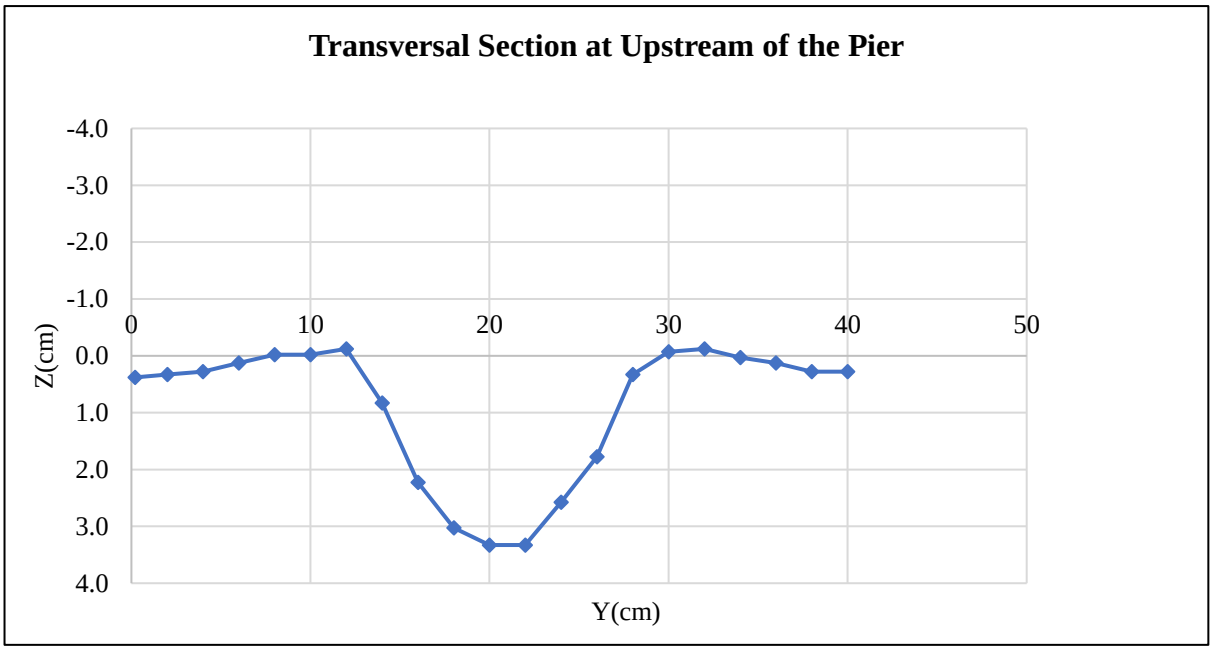
E24.5. Temporal Scour Depth measurements.



E24.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
	8.6	0.2	26.05	0.4
	10.4	2	26.1	0.3
	12.4	4	26.15	0.3
	14.4	6	26.3	0.1
	16.4	8	26.45	0.0
	18.4	10	26.45	0.0
	20.4	12	26.55	-0.1
	22.4	14	25.6	0.8
	24.4	16	24.2	2.2
	26.4	18	23.4	3.0
104.15	28.4	20	23.1	3.3
	30.4	22	23.1	3.3
	32.4	24	23.85	2.6
	34.4	26	24.65	1.8
	36.4	28	26.1	0.3
	38.4	30	26.5	-0.1
	40.4	32	26.55	-0.1
	42.4	34	26.4	0.0
	44.4	36	26.3	0.1
	46.4	38	26.15	0.3
	48.4	40	26.15	0.3

E24.7. Recorded surveyed transversal section measurements.

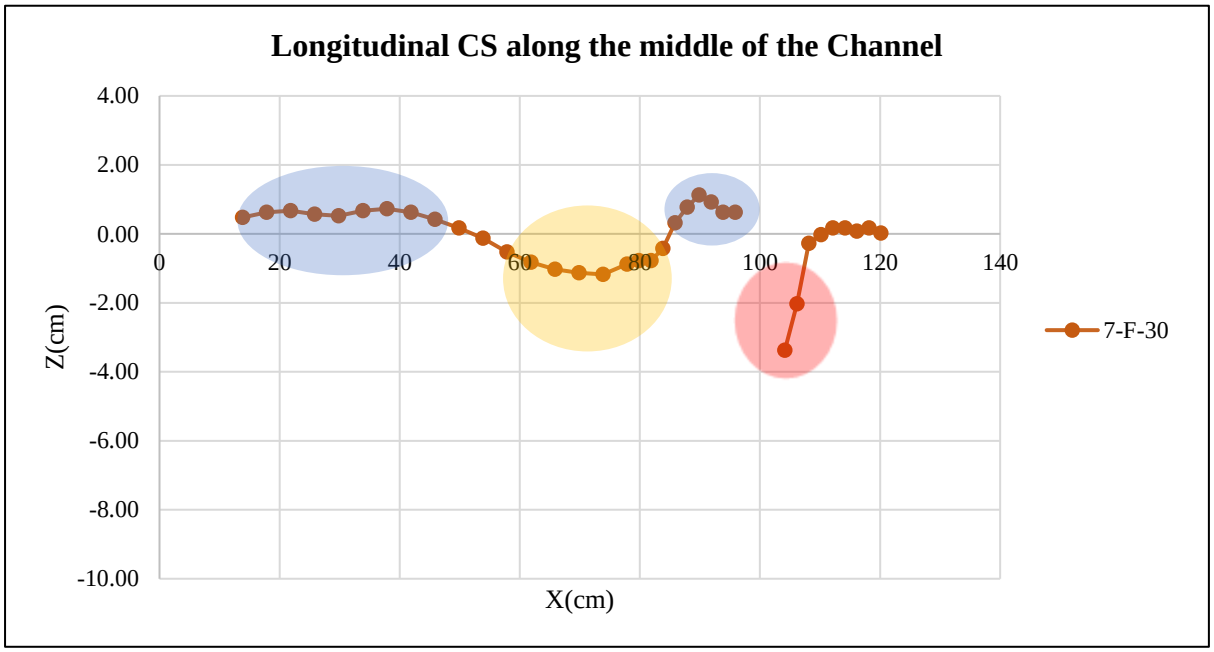


E24.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		26.9	0.47
79.7	17.85		27.05	0.62
83.7	21.85		27.1	0.67
87.7	25.85		27	0.57
91.7	29.85		26.95	0.52
95.7	33.85		27.1	0.67
99.7	37.85		27.15	0.72
3.7	41.85		27.05	0.62
7.7	45.85		26.85	0.42
11.7	49.85		26.6	0.17
15.7	53.85		26.3	-0.13
19.7	57.85		25.9	-0.53
23.7	61.85		25.6	-0.83
27.7	65.85	28.4	25.4	-1.03
31.7	69.85		25.3	-1.13
35.7	73.85		25.25	-1.18
39.7	77.85		25.55	-0.88
41.7	79.85		25.65	-0.78
43.7	81.85		25.65	-0.78
45.7	83.85		26	-0.43
47.7	85.85		26.75	0.32
49.7	87.85		27.2	0.77
51.7	89.85		27.55	1.12
53.7	91.85		27.35	0.92
55.7	93.85		27.05	0.62
57.7	95.85		27.05	0.62
61.85	100		The Middle of the Pier	

66	104.15		23.05	-3.38
68	106.15		24.4	-2.03
70	108.15		26.15	-0.28
72	110.15		26.4	-0.03
74	112.15		26.6	0.17
76	114.15		26.6	0.17
78	116.15		26.5	0.07
80	118.15		26.6	0.17
82	120.15		26.45	0.02

E24.9. Recorded surveyed longitudinal section measurements.



E24.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	2.91	46.21	28.00	687.70
2	46.21	32.99	24.00	950.39
3	32.99	0.00	9.83	162.22
4	0.00	-10.62	3.17	-16.81
5	-10.62	-6.57	6.70	-57.60
6	-6.57	0.00	0.65	-2.15
7	0.00	35.16	3.50	61.47
8	35.16	37.04	4.15	149.82
9	37.04	0.00	4.83	89.43
10	0.00	-1.91	0.17	-0.16
11	-1.91	-2.26	10.00	-20.84
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
2003.45	2101.02	-97.57	1785.22	218.24

E24.11. Calculated volume.

Experiment 25 (7-F-20)

20*20 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*3
	Along the width	2*3
	Around pier	4

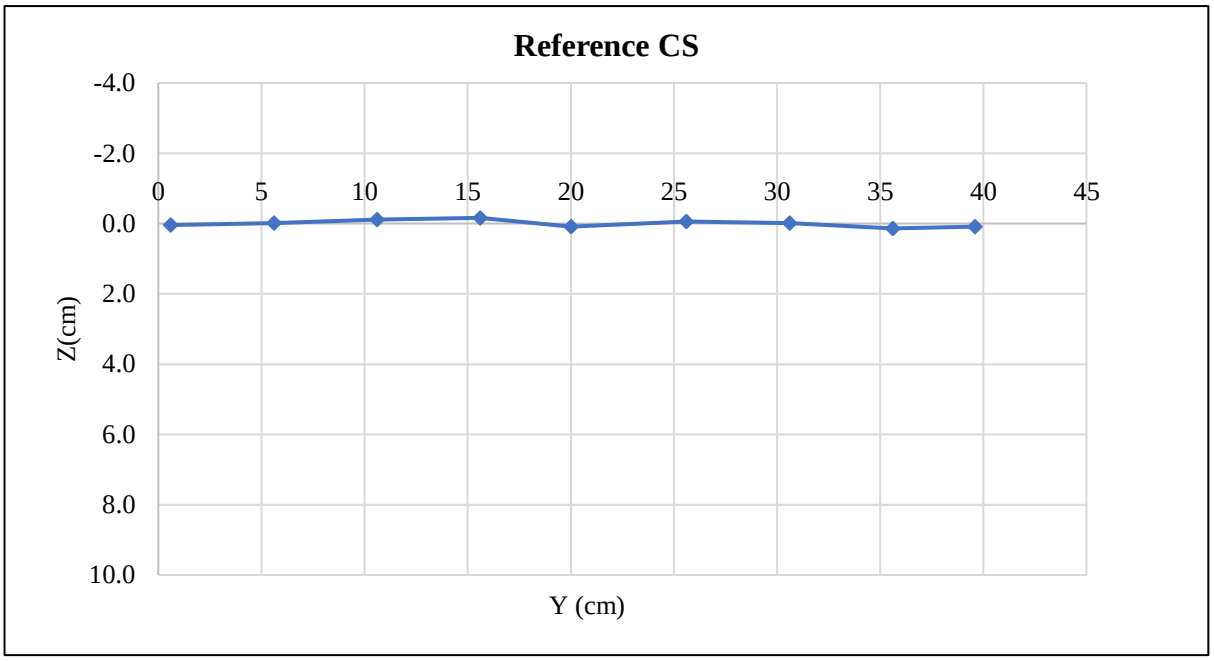
E25.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.305	7.253	7.272	7.227	7.151	7.160	7.094	7.206	7.153	7.153	7.186	7.176	7.110	7.253
	7.347	7.272	7.334	7.398	7.232	7.145	7.195	7.230	7.132	7.309	7.056	7.133	7.168	7.207
	7.336	7.268	7.263	7.365	7.282	7.233	7.169	7.247	7.250	7.231	7.074	7.217	7.185	7.156
	7.266	7.168	7.236	7.334	7.271	7.181	7.276	7.220	7.226	7.259	7.198	7.164	7.111	7.296
	7.308	7.199	7.213	7.229	7.165	7.174	7.260	7.263	7.298	7.341	7.066	7.173	7.192	7.331
	7.267	7.322	7.256	7.265	7.194	7.159	7.175	7.290	7.213	7.005	7.184	7.193	7.143	7.218
	7.202	7.256	7.218	7.172	7.271	7.253	7.169	7.448	7.145	7.210	7.165	7.167	7.149	7.196
	7.318	7.266	7.335	7.100	7.291	7.342	7.131	7.171	7.284	7.262	7.146	7.126	7.070	7.233
	7.337	7.121	7.120	7.288	7.395	7.166	7.271	7.284	7.193	7.123	7.140	7.204	7.132	7.192
	7.258	7.263	7.135	7.219	7.286	7.213	7.097	7.286	7.232	7.270	7.170	7.211	7.183	7.284
Average	7.294	7.239	7.238	7.260	7.254	7.203	7.184	7.265	7.213	7.216	7.139	7.176	7.144	7.237
Ratio	1.006	0.998	0.998	1.001	1.001	0.993	0.991	1.002	0.995	0.995	0.985	0.990	0.985	0.998

E25.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.45	0.0
	14	5.6	26.5	0.0
	19	10.6	26.6	-0.1
	24	15.6	26.65	-0.2
	28.4	20	26.4	0.1
	34	25.6	26.55	-0.1
	39	30.6	26.5	0.0
	44	35.6	26.35	0.1
	48	39.6	26.4	0.1
		Average (Reference Elevation)	26.49	

E25.3. Calculated Reference Elevation.

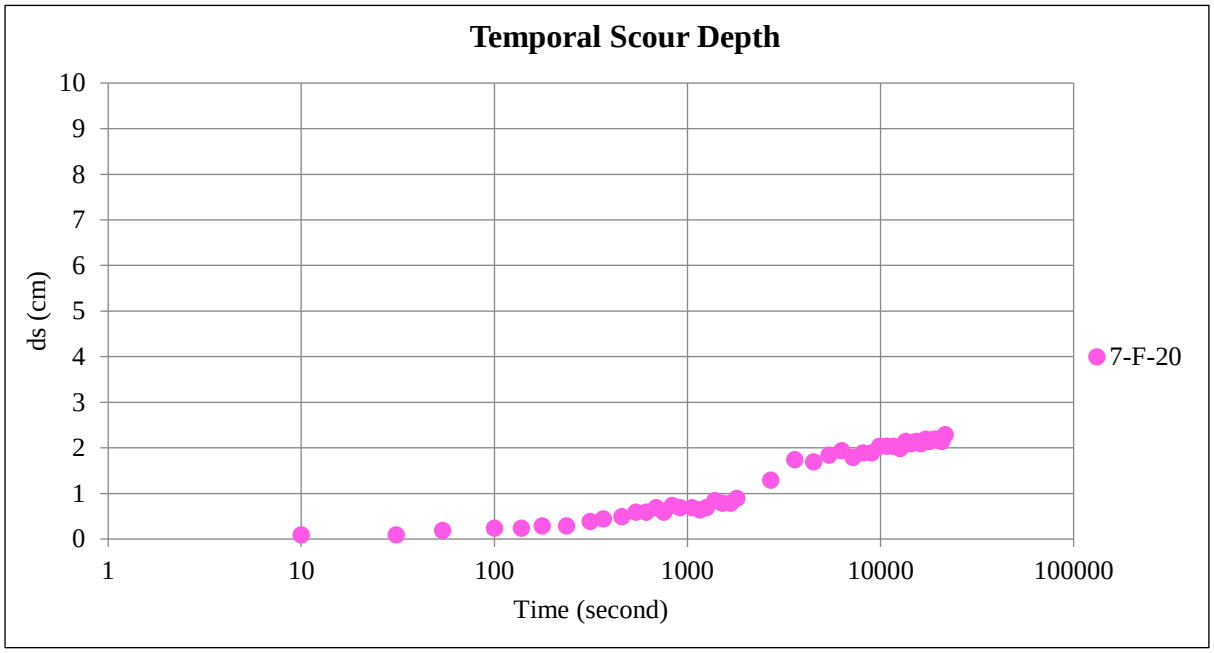


E25.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.49
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	10	10	26.4	0.09
0	0	31	31	26.4	0.09
0	0	54	54	26.3	0.19
0	1	40	100	26.25	0.24
0	2	18	138	26.25	0.24
0	2	57	177	26.2	0.29
0	3	56	236	26.2	0.29
0	5	13	313	26.1	0.39
0	6	7	367	26.05	0.44
0	7	38	458	26	0.49
0	9	2	542	25.9	0.59
0	10	12	612	25.9	0.59
0	11	28	688	25.8	0.69
0	12	33	753	25.9	0.59
0	13	53	833	25.75	0.74
0	15	18	918	25.8	0.69
0	17	36	1056	25.8	0.69
0	19	21	1161	25.85	0.64
0	20	55	1255	25.8	0.69
0	23	3	1383	25.65	0.84
0	25	15	1515	25.7	0.79
0	27	54	1674	25.7	0.79
0	30	0	1800	25.6	0.89
0	45	0	2700	25.2	1.29
1	0	0	3600	24.75	1.74
1	15	0	4500	24.8	1.69

1	30	0	5400	24.65	1.84
1	45	0	6300	24.55	1.94
2	0	0	7200	24.7	1.79
2	15	0	8100	24.6	1.89
2	30	0	9000	24.6	1.89
2	45	0	9900	24.45	2.04
3	0	0	10800	24.45	2.04
3	15	0	11700	24.45	2.04
3	30	0	12600	24.5	1.99
3	45	0	13500	24.35	2.14
4	0	0	14400	24.4	2.09
4	15	0	15300	24.35	2.14
4	30	0	16200	24.4	2.09
4	45	0	17100	24.3	2.19
5	0	0	18000	24.35	2.14
5	15	0	18900	24.3	2.19
5	30	0	19800	24.3	2.19
5	45	0	20700	24.35	2.14
6	0	0	21600	24.2	2.29

E25.5. Temporal Scour Depth measurements.

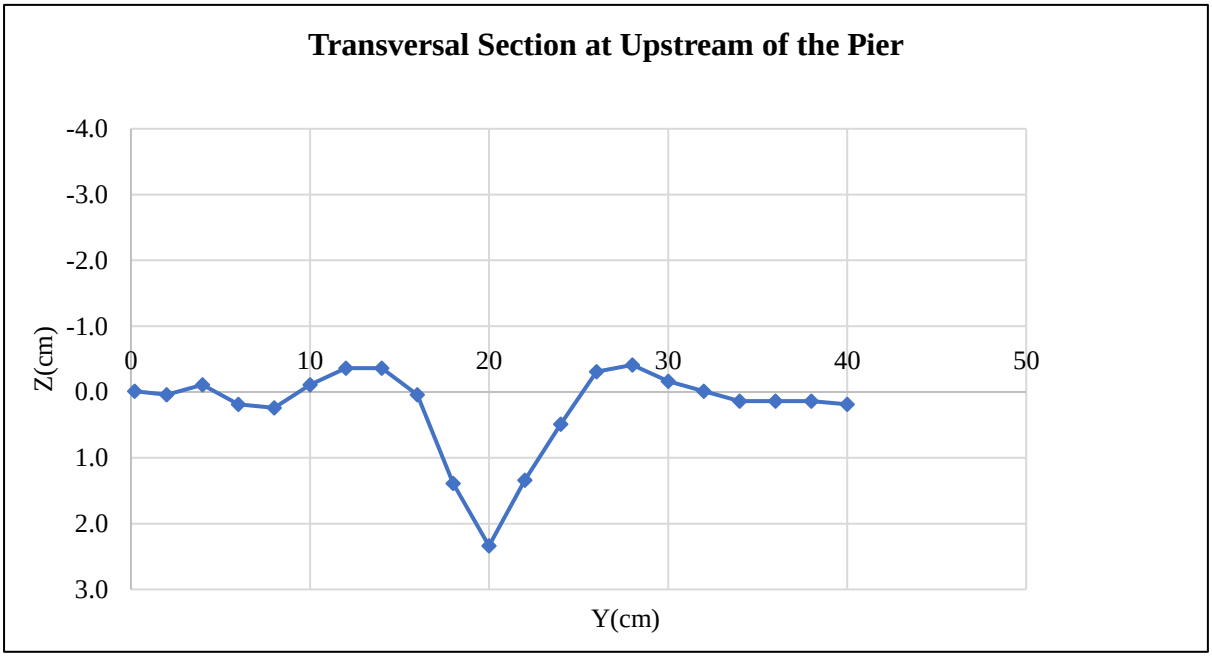


E25.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.5	0.0
	10.4	2	26.45	0.0
	12.4	4	26.6	-0.1
	14.4	6	26.3	0.2
	16.4	8	26.25	0.2
	18.4	10	26.6	-0.1
	20.4	12	26.85	-0.4

	22.4	14	26.85	-0.4
	24.4	16	26.45	0.0
	26.4	18	25.1	1.4
	28.4	20	24.15	2.3
	30.4	22	25.15	1.3
	32.4	24	26	0.5
	34.4	26	26.8	-0.3
	36.4	28	26.9	-0.4
	38.4	30	26.65	-0.2
	40.4	32	26.5	0.0
	42.4	34	26.35	0.1
	44.4	36	26.35	0.1
	46.4	38	26.35	0.1
	48.4	40	26.3	0.2

E25.7. Recorded surveyed transversal section measurements.

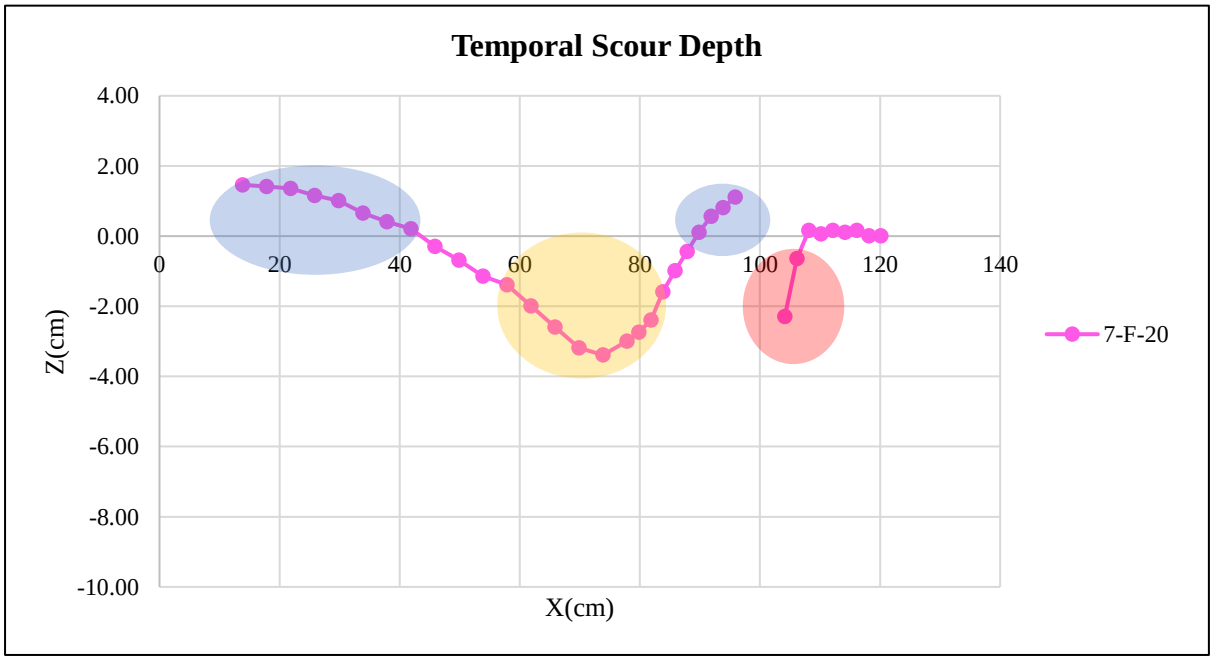


E25.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	27.95	1.46
79.7	17.85		27.9	1.41
83.7	21.85		27.85	1.36
87.7	25.85		27.65	1.16
91.7	29.85		27.5	1.01
95.7	33.85		27.15	0.66
99.7	37.85		26.9	0.41
3.7	41.85		26.7	0.21
7.7	45.85		26.2	-0.29
11.7	49.85		25.8	-0.69
15.7	53.85		25.35	-1.14
19.7	57.85		25.1	-1.39

23.7	61.85		24.5	-1.99
27.7	65.85		23.9	-2.59
31.7	69.85		23.3	-3.19
35.7	73.85		23.1	-3.39
39.7	77.85		23.5	-2.99
41.7	79.85		23.75	-2.74
43.7	81.85		24.1	-2.39
45.7	83.85		24.9	-1.59
47.7	85.85		25.5	-0.99
49.7	87.85		26.05	-0.44
51.7	89.85		26.6	0.11
53.7	91.85		27.05	0.56
55.7	93.85		27.3	0.81
57.7	95.85		27.6	1.11
61.85	100		The Middle of the Pier	
66	104.15		24.2	-2.29
68	106.15		25.85	-0.64
70	108.15		26.65	0.16
72	110.15		26.55	0.06
74	112.15		26.65	0.16
76	114.15		26.6	0.11
78	116.15		26.65	0.16
80	118.15		26.5	0.01
82	120.15		26.5	0.01

E25.9. Recorded surveyed longitudinal section measurements.



E25.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	0.99	94.26	28.00	1333.55
2	94.26	129.02	24.00	2679.35
3	129.02	23.90	13.00	993.97
4	23.90	7.74	6.70	106.00
5	7.74	4.83	4.15	26.07
6	4.83	9.45	4.15	29.63
7	9.45	0.00	4.46	21.06
8	0.00	-1.55	0.54	-0.42
9	-1.55	0.00	5.22	-4.04
10	0.00	1.42	4.78	3.39
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
5188.56	5193.02	-4.46	5138.93	49.63

E25.11. Calculated volume.

