

**Former private garages site
at Princess Avenue
Clitheroe**

Proposed housing

Flood Risk Assessment

NGR SD 746 423

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I N D E X

1.0 Introduction

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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

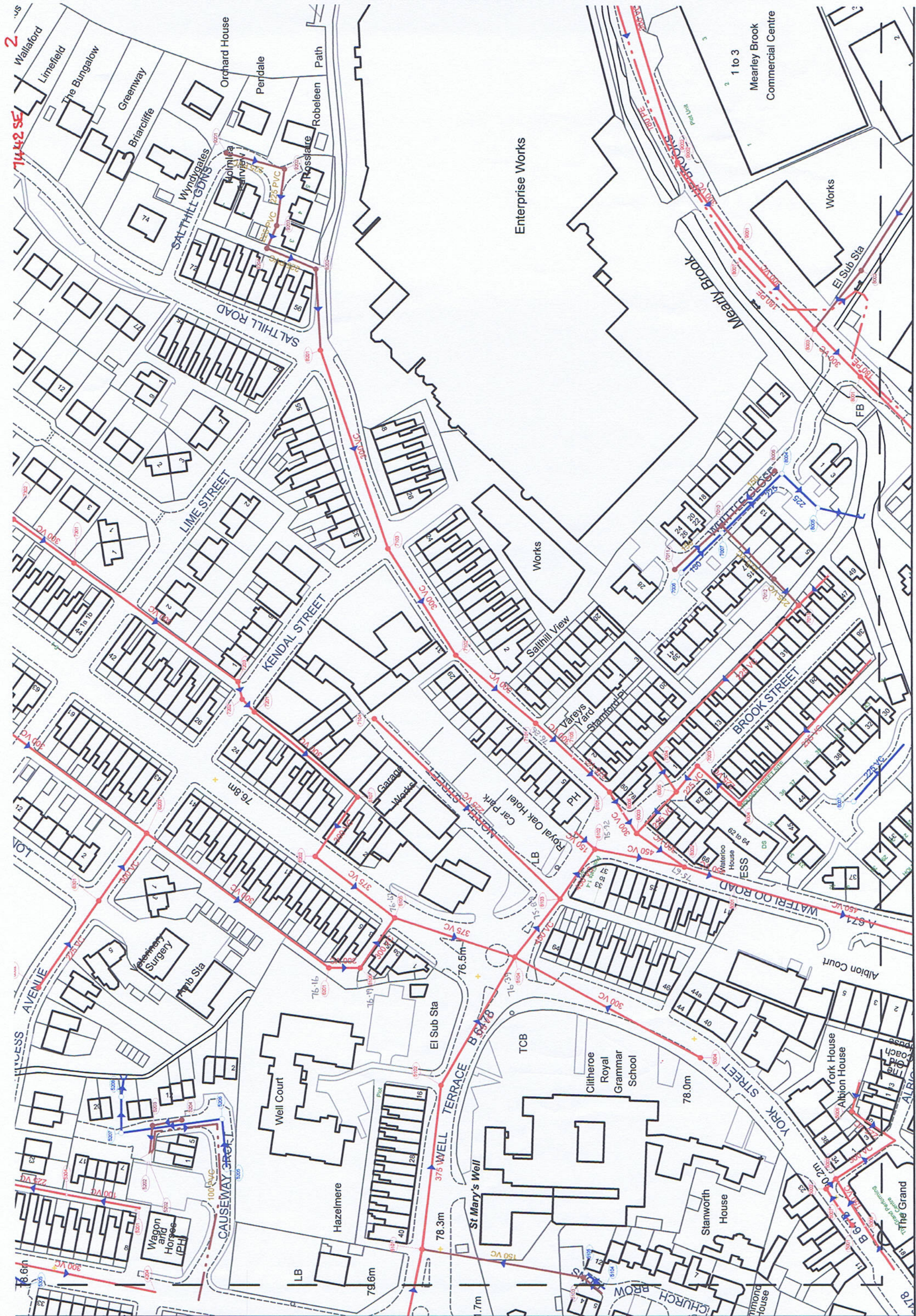
130205fra01

130206attach1-A3

130206attach2-A3

130206attach3-A4





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●	HEAT
●	HEAT
●	HYDI
●	INLE
●	INSP
●	GHOS
●	EXPEI
●	BIFU
●	CAT
●	CHAI
●	CONT
●	SURF
●	PL
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●	ST

