Former private garages site
at Princess Avenue
Clitheroe

Proposed housing

Flood Risk Assessment

NGR SD 746 423

Michael Lambert Associates
Pear Tree House
1 Partridge Close
Winsford
Cheshire
CW7 1PY

Tel/fax: 01606 862373
Mobile: 07958 964054
Email: floodriskengineer@gmail.com

Avalon Town Planning
2 Reedley Business Centre
Redman Road
Burnley
Lancashire
BB10 2TY

I N D E X

1.0 Introduction

Four apartments are proposed for a former private garages site between 15 and 17 Princess Avenue, Clitheroe. This report covers the flood risk and surface water aspects of the proposal.

2.0 Executive summary

Four apartments are proposed for a former lockup garage site. The site is floodzone 2 on the Environment Agency floodrisk zone maps. Detailed hydraulic river modelling shows that risk levels are lower and the site is in practice floodzone 1. The proposal is suitable for the residential area, surface water discharges to the beck will reduce in terms of flow rates and volumes and flood risk to others will decrease. New hard area will be less than before and SR744 is complied with.

3.0 Existing site and river system.

The existing site is a block of former rented private garages with an access from Princess Avenue between house numbers 15 and 17. The site has been surveyed and has a level range of 76.86 to 77.3. There is a concrete slab yard area in front of the garages which slopes towards the stream and runoff from the overall hard area of approx 200m2 will flow straight into the stream. Chatburn Beck (Pimlico watercourse) flows through the site in open channel. The Beck flows under Princess Avenue in culvert and also flows into a culvert approx 40m downstream of the site. To the west of the site the gardens and private ground to Well Court slope away to a lower level.

The upstream beck catchment has a catchment area of 1.61 km2. Annual rainfall is 1222mm, average bedslope DPSBAR is 40.3 m/km indicating a flattish catchment and SPRHOST is 30.24%. The catchment is thin with a length to width average ratio of 2.

4.0 Hydrology and river modelling

WinFAP3 software has been utilised to find similar catchments. A pooling group analysis was then carried out resulting in a Q100 flow of 4 m3/sec. This is approx 2.5 times the area and based on our own in house data from the analysis of over 200 small catchments is the sort of figure we would expect. To uprate the Q100 flow to Q1000 a growth factor of 1.7 has been used. Q100 + CC is 4.8 m3/sec and Q1000 is 6.8m3/sec.

Cross section points have been selected on the site survey and cross section data input to Hec Ras 4.1.0 using survey levels. The river channel consists of vertical brick walls with a natural bed and ‘n’ values of 0.020 walls and 0.035 bed have been input. As can be seen on Google Earth the land to Well Court is lower and flow can spill over the channel wall towards Well Court. A lateral sideweir has been put into the model at the channel bend to simulate this.

The model has been run for Q100, Q100+ CC, and Q1000 flows. Cross sections 2 to 5 apply to the proposal and risk level results are as follows:-

Q100- flow 0.2m to 0.8m below the channel wall

Q100 + CC- flow 0.15m to 0.25m below the channel wall
Q1000- flow level at wall top level to 0.35 below the channel wall

The results show that the site is floodzone 1 above the 1 in 1000 year risk level. We applied to the Environment Agency for risk levels for the beck and the 1 in 1000 year risk levels at the EA nodes 0421 and 0461 are 750mm above existing ground levels which is unlikely to occur in practice as sidespills will occur. We expect that the EA modelling will have cross sections with 'glass walls' at either side of the channel which produce artificially high risk levels.

5.0 Proposals and drainage
The proposals are for the demolition of the garages and the building of four apartments as one building. Drainage will be separate system with surface water draining to the beck and foul draining to Princess Avenue public sewer system via a submersible pumping station.

The guidelines for surface water runoff management for developments (2004 Gibbs paper) have been revised in Jan 2012 and are now contained in SR744 – 'preliminary rainfall runoff management for developments'. They allow comparison of proposals with the existing drainage performance of the site (principle 4) and on this basis surface water runoff rates and volumes will decrease as a result of the proposal and surface water attenuation will not be needed.

The beck is in open channel form between Princess Avenue and Well Court boundary where it goes into culvert. The culvert inlet is a blockage risk point and access is from Well Croft or 2 Causeway Croft rear garden. The beck channel inside the site is brick walls and access to the beck is at present from the access road to the existing garages and will continue to be so if the proposal is consented. The new apartments garden areas and the new building is shown partly within the 8m strip that the EA can ask to be kept clear, however the beck channel access is by climbing down into the channel from the access roadway and we would suggest that the proposal will not compromise maintenance access.

6.0 National Planning Policy Framework and Technical Guidance
The proposals are for housing, and are classed as 'more vulnerable' in Table 2, and are 'appropriate' in floodzone 1 as per Table 3.

All forms of flooding (PPS25 notation) are:-

C4 – rivers – see above
C5 – sea – no tidal influence
C6 – land – no undrained land slopes towards either site
C7 – groundwater – no springs or weep areas on site
C8 – sewers – no reported incidents of on-site sewer flooding
C9 – reservoirs, canals – none nearby

7.0 Attachments

Attachment	number	size
Site location and sewer records	1 to 5	A3
Site survey and river cross section positions	6, 7	A3
Proposals	8	A3
Environment Agency risk level data	9, 10	A3
Hec Ras outputs Q100, Q100+CC, Q1000	11 to 19	A3
FEH catchment plan	20	A3
FEH descriptors	21	A4
FEH rain data	22	A4

This report is an email report and A4 and A3 attachments are grouped for scanning and can be put in order by using the top RH corner lettering.

Email file list
130205fra01
130206attach1-A3
130206attach2-A3
130206attach3-A4

SD7442 SE

1

Pavilion

FB

Tennis Court

Cricket Ground

81.7m

MARSH WAY

Council Offices

Tennis Court

Club

Penhaven

Pendle County Primary School

79.6m

CHATBURN AVENUE

THE GROVE

El Sub Sta

Fire Station

El Sub Sta

CHATBURN ROAD

TOWER HILL

Somerville

West Winds

Wallaford

Limefield

The Bungalow

Greenway

Briarcliffe

Wyndygates

Orchard House

Holmlea

Fairview

Pendale

Rosslare

Robeleen

Path

SALTHILL GDNS

SALTHILL ROAD

LIME STREET

KENDAL STREET

LONGSIGHT AVENUE

PRINCESS AVENUE

SITE

Veterinary Surgery

Wagon and Horses (PH)

CAUSEWAY

Well Court

LB

Hazelmere

79.6m

76.8m

Garage

7442 SE

2

Wallaford
Limefield
The Bungalow
Greenway
Briarcliffe
Wyndymates
Holmlea
Fairview
Orchard House
Perdale
Rosslare
Robeleen
Path
SALTHILL ROAD
SALTHILL GDNS
LIME STREET
KENDAL STREET
NORTH STREET
Car Park
Royal Oak Hotel
PH
LB
Gazebo
Works
Salthill View
Varleys Yard
Stamford Ho
Enterprise Works
Wagon and Horses (PH)
Veterinary Surgery
Sub Sta
CAUSEWAY
Well Court
Hazelmere
El Sub Sta
WELL TERRACE
B 6478
St Mary's Well
TCB
Clitheroe Royal Grammar School
CHURCH BROW
Stanworth House
YORK STREET
York House
Albion House
Albion Court
WATERLOO ROAD
A 671
Waterloo House
BROOK STREET
Mearly Brook
1 to 3
Mearley Brook
Commercial Centre
The Grand
FB
78.6m
79.6m
78.3m
78.8m
76.5m
78.0m
80.2m

7442 SE

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
5001	80.79	C	M	79.82	150		C	VC	14	8.69
5002	80.26	C	M	77.04	300		C	VC	67	5.38
5003	80.17	C	M	76.93	300		C	VC	17	27.08
5004		C	M		300		C	VC		81.09
5005		C	G		225			VC		12.23
5006		C	M		225		C	VC		20.06
5007		C	Q	79.2	225		C	VC	14	8.45
5008		C	Q		150		C	VC		21.21
5101	78.4	C	M	75.93	375		C	VC	36	63.9
5102	76.63	C	M	74.15	375		C	VC	143	57.19
5103	83.48	F	M	81.85	150		C	VC	13	62.83
5105	83.34	S	M							
5200		S	F							
5201		C	L	76.95	100		C	VC	284	28.36
5202	77.55	F	P		100		C	PVC		104.46
5203		F	M		100			PVC		12.93
5204		F	M		100			PVC		11.45
5205		S	M							19.66
5206		S	M							39
5207		S	M							14.03
5208		S	M		225					7
5301	78.19	C	M	76.73	300		C	VC	230	29.84
5302	78.66	C	M	76.58	300		C	VC	2313	69.39
5303	78.8	C	M	76.7	300		C	VC	253	25.33
5304		C	Q	76.85	225		C	VC	265	26.49
5401	78.69	C	M	77.24	225		C	VC	202	101.21
5402	79.74	C	M	77.15	300		C	VC	188	80.75
6001		C	L		450		C	VC		86.31
6002	75.67	C	M	73.29	450		C	VC		20.5
6003	75.9	C	M	73.49	300		C	VC	131	22.33
6004	75.8	C	M	73.89	225		C	VC	166	21.64
6005		C	M		225		C	VC		22.26
6006		C	Q	73.52	300		C	VC	487	9.74
6007	76.25	S	M	74.89	225		C	VC	81	29.31
6101	76.06	C	M	73.54	375		C	VC	465	9.31
6102	75.92	C	M	73.48	450		C	VC	206	34.99
6103	75.89	C	M	73.5	450		C	VC		23.46
6104	76.39	C	M	73.73	450		C	VC	136	28.56
6105	76.47	C	M	73.98	375		C	VC	210	48.41
6106	76.19	C	M	74.16	300		C	VC	147	23.51
6107	76.44	C	M	74.46	300		C	VC	156	28.11
6108		C	3		150		C	VC		9.62
6201	76.16	C	M	74.25	300		C	VC	172	12.01
6202	76.62	C	M	74.26	375		C	VC	148	38.44
6203	76.38	C	M	74.65	300		C	VC	241	86.62
6301	76.72	C	M	75.14	300		C	VC	68	31.8
6302	77.01	C	M	75.97	225		C	VC	59	40.69
7001		C	G		225		C	VC		75.86
7002		C	G		225		C	VC		16.7
7003	76.16	C	M	73.72	225		C	VC		12.86
7004		C	M		225			VC		17.47
7006	75.55	S	M		150					21.76
7007	76.8	S	M	75.36	225				90	32.49
7009		S	F							
7010	76.85	F	M	75.37	225			VC	68	28.7
7011	76.7	F	M	75.37	150				59	24.77
7012	76.7	F	M	74.64	225			VC	154	13.84
7013	76.25	C	M		225		C	VC		80.92
7101	76.26	C	M	73.73	300		C	VC	241	19.25
7102	76.4	C	M	73.91	300		C	VC	251	40.2
7103	76.96	C	M	74.12	300		C	VC	255	48.38
7104	76.06	C	M	74.87	225		C	VC		99.06
7105		C	Q	73.65	375		C	VC	216	19.45
7201	76.51	C	M		300		C	VC		51.07
7202	76.49	C	M	74.68	300		C	VC	168	6.73
7203	76.76	C	M	75.05	300		C	VC	20	6.96
7301	76.84	C	M	75.06	300		C	VC	-7724	77.24
7302	77.23	C	M	75.21	300		C	VC	220	28.58
7303	77.11	C	M	75.21	300		C	VC	208	112.06
8001	76.89	C	M	74.55	300		C	VC	76	98
8002		F	M		300			VC		28.93
8003		C	M		300		C	VC		25.42
8004		S	M	75	225				76	19.03
8005		S	M	74.75					95	17.12
8006	77.1	F	M	75.45	150				59	29.28
8007		C	H	76.3	160		C	PE	100	112.66
8201	77.68	C	M	74.68	300		C	VC	150	81.03
8202	77.83	F	M		300		C	VC		31.51
8401	81.08	C	M	79.2	225		C	VC	38	114.15
8402	81.41	C	M	79.72	225		C	VC	65	32.44
8402	81.41	C	M	79.71	300		C	VC		12.18
8403		C	L		300		C	VC		56
8404		C	G							
9001	77.5	C	M	75.32	300		C	VC		42.47
9002	78.07	C	M		300		C	VC		40.52
9201	79.7	F	M	78.3	225		C	PVC	18	23.09
9202	78.4	F	M	77	225		C	PVC	27	21.85
9203	78.4	F	M	76.19	225		C	PVC	29	9.42
9204	78.2	F	M	75.85	225		C	PVC	28	20.35
9401	86.53	C	D		150		C	VC		66.84
9402	84.84	C	D	83.13	150		C	VC		30.9
9403	86.53	S	D		150		C	VC		66.84
9404	84.84	S	D	83.33	150		C	VC		30.95

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The Grand
The Old Coach House
Albion
ALBION STREET
A 671
WATERLOO ROAD
Timber Yd
Mearley Brook
RIVER TEA GARDENS
Brookside Industrial Units
Works
Rubble House
Roscoe House
Calder House
BACK
Kingdom Hall
Waterloo Bridge
Superstore
Car Park
HOLDEN STREET
TAYLOR STREET
BRIGHT STREET
Clitheroe Brookside Primary School
Post
Wellfold
PH
DUCK STREET
LB
Heald Well
78.0m
Day Nursery
PH
The Old Sawmill
SHAWBRIDGE COURT
Govt Offices
CROFT
NDLEMAKERS
Stands
Drain
Playground
HIGHMOOR CROFT
Football Ground
Shaw Bridge
75.3m
SHAWBRIDGE STREET
Stand
Slands
El Sub Sta
ROMAN WAY
HIGHMOOR
Shaw Cottage
Ashgrove House
Ashgrove Barn