Experiment 26 (7-F-10)

10*10 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	-
	Along the width	-
	Around pier	4

E26.1. Anchorage characteristics, including nail' position and quantity.

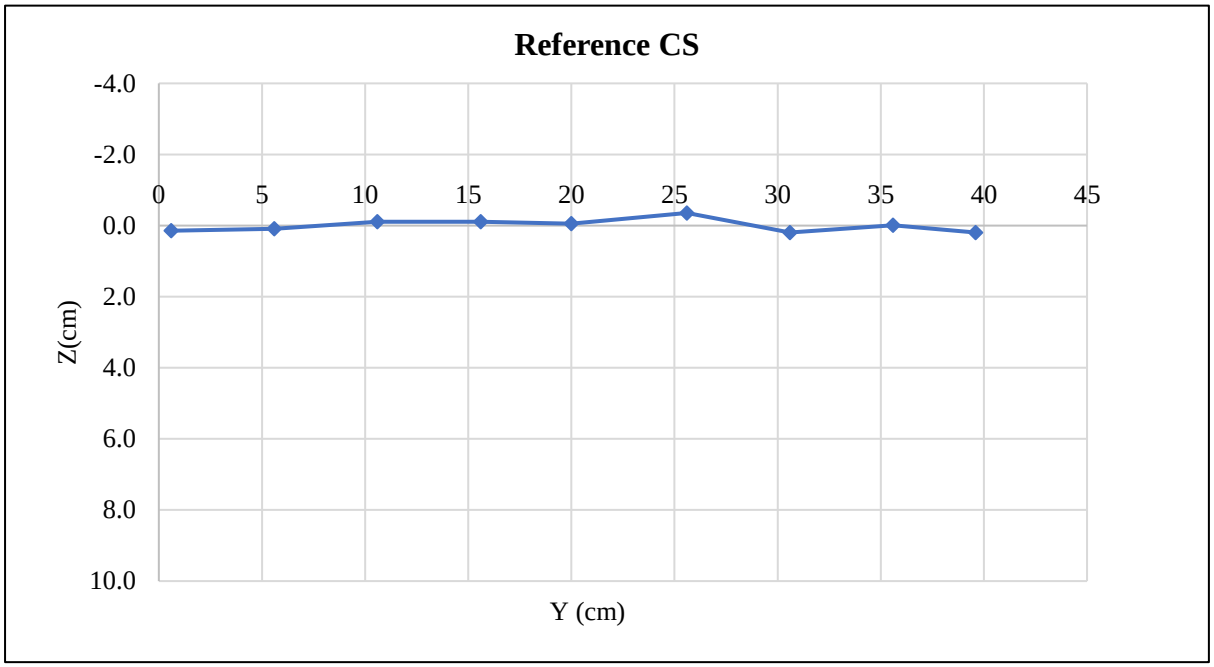
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.227	7.279	7.149	7.065	7.109	7.160	6.989	7.177	7.191	7.436	7.184	7.333	7.211	7.360
	7.198	7.293	7.176	7.133	7.007	7.148	7.052	7.169	7.299	7.256	7.295	7.260	7.260	7.275
	7.089	7.158	7.088	7.075	7.107	7.224	7.143	7.220	7.065	7.356	7.231	7.161	7.314	7.394
	7.139	7.157	7.198	7.036	7.114	7.185	7.161	7.184	7.155	7.212	7.317	7.297	7.444	7.202
	7.146	7.075	7.039	6.919	7.247	7.173	7.272	7.226	7.191	7.300	7.304	7.312	7.412	7.120
	7.106	7.006	7.165	7.114	7.103	7.218	7.341	7.121	7.289	7.170	7.155	7.375	7.344	7.235
	7.059	7.218	7.107	7.038	7.109	7.137	7.218	7.004	7.216	7.325	7.258	7.253	7.303	7.261
	7.130	7.176	7.165	7.223	7.149	7.165	7.159	7.195	7.177	7.238	7.240	7.390	7.181	7.285
	7.112	7.147	7.200	7.154	6.998	7.118	7.287	7.164	7.185	7.330	7.302	7.271	7.139	7.310
	7.099	7.189	7.097	7.107	7.085	7.131	7.108	7.157	7.283	7.145	7.317	7.276	7.309	7.285
Average	7.131	7.170	7.138	7.086	7.103	7.166	7.173	7.162	7.205	7.277	7.260	7.293	7.292	7.273
Ratio	0.984	0.989	0.985	0.977	0.980	0.988	0.989	0.988	0.994	1.004	1.001	1.006	1.006	1.003

E26.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.15	0.1
	14	5.6	26.2	0.1
	19	10.6	26.4	-0.1
	24	15.6	26.4	-0.1

	28.4	20	26.35	-0.1
	34	25.6	26.65	-0.4
	39	30.6	26.1	0.2
	44	35.6	26.3	0.0
	48	39.6	26.1	0.2
		Average (Reference Elevation)	26.29	

E26.3. Calculated Reference Elevation.

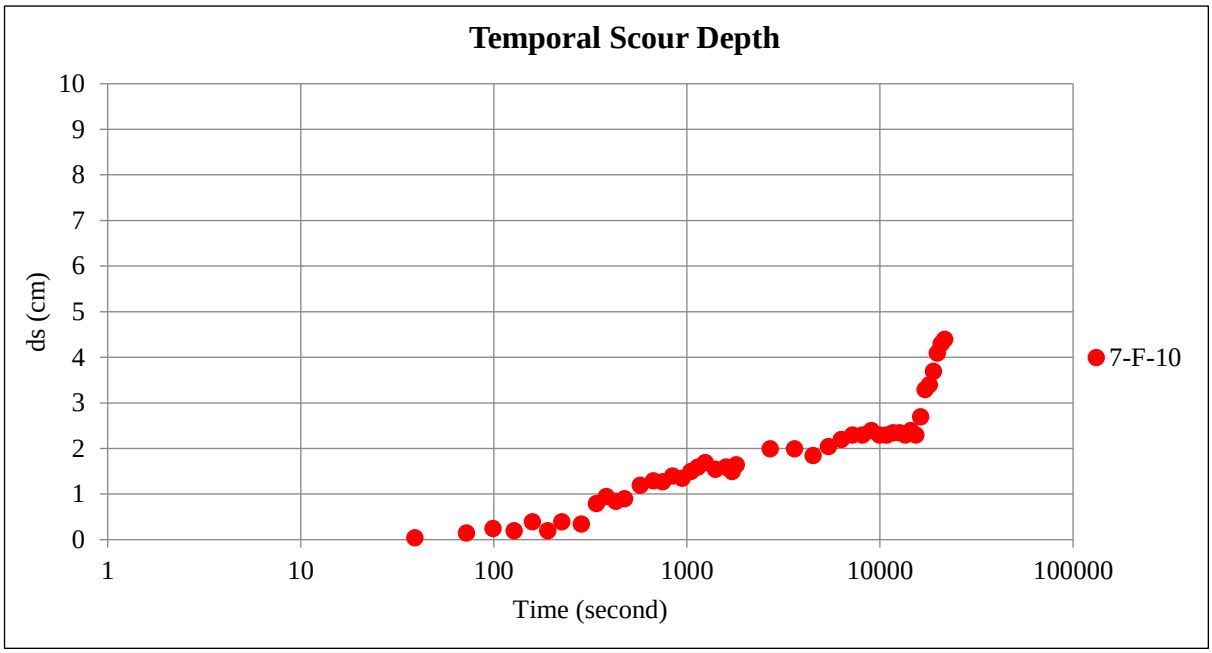


E26.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.29**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	16	16	26.3	-0.01
0	0	39	39	26.25	0.04
0	1	12	72	26.15	0.14
0	1	39	99	26.05	0.24
0	2	7	127	26.1	0.19
0	2	38	158	25.9	0.39
0	3	10	190	26.1	0.19
0	3	45	225	25.9	0.39
0	4	44	284	25.95	0.34
0	5	39	339	25.5	0.79
0	6	22	382	25.35	0.94
0	7	9	429	25.45	0.84
0	7	55	475	25.4	0.89
0	9	33	573	25.1	1.19
0	11	10	670	25	1.29
0	12	27	747	25.025	1.27
0	14	3	843	24.9	1.39
0	15	42	942	24.95	1.34

0	17	28	1048	24.8	1.49
0	19	0	1140	24.7	1.59
0	20	42	1242	24.6	1.69
0	23	22	1402	24.75	1.54
0	26	35	1595	24.7	1.59
0	28	30	1710	24.8	1.49
0	30	0	1800	24.65	1.64
0	45	0	2700	24.3	1.99
1	0	0	3600	24.3	1.99
1	15	0	4500	24.45	1.84
1	30	0	5400	24.25	2.04
1	45	0	6300	24.1	2.19
2	0	0	7200	24	2.29
2	15	0	8100	24	2.29
2	30	0	9000	23.9	2.39
2	45	0	9900	24	2.29
3	0	0	10800	24	2.29
3	15	0	11700	23.95	2.34
3	30	0	12600	23.95	2.34
3	45	0	13500	24	2.29
4	0	0	14400	23.9	2.39
4	15	0	15300	24	2.29
4	30	0	16200	23.6	2.69
4	45	0	17100	23	3.29
5	0	0	18000	22.9	3.39
5	15	0	18900	22.6	3.69
5	30	0	19800	22.2	4.09
5	45	0	20700	22	4.29
6	0	0	21600	21.9	4.39

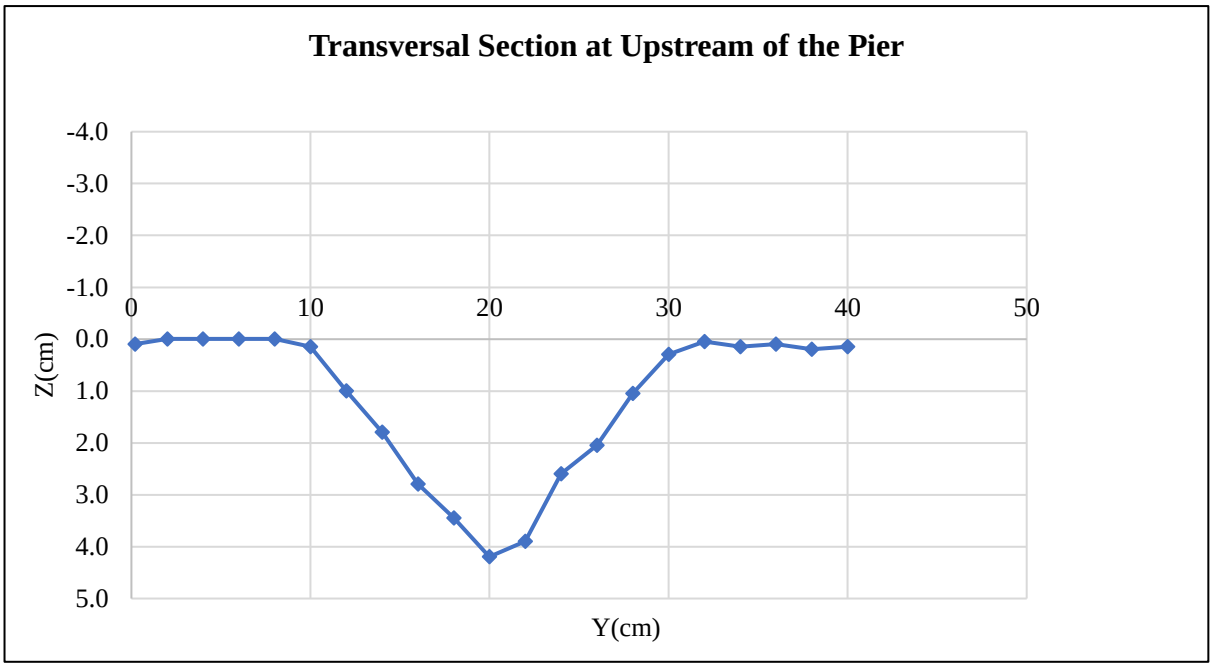
E26.5. Temporal Scour Depth measurements.



E26.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.2	0.1
	10.4	2	26.3	0.0
	12.4	4	26.3	0.0
	14.4	6	26.3	0.0
	16.4	8	26.3	0.0
	18.4	10	26.15	0.1
	20.4	12	25.3	1.0
	22.4	14	24.5	1.8
	24.4	16	23.5	2.8
	26.4	18	22.85	3.4
	28.4	20	22.1	4.2
	30.4	22	22.4	3.9
	32.4	24	23.7	2.6
	34.4	26	24.25	2.0
	36.4	28	25.25	1.0
	38.4	30	26	0.3
	40.4	32	26.25	0.0
	42.4	34	26.15	0.1
	44.4	36	26.2	0.1
	46.4	38	26.1	0.2
	48.4	40	26.15	0.1

E26.7. Recorded surveyed transversal section measurements.

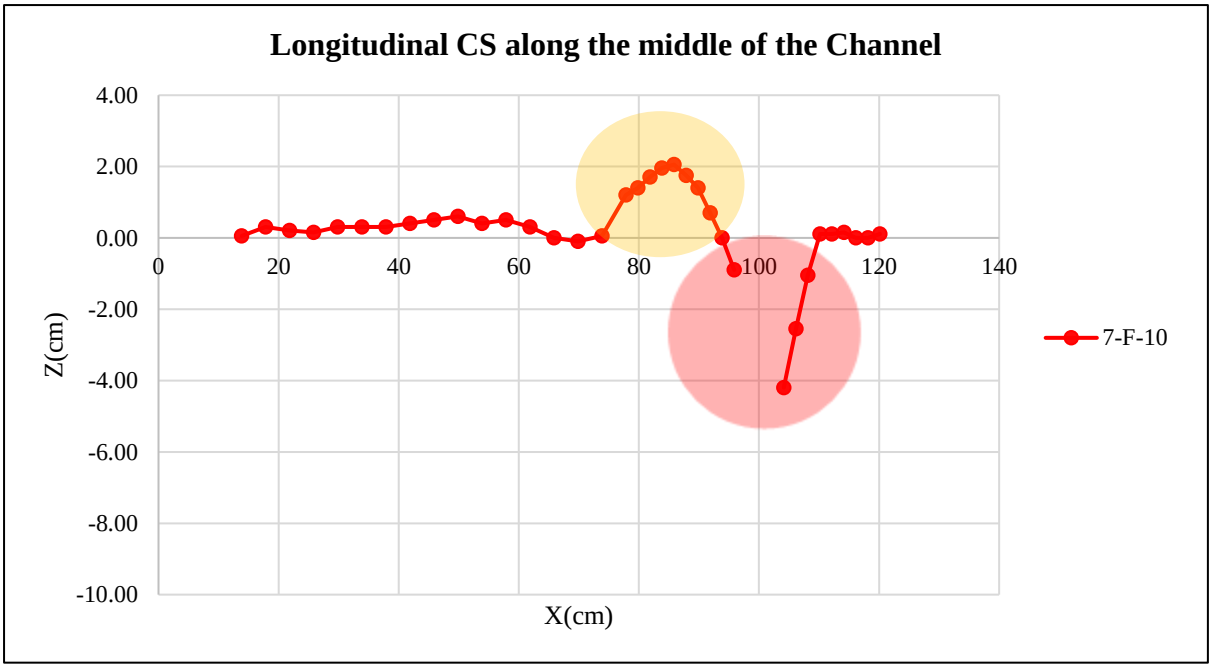


E26.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		26.35	0.06
79.7	17.85		26.6	0.31
83.7	21.85		26.5	0.21
87.7	25.85		26.45	0.16
91.7	29.85		26.6	0.31
95.7	33.85		26.6	0.31
99.7	37.85		26.6	0.31
3.7	41.85		26.7	0.41
7.7	45.85		26.8	0.51
11.7	49.85		26.9	0.61
15.7	53.85		26.7	0.41
19.7	57.85		26.8	0.51
23.7	61.85		26.6	0.31
27.7	65.85	28.4	26.3	0.01
31.7	69.85		26.2	-0.09
35.7	73.85		26.35	0.06
39.7	77.85		27.5	1.21
41.7	79.85		27.7	1.41
43.7	81.85		28	1.71
45.7	83.85		28.25	1.96
47.7	85.85		28.35	2.06
49.7	87.85		28.05	1.76
51.7	89.85		27.7	1.41
53.7	91.85		27	0.71
55.7	93.85		26.3	0.01
57.7	95.85		25.4	-0.89
61.85	100		The Middle of the Pier	

66	104.15		22.1	-4.19
68	106.15		23.75	-2.54
70	108.15		25.25	-1.04
72	110.15		26.4	0.11
74	112.15		26.4	0.11
76	114.15		26.45	0.16
78	116.15		26.3	0.01
80	118.15		26.3	0.01
82	120.15		26.4	0.11

E26.9. Recorded surveyed longitudinal section measurements.



E26.10. Visual representation of the surveyed longitudinal section measurements. The red circle is indicating the critical area of scouring around the pier, the yellow circle is indicating the accumulated sediment after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	-5.44	-1.47	28.00	-96.72
2	-1.47	-14.49	24.00	-191.49
3	-14.49	-7.19	13.00	-140.93
4	-7.19	0.00	1.18	-4.24
5	0.00	33.64	5.52	92.86
6	33.64	61.87	4.15	198.19
7	61.87	47.62	4.15	227.19
8	47.62	5.52	5.00	132.85
9	5.52	0.00	2.79	7.69
10	0.00	-4.38	2.21	-4.85
11	-4.38	-4.82	10.00	-45.99
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
174.57	658.78	-484.21	-142.33	316.90

E26.11. Calculated volume.

Experiment 27 (7-F-40*60)

40*60 (7mm)		
Anchorage	Position	Nails number
	Along the length	2*7
	Along the width	2*5
	Around pier	4

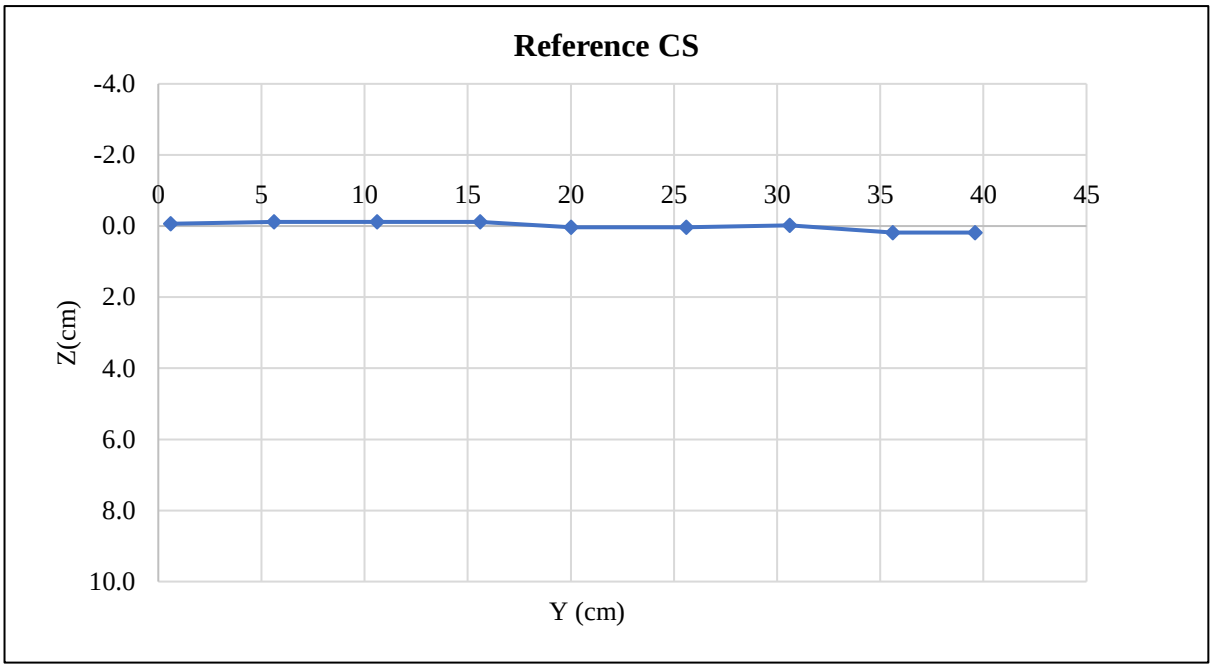
E27.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.245	7.123	7.144	7.205	7.192	7.198	7.156	7.044	7.124	7.125	7.065	7.220	7.056	7.096
	7.166	7.125	7.196	7.209	7.100	7.175	7.181	7.233	7.096	7.146	7.113	7.304	7.173	7.145
	7.235	7.196	7.256	7.135	7.210	7.224	7.111	7.256	7.202	7.103	7.246	7.006	7.133	7.147
	7.197	7.214	7.117	7.184	7.163	7.149	7.158	7.220	7.110	7.161	7.104	7.111	7.204	7.019
	7.234	7.293	7.189	7.260	7.194	7.221	7.104	7.115	7.103	7.063	7.244	7.199	7.212	7.130
	7.054	7.285	7.243	7.199	7.073	7.139	7.140	7.110	7.139	7.106	7.305	7.185	7.190	7.125
	7.098	7.177	7.113	7.247	7.171	7.113	7.096	7.024	7.039	7.217	7.144	7.216	7.165	7.166
	7.198	7.155	7.138	7.123	7.089	7.068	7.112	7.143	7.076	7.136	7.102	7.057	7.062	7.185
	7.165	7.090	7.135	7.184	7.244	7.297	7.003	7.052	6.996	7.015	7.182	7.044	7.152	7.004
	7.126	7.198	7.093	7.139	7.070	7.199	7.192	6.957	7.082	7.036	7.279	7.124	7.245	7.107
Average	7.172	7.186	7.162	7.189	7.151	7.178	7.125	7.115	7.097	7.111	7.178	7.147	7.159	7.112
Ratio	0.989	0.991	0.988	0.992	0.986	0.990	0.983	0.981	0.979	0.981	0.990	0.986	0.987	0.981

E27.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.45	-0.1
	14	5.6	26.5	-0.1
	19	10.6	26.5	-0.1
	24	15.6	26.5	-0.1
	28.4	20	26.35	0.0
	34	25.6	26.35	0.0
	39	30.6	26.4	0.0
	44	35.6	26.2	0.2
	48	39.6	26.2	0.2
		Average (Reference Elevation)	26.38	

E27.3. Calculated Reference Elevation.

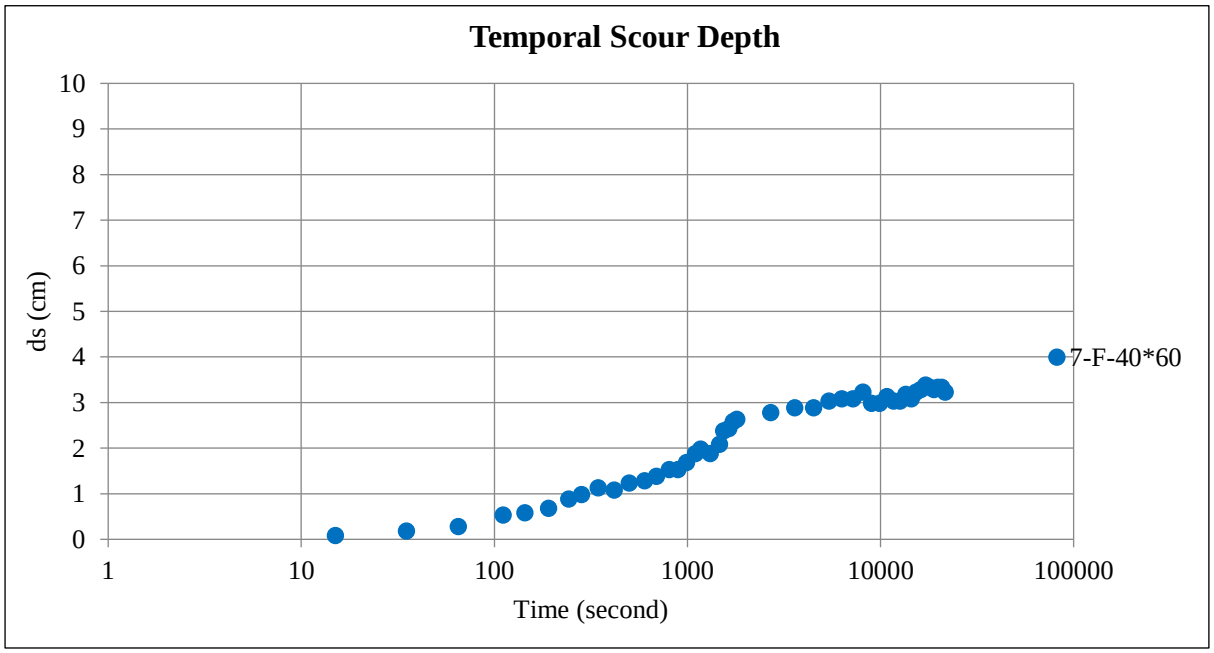


E27.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.38
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	15	15	26.3	0.08
0	0	35	35	26.2	0.18
0	1	5	65	26.1	0.28
0	1	51	111	25.85	0.53
0	2	24	144	25.8	0.58
0	3	11	191	25.7	0.68
0	4	3	243	25.5	0.88
0	4	43	283	25.4	0.98
0	5	45	345	25.25	1.13
0	6	57	417	25.3	1.08
0	8	20	500	25.15	1.23
0	10	0	600	25.1	1.28
0	11	31	691	25	1.38
0	13	25	805	24.85	1.53
0	14	51	891	24.85	1.53
0	16	31	991	24.7	1.68
0	18	19	1099	24.5	1.88
0	19	29	1169	24.4	1.98
0	21	51	1311	24.5	1.88
0	24	25	1465	24.3	2.08
0	25	43	1543	24	2.38
0	27	20	1640	23.95	2.43
0	28	50	1730	23.8	2.58
0	30	0	1800	23.75	2.63
0	45	0	2700	23.6	2.78
1	0	0	3600	23.5	2.88

1	15	0	4500	23.5	2.88
1	30	0	5400	23.35	3.03
1	45	0	6300	23.3	3.08
2	0	0	7200	23.3	3.08
2	15	0	8100	23.15	3.23
2	30	0	9000	23.4	2.98
2	45	0	9900	23.4	2.98
3	0	0	10800	23.25	3.13
3	15	0	11700	23.35	3.03
3	30	0	12600	23.35	3.03
3	45	0	13500	23.2	3.18
4	0	0	14400	23.3	3.08
4	15	0	15300	23.15	3.23
4	30	0	16200	23.1	3.28
4	45	0	17100	23	3.38
5	0	0	18000	23.05	3.33
5	15	0	18900	23.1	3.28
5	30	0	19800	23.05	3.33
5	45	0	20700	23.05	3.33
6	0	0	21600	23.15	3.23

E27.5. Temporal Scour Depth measurements.