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Refno Cover Func Type Invert Size.xSize.y Shape Matl Grad Length

0916		S	F																
5501	74.18	C	M	70.39	900		C	VC											
5502	74.62	C	M		225		C	VC											
5503	75.19	C	M	73.62	225		C	VC											
5504		C	L		225		C	VC											
5505		C	G		225		C	VC											
5506		C	L		225		C	VC											
5507	75.9	C	M	73.62	225		C	VC	142										
5508		C	G		225			VC											
5509		C	Q		525		C	VC											
5601	75.46	C	M	70.88	900		C	VC	214										
5701	75.16	C	M	72.63	225		C	VC	68										
5702	75.14	C	M		225		C	VC											
5801	77.58	C	M	74.99	225		C	VC											
5802	78.16	C	M	76.89	225		C	VC	10										
5803	78.48	C	M	77.08	225		C	VC	204										
5804		C	M		100		C	VC											
5805		C	M		100		C	VC											
5901	77.62	C	M	75.3	300		C	VC	21										
5902		C	L	74.06	225		C	VC	82										
5903	78.27	C	M	76.1	225		C	VC											
5904		C	G		225		C	VC											
5905		C	J		225		C	VC											
5906		C	G		300		C	VC											
5907		C	Q	74.68	225		C	VC	21										
5908		C	Q	73.89	300		C	VC	78										
6501	81.08	C	M	78.98	300		C	VC	47										
6502	79.97	C	M	77.88	300		C	VC	44										
6503	79.02	C	M	76.89	300		C	VC	27										
6504		C	G		225		C	VC											
6505		C	J																
6506		C	J																
6507		F	3		150		C	VC											
6508		F	D		150		C	VC											
6509		S	D		150		C	VC											
6510		S	3		150		C	VC											
6511		F	D		150		C	VC											
6512		S	D		150		C	VC											
6513		S	J																
6514		F	J																
6515		C	M		100		C	VC											
6516		C	M		100		C	VC											
6517		C	M		100		C	VC											
6518		C	M		100		C	VC											
6519		C	J																
6520		C	J																
6601	76.19	C	M	73.35	300		C	VC	22										
6602	75.57	C	M	71.27	900		C	VC	263										
6603	75.96	C	M	73.33	300		C	VC	62										
6701	75.09	C	M	71.63	825		C	VC	1										
6702		C	M		825		C	CO											
6703		C	M		825		C	CO											
6704		C	Q	72.2	300		C	VC	70										
6705		C	Q	33.83	825		C	CO											
6706		C	Q	71.39	825		C	VC	-120										
6707		C	Q	33.32	825		C	VC											
6801	74.77	C	M	71.27	825		C	CO											
6802	74.73	C	M	71.95	825		C	CO	20										
6803	74.73	C	M	71.99	825		C	CO	11										
6804	74.79	C	M	72.22	525		C	CO	85										
6805	75	C	M	72.37	450		C	VC	34										
6806	74.6	C	M		450		C	VC											
6807		C	Q	72.7	150		C	CO	14										
6808	74.75	C	J	73.75	225		C	PE	20										
6809	74.7	C	M	71.96	525		C	CO	2										
6810	74.61	C	M	73.1	300		C	VC	22										
6901	75.47	C	M	72.87	450		C	VC											
6902	75.6	C	M	73.69	300		C	VC	50										
6903	76.05	S	M	74.18	450		C	CO	251										
6904		S	M	74.08	300		C												
6905		S	F																
7500		F	J																
7501		F	D		150		C	VC											
7502		S	D		150		C	VC											
7503		F	D		150		C	VC											
7504		S	D		150		C	VC											
7505		S	D		150		C	VC											
7506		F	D		150		C	VC											
7507		S	D		150		C	VC											
7508		F	D		150		C	VC											
7509		S	D		150		C	VC											
7510		F	D		150		C	VC											
7511		S	D		150		C	VC											
7512		F	D		150		C	VC											
7513		S	D		150		C	VC											
7514		F	D		150		C	VC											
7515		C	M		100		C	VC											
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7522		S	D		150		C	VC											
7523		F	D		150		C	VC											
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Refno Cover Func Type Invert Size.xSize.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
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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
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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
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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
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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
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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					51.55



Notes

7
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.