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0916		S	F							
5501	74.18	C	M	70.39	900		C	VC		27.55
5502	74.62	C	M		225		C	VC		22.43
5503	75.19	C	M	73.62	225		C	VC		25.06
5504		C	L		225		C	VC		18.44
5505		C	G		225		C	VC		34.25
5506		C	L		225		C	VC		19.52
5507	76.9	C	M	73.62	225		C	VC	142	29.82
5508		C	G		225			VC		45.17
5509		C	Q		525		C	VC		28.26
5601	76.46	C	M	70.88	900		C	VC	214	100.77
5701	75.16	C	M	72.63	225		C	VC	68	29.4
5702	75.14	C	M		225		C	VC		5.32
5801	77.68	C	M	74.99	225		C	VC		55.57
5802	78.16	C	M	76.89	225		C	VC	10	18.75
5803	78.48	C	M	77.08	225		C	VC	204	32.62
5804		C	M		100		C	VC		12.52
5805		C	M		100		C	VC		14.34
5901	77.62	C	M	75.3	300		C	VC	21	12.82
5902		C	L	74.06	225		C	VC	82	13.9
5903	78.27	C	M	76.1	225		C	VC		7.02
5904		C	G		225		C	VC		21.66
5905		C	J		225		C	VC		17.28
5906		C	G		300		C	VC		20.49
5907		C	Q	74.68	225		C	VC	21	12.86
5908		C	Q	73.89	300		C	VC	78	13.27
6501	81.08	C	M	78.98	300		C	VC	47	50.49
6502	79.97	C	M	77.88	300		C	VC	44	43.1
6503	79.02	C	M	76.89	300		C	VC	27	51.61
6504		C	G		225		C	VC		33.21
6505		C	J							
6506		C	J							
6507		F	3		150		C	VC		2.65
6508		F	D		150		C	VC		2.63
6509		S	D		150		C	VC		3.18
6510		S	3		150		C	VC		3.26
6511		F	D		150		C	VC		3.47
6512		S	D		150		C	VC		2.26
6513		S	J							
6514		F	J							
6515		C	M		100		C	VC		2.96
6516		C	M		100		C	VC		21.81
6517		C	M		100		C	VC		12.15
6518		C	M		100		C	VC		7.79
6519		C	J							
6520		C	J							
6601	76.19	C	M	73.35	300		C	VC	22	36.54
6602	75.57	C	M	71.27	900		C	VC	263	97.28
6603	75.96	C	M	73.33	300		C	VC	62	26.57
6701	75.09	C	M	71.63	825		C	VC	1	19.17
6702		C	M		825		C	CO		15.73
6703		C	M		825		C	CO		14.6
6704		C	Q	72.2	300		C	VC	70	29.42
6705		C	Q	33.83	825		C	CO		18.54
6706		C	Q	71.39	825		C	VC	-120	31.15
6707		C	Q	33.32	825		C	VC		14.1
6801	74.77	C	M	71.27	825		C	CO		35.05
6802	74.73	C	M	71.95	825		C	CO	20	13.52
6803	74.73	C	M	71.99	825		C	CO	11	9.87
6804	74.79	C	M	72.22	525		C	CO	85	22.1
6805	75	C	M	72.37	450		C	VC	34	41.92
6806	74.6	C	M		450		C	VC		41.35
6807		C	Q	72.7	150		C	CO	14	5.49
6808	74.75	C	J	73.75	225		C	PE	20	1.99
6809	74.7	C	M	71.96	525		C	CO	2	1.78
6810	74.61	C	M	73.1	300		C	VC	22	8.74
6901	75.47	C	M	72.87	450		C	VC		86.8
6902	75.6	C	M	73.69	300		C	VC	50	26.3
6903	76.05	S	M	74.18	450		C	CO	251	25.09
6904		S	M	74.08	300		C			19.23
6905		S	F							
7500		F	J							
7501		F	D		150		C	VC		4.68
7502		S	D		150		C	VC		4.75
7503		F	D		150		C	VC		19.8
7504		S	D		150		C	VC		20
7505		S	D		150		C	VC		25.89
7506		F	D		150		C	VC		26.31
7507		S	D		150		C	VC		11.14
7508		F	D		150		C	VC		11.34
7509		S	D		150		C	VC		13.89
7510		F	D		150		C	VC		14.07
7511		S	D		150		C	VC		12.26
7512		F	D		150		C	VC		12.37
7513		S	D		150		C	VC		58.66
7514		F	D		150		C	VC		59.25
7515		C	M		100		C	VC		26.73
7516		S	D		150		C	VC		17.97
7517		F	D		150		C	VC		18.21
7518		S	D		150		C	VC		15.86
7519		F	D		150		C	VC		16.47
7520		S	D		150		C	VC		27.52
7521		F	D		150		C	VC		27.61
7522		S	D		150		C	VC		14.47
7523		F	D		150		C	VC		14.49
7524		F	M		150		C	VC		8.4

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
7525		F	M		150		C	VC		6.15
7527		F	M		150		C	VC		3.65
7600		S	F							
7601	81.22	C	M	79.52	300		C	VC		32.17
7602	77.35	C	M	74.9	300		C	VC	21	32.32
7603		F	M							22.51
7604		F	M							25.6
7605		F	M		300			VC		7.8
7606		F	M		300			VC		25.04
7607		F	M		300			VC		11.51
7608		F	M		300			VC		9.63
7609		C	M		300		C	VC		26.73
7610		S	M							25.74
7611		S	M							11.33
7612		S	M							8.22
7613		F	M							22.35
7701		F	M							20.8
7702		S	M		375		C			20.64
7703		S	M							29.4
7704		F	M							32.69
7801	74.93	C	M	72.43	375		C	VC	239	45.47
7901	75.37	C	M	72.97	300		C	VC		23.51
7902	75.66	C	M	73.26	300		C	VC	40	11.49
7903		C	M	72.69	375		C	VC	160	38.42
7904	76.63	S	M	74.53	225		C	VC		15.27
7905		S	F							
7906	76.32	S	M	74.58	450		C	CO	109	27.31
7907	76.24	S	M	74.33	450		C	CO	106	15.92
7908	75.86	S	M	74.57	225		C	VC	104	25.07
7909		F	M		150		C	VC		31.48
7910	75.85	F	M	74.17	150		C	VC		18.03
7911	76.2	F	M	74.77	150		C	VC	35	20.79
7912		C	M		300		C	VC		8.42
7913		C	H	74.48	180		C	PE	162	149.26
8501	92.8	C	M	88.7	300		C	VC	21	64.88
8502	88.19	C	M	85.56	300		C	VC	30	26.05
8503	86.82	C	M	84.62	300		C	VC	16	79.62
8504		S	M				C			28.97
8505		S	F							
8601		F	M		150		C	VC		17.27
8602		F	M		150		C	VC		29.48
8603		F	M		150		C			57.98
8604		F	M							15.52
8605		S	M							9.58
8606		S	M		300		C	VC		17.63
8607		S	M		300		C	VC		30.04
8608		S	M		150		C	VC		58.67
8609		S	M							16.22
8610		S	M							29.33
8611		F	M							16.1
8701		F	M		150		C	VC		32.15
8702		F	M							25.71
8703		F	M		150		C	VC		32.46
8704		F	M		150		C	VC		16.16
8705		F	M		150		C	VC		39.55
8706		S	M		300		C	VC		40.25
8707		F	M		150		C	VC		27.16
8709		S	M		300		C	VC		16.7
8710		S	M		375		C			26.71
8711		S	M		375		C			32.89
8712		S	M		225		C	VC		24.89
8713		S	M		375		C			35.23
8719		F	M		150		C	VC		39.84
8727		S	M		150		C	VC		39.85
8803		F	G		300		C	VC		131.73
8901		C	H	75.17	180		C	PE	151	104.17
9501	93.76	C	M	90.29	300		C	VC	21	33.92
9601		F	M							59.06
9602		F	M							36.28
9603		F	M		150		C	VC		33.94
9604		F	M							24.04
9605		F	M							24.9
9606		F	M							31.75
9607		S	M							27.13
9608		S	M							36.32
9609		S	M							58.68
9610		S	M							33.89
9611		S	M							25.63
9612		S	M							32.72
9613		S	M							17.65
9701		F	M		150		C	VC		37.65
9702		S	M		150		C	VC		40.18
9703		F	M							34.59
9704		S	M							34.5
9707		F	M							31.79
9708		S	M							35.26
9709		S	M							24.26
9710		S	M							52.62
9711		F	M							20.98
9712		F	M							52.41
9713		F	M							24.44
9714		S	M							27.33
9801		S	M							43.44
9802		F	M							41.94
9901	80.1	F	M	78.47	300			VC		64.06
9902		F	M		300			VC		51.59

Note

This
with
Unat
Crow


1
2
3
4
5
6
TF78.82
TF78.17
Retaining Wall
Chainlink
Garages
CONCRETE
CRUSHED STONE&GRASS
Concrete Panel Fence
Post & Rail Fence
Post & Panel Fence
CHIPPINGS
TARMAC
RW6.44
RW6.45
RW6.46
RW6.47
RW6.48
RW6.49
RW6.50
RW6.51
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RW6.76
RW6.77
RW6.78
RW6.79
RW6.80
RW6.81
RW6.82
RW6.83

Notes

All Dimensions to be checked on site. Walls shown on plans are not to be assumed to be solid & should be checked for thickness, construction, load bearing capacity & stability.

7

North

0 2 4 6 8 10 12 14 16 18 20

Metres

ABBREVIATIONS

CL	Cover Level
DK	Drop Kerb
EH	Eves Height
LP	Lamp Post
MH	Man Hole
RH	Ridge/Roof Height
TF	Top of Fence
TL	Threshold Level
TW	Top of Wall
US	Under Side

NOTE

Rev.0 Description. Issued

TriCAD Solutions Ltd.
BUILDING & LAND SURVEYORS
2 Berkshire Close | Wilpshire | Blackburn | Lancashire | BB1 9NG
tel 01254 614055 fax 01254 209754 e-mail sales@tricadsolutions.co.uk

Site Address

Land Adjacent to
15 Princess Way
Clitheroe. BB7 2AL

Project Description

Site Survey

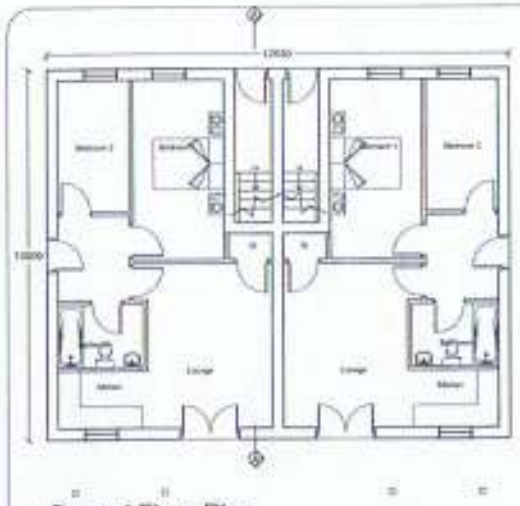
Drawing Title

Existing Site Layout

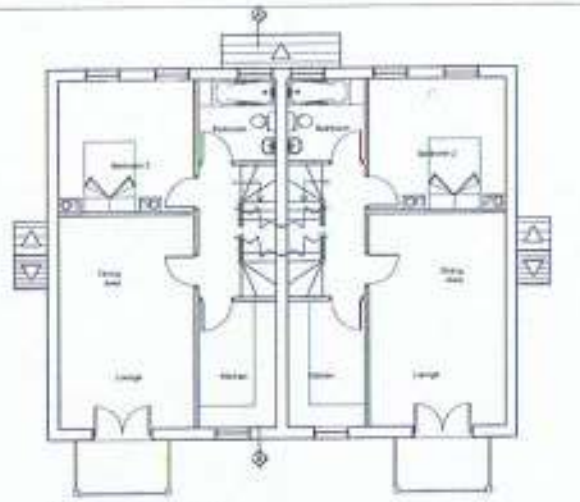
Scale	Date	Drawn By
1:200@A1	04/01/2013	MW

Drawing Number

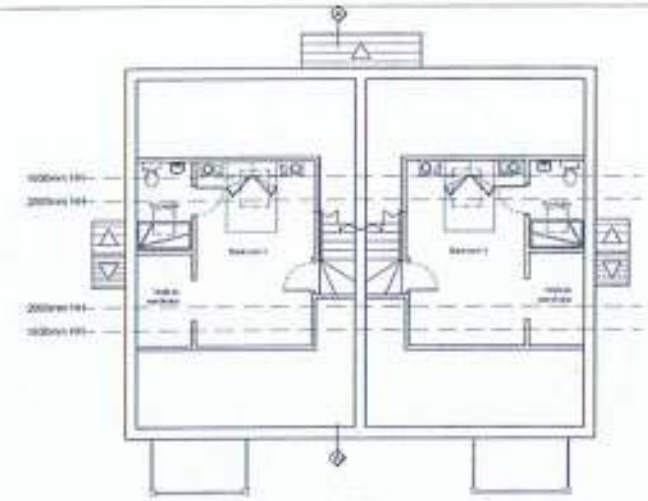
TRI-0952-01



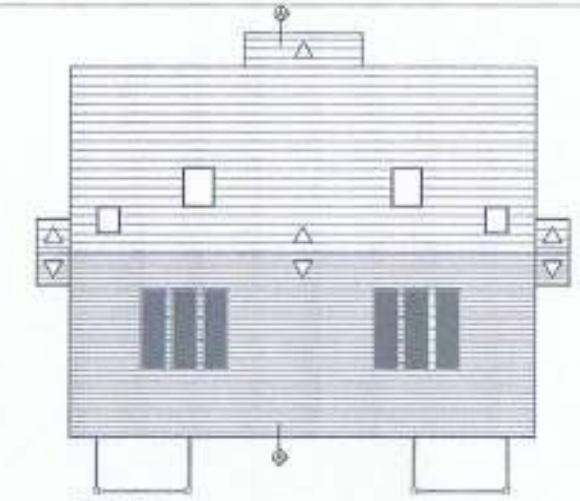
Ground Floor Plan



First Floor Plan



Second Floor/ Attic Plan



Roof Plan

Notes:

All work is to be carried out to the latest current British standards Codes of Practice and recognised working practices.