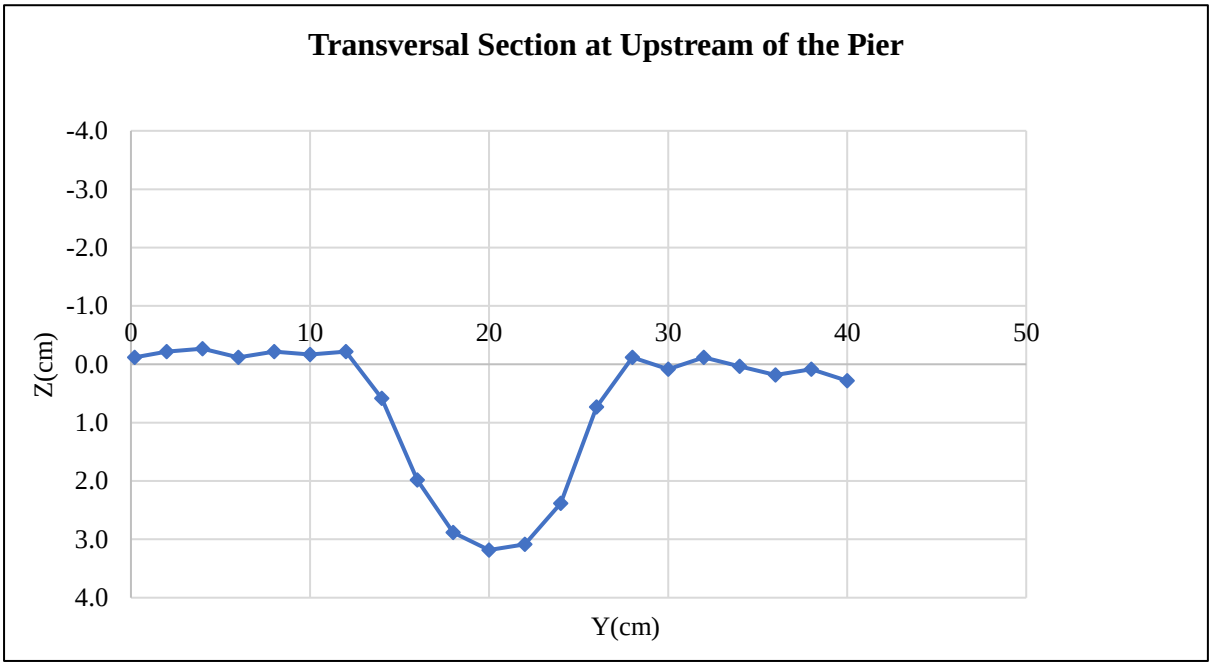


E27.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.5	-0.1
	10.4	2	26.6	-0.2
	12.4	4	26.65	-0.3
	14.4	6	26.5	-0.1
	16.4	8	26.6	-0.2
	18.4	10	26.55	-0.2

	20.4	12	26.6	-0.2
	22.4	14	25.8	0.6
	24.4	16	24.4	2.0
	26.4	18	23.5	2.9
	28.4	20	23.2	3.2
	30.4	22	23.3	3.1
	32.4	24	24	2.4
	34.4	26	25.65	0.7
	36.4	28	26.5	-0.1
	38.4	30	26.3	0.1
	40.4	32	26.5	-0.1
	42.4	34	26.35	0.0
	44.4	36	26.2	0.2
	46.4	38	26.3	0.1
	48.4	40	26.1	0.3

E27.7. Recorded surveyed transversal section measurements.

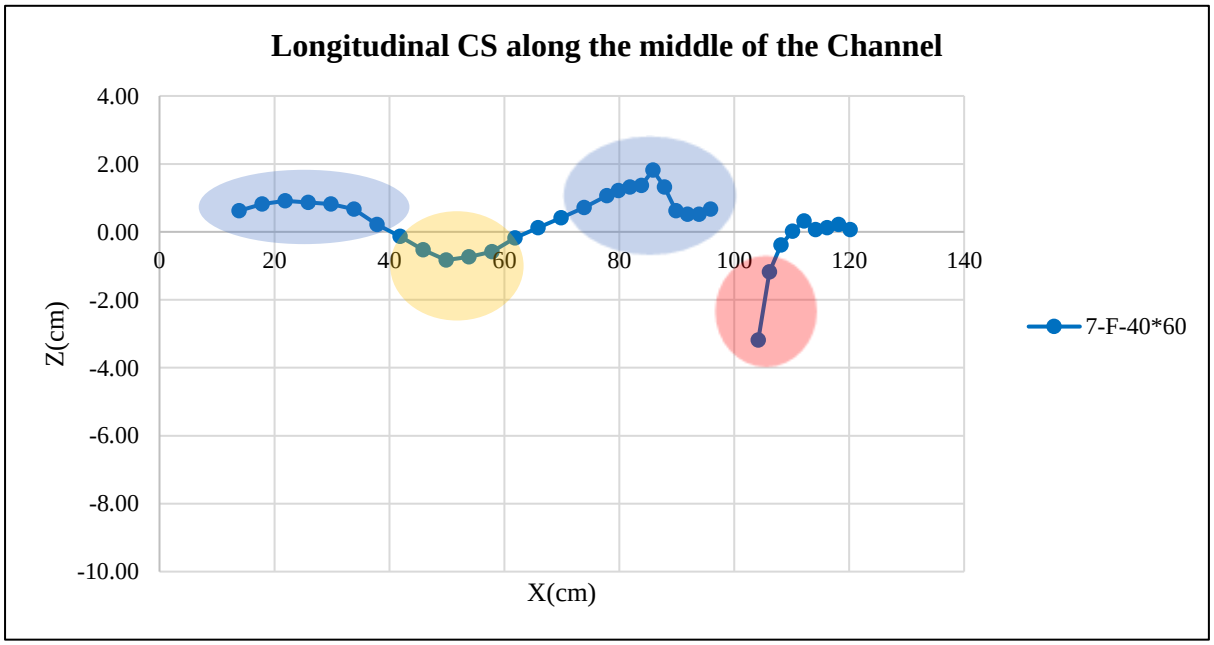


E27.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	27	0.62
79.7	17.85		27.2	0.82
83.7	21.85		27.3	0.92
87.7	25.85		27.25	0.87
91.7	29.85		27.2	0.82
95.7	33.85		27.05	0.67
99.7	37.85		26.6	0.22
3.7	41.85		26.25	-0.13
7.7	45.85		25.85	-0.53
11.7	49.85		25.55	-0.83

15.7	53.85		25.65	-0.73
19.7	57.85		25.8	-0.58
23.7	61.85		26.2	-0.18
27.7	65.85		26.5	0.12
31.7	69.85		26.8	0.42
35.7	73.85		27.1	0.72
39.7	77.85		27.45	1.07
41.7	79.85		27.6	1.22
43.7	81.85		27.7	1.32
45.7	83.85		27.75	1.37
47.7	85.85		28.2	1.82
49.7	87.85		27.7	1.32
51.7	89.85		27	0.62
53.7	91.85		26.9	0.52
55.7	93.85		26.9	0.52
57.7	95.85		27.05	0.67
61.85	100		The Middle of the Pier	
66	104.15		23.2	-3.18
68	106.15		25.2	-1.18
70	108.15		26	-0.38
72	110.15		26.4	0.02
74	112.15		26.7	0.32
76	114.15		26.45	0.07
78	116.15		26.5	0.12
80	118.15		26.6	0.22
82	120.15		26.45	0.07

E27.9. Recorded surveyed longitudinal section measurements.



E27.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	17.07	56.25	28.00	1026.55
2	56.25	0.00	21.61	607.86
3	0.00	-6.22	2.39	-7.42
4	-6.22	-15.62	10.61	-115.88
5	-15.62	-4.08	6.70	-66.00
6	-4.08	0.00	0.50	-1.01
7	0.00	30.08	3.65	54.96
8	30.08	27.77	4.15	120.02
9	27.77	0.00	4.34	9.20
10	0.00	-4.24	0.66	-10.61
11	-4.24	-4.28	5.00	-21.30
12	-4.28	-1.76	10.00	-30.21
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
1566.17	1818.59	-252.43	1499.06	67.11

E27.11. Calculated volume.

Experiment 28 (7-F-40*80)

40*80 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*8
	Along the width	2*5
	Around pier	4

E28.1. Anchorage characteristics, including nail's position and quantity.

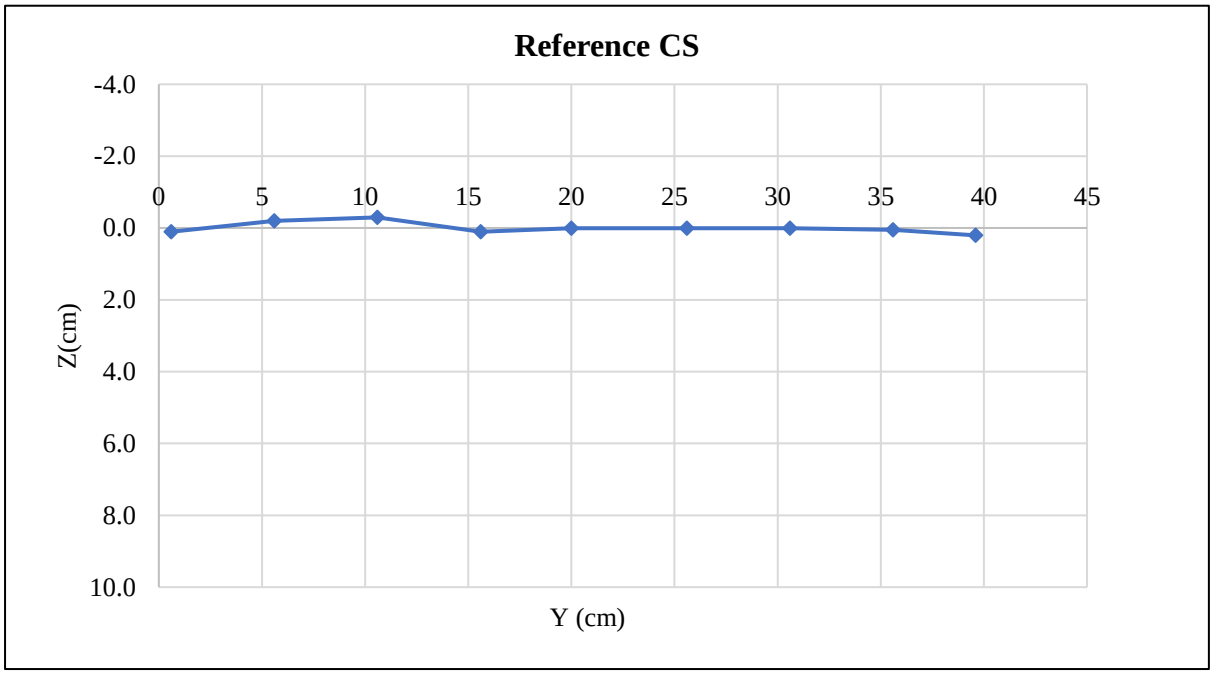
T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.202	7.024	7.231	7.369	7.198	7.158	7.267	7.007	7.213	7.028	7.084	7.184	7.139	7.194
	7.263	7.004	7.213	7.318	7.178	7.088	7.255	7.009	7.271	7.072	7.154	7.198	7.158	7.205
	7.289	6.989	7.244	7.339	7.304	7.216	7.099	7.069	7.384	7.154	7.172	7.330	7.163	7.176
	7.291	7.119	7.220	7.265	7.275	7.262	7.135	7.045	7.293	7.186	7.179	7.348	7.127	7.168
	7.194	7.036	7.259	7.295	7.242	7.307	7.238	6.930	7.226	7.123	7.245	7.111	7.112	7.209
	7.235	7.039	7.286	7.277	7.272	7.293	7.277	7.115	7.245	7.137	7.320	7.170	7.167	7.231
	7.285	7.117	7.186	7.309	7.243	7.263	7.246	7.042	7.197	7.142	7.117	7.099	7.099	7.195
	7.116	7.169	7.166	7.305	7.259	7.188	7.204	6.972	7.238	7.143	7.153	7.214	7.237	7.159
	7.274	7.105	7.169	7.190	7.227	7.166	7.280	7.173	7.184	7.267	7.166	7.123	7.258	7.160
	7.192	7.007	7.205	7.281	7.172	7.242	7.263	6.950	7.122	7.195	7.216	7.211	7.088	7.122
Average	7.234	7.061	7.218	7.295	7.237	7.218	7.226	7.031	7.237	7.145	7.181	7.199	7.155	7.182
Ratio	0.998	0.974	0.996	1.006	0.998	0.996	0.997	0.970	0.998	0.985	0.990	0.993	0.987	0.991

E28.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.1
	14	5.6	26.6	-0.2

	19	10.6	26.7	-0.3
	24	15.6	26.3	0.1
	28.4	20	26.4	0.0
	34	25.6	26.4	0.0
	39	30.6	26.4	0.0
	44	35.6	26.35	0.1
	48	39.6	26.2	0.2
		Average (Reference Elevation)	26.41	

E28.3. Calculated Reference Elevation.

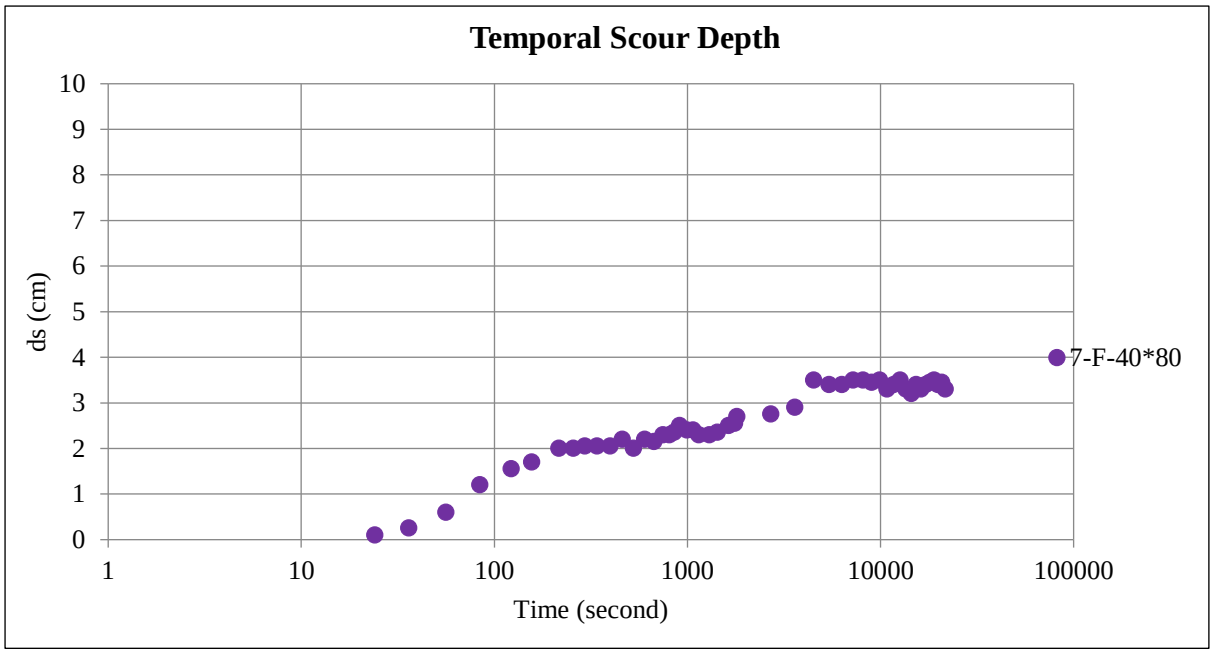


E28.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	**20**			**Reference (cm)**	**26.41**
Hours	**Minutes**	**Seconds**	**Total seconds**	**Z direction (cm)**	**Scour Depth (cm)**
0	0	24	24	26.3	0.11
0	0	36	36	26.15	0.26
0	0	56	56	25.8	0.61
0	1	24	84	25.2	1.21
0	2	2	122	24.85	1.56
0	2	36	156	24.7	1.71
0	3	36	216	24.4	2.01
0	4	16	256	24.4	2.01
0	4	54	294	24.35	2.06
0	5	40	340	24.35	2.06
0	6	37	397	24.35	2.06
0	7	39	459	24.2	2.21
0	8	45	525	24.4	2.01
0	10		600	24.2	2.21
0	11	11	671	24.25	2.16
0	12	26	746	24.1	2.31

0	13	25	805	24.1	2.31
0	14	13	853	24.05	2.36
0	15	11	911	23.9	2.51
0	16	33	993	24	2.41
0	17	49	1069	24	2.41
0	19	3	1143	24.1	2.31
0	21	35	1295	24.1	2.31
0	23	47	1427	24.05	2.36
0	27	10	1630	23.9	2.51
0	29	11	1751	23.85	2.56
0	30	0	1800	23.7	2.71
0	45	0	2700	23.65	2.76
1	0	0	3600	23.5	2.91
1	15	0	4500	22.9	3.51
1	30	0	5400	23	3.41
1	45	0	6300	23	3.41
2	0	0	7200	22.9	3.51
2	15	0	8100	22.9	3.51
2	30	0	9000	22.95	3.46
2	45	0	9900	22.9	3.51
3	0	0	10800	23.1	3.31
3	15	0	11700	23	3.41
3	30	0	12600	22.9	3.51
3	45	0	13500	23.1	3.31
4	0	0	14400	23.2	3.21
4	15	0	15300	23	3.41
4	30	0	16200	23.1	3.31
4	45	0	17100	23	3.41
5	0	0	18000	22.95	3.46
5	15	0	18900	22.9	3.51
5	30	0	19800	23	3.41
5	45	0	20700	22.95	3.46
6	0	0	21600	23.1	3.31

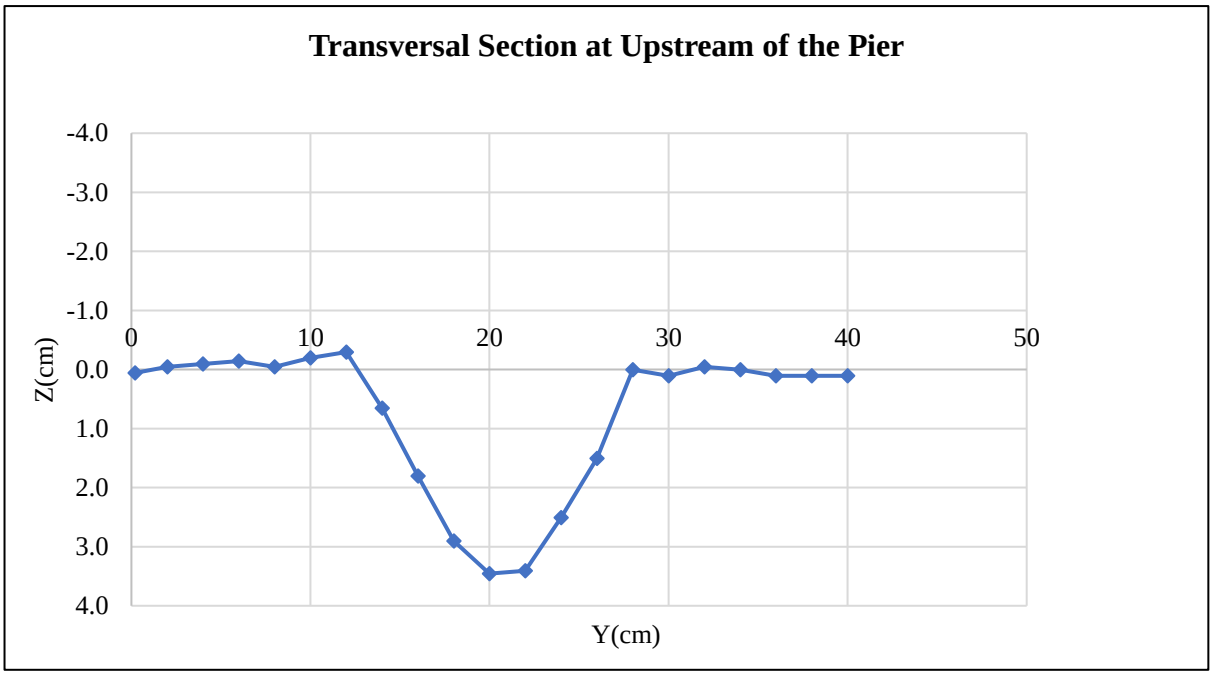
E28.5. Temporal Scour Depth measurements.



E28.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.35	0.1
	10.4	2	26.45	0.0
	12.4	4	26.5	-0.1
	14.4	6	26.55	-0.1
	16.4	8	26.45	0.0
	18.4	10	26.6	-0.2
	20.4	12	26.7	-0.3
	22.4	14	25.75	0.7
	24.4	16	24.6	1.8
	26.4	18	23.5	2.9
	28.4	20	22.95	3.5
	30.4	22	23	3.4
	32.4	24	23.9	2.5
	34.4	26	24.9	1.5
	36.4	28	26.4	0.0
	38.4	30	26.3	0.1
	40.4	32	26.45	0.0
	42.4	34	26.4	0.0
	44.4	36	26.3	0.1
	46.4	38	26.3	0.1
	48.4	40	26.3	0.1

E28.7. Recorded surveyed transversal section measurements.

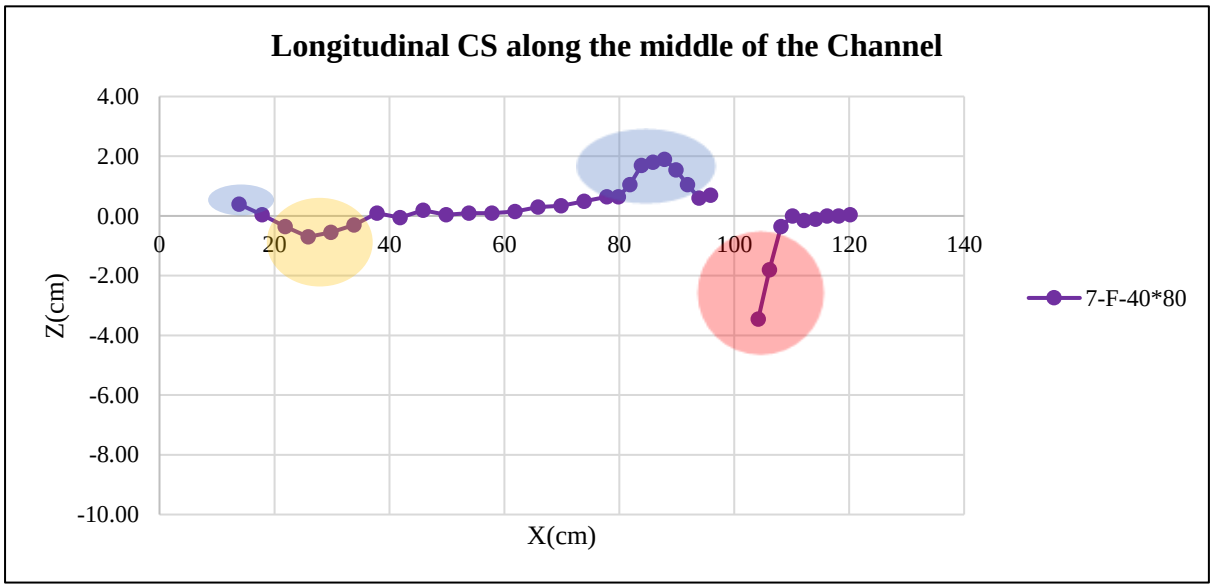


E28.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85		26.8	0.39
79.7	17.85		26.45	0.04
83.7	21.85		26.05	-0.36
87.7	25.85		25.7	-0.71
91.7	29.85		25.85	-0.56
95.7	33.85		26.1	-0.31
99.7	37.85		26.5	0.09
3.7	41.85		26.35	-0.06
7.7	45.85		26.6	0.19
11.7	49.85		26.45	0.04
15.7	53.85		26.5	0.09
19.7	57.85		26.5	0.09
23.7	61.85		26.55	0.14
27.7	65.85	28.4	26.7	0.29
31.7	69.85		26.75	0.34
35.7	73.85		26.9	0.49
39.7	77.85		27.05	0.64
41.7	79.85		27.05	0.64
43.7	81.85		27.45	1.04
45.7	83.85		28.1	1.69
47.7	85.85		28.2	1.79
49.7	87.85		28.3	1.89
51.7	89.85		27.95	1.54
53.7	91.85		27.45	1.04
55.7	93.85		27	0.59
57.7	95.85		27.1	0.69
61.85	100		The Middle of the Pier	

66	104.15		22.95	-3.46
68	106.15		24.6	-1.81
70	108.15		26.05	-0.36
72	110.15		26.4	-0.01
74	112.15		26.25	-0.16
76	114.15		26.3	-0.11
78	116.15		26.4	-0.01
80	118.15		26.4	-0.01
82	120.15		26.45	0.04

E28.9. Recorded surveyed longitudinal section measurements.