ABBREVIATIONS

CL Cover Level
DK Drop Kerb
EH Eaves Height
LH Land Height
MH Main Road
RH Ridge/Roof Height
TF Top of Fence
TL Threshold Level
TW Top of Wall
US Under Side

NOTE

All levels and measurements taken in COORDINATE using GPS/ED data.
Levels, setting out or other measurements are shown as shown on plan.

Rev. 0 Description. Issued



2 Berkshire Close | Wilshire | 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

1:200@A1

Date

04/01/2013

Drawn By

MW

Drawing Number

TRI-0952-01

Notes:

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

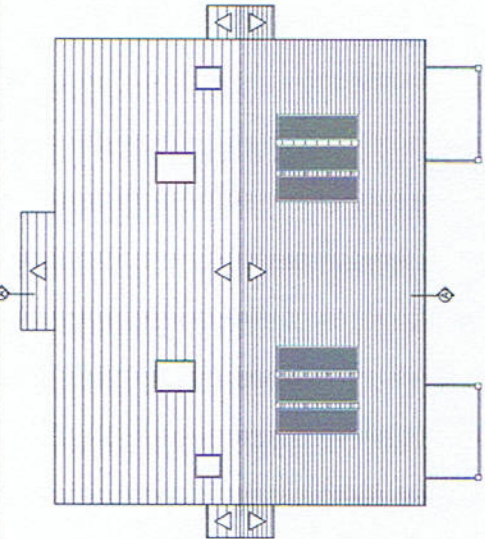
All work and materials should comply with Health and Safety legislation and to be approved by the Local Authority Planning / Building Control Officer.

All dimensions are in millimetres unless where explicitly shown otherwise.

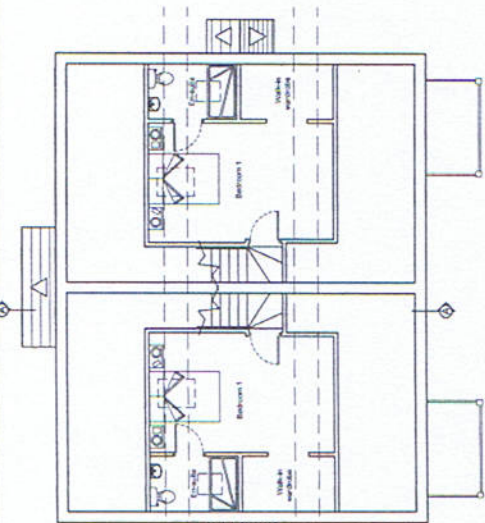
The contractor should check and clarify all dimensions as work proceeds and notify the design team of any discrepancies.

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

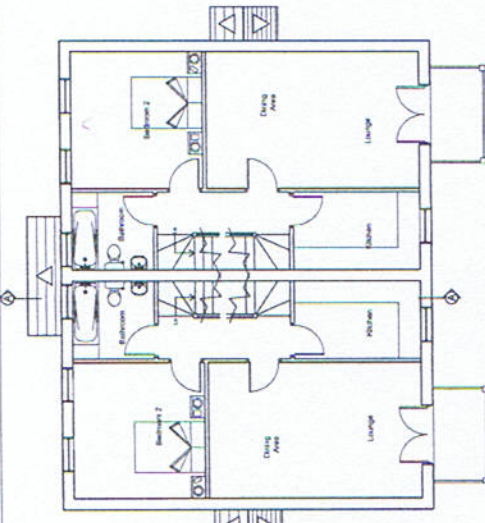
Avalon Chartered Town Planning are not liable for work undertaken prior to Full Planning Consent and/or Building Regulations Approval