All work and materials should comply with Health and Safety legislation and to be approved by the Local Authority Planning / Building Control Officer.

All dimensions are in millimetres unless where explicitly shown otherwise.

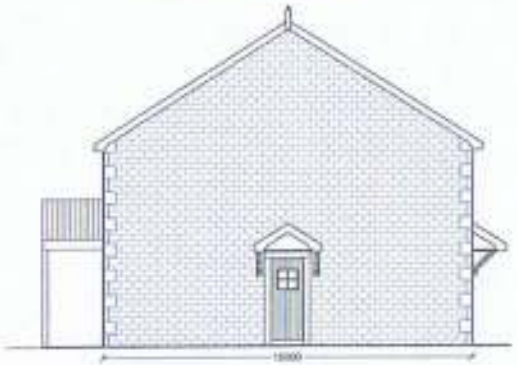
The contractor should check and clarify all dimensions as work proceeds and notify the design team of any discrepancies.

Do not scale off the drawings, if in doubt ask.

Avalon Chartered Town Planning are not liable for work undertaken prior to Full Planning Consent and/or Building Regulations Approval

North West Elevation

North East Elevation



South East Elevation

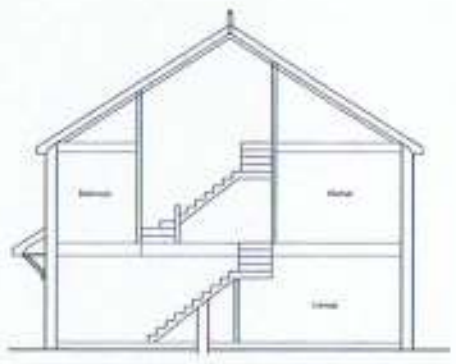
South West Elevation

Site Location Plan (1:1250)

Site Plan (1:200)

Apartment Floor Areas:

Ground Floor Apartments:	**50m2**
First Floor Apartments:	55m2 + 24m2 = **79m2**



Section A-A

Avalon RTPI
Chartered Town Planning
Town Planning · Architectural Design · Building Regulations · Surveying
Phone: 01282 834834 Fax: 01282 451666
Web: www.avalonrtpi.co.uk Email: planning@avalonrtpi.co.uk
2 Rowley Business Centre, Robinson Road, Burnley, Lancashire, BB12 2TT

PROPOSED PLANS AND ELEVATIONS

Site: Proposed Development
Land off Princess Avenue
Clitheroe

Client: Mr R Wood

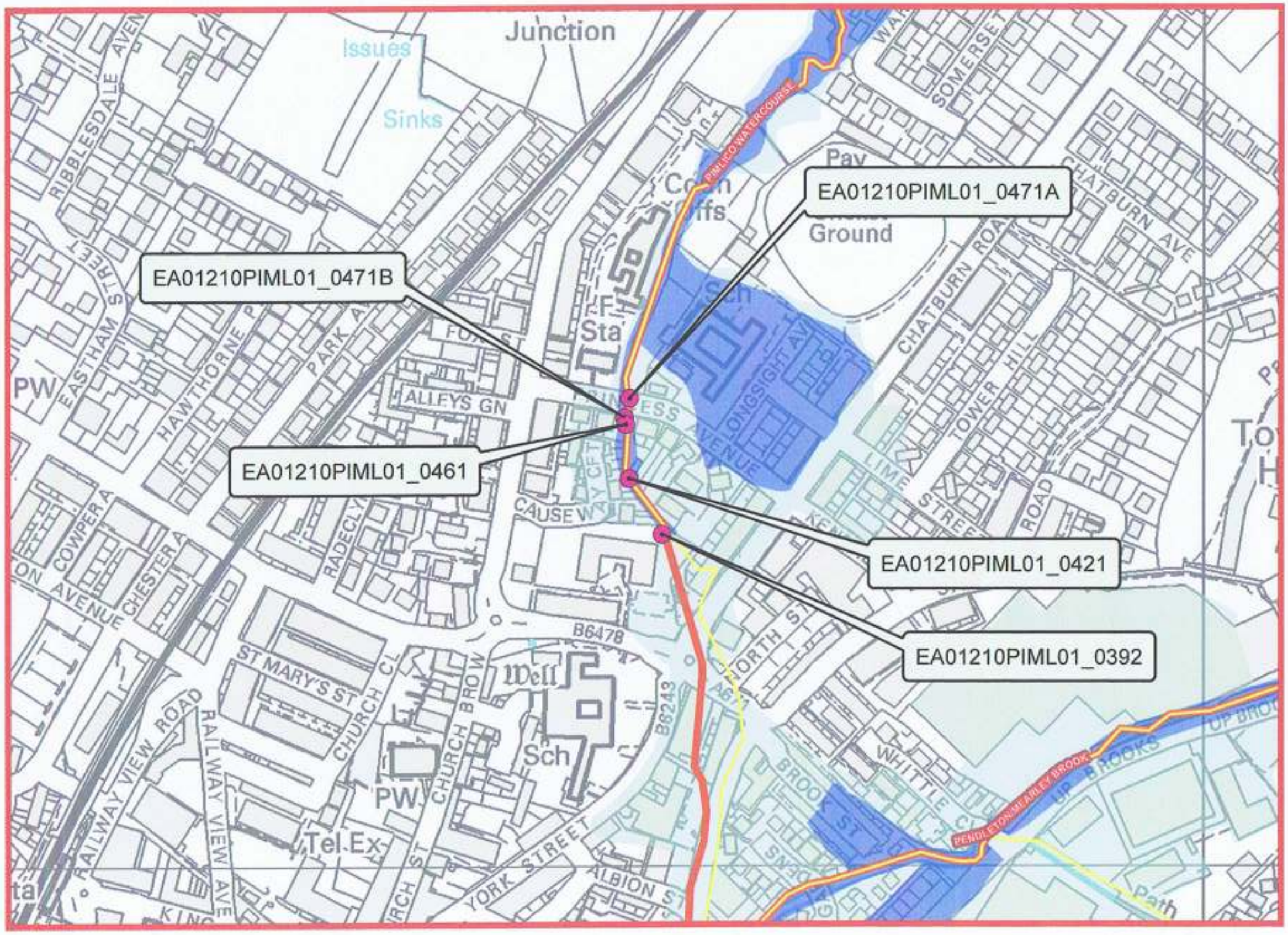
Date: 04.12.12 | Scale: 1:100 @ A1

Project No: WOOD/01 Dwg 01 | Drawn: DS

Amendments:

Flood Map (NTH6802S) - Princess Avenue, Clitheroe

National Grid Reference: SD 74600 42300



Environment Agency

North West Region - North Area

Lutra House, Dodd Way, Off Seedlee Road, Walton Summit, Bamber Bridge. Preston. PR5 8BX.

Tel: 03708 506 506 | www.environment-agency.gov.uk

Produced by Flood Risk Mapping

Map produced on: 6 February 2013

Legend

- Node Point
- Modelled Flood Group
- Main River
- Flood Zone 3
- Flood Zone 2

The datasets used in this plan may not have been audited. The Agency cannot ensure that the data in its possession will always be accurate, up to date or valid but the Agency will use reasonable care to ensure an accurate copy of the data. The accompanying disclaimer should be used in conjunction with this plan.

Flood Zone 3: Shows the area that could be affected by flooding from rivers or the sea, if there were no defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) chance or greater of happening each year.
- or from a river by a flood that has a 1% (1 in 100) chance or greater of happening each year.

Flood Zone 2: Shows the additional extent of an extreme flood from rivers or the sea, if there were no defences. These outlying areas are likely to be affected by a major flood, that has up to a 0.1% (1 in 1000) chance of occurring each year.

Historic Flooding:
We do not hold any records of flooding at this location.

0 12.5 25 50
Metres

N W E S

Undefended Level (mAOD)and Flow (m3/sec) data for Clitheroe

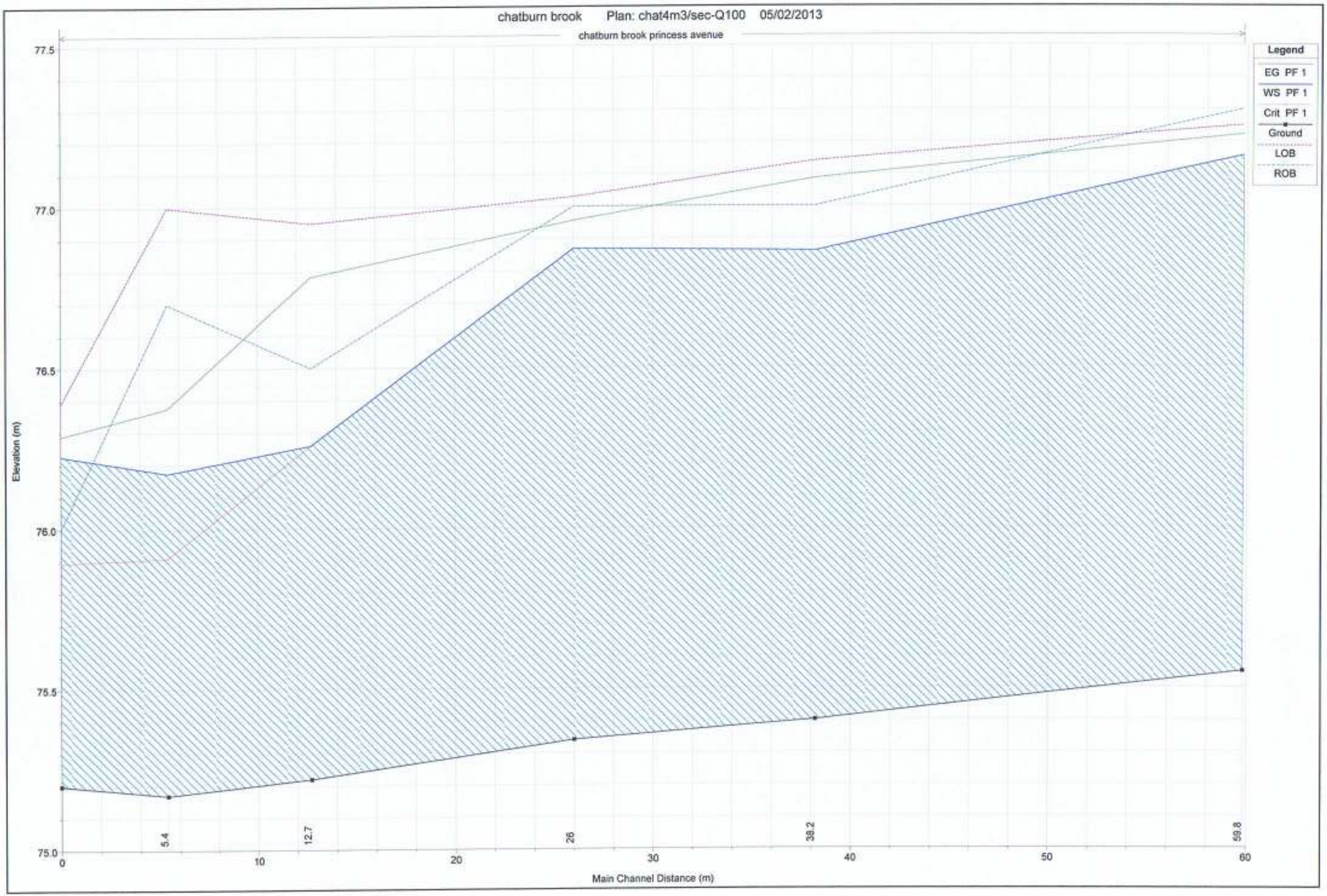
	5		10		25		50		75		100		200		1000	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
EA01210PIML01_0392	75.45	1.98	75.5	2.27	75.58	2.77	75.67	3.35	75.73	3.77	75.77	4.06	76.03	4.8	77.74	7.66
EA01210PIML01_0421	75.8	1.98	75.85	2.28	75.93	2.77	76.02	3.36	76.07	3.78	76.11	4.07	76.2	4.82	77.74	7.77
EA01210PIML01_0461	76.41	1.98	76.47	2.28	76.56	2.78	76.66	3.36	76.72	3.78	76.76	4.08	76.86	4.84	77.75	7.82
EA01210PIML01_0471A	76.52	1.98	76.59	2.28	76.72	2.78	76.87	3.37	76.98	3.79	77.05	4.08	77.23	4.84	77.85	7.82
EA01210PIML01_0471B	76.46	1.98	76.53	2.28	76.63	2.78	76.74	3.37	76.81	3.79	76.85	4.08	76.96	4.84	77.74	7.82