E28.10. Visual representation of the surveyed longitudinal section measurements. The red circle indicates the critical area of scouring at 1 cm upstream edge of the pier, the blue ovals are indicating the accumulated eroded sediments in the downstream of the pier, the yellow circle is indicating the scouring after the net.

Cross-sections	A1	A2	L (distance btw A1 & A2)	Volume
1	80.92	7.33	17.00	750.09
2	7.33	0.00	8.47	31.05
3	0.00	-2.19	2.53	-2.76
4	-2.19	-5.29	24.00	-89.73
5	-5.29	-25.36	13.00	-199.22
6	-25.36	-7.85	6.70	-111.25
7	-7.85	0.00	0.76	-2.98
8	0.00	35.01	3.39	59.34
9	35.01	31.57	4.15	138.16
10	31.57	-0.48	5.00	77.72
11	-0.48	0.00	1.15	-0.28
12	0.00	1.62	3.85	3.11
13	1.62	0.47	10.00	10.41
Total Scour volume	**Positive Volume**	**Negative Volume**	**Downstream Volume**	**Upstream Volume**
663.66	1069.60	-406.22	434.54	229.12

E28.11. Calculated volume.

Experiment 29 (7-F-20*60)

20*60 (7mm)		
Anchorage	**Position**	**Nails number**
	Along the length	2*7
	Along the width	2*3
	Around pier	4

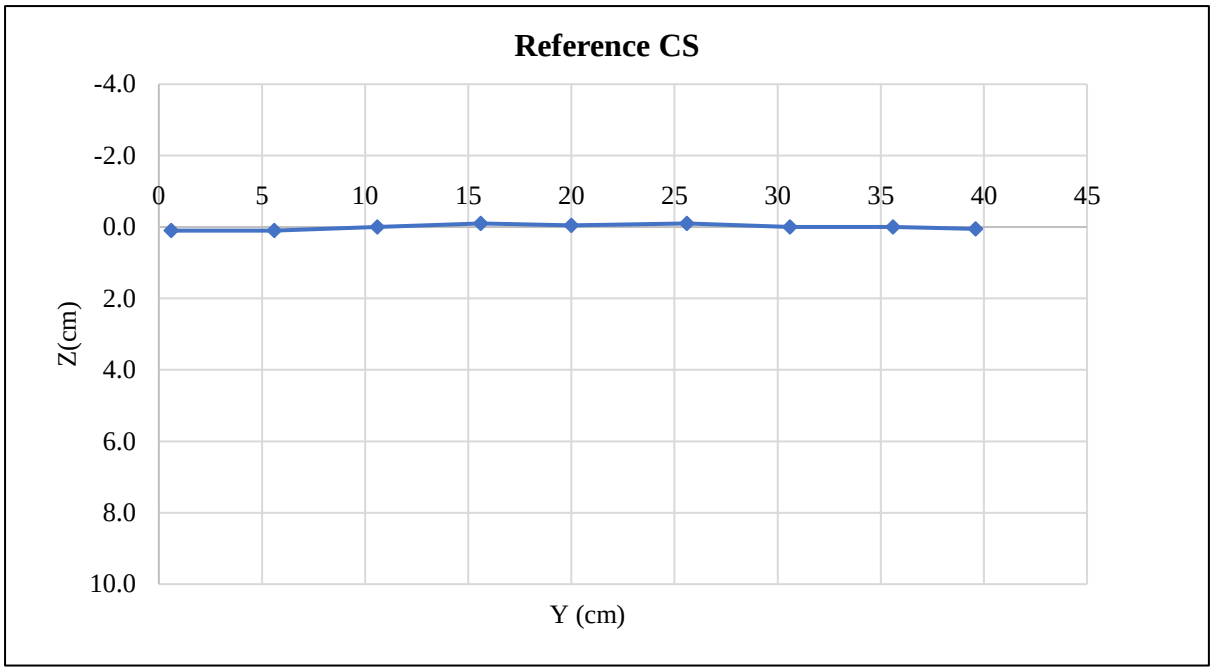
E29.1. Anchorage characteristics, including nail's position and quantity.

T(min)	0	10	30	60	90	120	150	180	210	240	270	300	330	360
Discharge (l/s)	7.128	6.958	7.307	7.224	7.025	7.142	7.103	7.005	7.139	7.143	7.166	7.052	7.179	7.129
	7.216	6.925	7.212	7.286	6.998	7.124	7.156	7.172	7.088	7.042	7.244	7.044	7.136	7.186
	7.258	6.889	7.191	7.333	7.095	7.277	7.078	7.129	7.117	7.159	7.181	7.158	7.286	7.275
	7.284	6.996	7.246	7.275	7.086	7.129	7.116	7.103	7.244	7.076	7.002	7.199	7.312	7.244
	7.167	7.003	7.227	7.262	7.128	7.065	7.064	7.121	7.145	7.156	7.174	7.129	7.143	7.174
	7.125	6.972	7.301	7.211	7.225	7.042	7.125	7.306	7.053	7.195	7.098	7.158	7.102	7.240
	7.201	6.998	7.159	7.259	7.199	7.155	7.137	7.138	7.178	7.197	7.187	7.096	7.182	7.245
	7.123	6.875	7.254	7.175	7.153	7.140	7.177	7.154	7.138	7.216	7.233	7.173	7.054	7.211
	7.127	6.902	7.317	7.336	7.244	7.195	7.117	7.016	7.005	7.160	7.236	7.102	7.169	7.124
	7.110	6.775	7.267	7.293	7.191	7.224	7.072	7.146	7.164	7.179	7.178	7.169	7.223	7.067
Average	7.174	6.929	7.248	7.265	7.134	7.149	7.115	7.129	7.127	7.152	7.170	7.128	7.179	7.190
Ratio	0.990	0.956	1.000	1.002	0.984	0.986	0.981	0.983	0.983	0.987	0.989	0.983	0.990	0.992

E29.2. Recorded Discharge Values at Different Time Intervals with 10 Consecutive Measurements per Time Interval.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	9	0.6	26.3	0.1
	14	5.6	26.3	0.1
	19	10.6	26.4	0.0
	24	15.6	26.5	-0.1
	28.4	20	26.45	-0.1
	34	25.6	26.5	-0.1
	39	30.6	26.4	0.0
	44	35.6	26.4	0.0
	48	39.6	26.35	0.0
		Average (Reference Elevation)	26.40	

E29.3. Calculated Reference Elevation.

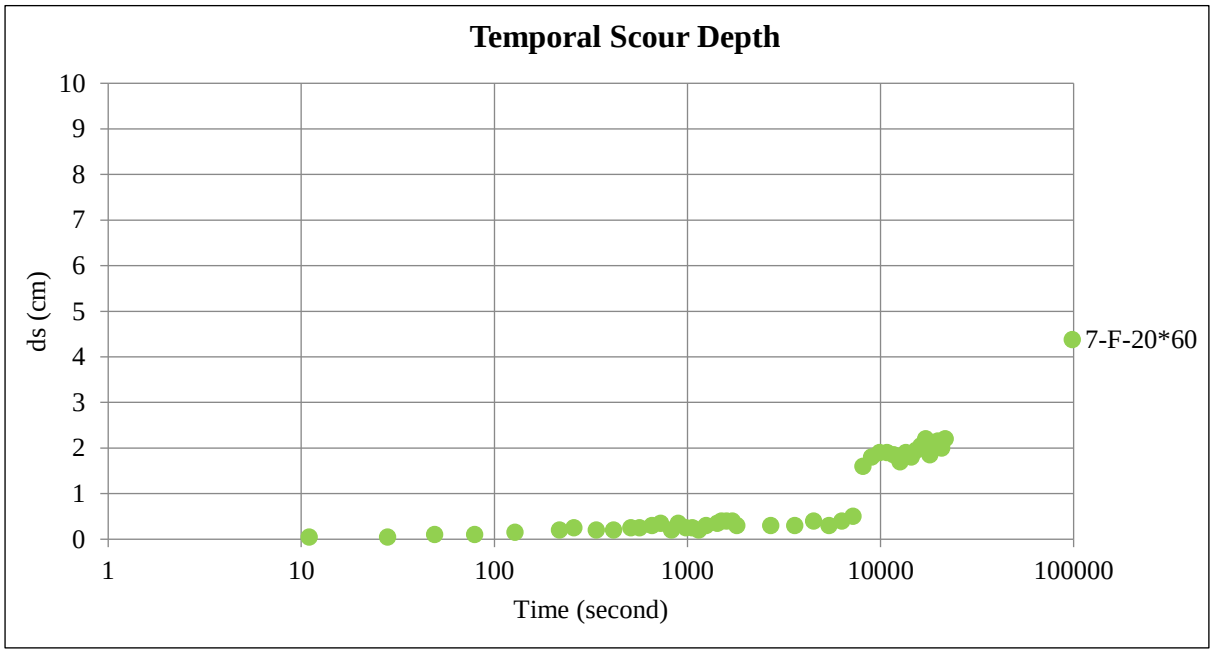


E29.4. Visual representation of the measured reference elevation.

Calibrated Y Mid-Point (cm)	20			Reference (cm)	26.40
Hours	Minutes	Seconds	Total seconds	Z direction (cm)	Scour Depth (cm)
0	0	11	11	26.35	0.05
0	0	28	28	26.35	0.05
0	0	49	49	26.3	0.10
0	1	19	79	26.3	0.10
0	2	8	128	26.25	0.15
0	3	37	217	26.2	0.20
0	4	18	258	26.15	0.25
0	5	37	337	26.2	0.20
0	6	55	415	26.2	0.20
0	8	30	510	26.15	0.25
0	9	25	565	26.15	0.25
0	10	56	656	26.1	0.30
0	12	5	725	26.05	0.35
0	13	48	828	26.2	0.20
0	14	55	895	26.05	0.35
0	16	20	980	26.15	0.25
0	17	39	1059	26.15	0.25
0	19	5	1145	26.2	0.20
0	20	50	1250	26.1	0.30
0	23	45	1425	26.05	0.35
0	25	1	1501	26	0.40
0	26	35	1595	26	0.40
0	28	27	1707	26	0.40
0	30	0	1800	26.1	0.30
0	45	0	2700	26.1	0.30
1	0	0	3600	26.1	0.30

1	15	0	4500	26	0.40
1	30	0	5400	26.1	0.30
1	45	0	6300	26	0.40
2	0	0	7200	25.9	0.50
2	15	0	8100	24.8	1.60
2	30	0	9000	24.6	1.80
2	45	0	9900	24.5	1.90
3	0	0	10800	24.5	1.90
3	15	0	11700	24.55	1.85
3	30	0	12600	24.7	1.70
3	45	0	13500	24.5	1.90
4	0	0	14400	24.6	1.80
4	15	0	15300	24.45	1.95
4	30	0	16200	24.35	2.05
4	45	0	17100	24.2	2.20
5	0	0	18000	24.55	1.85
5	15	0	18900	24.35	2.05
5	30	0	19800	24.25	2.15
5	45	0	20700	24.4	2.00
6	0	0	21600	24.2	2.20

E29.5. Temporal Scour Depth measurements.

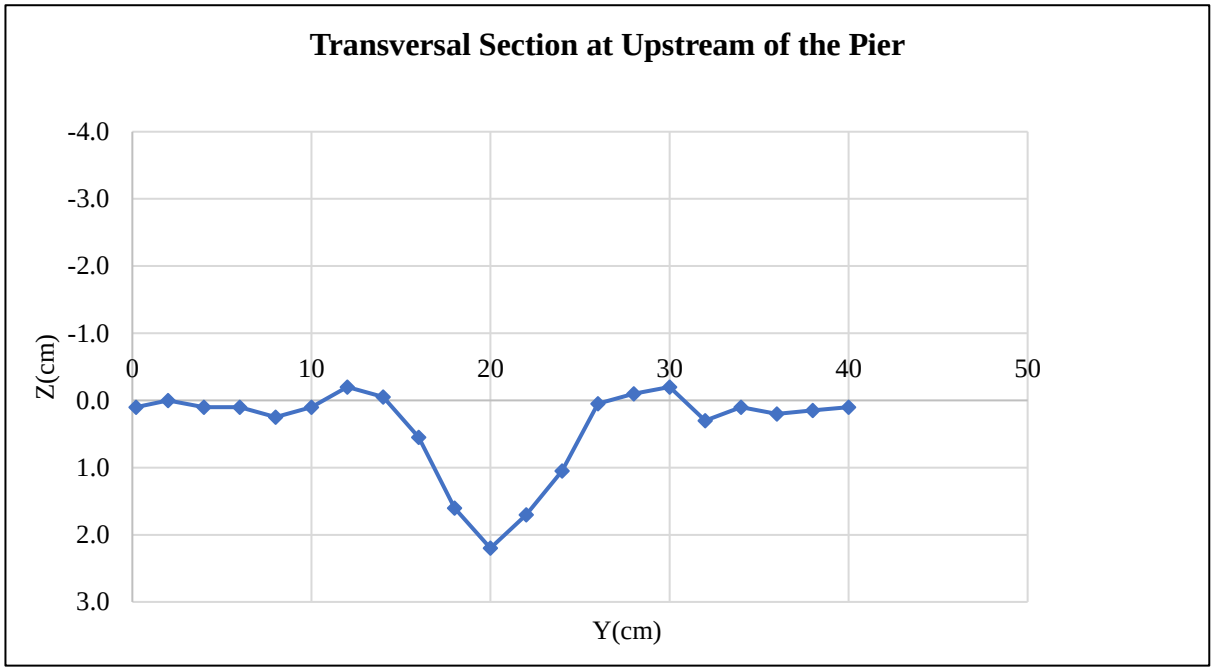


E29.6. Visual representation of the temporal scour depth.

Calibrated X Direction (cm)	Y Direction (cm)	Calibrated Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
104.15	8.6	0.2	26.3	0.1
	10.4	2	26.4	0.0
	12.4	4	26.3	0.1
	14.4	6	26.3	0.1
	16.4	8	26.15	0.3
	18.4	10	26.3	0.1

	20.4	12	26.6	-0.2
	22.4	14	26.45	-0.1
	24.4	16	25.85	0.5
	26.4	18	24.8	1.6
	28.4	20	24.2	2.2
	30.4	22	24.7	1.7
	32.4	24	25.35	1.1
	34.4	26	26.35	0.0
	36.4	28	26.5	-0.1
	38.4	30	26.6	-0.2
	40.4	32	26.1	0.3
	42.4	34	26.3	0.1
	44.4	36	26.2	0.2
	46.4	38	26.25	0.1
	48.4	40	26.3	0.1

E29.7. Recorded surveyed transversal section measurements.



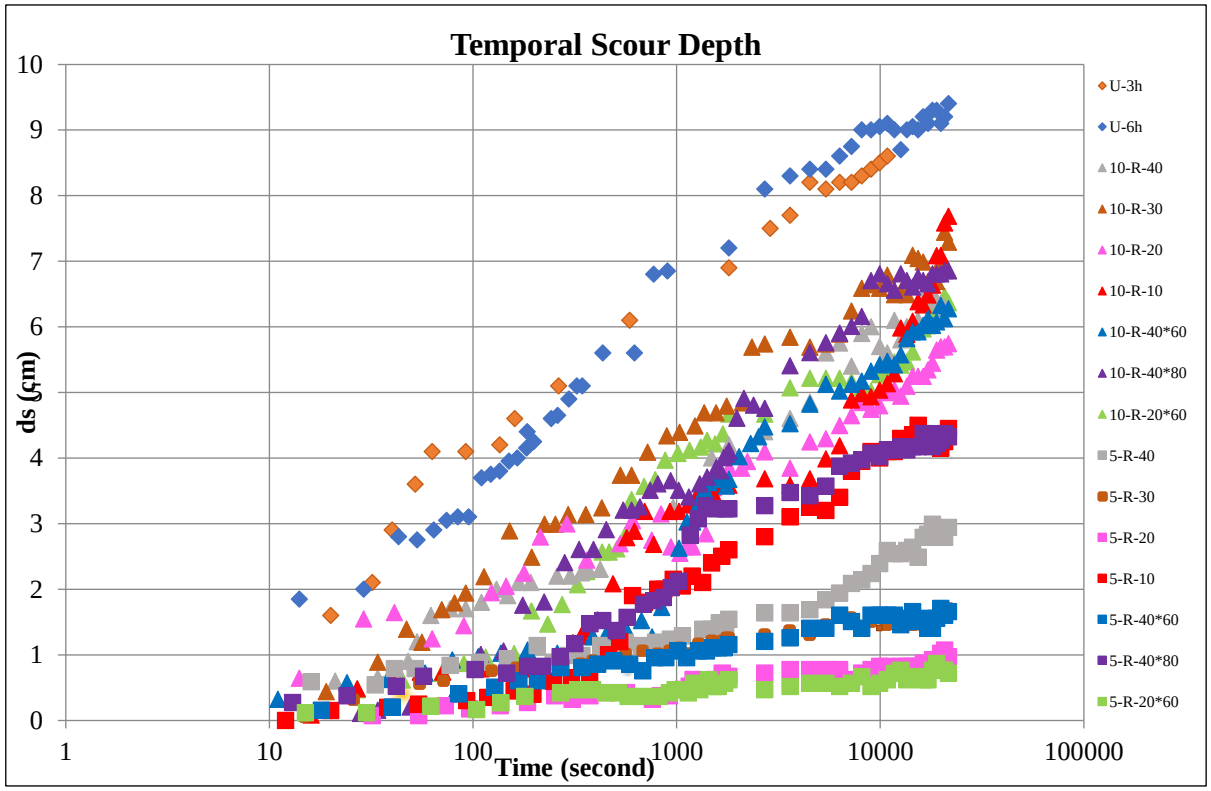
E29.8. Visual representation of the surveyed transversal section measurements.

X Direction (cm)	Calibrated X Direction (cm)	Y Direction (cm)	Z Direction (cm)	Scour Depth (cm)
75.7	13.85	28.4	26.40	0.00
79.7	17.85		26.45	0.05
83.7	21.85		26.6	0.20
87.7	25.85		26.7	0.30
91.7	29.85		26.75	0.35
95.7	33.85		26.7	0.30
99.7	37.85		26.65	0.25
3.7	41.85		26.7	0.30
7.7	45.85		26.2	-0.20
11.7	49.85		26	-0.40

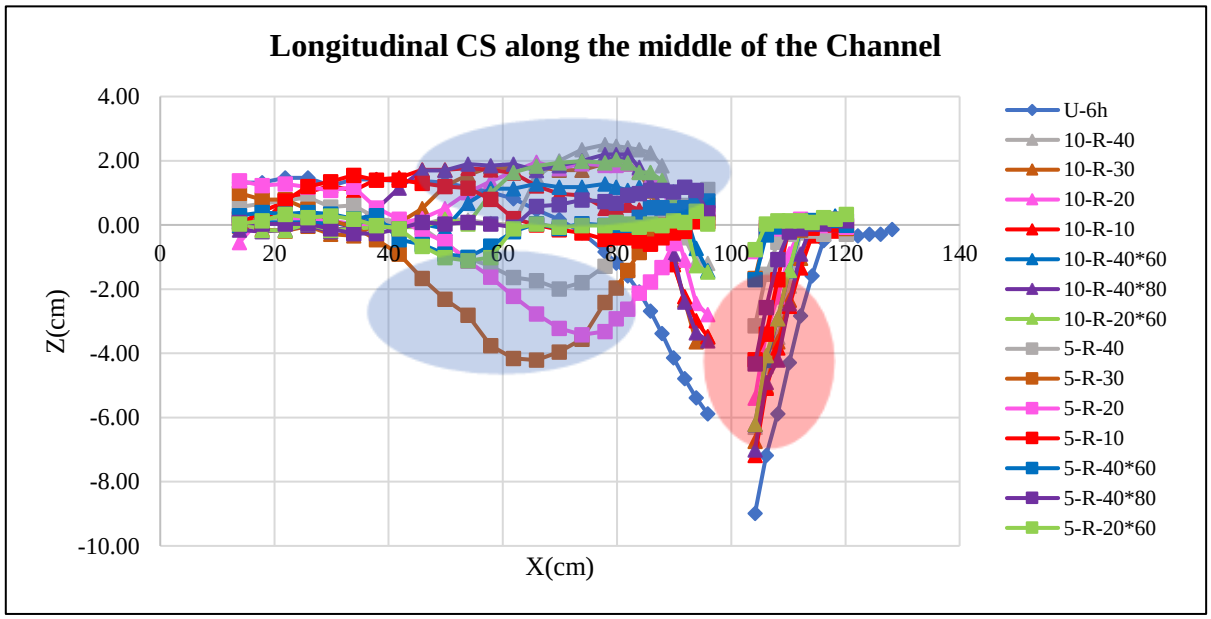
15.7	53.85		25.7	-0.70
19.7	57.85		25.4	-1.00
23.7	61.85		26.1	-0.30
27.7	65.85		26.6	0.20
31.7	69.85		26.5	0.10
35.7	73.85		26.45	0.05
39.7	77.85		26.85	0.45
41.7	79.85		26.9	0.50
43.7	81.85		26.85	0.45
45.7	83.85		27.25	0.85
47.7	85.85		27.5	1.10
49.7	87.85		27.85	1.45
51.7	89.85		27.7	1.30
53.7	91.85		27.25	0.85
55.7	93.85		26.8	0.40
57.7	95.85		26.85	0.45
61.85	100		The Middle of the Pier	
66	104.15		24.2	-2.20
68	106.15		25.5	-0.90
70	108.15		26.65	0.25
72	110.15		26.5	0.10
74	112.15		26.6	0.20
76	114.15		26.45	0.05
78	116.15		26.45	0.05
80	118.15		26.45	0.05
82	120.15		26.45	0.05

E29.9. Recorded surveyed longitudinal section measurements.

