

**CE 540 Unsteady Flows in Rivers and Pipe Networks,
Homework 2/ Mini Project 2, Fall 2013
Instructor: Arturo Leon**

Name of student: _____ **Due date:** November 05

1. Considering the flow hydrographs shown below for the upstream ends of upper reach (Baxter River) and tributary (Tule Creek), and assuming that there is a waterfall at the downstream end of lower reach (Baxter River),
 - (a) Provide recommendations to mitigate flood control in the urban area shown in the Geo-RAS file adjacent to Baxter River (e.g., provide locations and heights of levees to avoid flooding).
 - (b) Provide recommendations for the most suitable areas for urban development (areas with lower risk of flooding).
 - (c) Compare your results with the steady flow case and discuss the similarities and differences.
 - The data for the Baxter River can be downloaded from http://web.engr.oregonstate.edu/~leon/Teaching_transients.html or from Blackboard (data for Tutorial 1)
 - State your assumptions.

2. Derive the 1D Saint-Venant equations using a different method to that shown in class. For instance, you can integrate the 2D shallow water equations or you can derive the differential form of the Saint-Venant equations from their integral form. Provide a step-by-step derivation and describe the physical meaning of each term in the resulting Saint-Venant equations.

Data for problem 1

Upstream End of Upper Reach (Baxter River)		Upstream End of Tributary (Tule Creek)	
Time (min)	Q (cfs)	Time (min)	Q (cfs)
10	20000	10	400
20	20000	20	400
30	20000	30	400
40	20000	40	400
50	20000	50	400
60	20000	60	400

70	20000	70	400
80	20000	80	400
90	20000	90	400
100	20000	100	400
110	20000	110	400
120	20000	120	400
130	22000	130	475
140	24000	140	550
150	26000	150	625
160	28000	160	700
170	30000	170	775
180	32000	180	850
190	34000	190	925
200	36000	200	1000
210	38000	210	1075
220	40000	220	1150
230	42000	230	1225
240	44000	240	1300
250	46000	250	1375
260	48000	260	1450
270	50000	270	1525
280	52000	280	1600
290	54000	290	1675
300	56000	300	1750
310	58000	310	1825
320	60000	320	1900
330	62000	330	1975
340	64000	340	2050
350	66000	350	2125
360	68000	360	2200
370	70000	370	2275
380	72000	380	2350
390	74000	390	2425
400	76000	400	2500
410	78000	410	2575
420	80000	420	2650
430	82000	430	2725
440	84000	440	2800
450	86000	450	2875
460	88000	460	2950
470	90000	470	3025
480	92000	480	3100
490	94000	490	3175

500	96000	500	3250
510	98000	510	3325
520	100000	520	3400
530	102000	530	3475
540	104000	540	3550
550	106000	550	3625
560	108000	560	3700
570	110000	570	3775
580	112000	580	3850
590	114000	590	3925
600	116000	600	4000
610	118000	610	3925
620	120000	620	3850
630	122000	630	3775
640	124000	640	3700
650	126000	650	3625
660	124000	660	3550
670	122000	670	3475
680	120000	680	3400
690	118000	690	3325
700	116000	700	3250
710	114000	710	3175
720	112000	720	3100
730	110000	730	3025
740	108000	740	2950
750	106000	750	2875
760	104000	760	2800
770	102000	770	2725
780	100000	780	2650
790	98000	790	2575
800	96000	800	2500
810	94000	810	2425
820	92000	820	2350
830	90000	830	2275
840	88000	840	2200
850	86000	850	2125
860	84000	860	2050
870	82000	870	1975
880	80000	880	1900
890	78000	890	1825
900	76000	900	1750
910	74000	910	1675
920	72000	920	1600

930	70000	930	1525
940	68000	940	1450
950	66000	950	1375
960	64000	960	1300
970	62000	970	1225
980	60000	980	1150
990	58000	990	1075
1000	56000	1000	1000
1010	54000	1010	925
1020	52000	1020	850
1030	50000	1030	775
1040	48000	1040	700
1050	46000	1050	625
1060	44000	1060	550
1070	42000	1070	475
1080	40000	1080	400
1090	38000	1090	400
1100	36000	1100	400
1110	34000	1110	400
1120	32000	1120	400
1130	30000	1130	400
1140	28000	1140	400
1150	26000	1150	400
1160	24000	1160	400
1170	22000	1170	400
1180	20000	1180	400
1190	20000	1190	400
1200	20000	1200	400
1210	20000	1210	400
1220	20000	1220	400
1230	20000	1230	400
1240	20000	1240	400
1250	20000	1250	400
1260	20000	1260	400
1270	20000	1270	400