Data taken from Mearley SFRM Study

Defended Level (mAOD)and Flow (m3/sec) data for Clitheroe

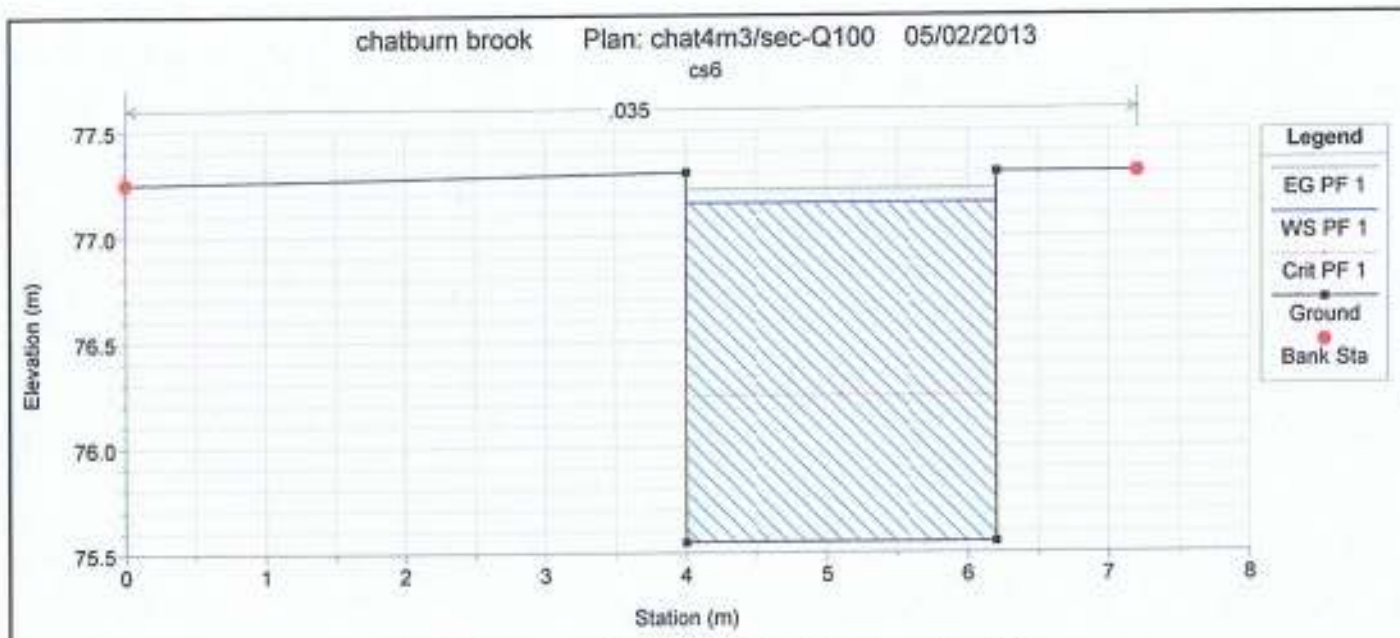
	10		50		75		100	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow
EA01210PIML01_0392	75.5	0	75.67	0	75.73	3.76	75.77	0
EA01210PIML01_0421	75.85	0	76.02	0	76.07	3.78	76.11	0
EA01210PIML01_0461	76.47	0	76.66	0	76.72	3.78	76.76	0
EA01210PIML01_0471A	76.59	0	76.87	0	76.98	3.78	77.05	0
EA01210PIML01_0471B	76.53	0	76.74	0	76.81	3.78	76.85	0

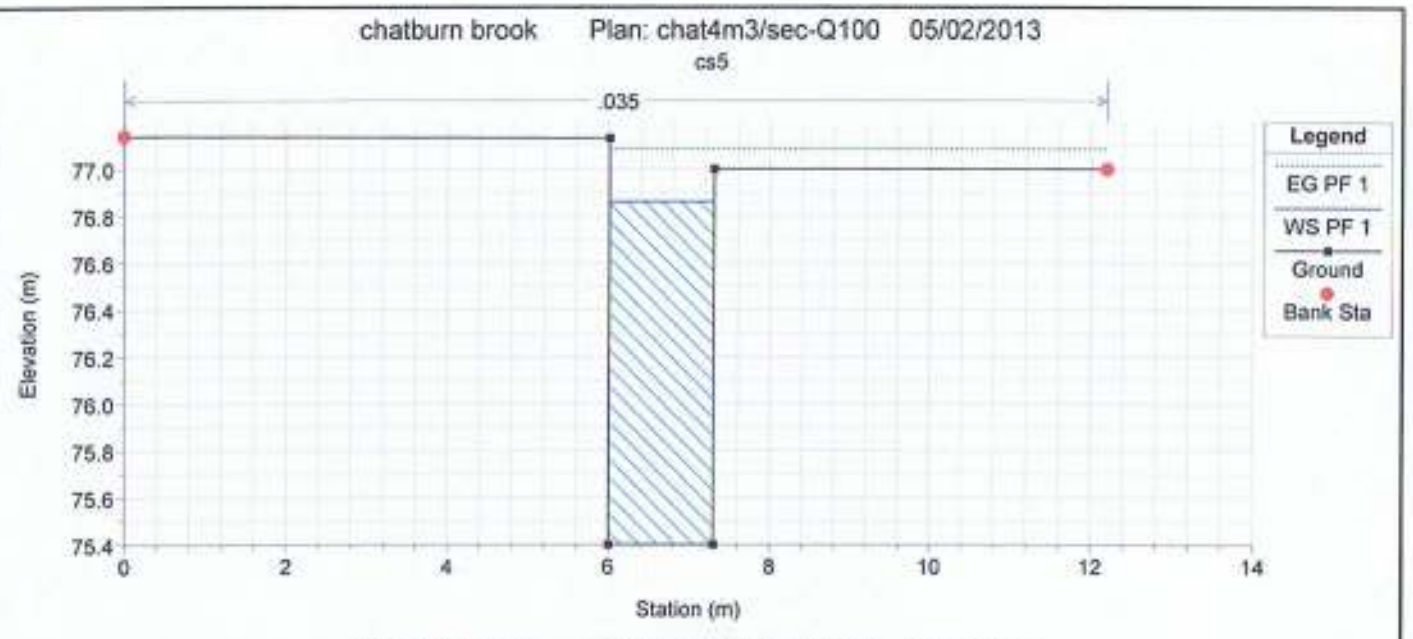
Data taken from Mearley SFRM Study

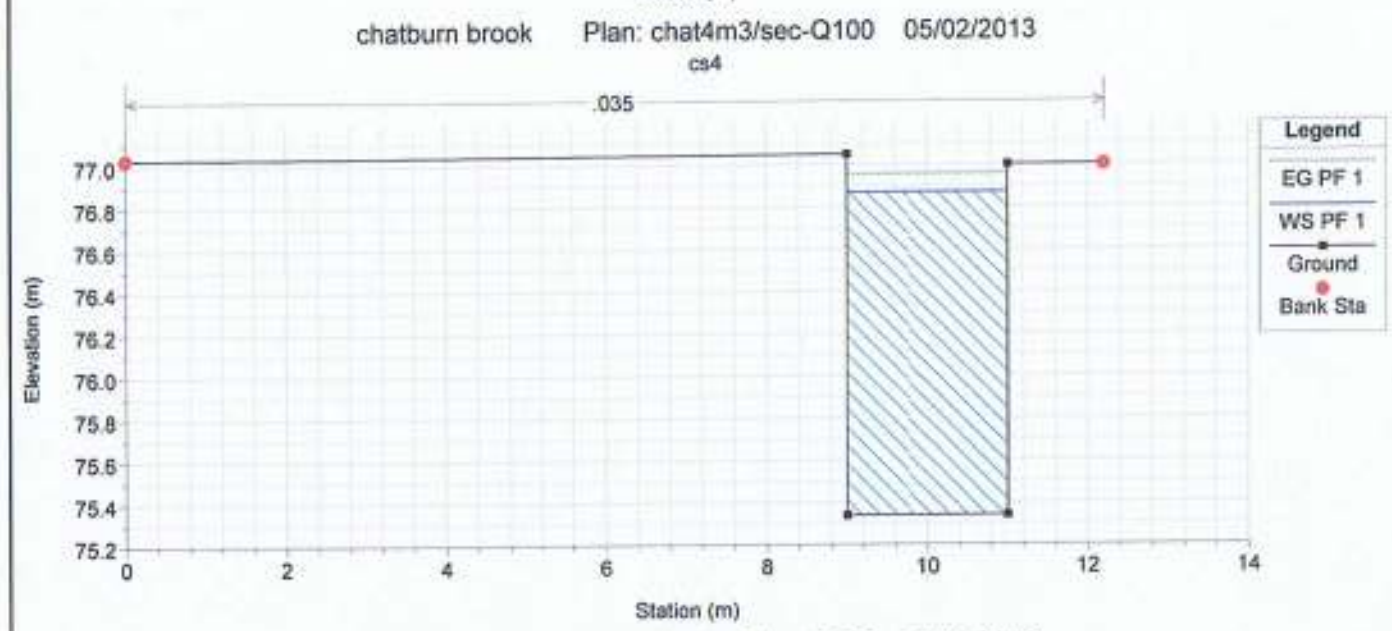

chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
chatburn brook princess avenue
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
LOB
ROB
Elevation (m)
77.5
77.0
76.5
76.0
75.5
75.0
0
10
20
30
40
50
60
5.4
12.7
26
38.2
59.8
Main Channel Distance (m)

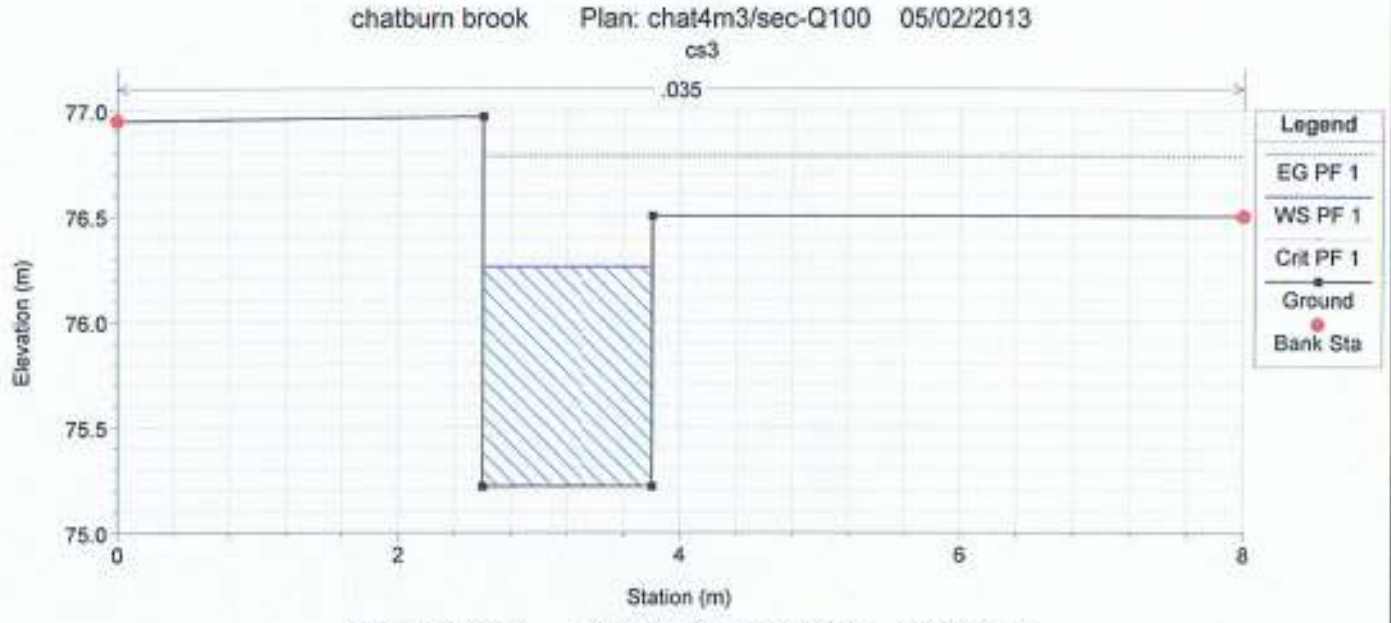
HEC-RAS Plan: p02 River: chatburn brook Reach: princess avenue Profile: PF 1