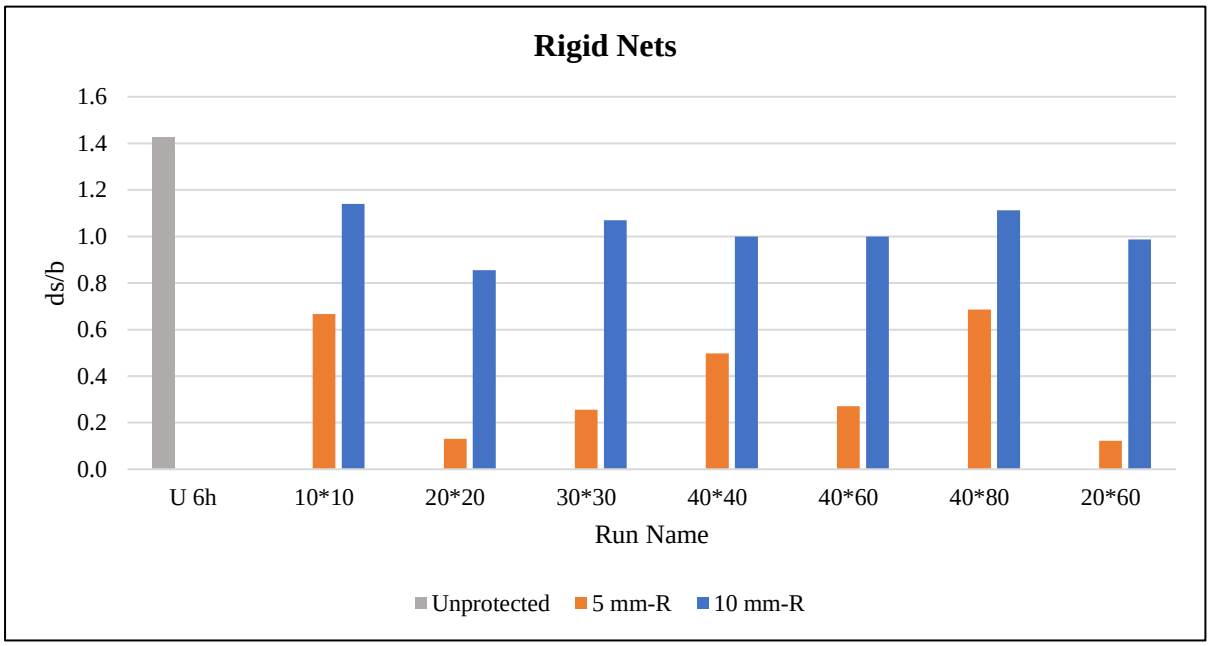
E30-Comparison among flexible (coarse and fine mesh) nets, and unprotected test (6h)



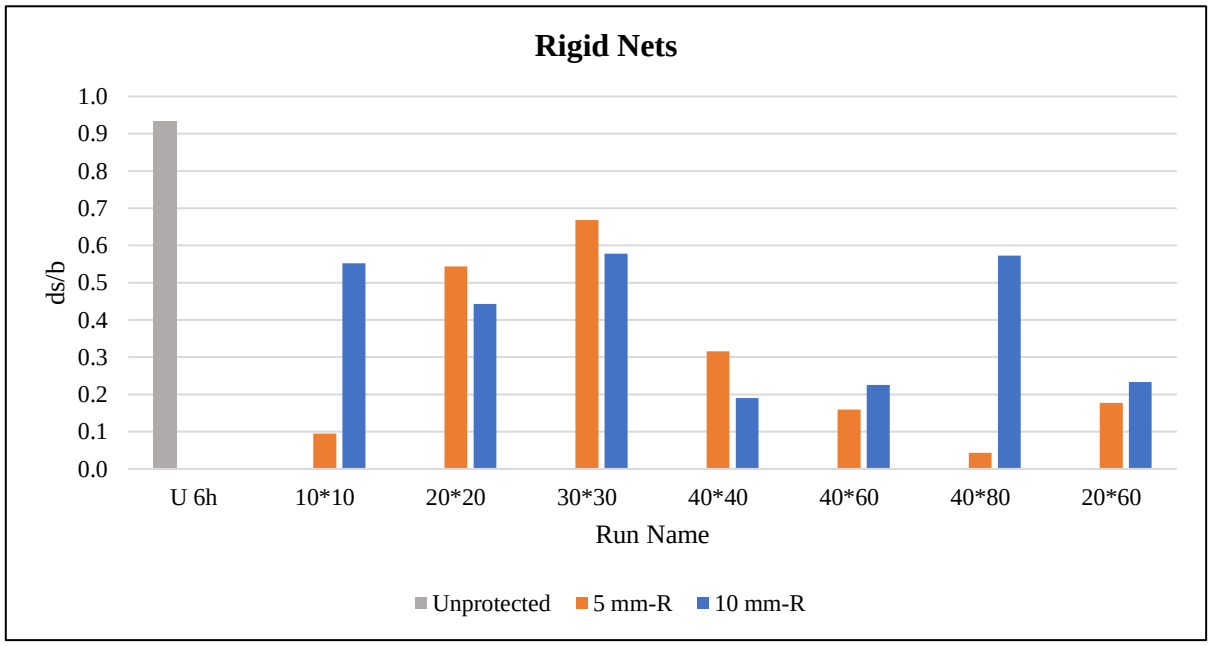
E30.1. Visual comparison of the temporal scour depth.



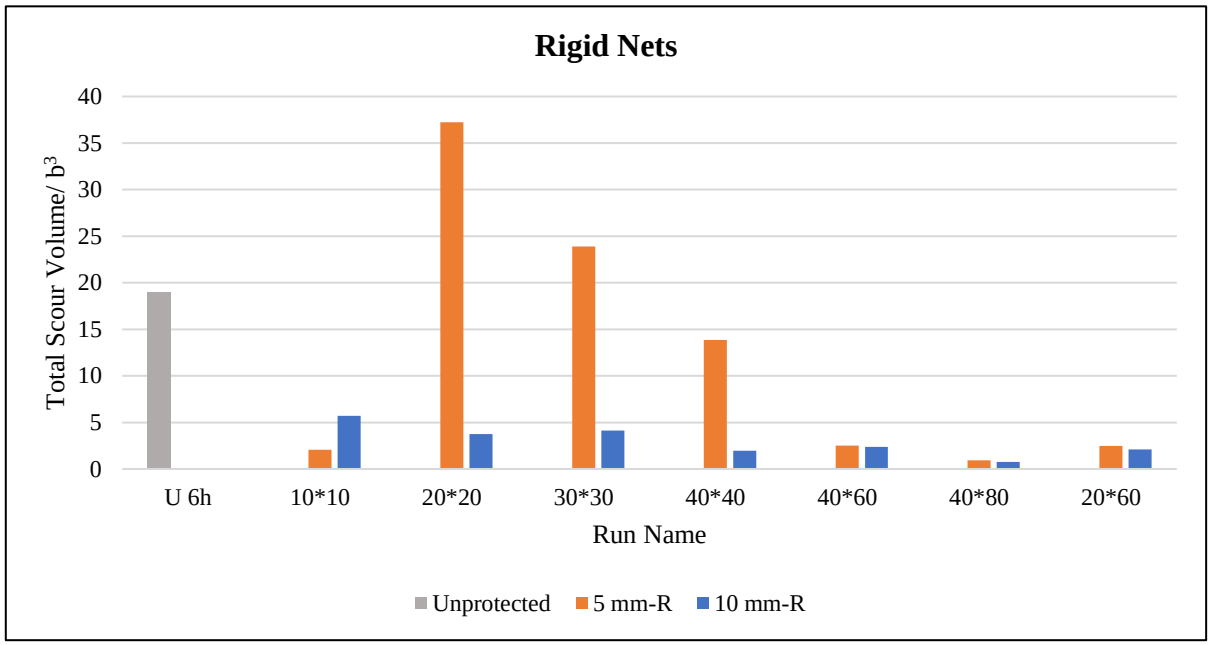
E30.2. Visual comparison of the longitudinal profiles. The red circle indicates the same trend of scouring upstream of the pier. The blue ovals are indicating the different trend of channel bed change in the downstream of the pier.



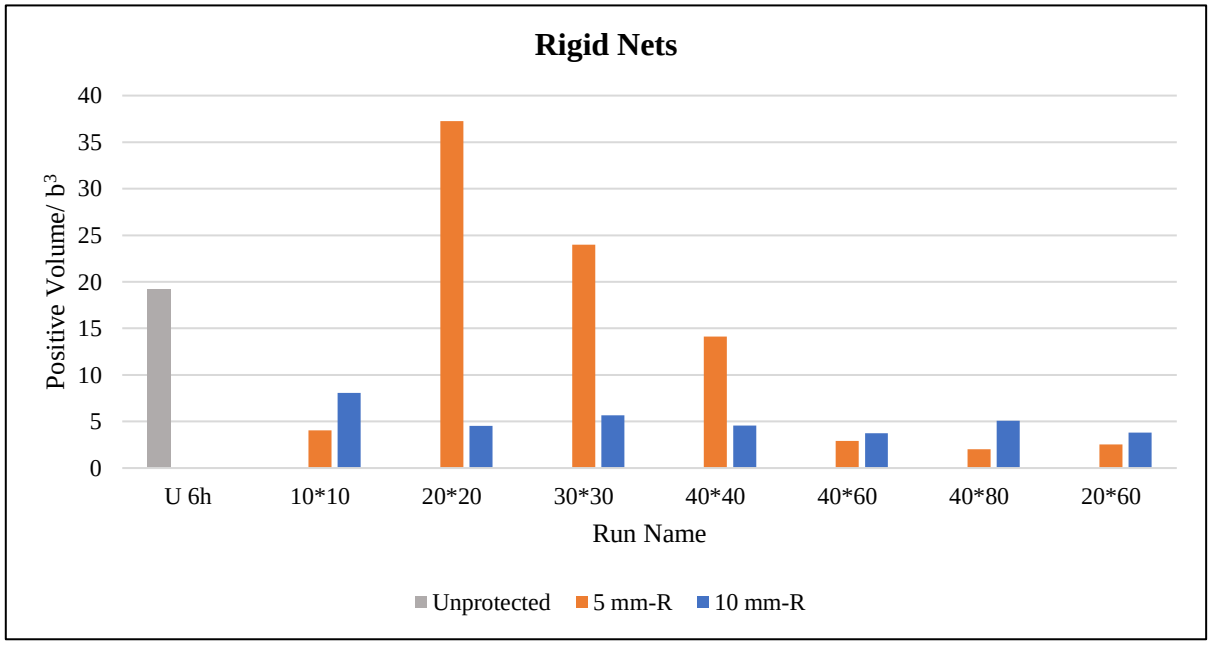
E30.3. Histogram comparison of the dimensionless upstream maximum scour depth.



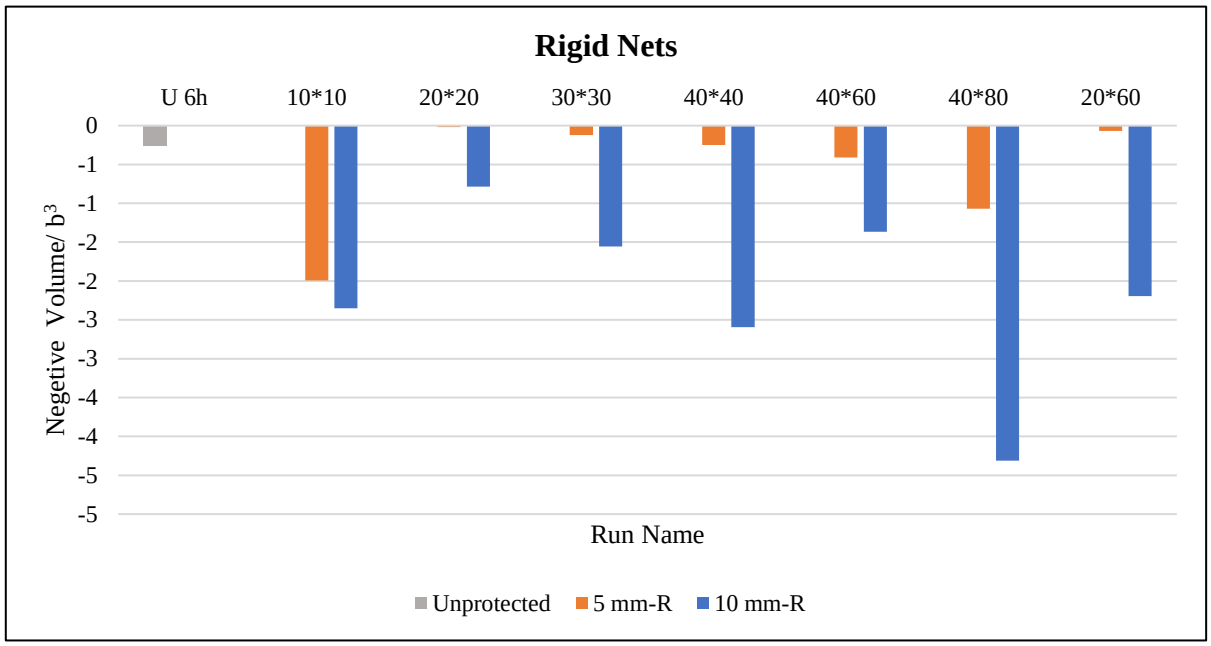
E30.4. Histogram comparison of the dimensionless downstream maximum scour depth.



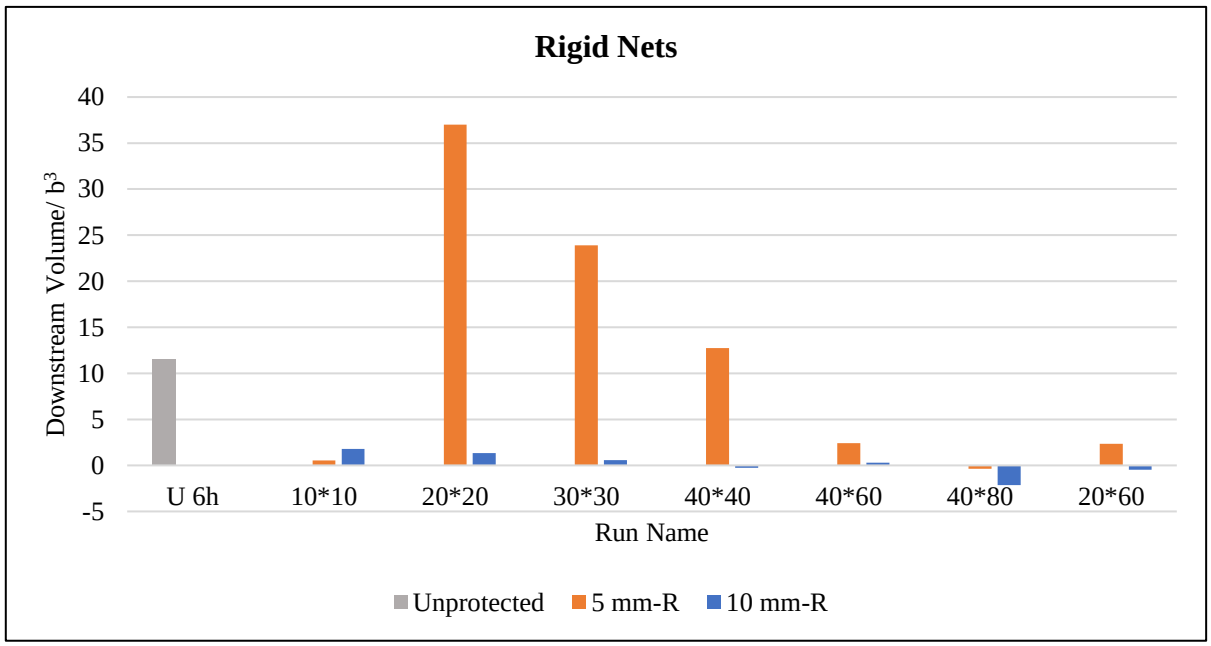
E30.5. Histogram comparison of the dimensionless total scour volume.



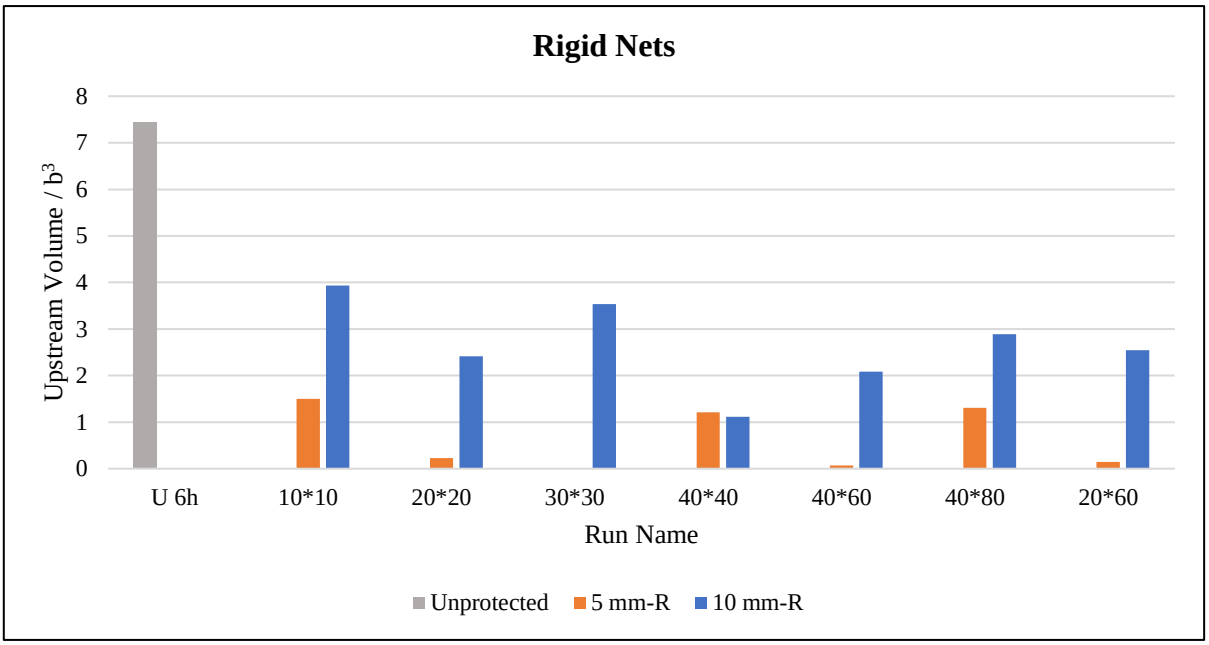
E30.6. Histogram comparison of the dimensionless positive scour volume.



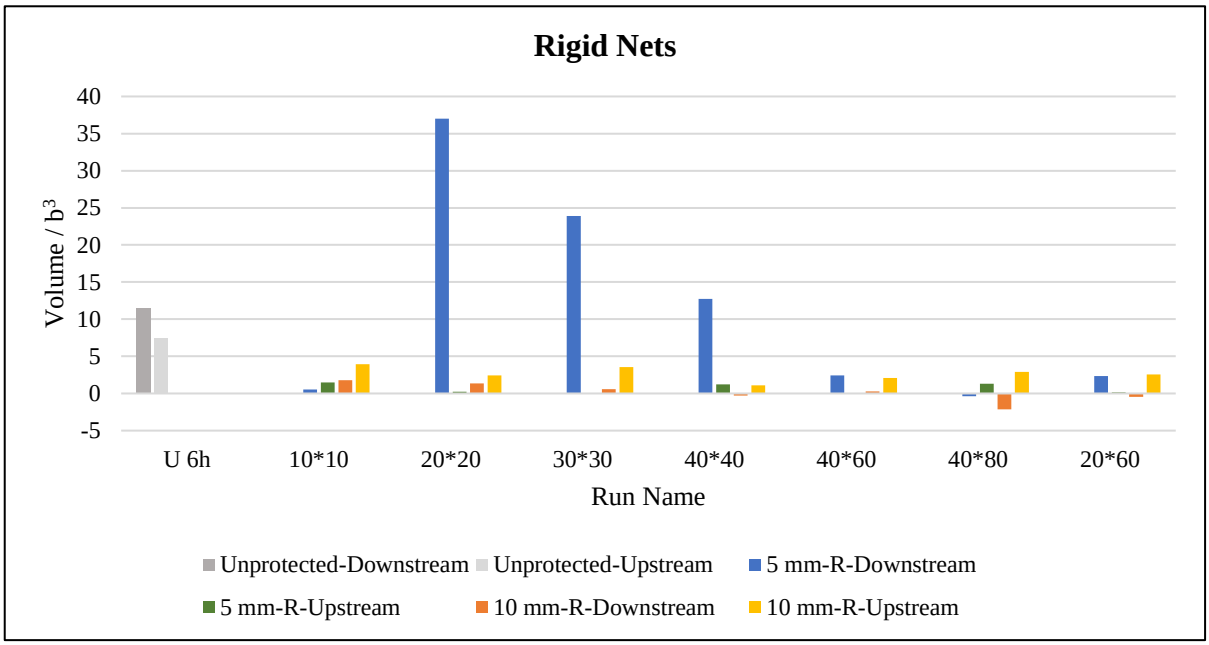
E30.7. Histogram comparison of the dimensionless negative scour volume.



E30.8. Histogram comparison of the dimensionless downstream scour volume.

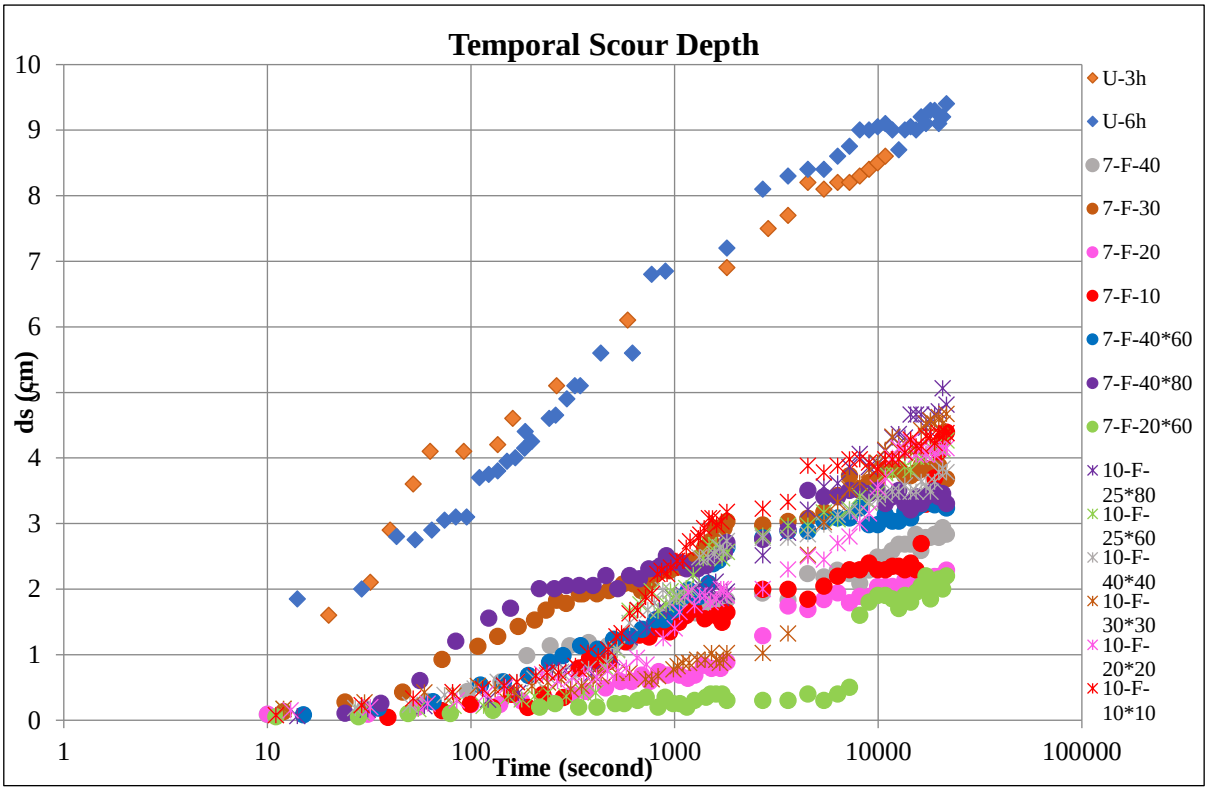


E30.9. Histogram comparison of the dimensionless upstream scour volume.

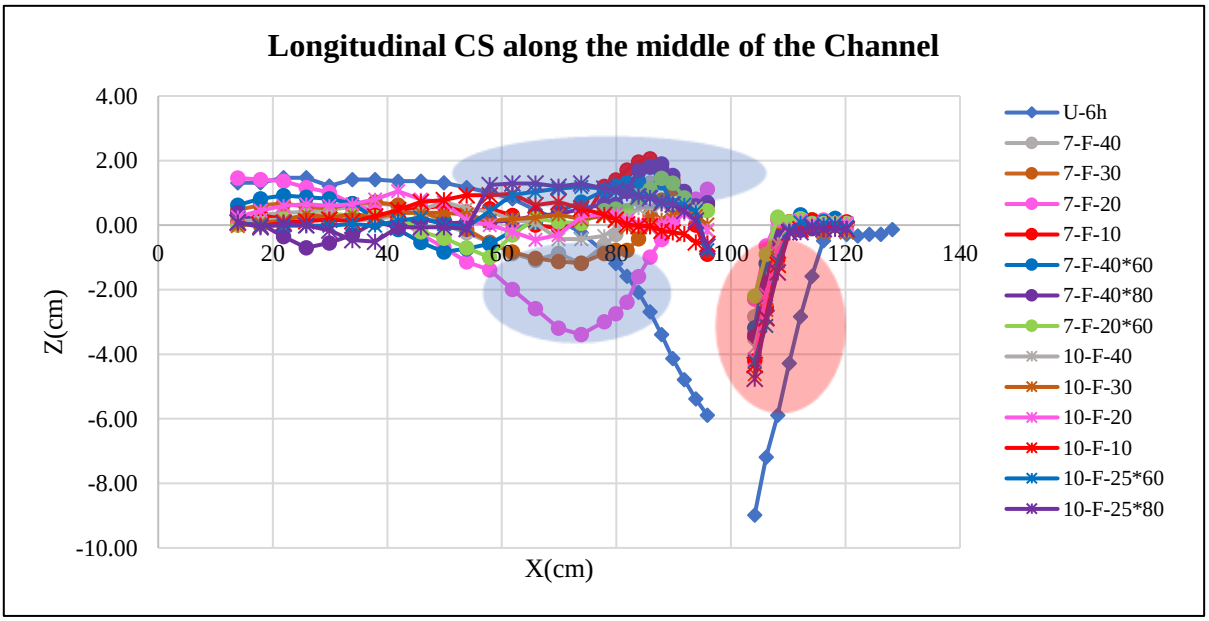


E30.10. Histogram comparison of the dimensionless up and downstream scour volume.

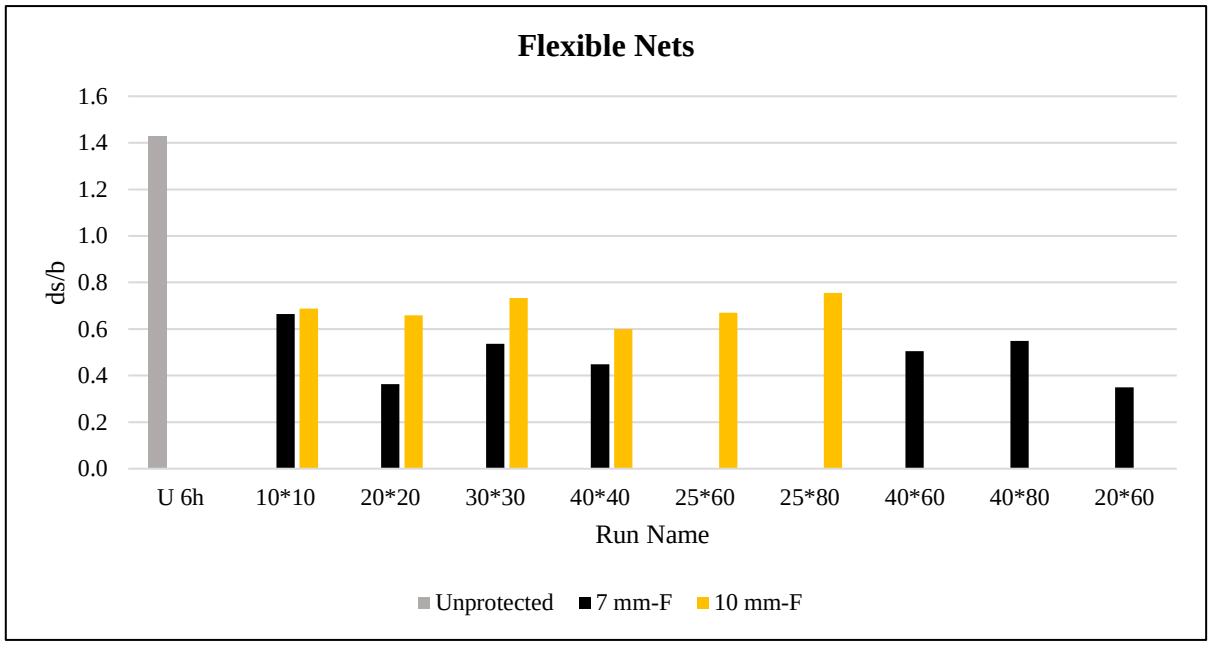
E31. Comparison among flexible (coarse and fine mesh) nets, and unprotected test (6h)



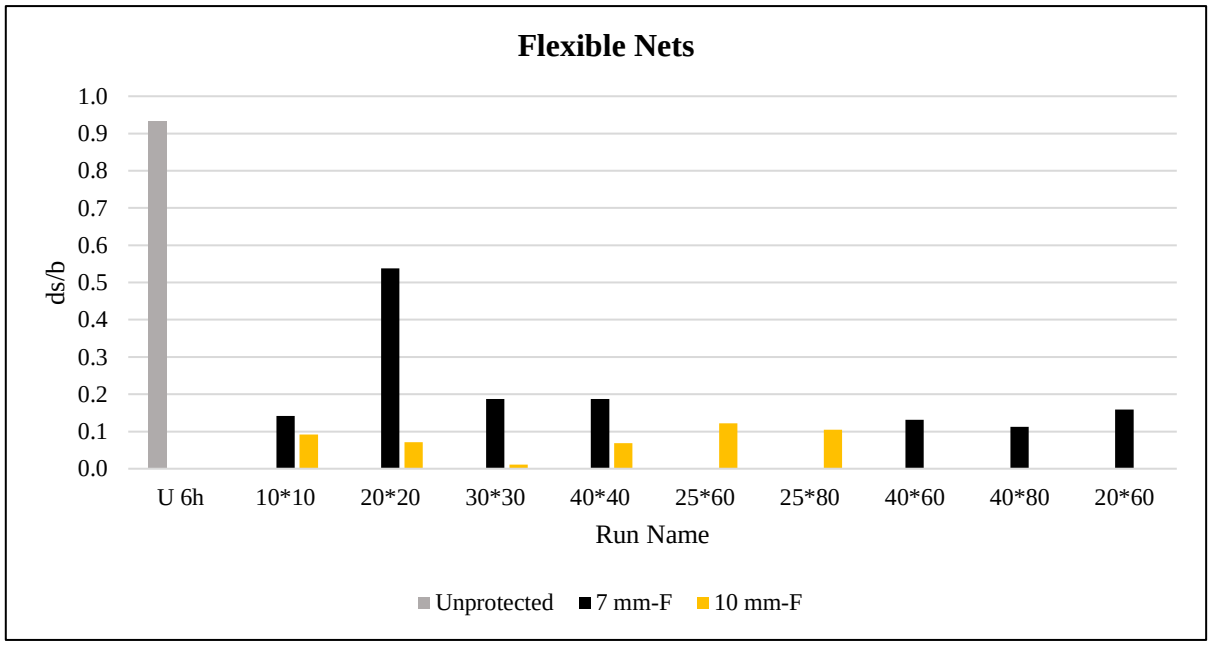
E31.1. Visual comparison of the temporal scour depth.



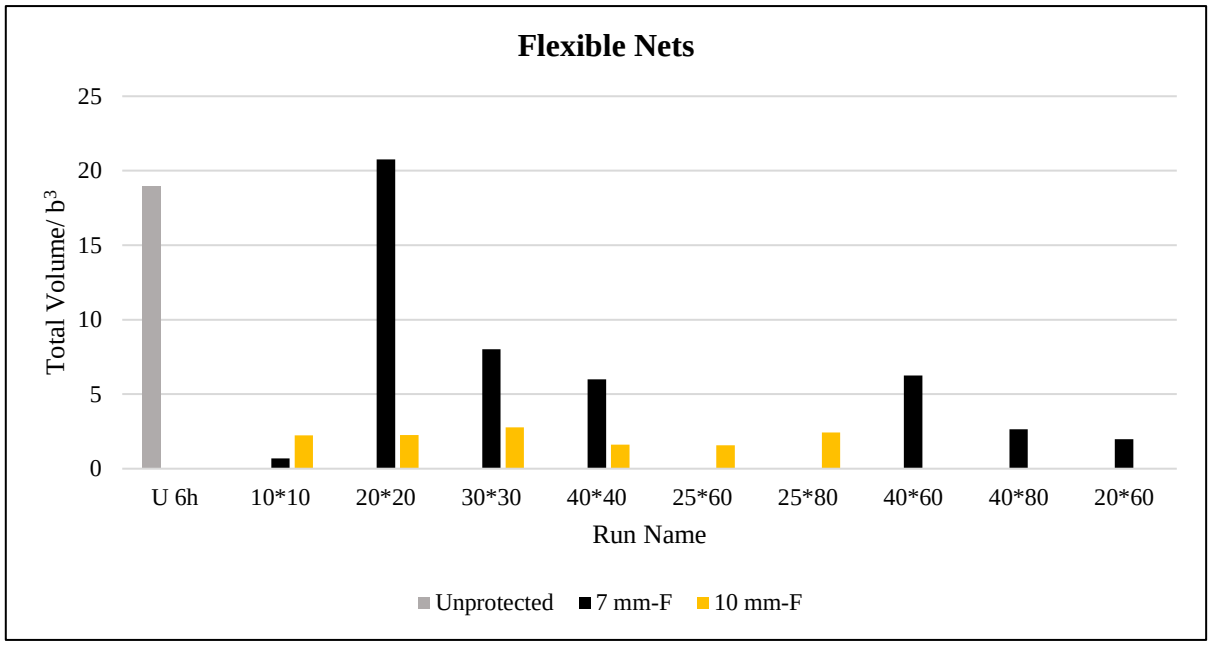
E31.2. Visual comparison of the longitudinal profiles. The red circle indicates the same trend of scouring at upstream of the pier. the blue ovals are indicating the different trend of channel bed change in the downstream of the pier.



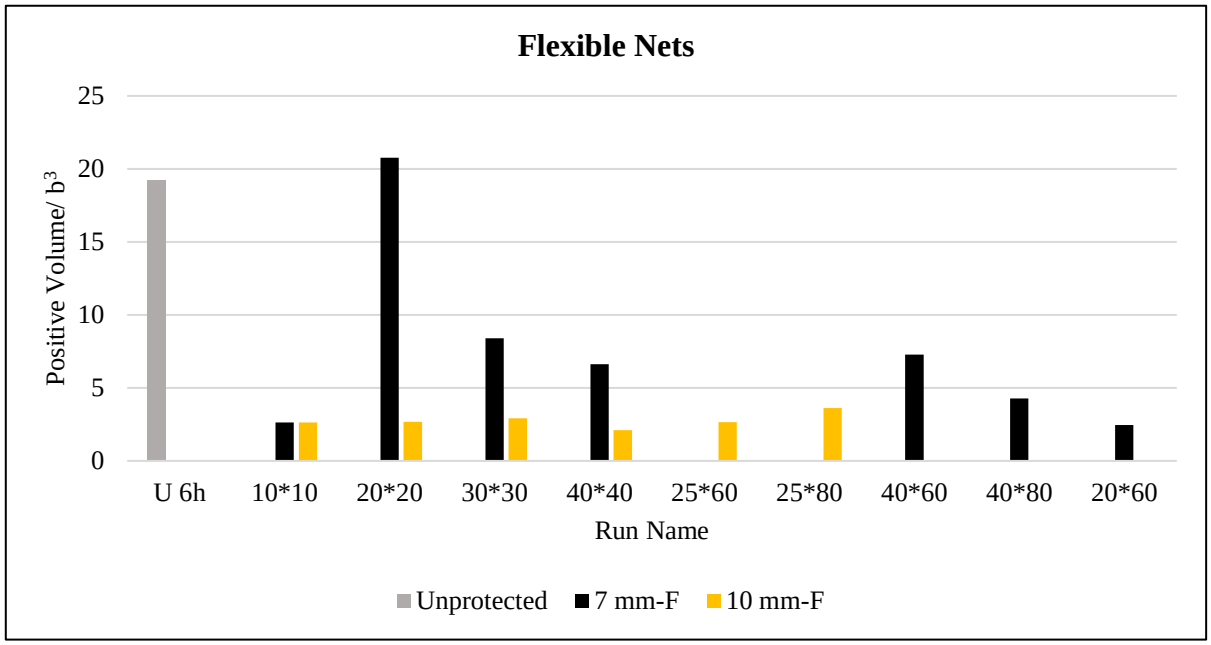
E31.3. Histogram comparison of the dimensionless upstream maximum scour depth.



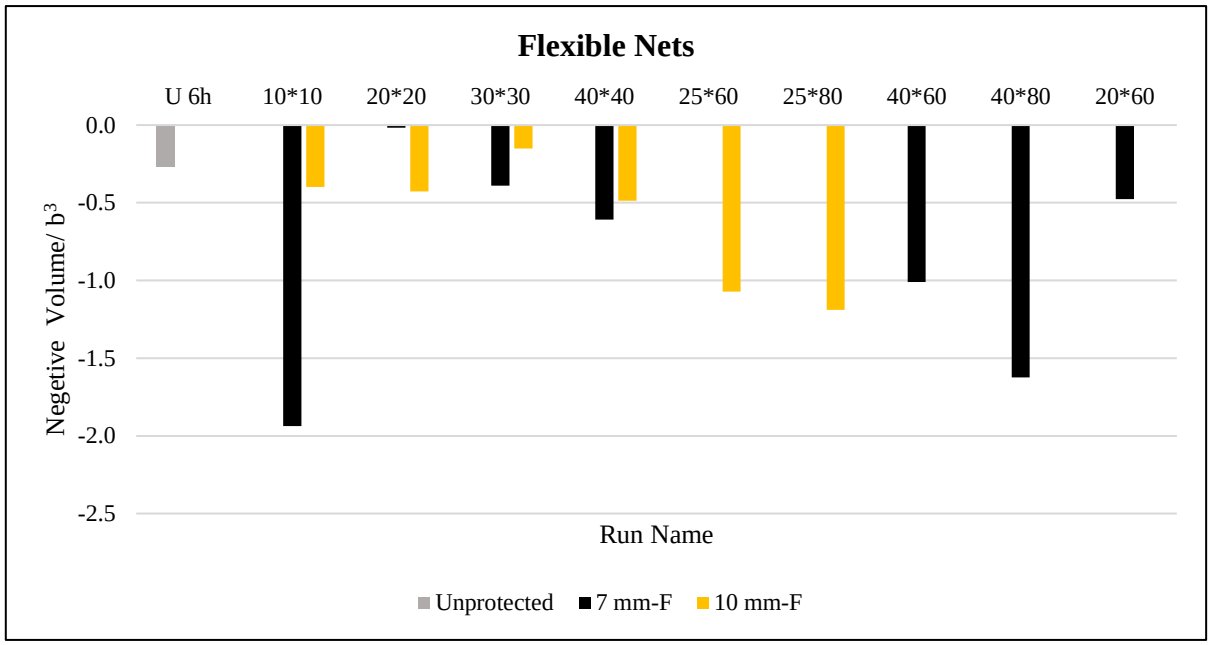
E31.4. Histogram comparison of the dimensionless downstream maximum scour depth.



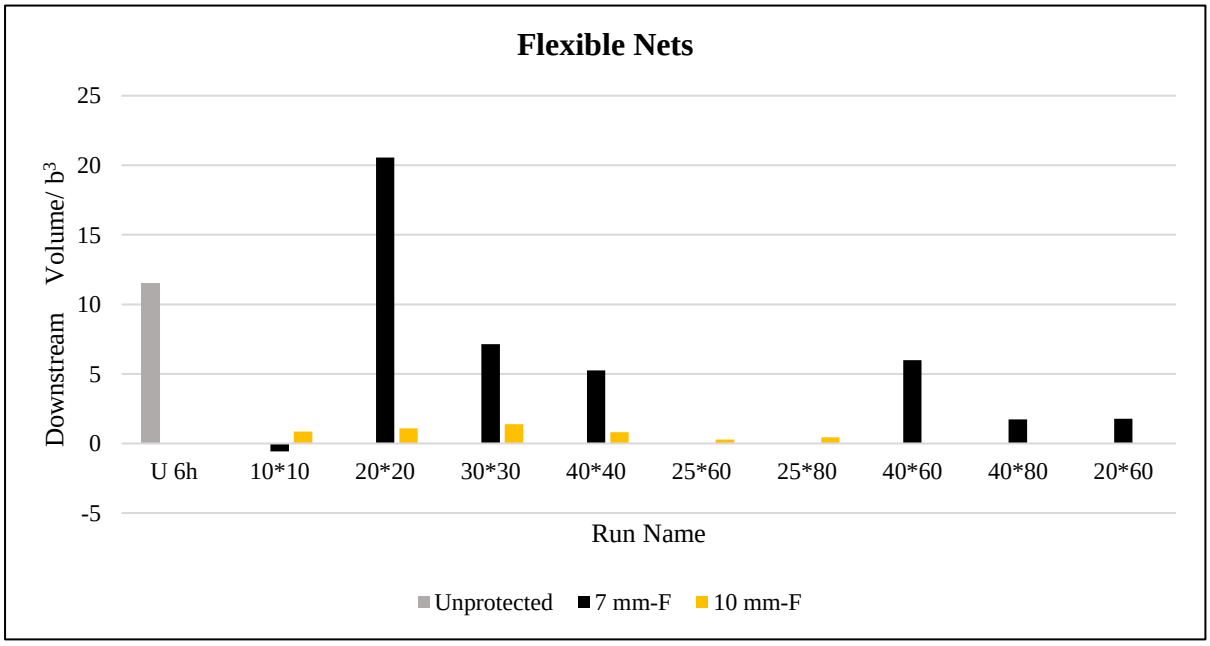
E31.5. Histogram comparison of the dimensionless total scour volume.



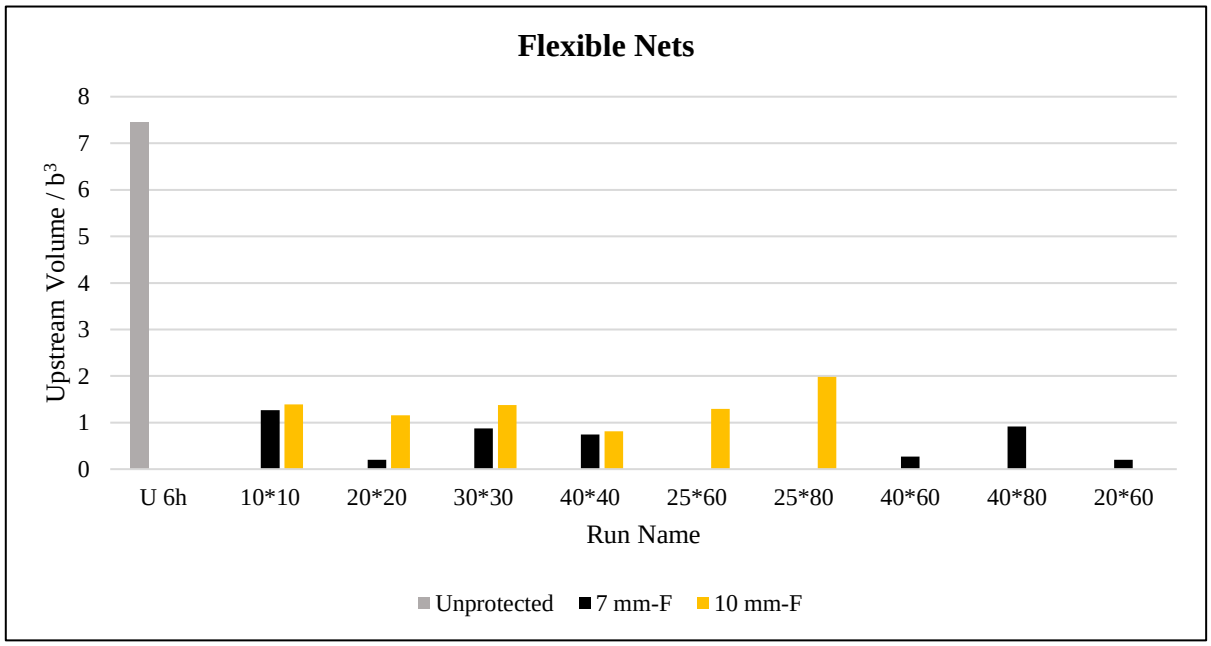
E31.6. Histogram comparison of the dimensionless positive scour volume



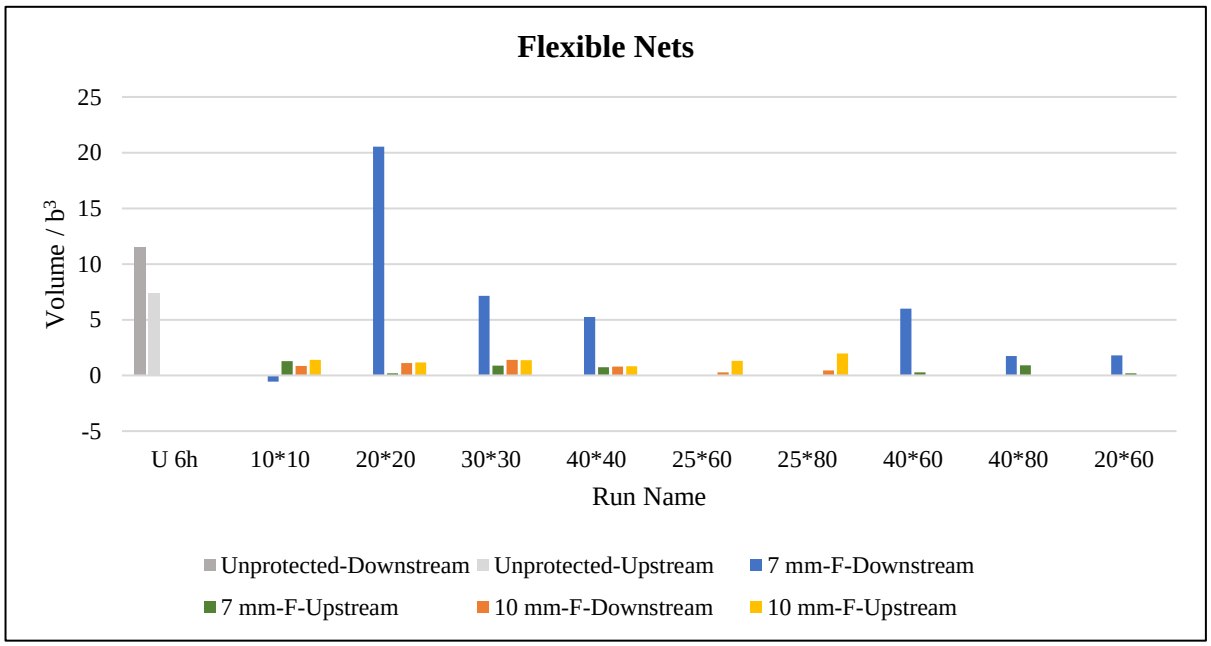
E31.7. Histogram comparison of the dimensionless negative scour volume



E31.8. Histogram comparison of the dimensionless downstream scour volume

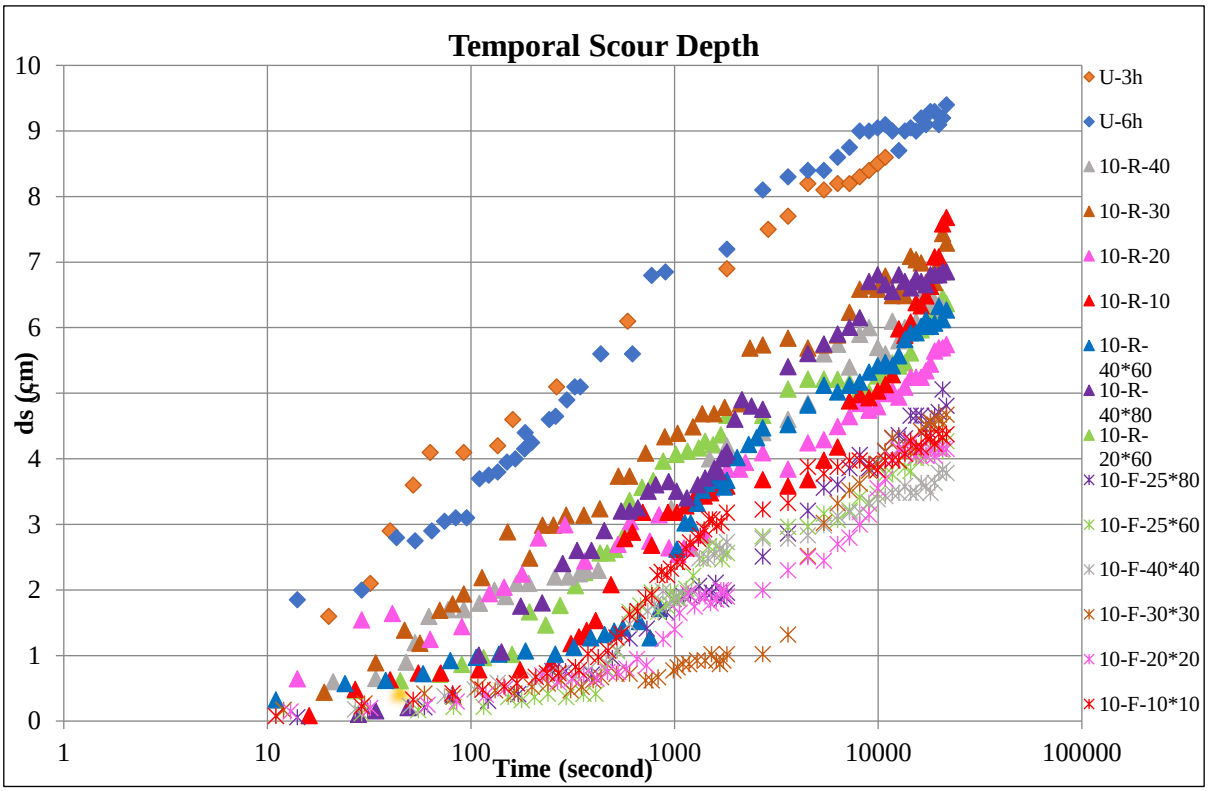


E31.9. Histogram comparison of the dimensionless upstream scour volume.