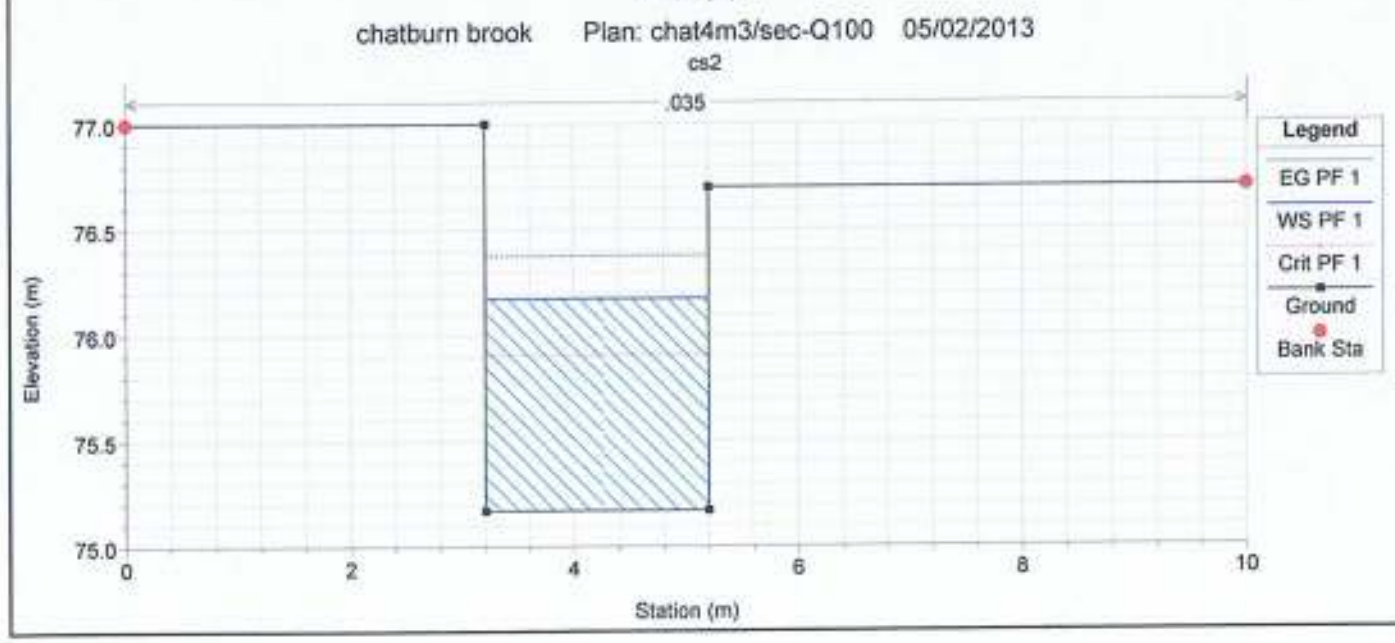
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
princess avenue	59.8	PF 1 6	4.00	75.55	77.16	76.24	77.22	0.002772	1.13	3.53	2.20	0.29
princess avenue	38.2	PF 1 5	4.00	75.40	76.86		77.09	0.015792	2.11	1.90	1.30	0.56
princess avenue	26	PF 1 4	4.00	75.34	76.87		76.96	0.004098	1.31	3.06	2.00	0.34
princess avenue	12.7	PF 1 3	4.00	75.22	76.26	76.26	76.78	0.045777	3.21	1.25	1.20	1.00
princess avenue	5.4	PF 1 2	4.00	75.17	76.17	75.91	76.38	0.012237	1.99	2.01	2.00	0.64
princess avenue	0	PF 1 1	4.00	75.20	76.23	75.89	76.29	0.006000	1.11	3.62	8.20	0.53

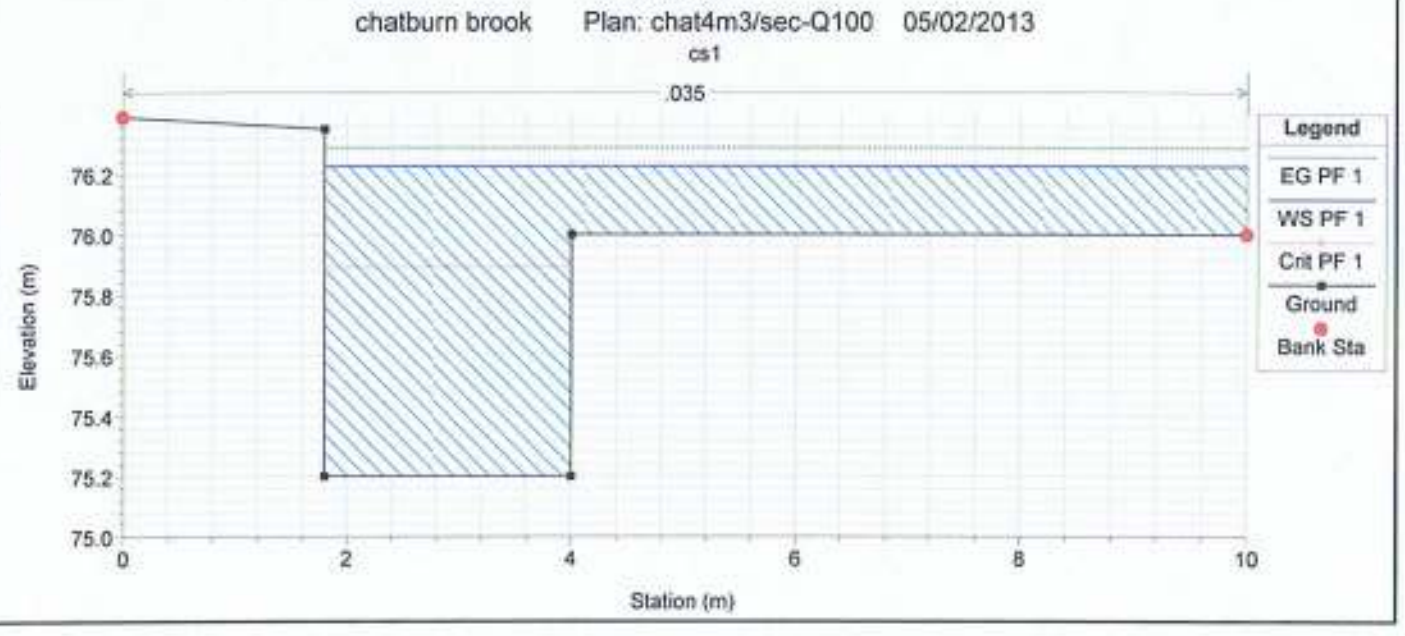

chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs6
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

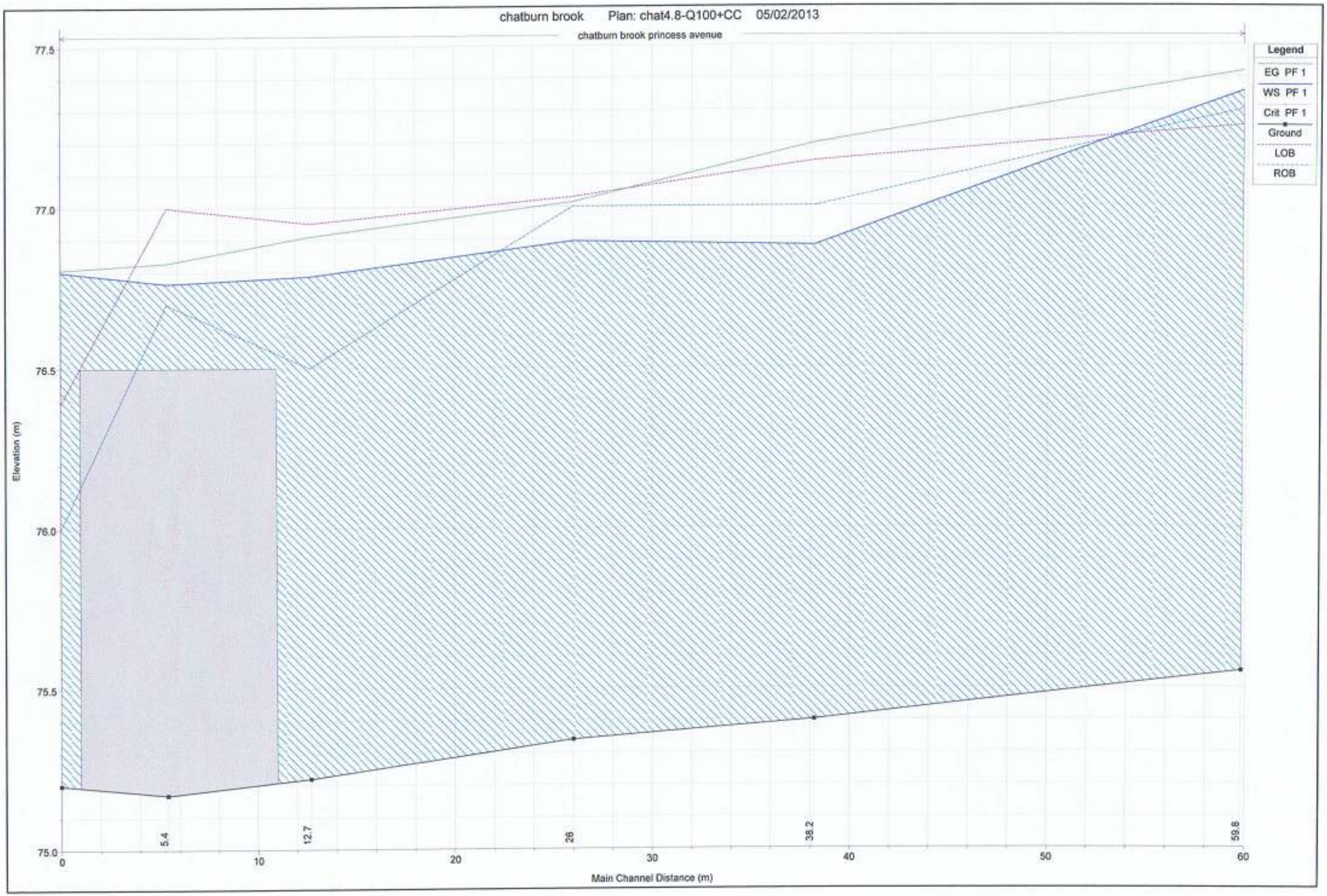

chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs5
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs4
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs3
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs2
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

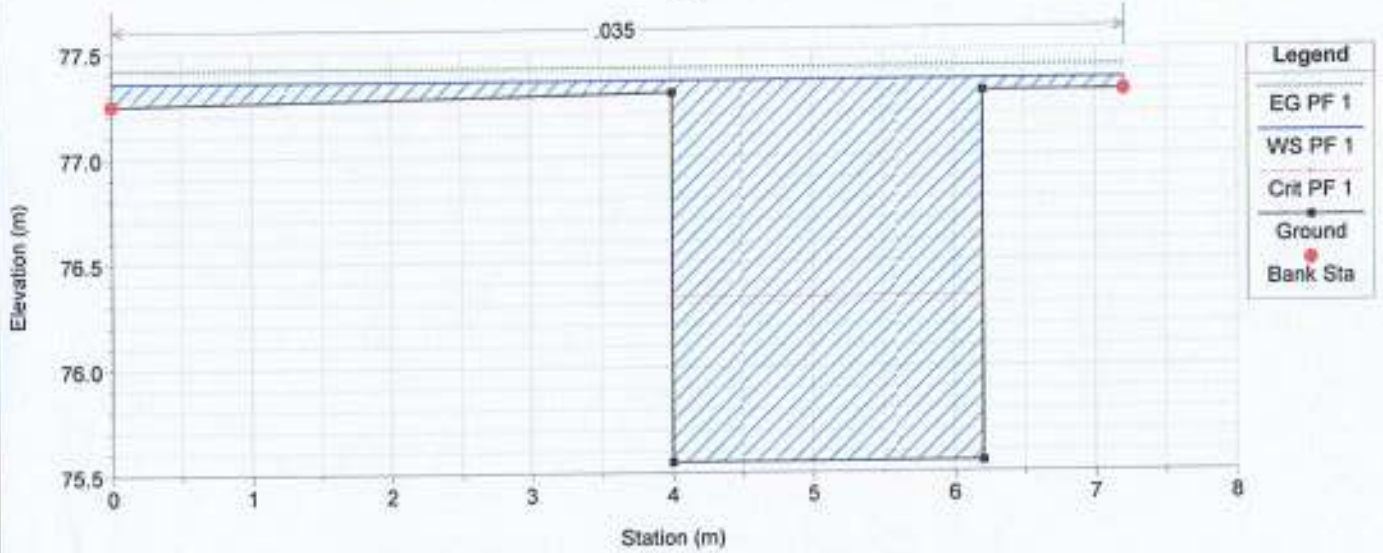

chatburn brook Plan: chat4m3/sec-Q100 05/02/2013
cs1
.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
chatburn brook princess avenue
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
LOB
ROB
Elevation (m)
77.5
77.0
76.5
76.0
75.5
75.0
0
10
20
30
40
50
60
5.4
12.7
26
38.2
59.6
Main Channel Distance (m)