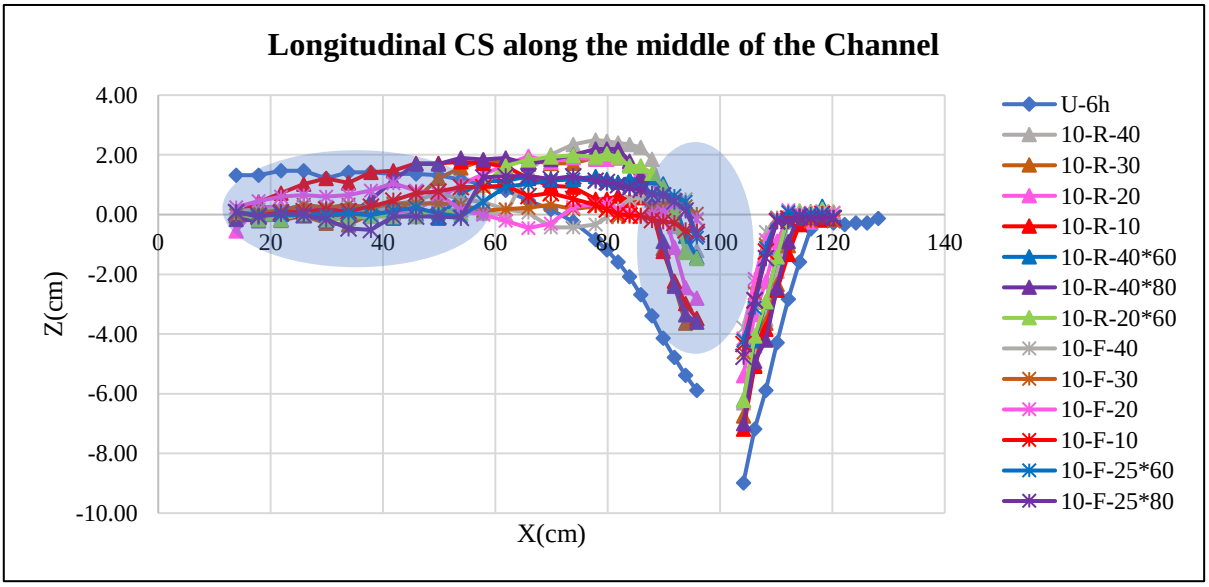


E31.10. Histogram comparison of the dimensionless up and downstream scour volume.

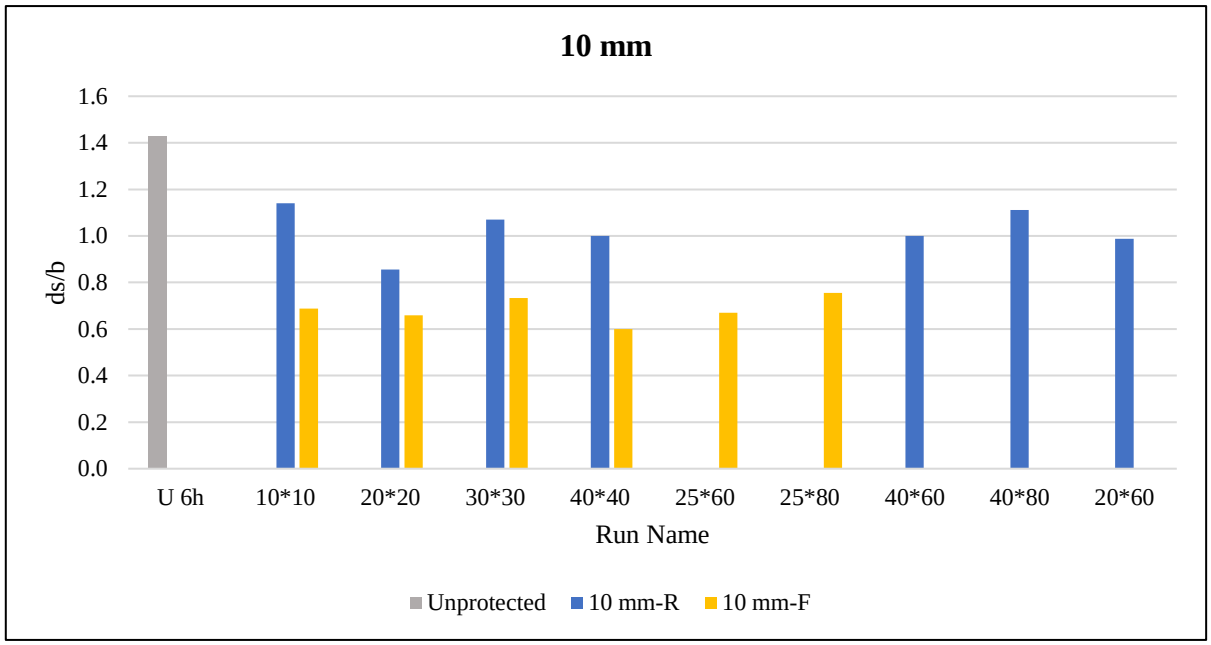
E32. Comparison between coarse (rigid and flexible) mesh nets.



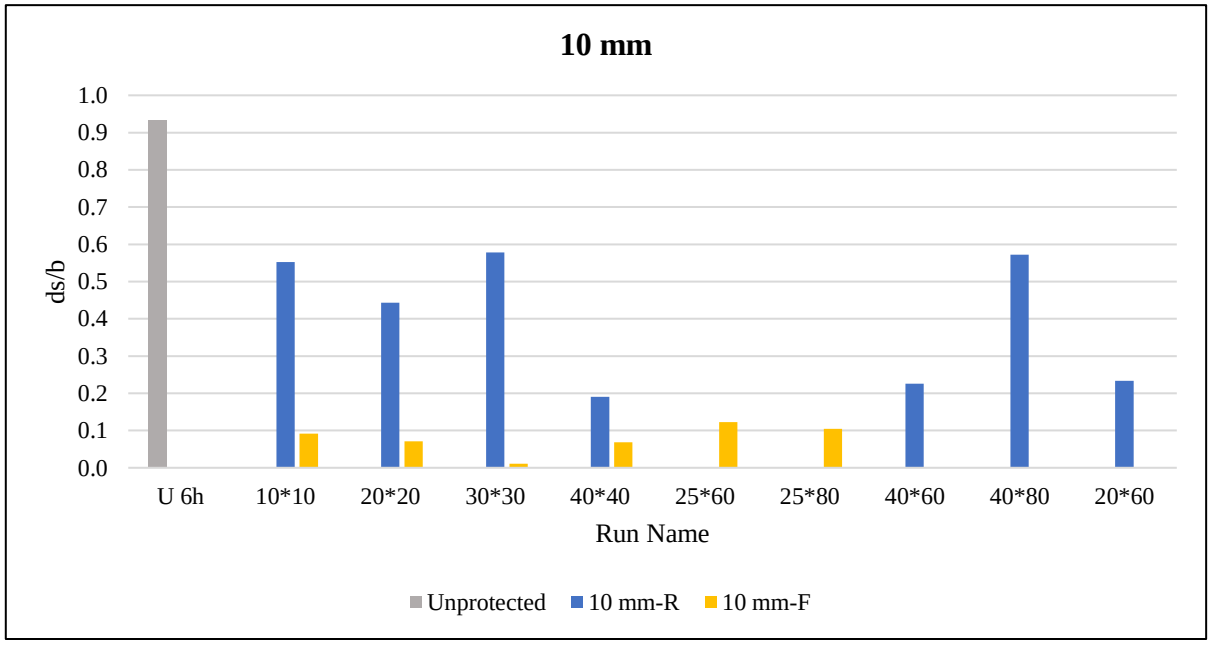
E32.1. Visual comparison of the temporal scour depth.



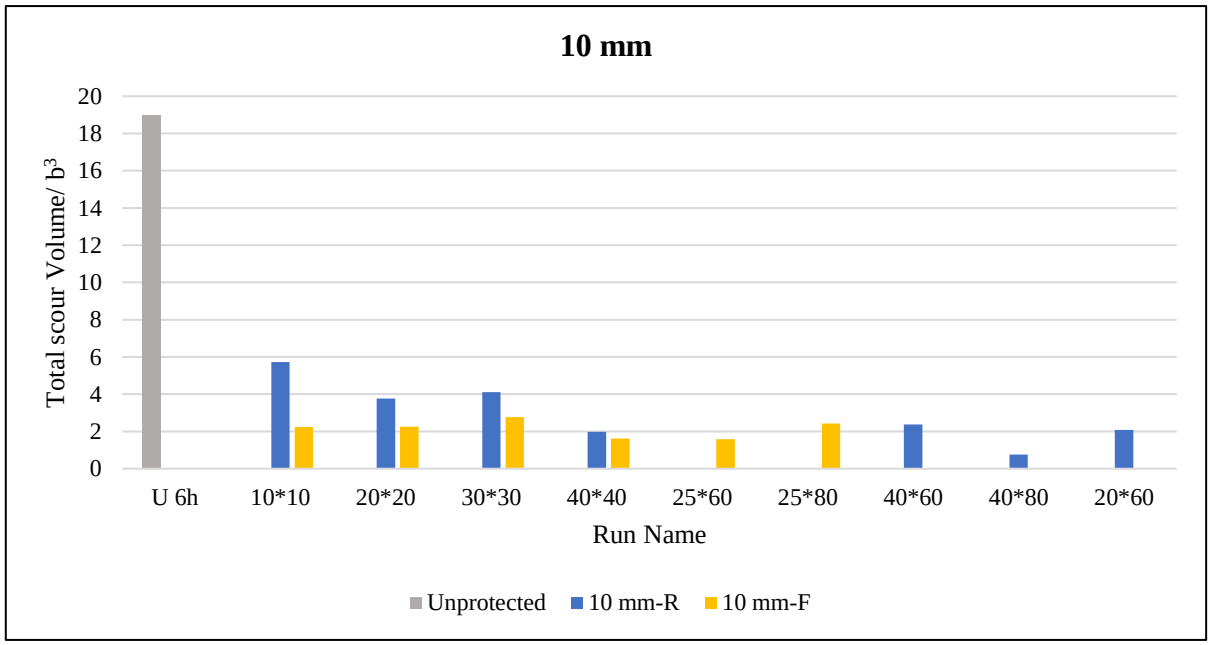
E32.2. Visual comparison of the longitudinal profiles. The blue ovals are indicating the different trend of channel bed change in the downstream of the pier.



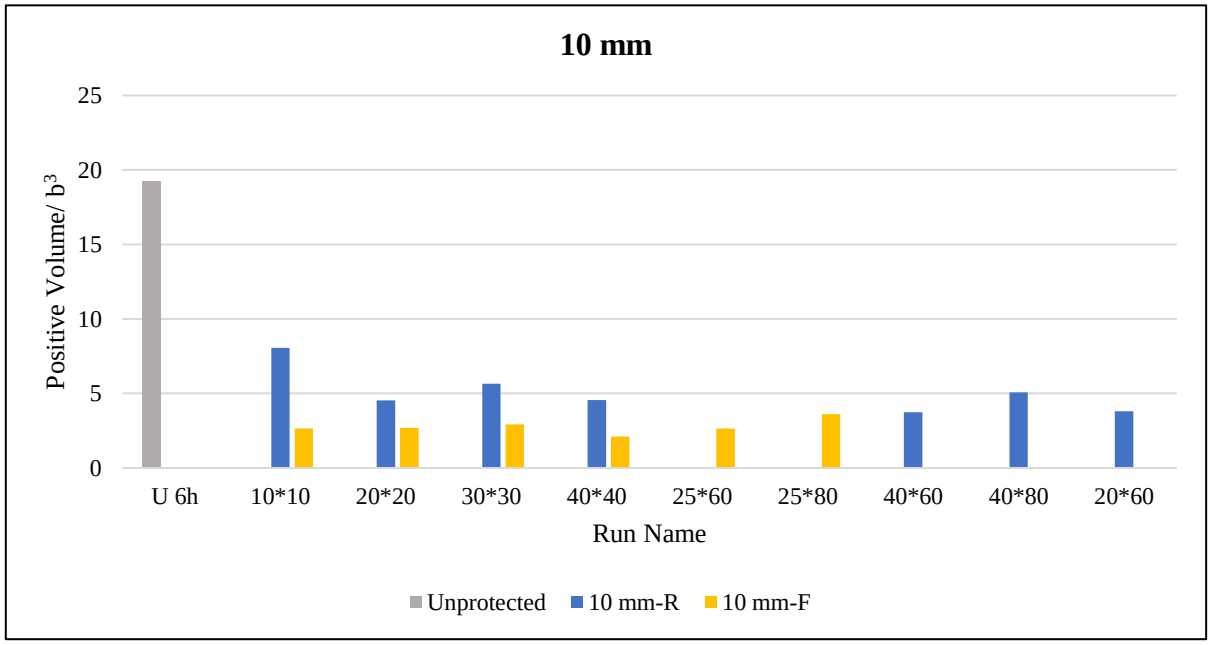
E32.3. Histogram comparison of the dimensionless upstream maximum scour depth.



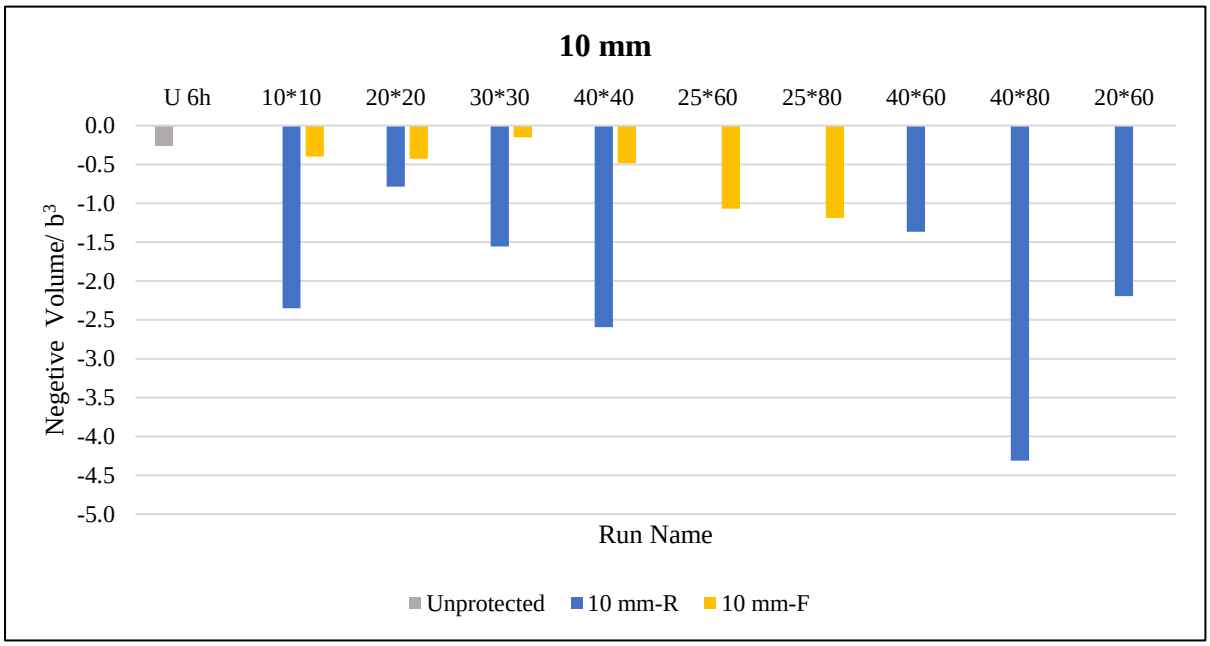
E32.4. Histogram comparison of the dimensionless downstream maximum scour depth.



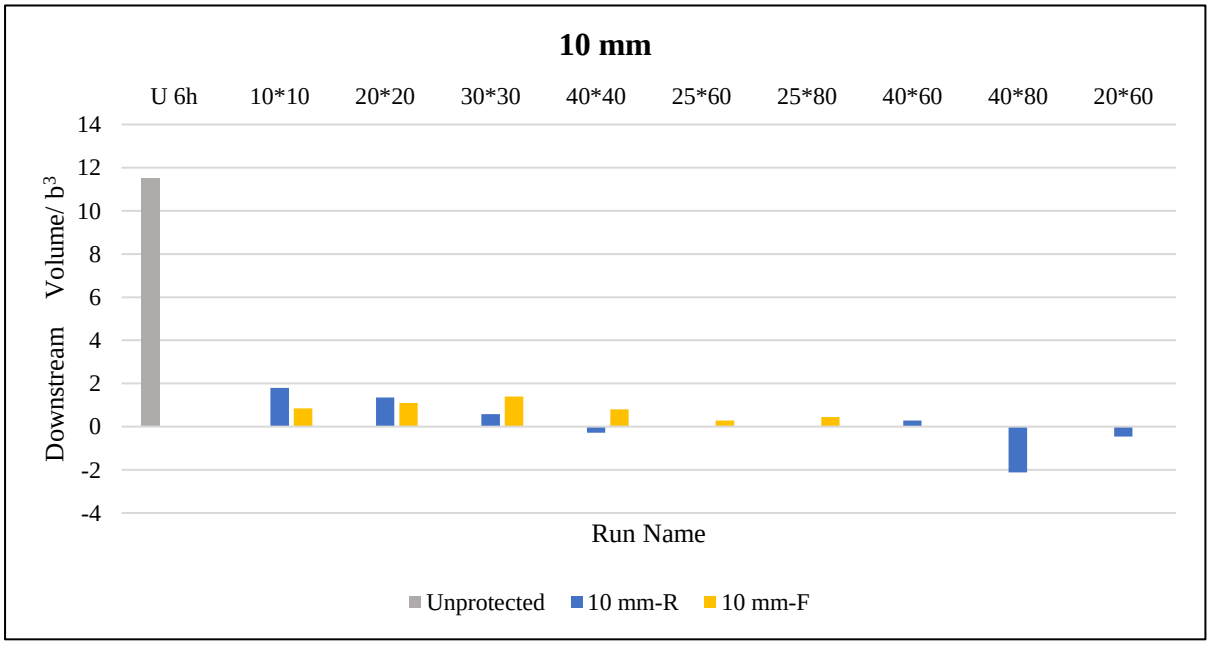
E32.5. Histogram comparison of the dimensionless total scour volume.



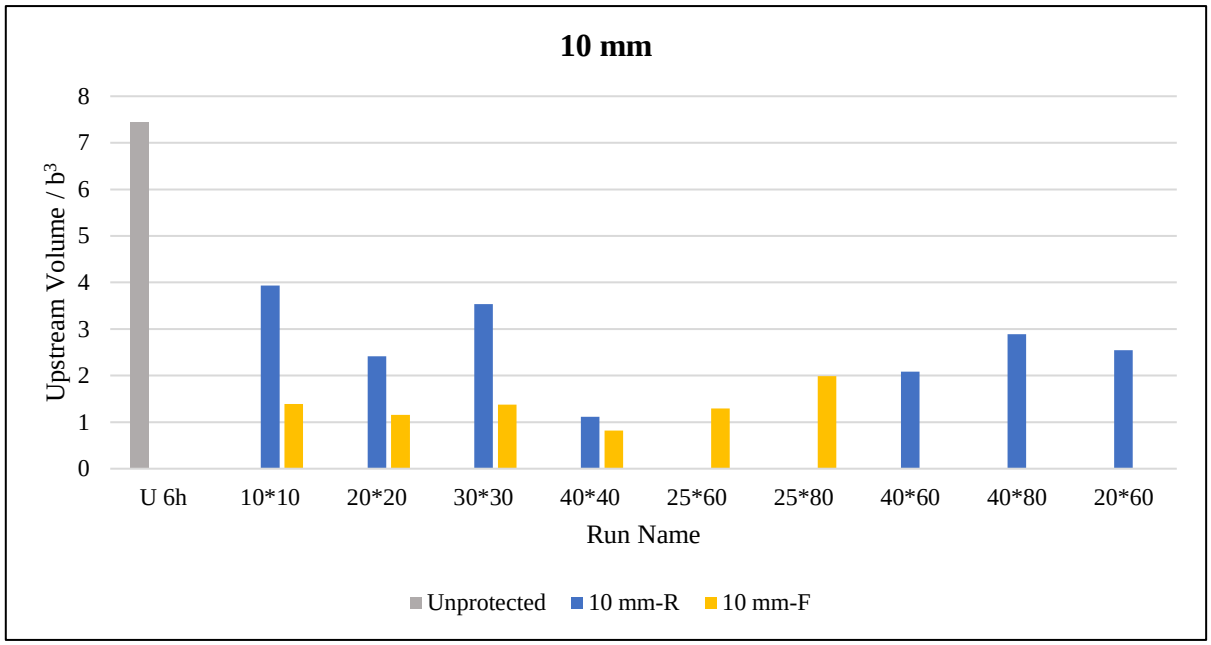
E32.6. Histogram comparison of the dimensionless positive scour volume.



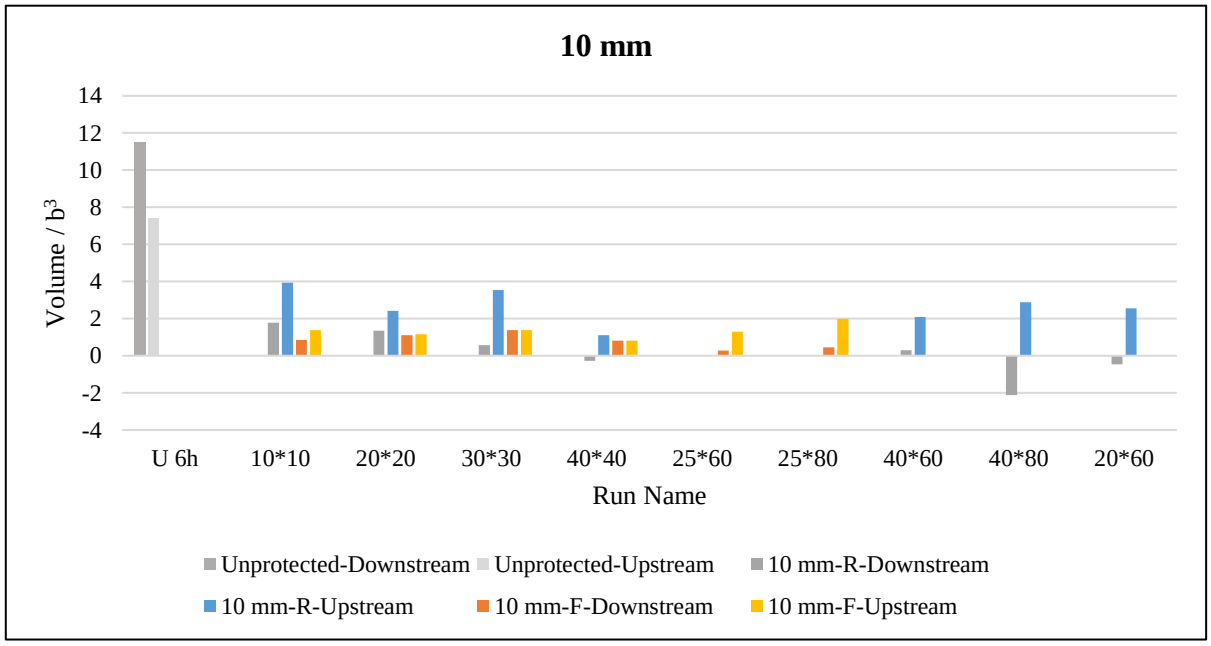
E32.7. Histogram comparison of the dimensionless negative scour volume.



E32.8. Histogram comparison of the dimensionless downstream scour volume.

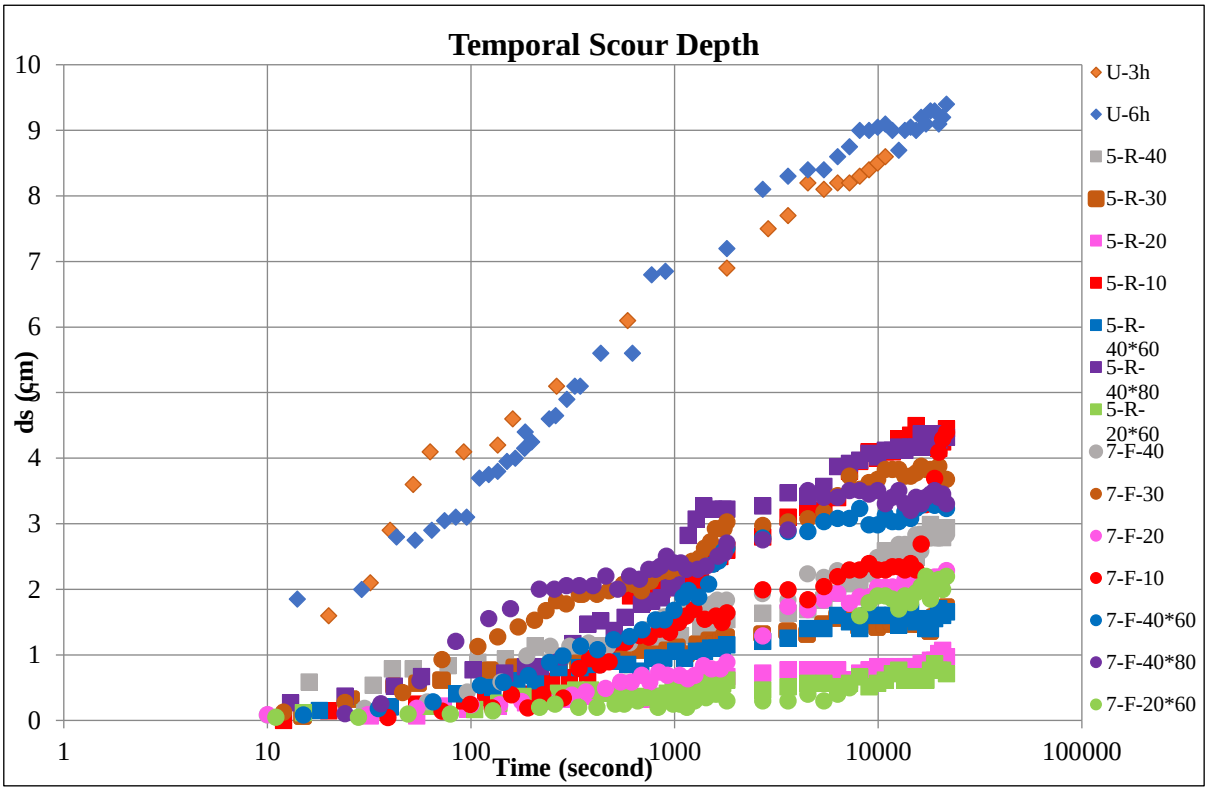


E32.9. Histogram comparison of the dimensionless upstream scour volume.