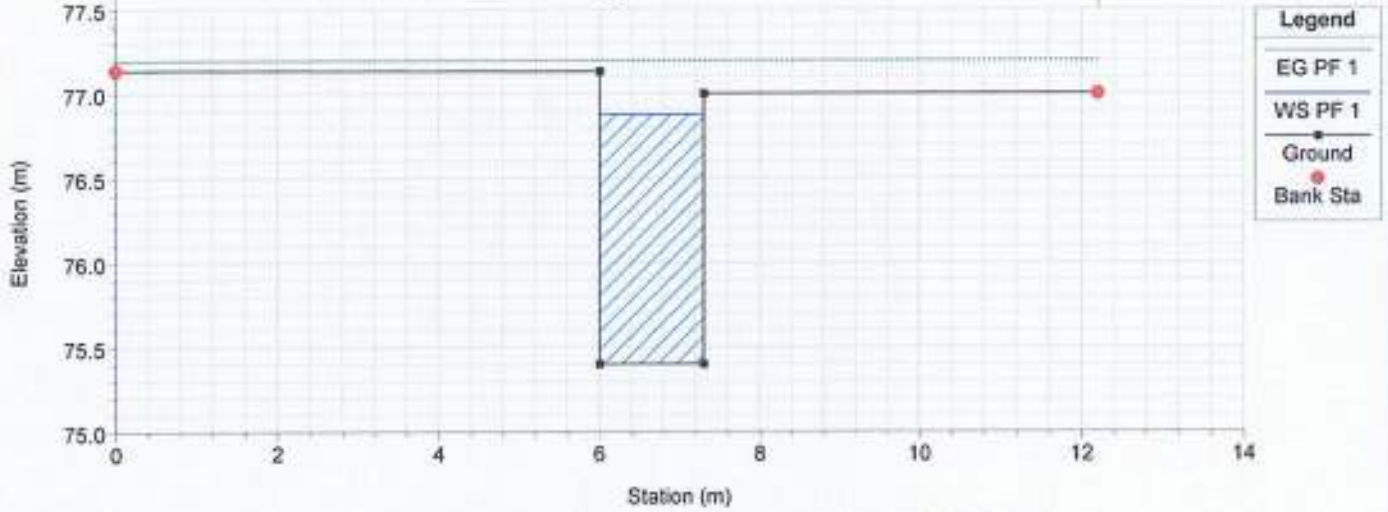
HEC-RAS Plan: p03 River: chatburn brook Reach: princess avenue Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
princess avenue	59.8	PF 1	4.80	75.55	77.36	76.33	77.42	0.005001	1.10	4.36	7.20	0.45
princess avenue	38.2	PF 1	4.80	75.40	76.88		77.20	0.022100	2.50	1.92	1.30	0.66
princess avenue	26	PF 1	4.80	75.34	76.89		77.01	0.005682	1.55	3.10	2.00	0.40
princess avenue	12.7	PF 1	4.80	75.22	76.79		76.91	0.011611	1.56	3.08	5.40	0.66
princess avenue	11		Lat Struct									
princess avenue	5.4	PF 1	3.94	75.17	76.76		76.83	0.006302	1.13	3.49	6.80	0.50
princess avenue	0	PF 1	3.23	75.20	76.80	75.80	76.81	0.000253	0.36	9.10	10.00	0.12

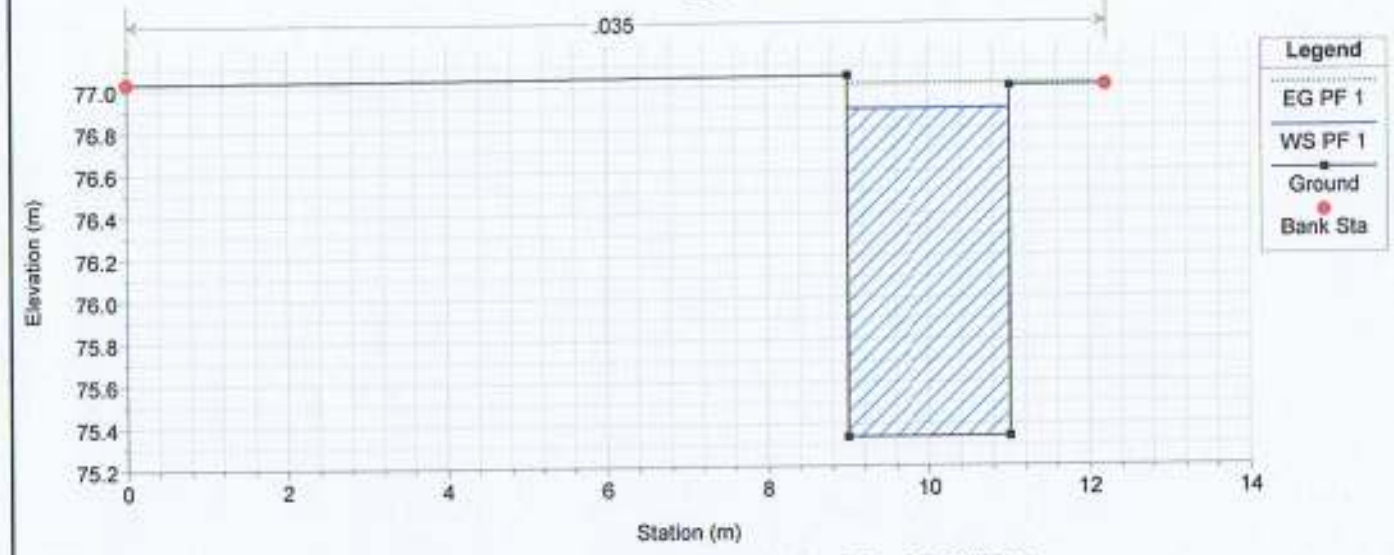
chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
cs6



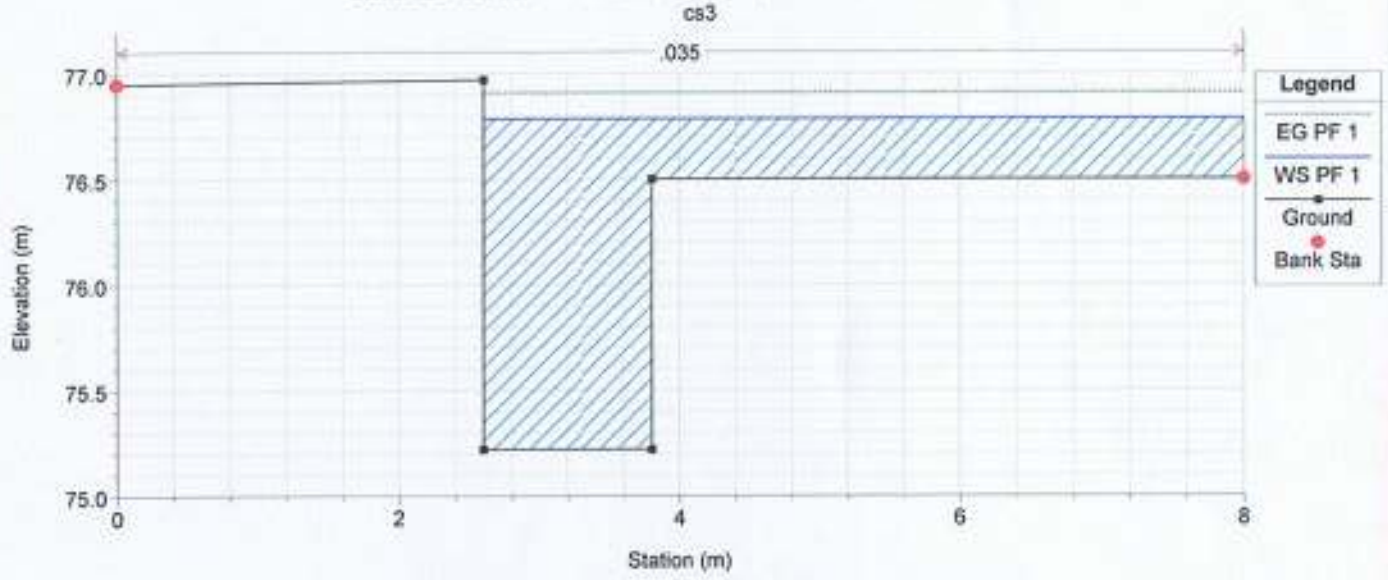
chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
cs5



chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
cs4



chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
cs3



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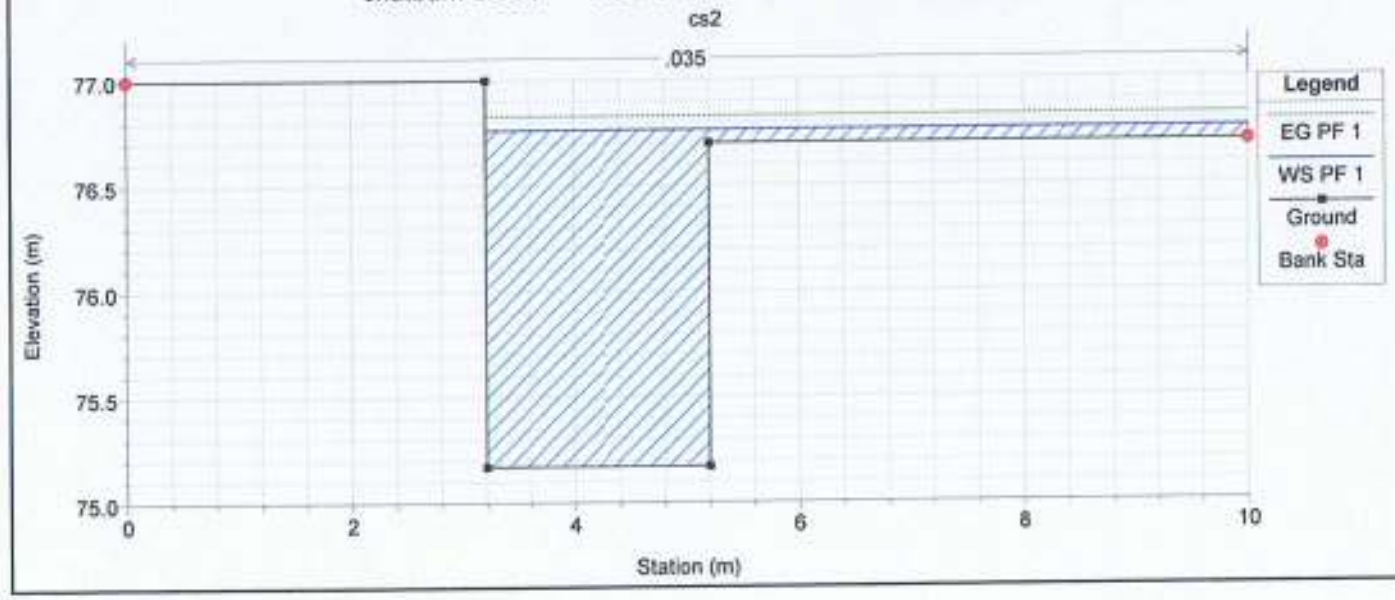
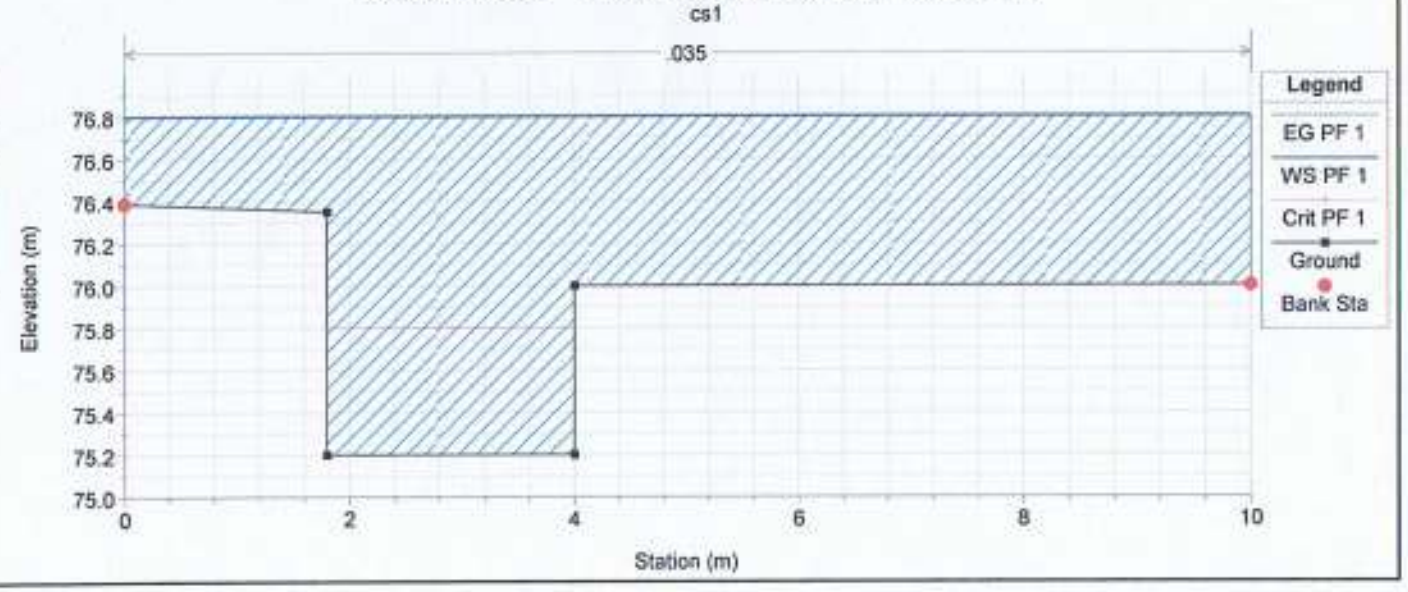
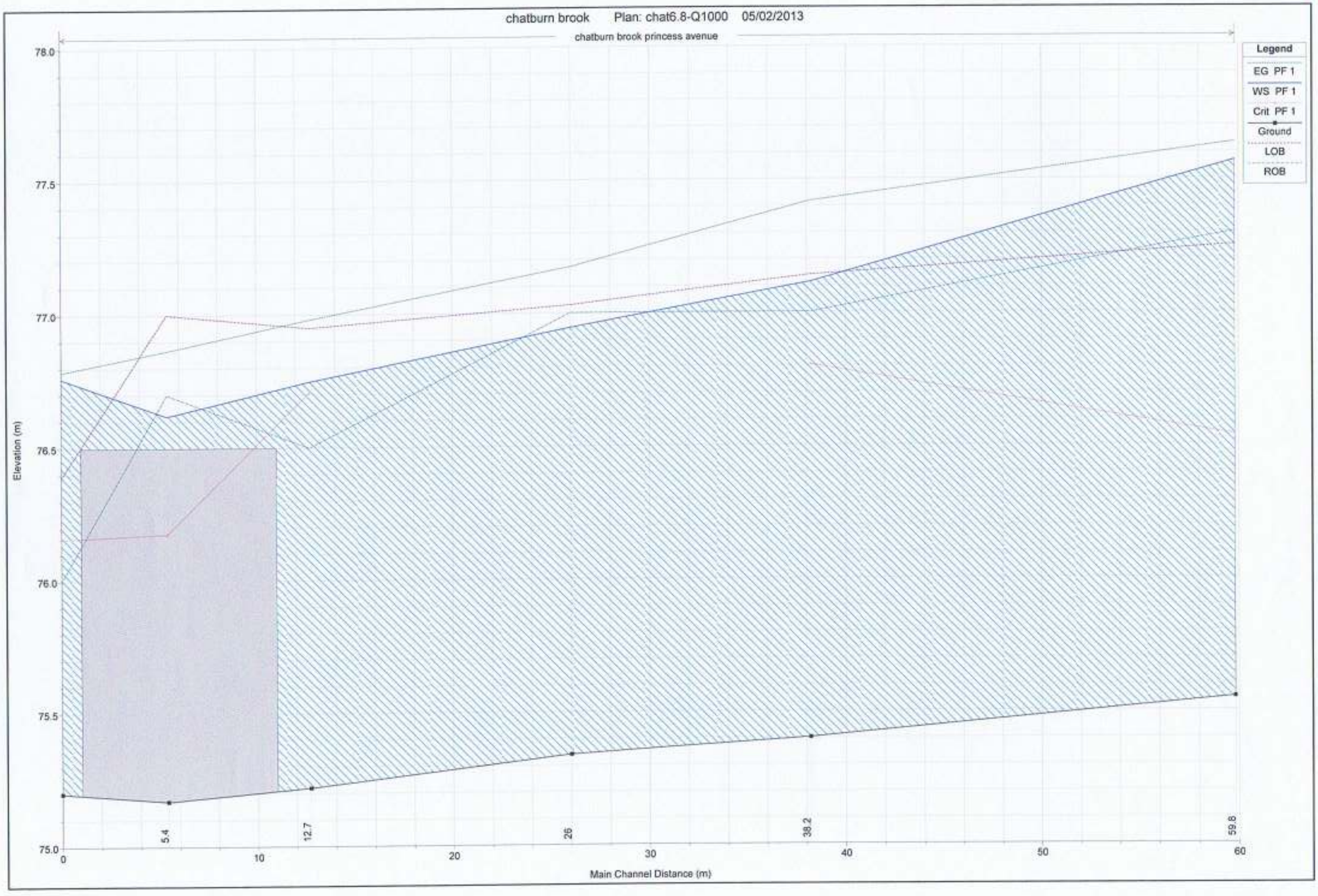
cs2



chatburn brook Plan: chat4.8-Q100+CC 05/02/2013
cs1

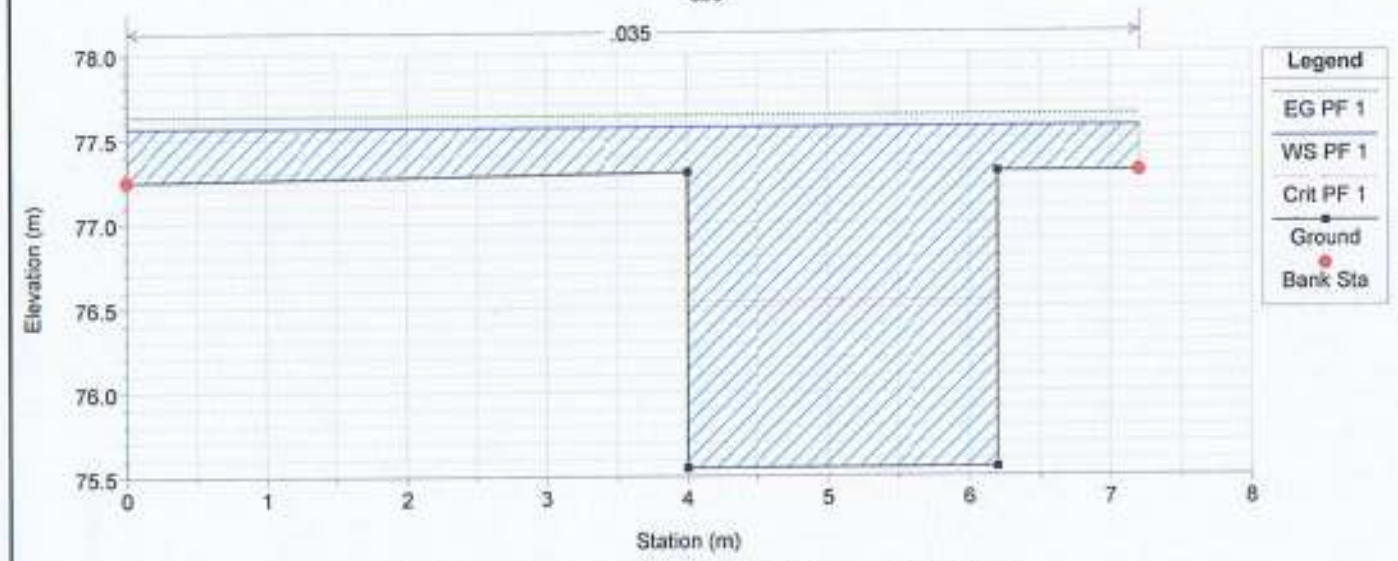



chatburn brook Plan: chat6.8-Q1000 05/02/2013
chatburn brook princess avenue
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
LOB
ROB
Elevation (m)
78.0
77.5
77.0
76.5
76.0
75.5
75.0
0
10
20
30
40
50
60
5.4
12.7
26
38.2
59.8
Main Channel Distance (m)

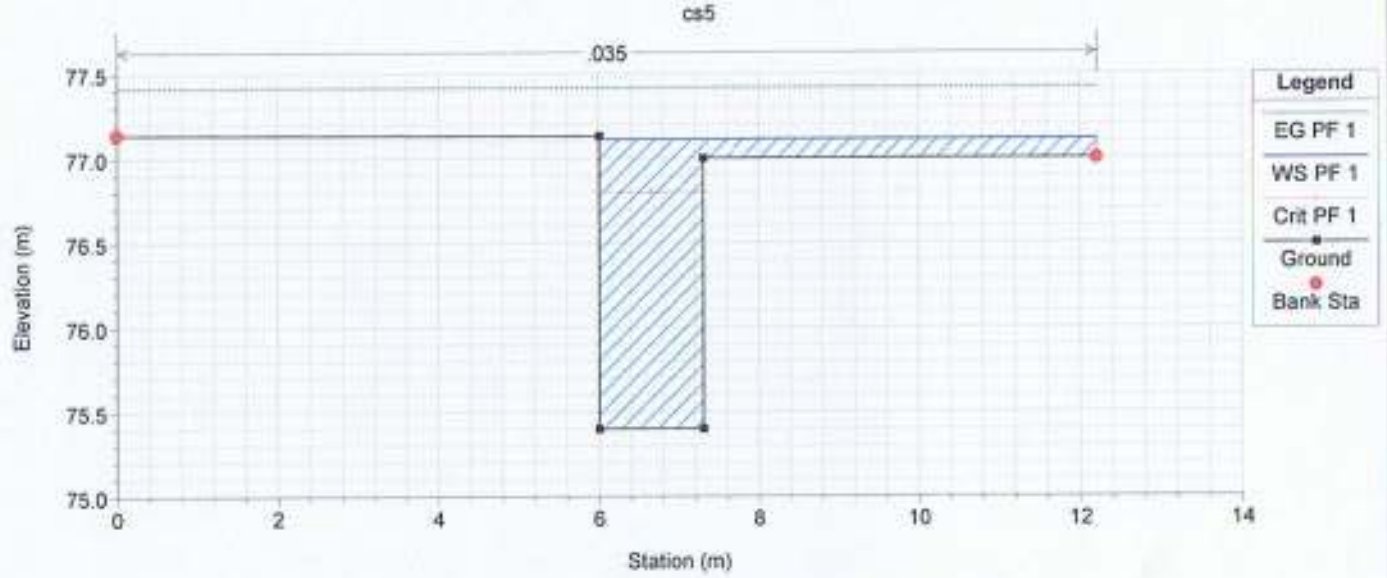
HEC-RAS Plan: p04 River: chatburn brook Reach: princess avenue Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
princess avenue	59.8	PF 1	6.80	75.55	77.57	76.54	77.64	0.003920	1.16	5.87	7.20	0.41
princess avenue	38.2	PF 1	6.80	75.40	77.11	76.80	77.42	0.038274	2.44	2.78	6.20	1.16
princess avenue	26	PF 1	6.80	75.34	76.95		77.17	0.010484	2.12	3.21	2.00	0.53
princess avenue	12.7	PF 1	6.80	75.22	76.75	76.71	76.98	0.021258	2.14	3.18	5.60	0.91
princess avenue	11		Lat Struct									
princess avenue	5.4	PF 1	6.36	75.17	76.62	76.18	76.86	0.011850	2.19	2.90	2.00	0.58
princess avenue	0	PF 1	5.99	75.20	76.76	76.16	76.78	0.001000	0.69	8.70	10.00	0.24

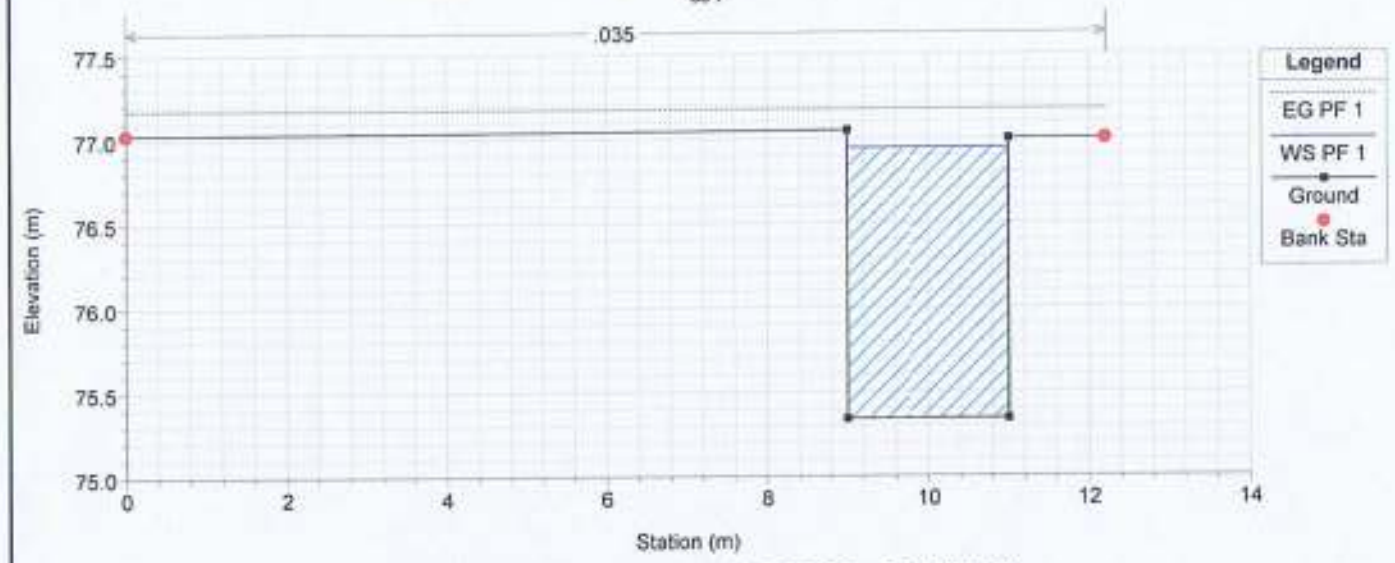
chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs6



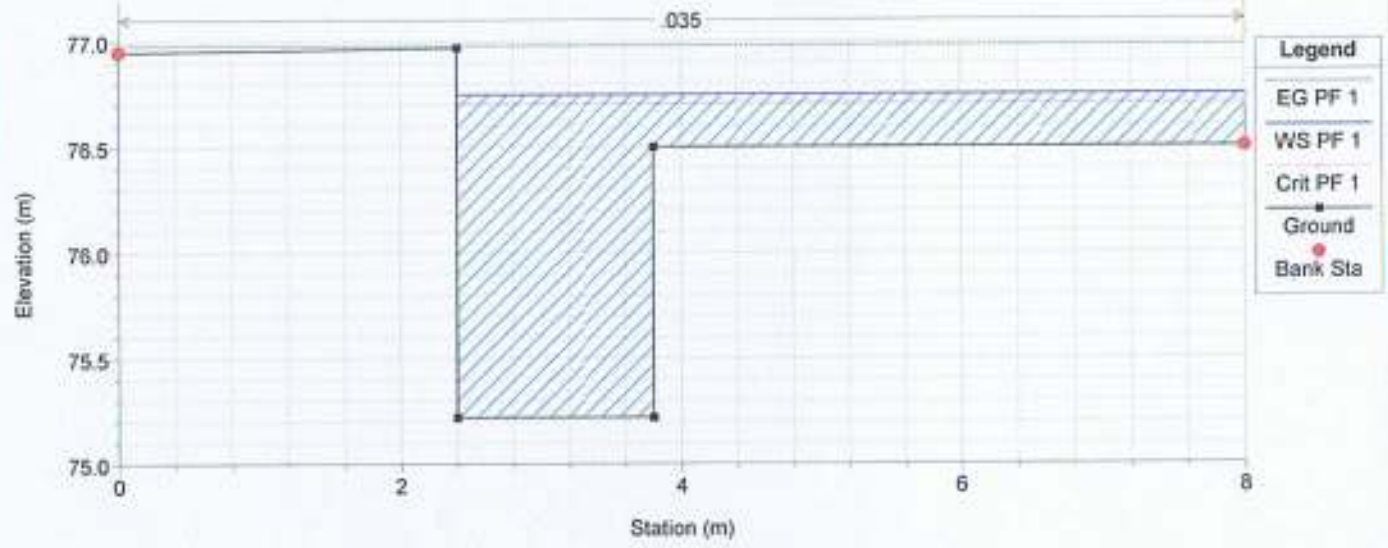
chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs5