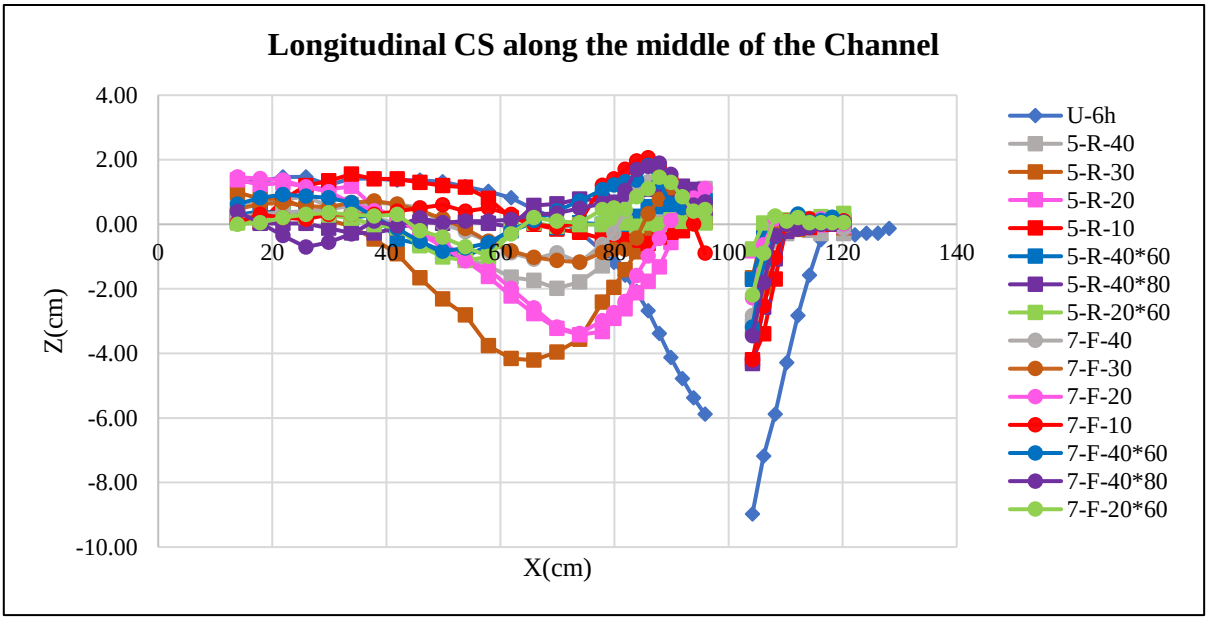


E32.10. Histogram comparison of the dimensionless up and downstream scour volume.

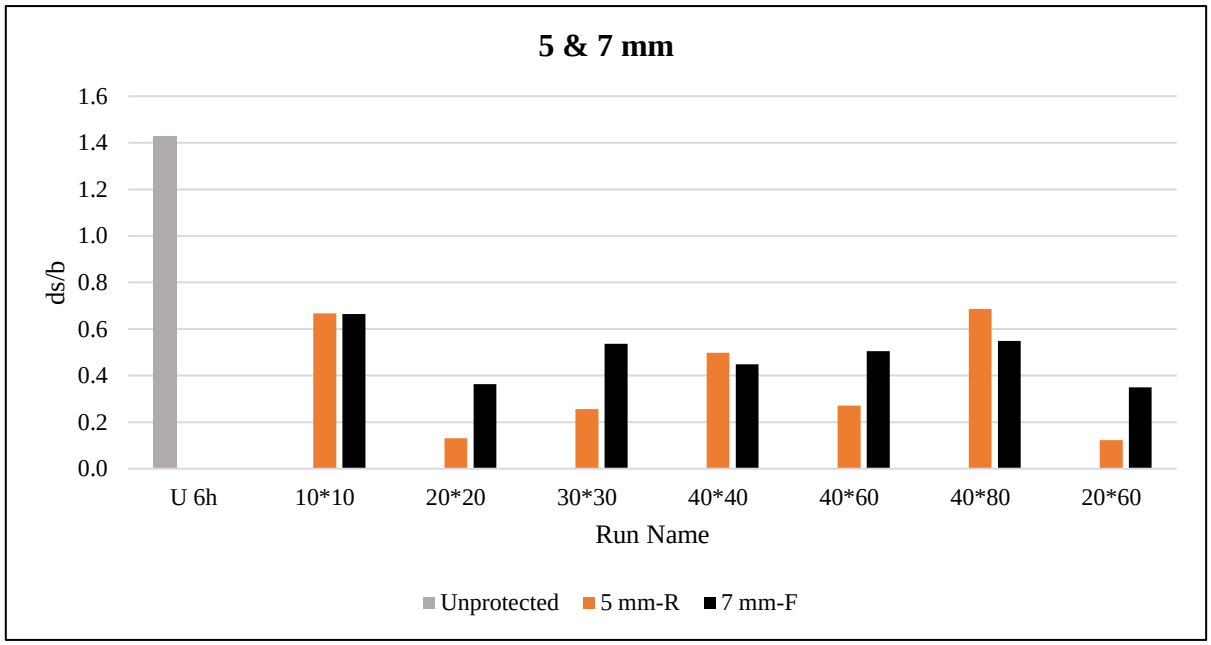
E33. Comparison between fine (rigid and flexible) mesh nets



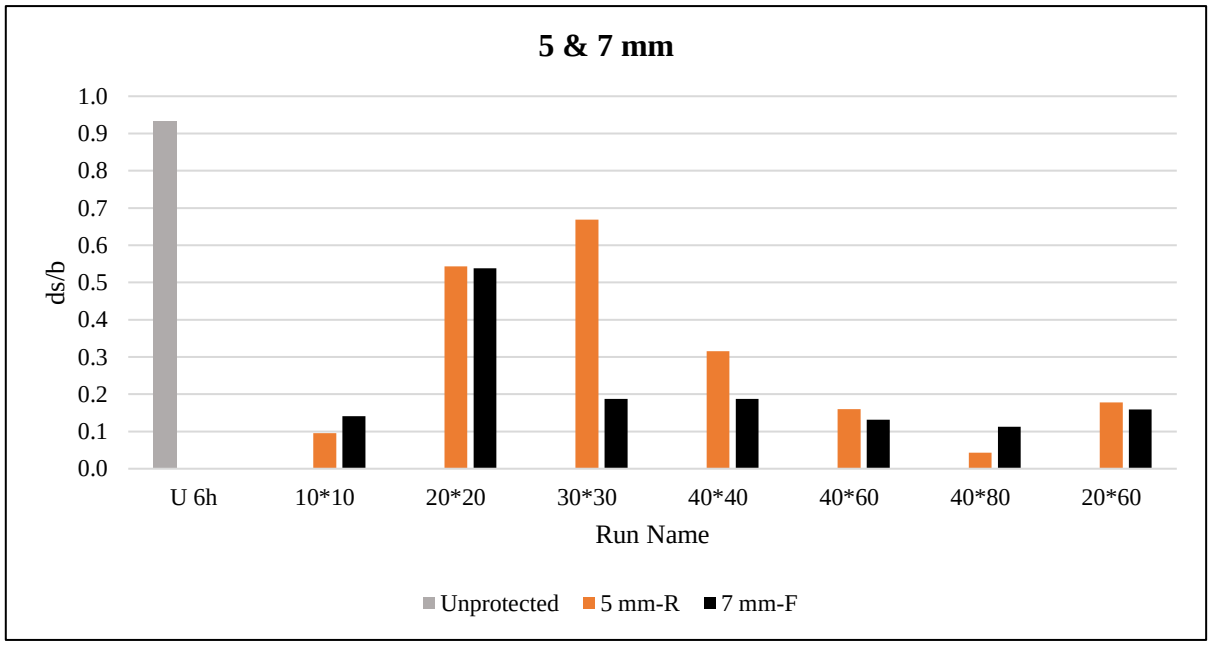
E33.1. Visual comparison of the temporal scour depth.



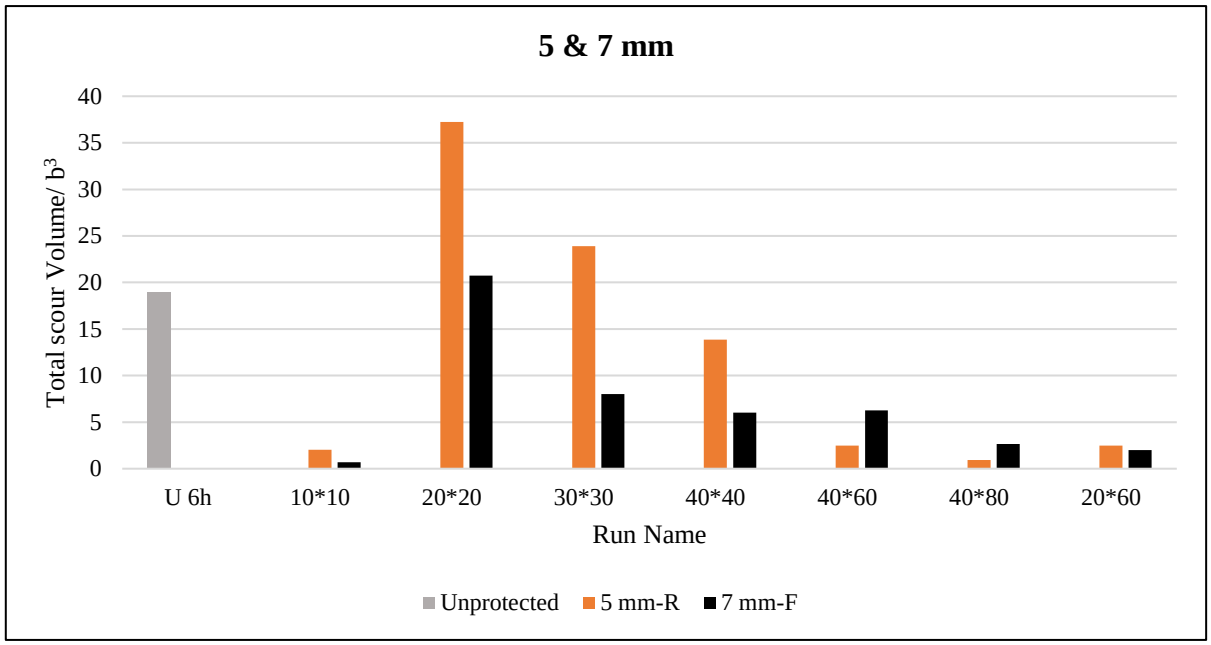
E33.2. Visual comparison of the longitudinal profiles.



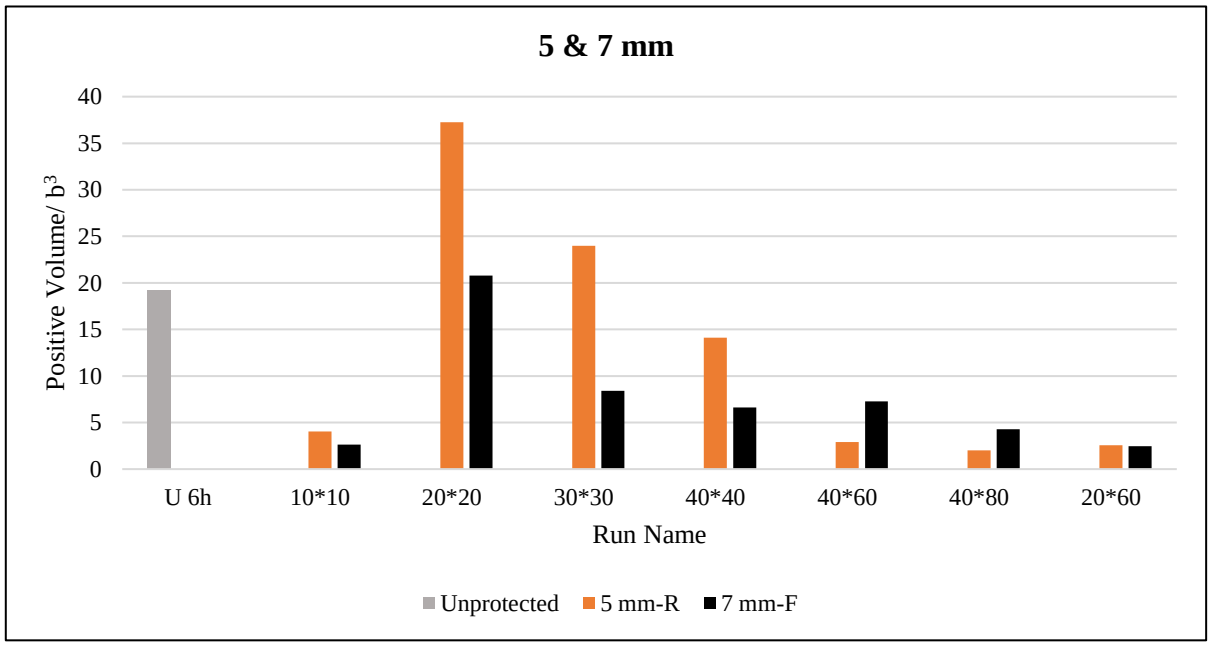
E33.3. Histogram comparison of the dimensionless upstream maximum scour depth.



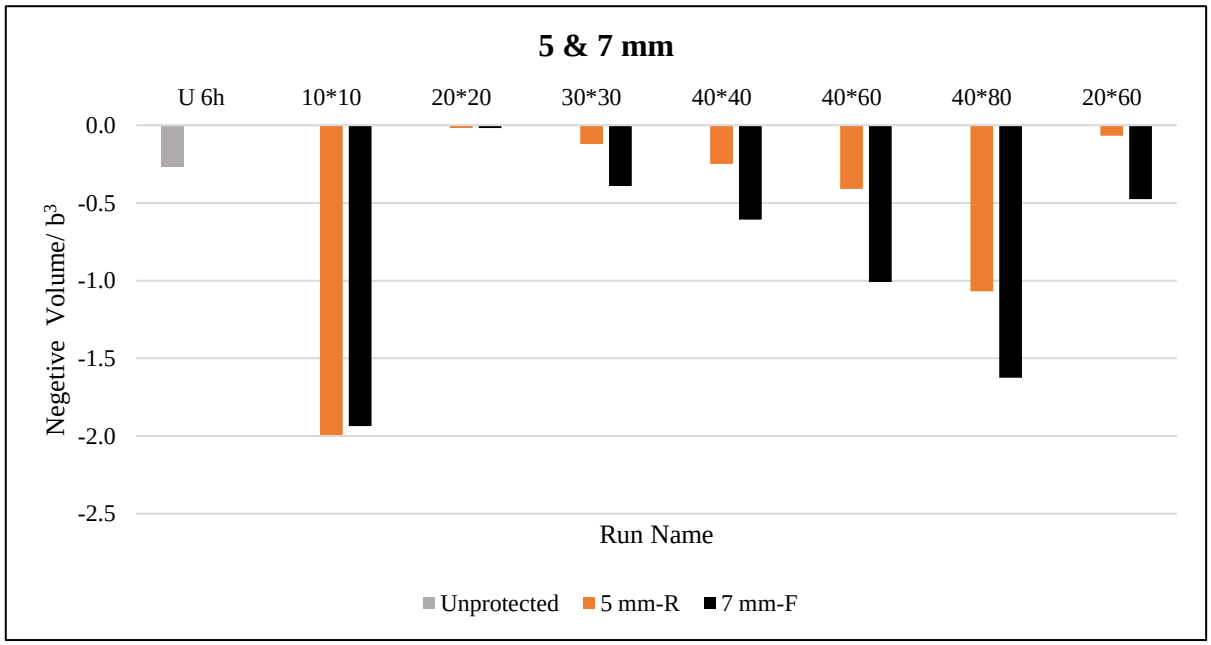
E33.4. Histogram comparison of the dimensionless downstream maximum scour depth.



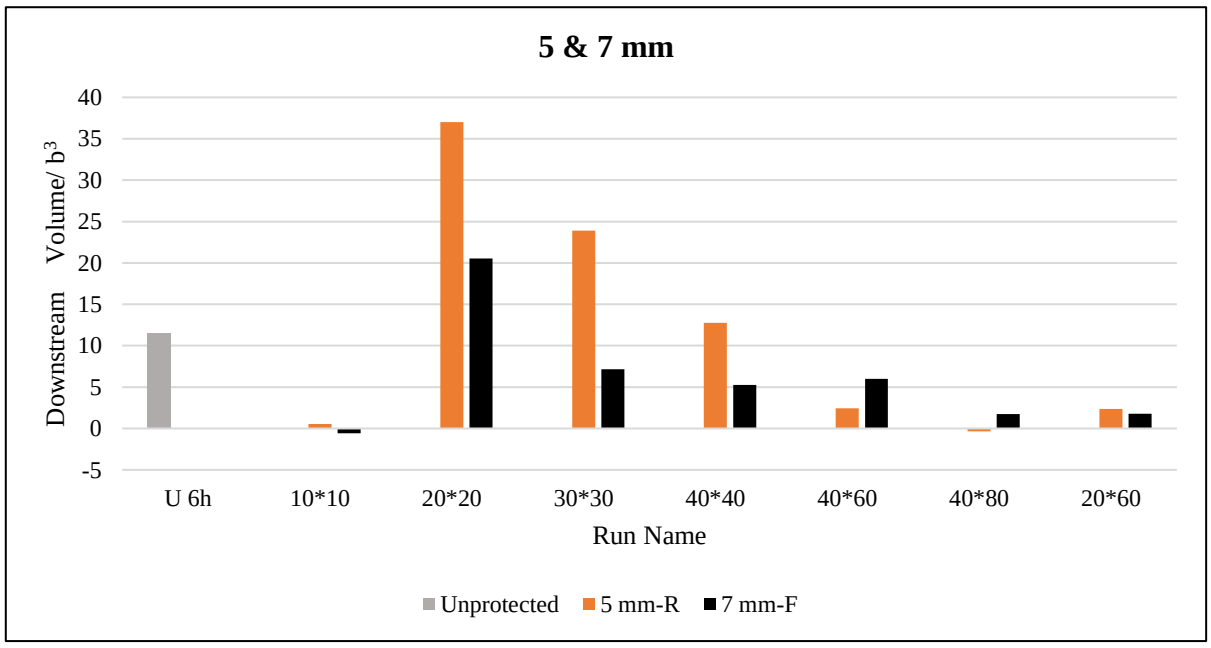
E33.5. Histogram comparison of the dimensionless total scour volume.



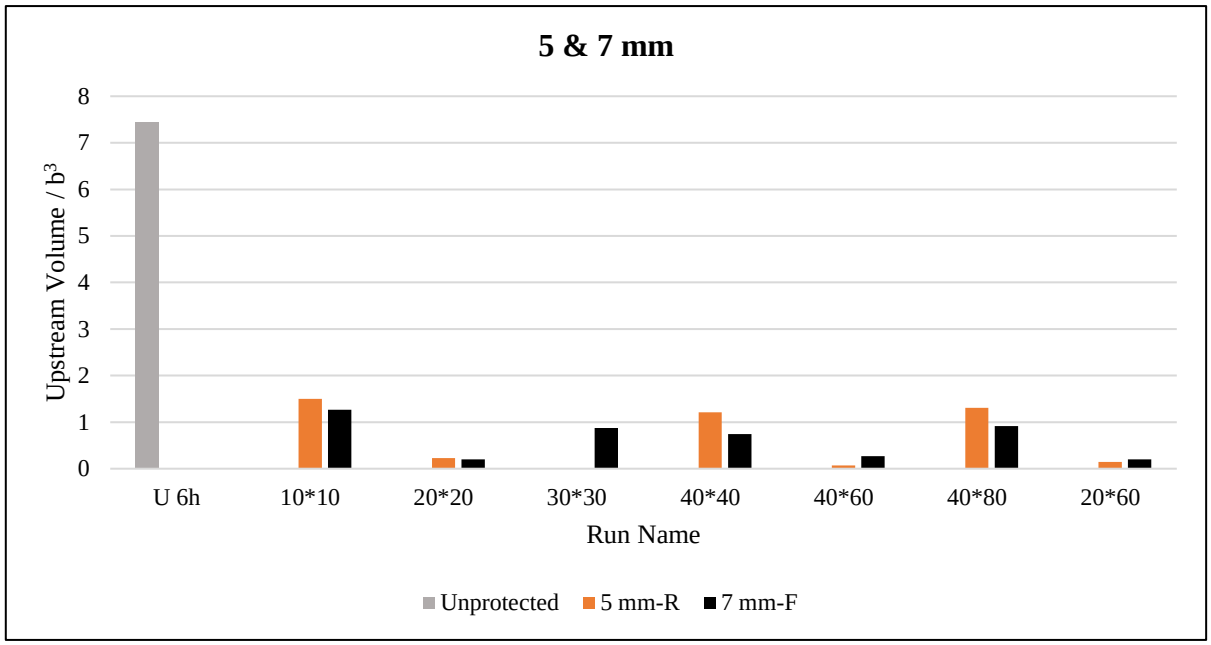
E33.6. Histogram comparison of the dimensionless positive scour volume.



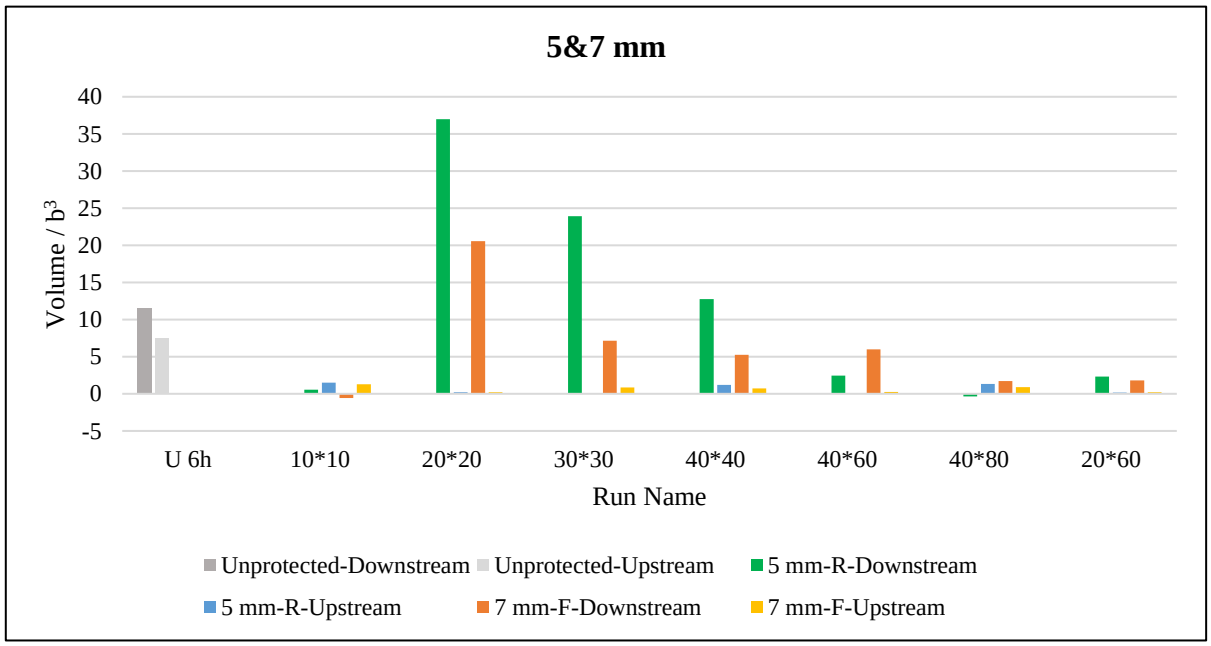
E33.7. Histogram comparison of the dimensionless negative scour volume.



E33.8. Histogram comparison of the dimensionless downstream scour volume.



E33.9. Histogram comparison of the dimensionless upstream scour volume.



E33.10. Histogram comparison of the dimensionless up and downstream scour volume.