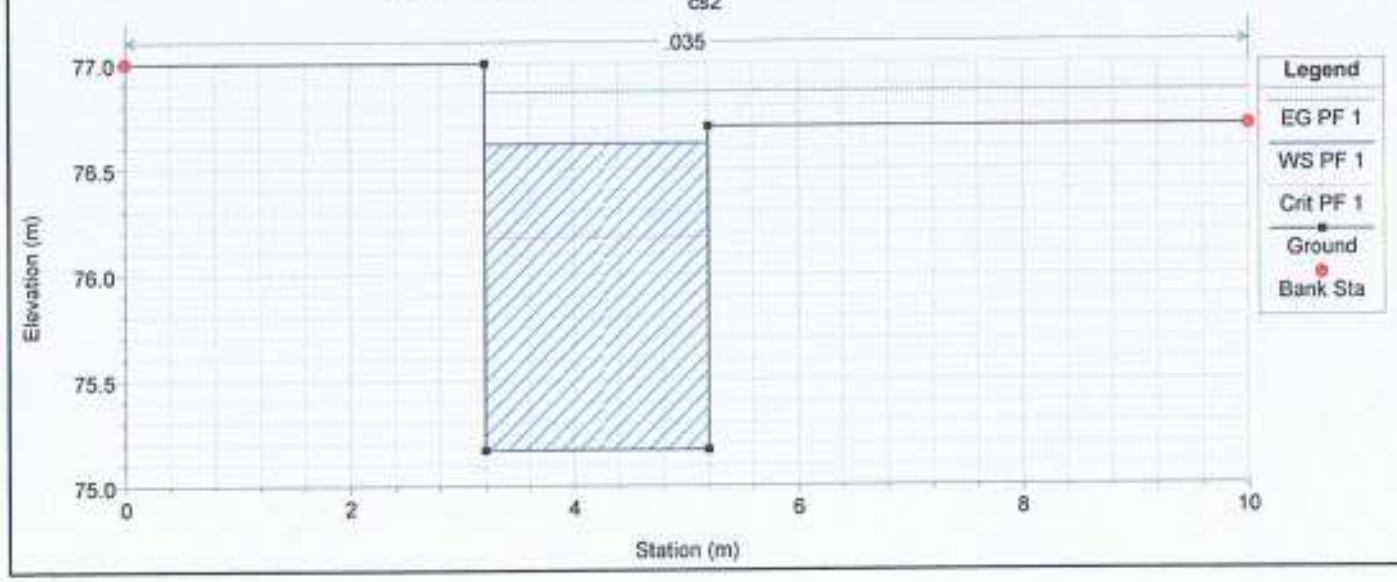
chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs4



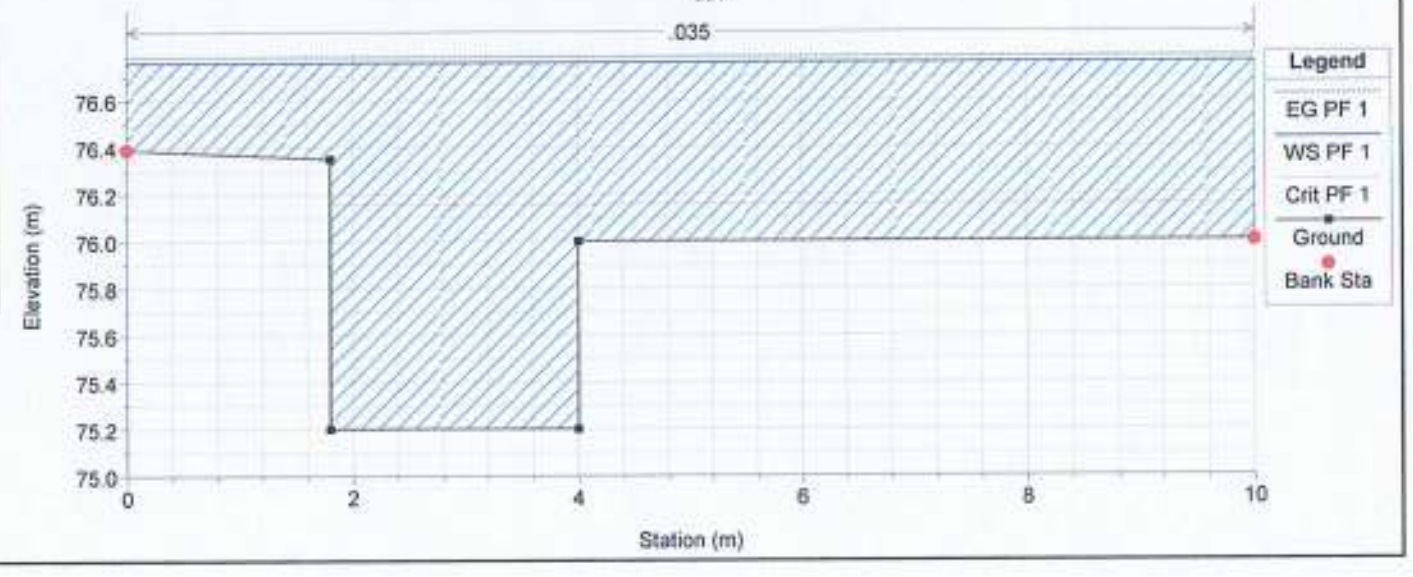
chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs3



chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs2



chatburn brook Plan: chat6.8-Q1000 05/02/2013
cs1



Sawley
Grindleton
Newby
Howgill
Rimington
West Bradford
Downham
Chatburn
Waddington
Horrocksford
Bashall Eaves
Pimlico
Worston
Bashall Town
Low Moor
Clitheroe
71003
71008
Barley
Pendleton
Newchurch in Pendle
71006
Great Mitton
Barrow
Hurst Green
71007
71009
Lamb Roe
Wiswell
Sabden
Higher Harpers

374600 442300 [SD 74600 42300]

VERSION	FEH CD-R	Version	3	exported at	10:25:13	GMT	Tue	05-Feb-13
CATCHMENT	GB	374600	442300	SD 74600 42300				
CENTROID	GB	375684	443002	SD 75684 43002				
AREA	1.61							
ALTBAR	98							
ASPBAR	284							
ASPVAR	0.37							
BFIHOST	0.435							
DPLBAR	1.81							
DPSBAR	40.3							
FARL	0.995							
FPEXT	0.1073							
FPDBAR	0.798							
FPLOC	0.879							
LDP	3.28							
PROPWET	0.6							
RMED-1H	10.4							
RMED-1D	42.4							
RMED-2D	58.8							
SAAR	1222							
SAAR4170	1159							
SPRHOST	30.24							
URBCONC1990	0.325							
URBEXT1990	0.035							
URBLOC1990	0.455							
URBCONC2000	0.757							
URBEXT2000	0.098							
URBLOC2000	0.441							
C	-0.02592							
D1	0.41741							
D2	0.38874							
D3	0.43324							
E	0.30185							
F	2.45601							
C(1 km)	-0.025							
D1(1 km)	0.405							
D2(1 km)	0.385							
D3(1 km)	0.437							
E(1 km)	0.301							
F(1 km)	2.458							

Michael Lambert Associates			Copyright under licence from IoH				
Catchment descriptors							
Chatburn Beck at Princess Avenue			05/02/2013	mel			B1343

VERSION	FEH CD-R	Version	3	exported at	10:31:37	GMT	Tue	05-Feb-13		B1343
Parameters					Clitheroe rain data					
Calculation	Design rainfall				06/02/2013	mel				
Calculation	Typical point in catchment									
Calculation	Catchment	GB	374600	442300	SD 74600 42300					
Catchment	1.61		km**2							
Duration=	6	1	(hours)							
Fixed durat	no									
Return peri	100	1	(years)							
Annual ma	yes									
c	d1	d2	d3	e	f					
-0.02592	0.41741	0.38874	0.43324	0.30185	2.45601					
An areal reduction factor of 0.976 has been applied to a point rainfall of 79.7 mm to yield a catchment design rainfall of 77.8 mm.										
No warning(s) or note(s) were present for this calculation.										
The data in the following table have been computed using sliding durations.										

Duration minutes	Duration hours	Duration days	10 year rainfall mm	20 year rainfall mm	50 year rainfall mm	100 year rainfall mm	200 year rainfall mm	500 year rainfall mm
15	0.25	0.010417	12.89	16.44	22.52	28.51	36.06	49.16
30	0.5	0.020833	16.85	21.21	28.57	35.72	44.62	59.84
45	0.75	0.03125	19.66	24.57	32.77	40.67	50.44	66.99
60	1	0.041667	21.92	27.24	36.09	44.56	54.97	72.52
75	1.25	0.052083	23.84	29.51	38.88	47.81	58.74	77.09
90	1.5	0.0625	25.53	31.49	41.31	50.63	62	81.01
105	1.75	0.072917	27.05	33.26	43.47	53.13	64.89	84.47
120	2	0.083333	28.43	34.88	45.44	55.4	67.49	87.58
135	2.25	0.09375	29.71	36.36	47.24	57.47	69.87	90.41
150	2.5	0.104167	30.89	37.74	48.9	59.38	72.06	93.01
165	2.75	0.114583	32.01	39.03	50.46	61.17	74.1	95.43
180	3	0.125	33.06	40.25	51.92	62.84	76.01	97.68
195	3.25	0.135417	34.05	41.4	53.3	64.42	77.8	99.8
210	3.5	0.145833	35	42.49	54.61	65.92	79.5	101.8
225	3.75	0.15625	35.91	43.53	55.86	67.34	81.11	103.69
240	4	0.166667	36.77	44.53	57.05	68.69	82.65	105.5
255	4.25	0.177083	37.61	45.49	58.19	69.99	84.12	107.22
270	4.5	0.1875	38.41	46.41	59.29	71.23	85.53	108.88
285	4.75	0.197917	39.18	47.3	60.35	72.43	86.88	110.44
300	5	0.208333	39.93	48.16	61.36	73.59	88.18	111.96
315	5.25	0.21875	40.66	48.99	62.35	74.7	89.44	113.43
330	5.5	0.229167	41.36	49.79	63.3	75.78	90.65	114.84
345	5.75	0.239583	42.04	50.57	64.22	76.82	91.83	116.2
360	6	0.25	42.71	51.33	65.12	77.83	92.96	117.52
375	6.25	0.260417	43.35	52.07	65.99	78.81	94.07	118.8
390	6.5	0.270833	43.98	52.78	66.84	79.77	95.14	120.04
405	6.75	0.28125	44.6	53.48	67.66	80.7	96.18	121.25
420	7	0.291667	45.2	54.17	68.46	81.6	97.2	122.43
435	7.25	0.302083	45.79	54.83	69.25	82.49	98.19	123.57
450	7.5	0.3125	46.36	55.49	70.02	83.35	99.15	124.68
465	7.75	0.322917	46.92	56.12	70.77	84.19	100.1	125.77
480	8	0.333333	47.47	56.75	71.5	85.01	101.02	126.83
495	8.25	0.34375	48.01	57.36	72.22	85.82	101.92	127.87
510	8.5	0.354167	48.54	57.96	72.92	86.61	102.8	128.88
525	8.75	0.364583	49.06	58.55	73.61	87.38	103.66	129.87
540	9	0.375	49.57	59.13	74.28	88.13	104.5	130.84
555	9.25	0.385417	50.07	59.69	74.94	88.88	105.33	131.79
570	9.5	0.395833	50.56	60.25	75.59	89.6	106.14	132.72
585	9.75	0.40625	51.05	60.8	76.23	90.32	106.94	133.64
600	10	0.416667	51.52	61.34	76.86	91.02	107.72	134.53
615	10.25	0.427083	51.99	61.86	77.48	91.71	108.49	135.41
630	10.5	0.4375	52.45	62.39	78.08	92.39	109.24	136.27
645	10.75	0.447917	52.91	62.9	78.68	93.05	109.98	137.12
660	11	0.458333	53.35	63.4	79.27	93.71	110.71	137.96
675	11.25	0.46875	53.8	63.9	79.85	94.35	111.43	138.78
690	11.5	0.479167	54.23	64.39	80.42	94.99	112.14	139.58
705	11.75	0.489583	54.66	64.87	80.98	95.62	112.83	140.38
720	12	0.5	55.08	65.35	81.53	96.23	113.52	141.16
735	12.25	0.510417	55.47	65.78	82.03	96.78	114.12	141.84
750	12.5	0.520833	55.85	66.21	82.52	97.32	114.72	142.51
765	12.75	0.53125	56.22	66.62	83	97.86	115.31	143.18
780	13	0.541667	56.59	67.04	83.48	98.39	115.89	143.83
795	13.25	0.552083	56.95	67.45	83.94	98.9	116.46	144.48
810	13.5	0.5625	57.31	67.85	84.41	99.42	117.02	145.11
825	13.75	0.572917	57.67	68.25	84.87	99.92	117.58	145.74
840	14	0.583333	58.02	68.64	85.32	100.42	118.13	146.35