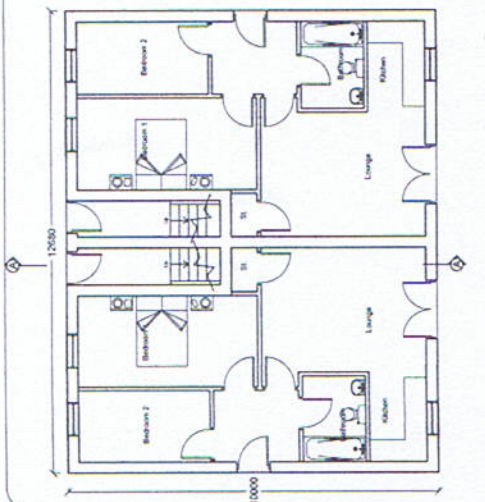
Roof Plan



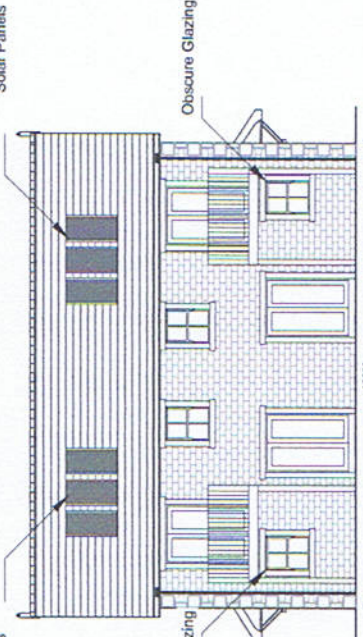
Second Floor/ Attic Plan



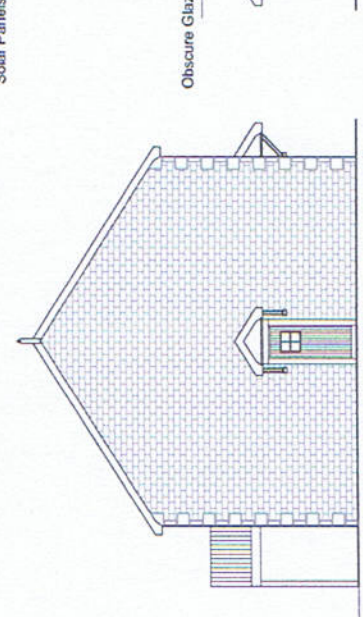
First Floor Plan



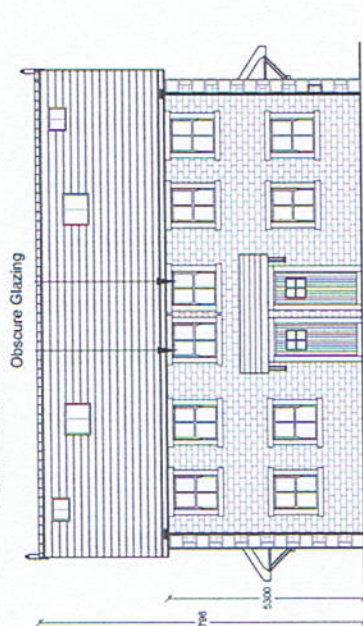
Ground Floor Plan



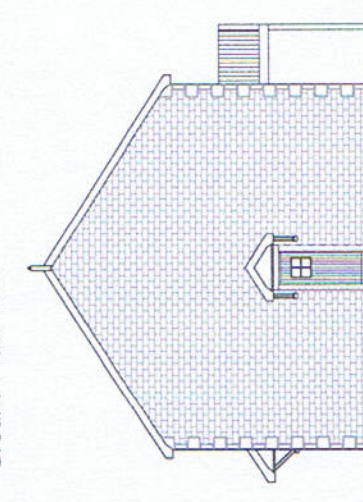
South West Elevation



South East Elevation



North East Elevation



North West Elevation



Site Location Plan (1:1250)

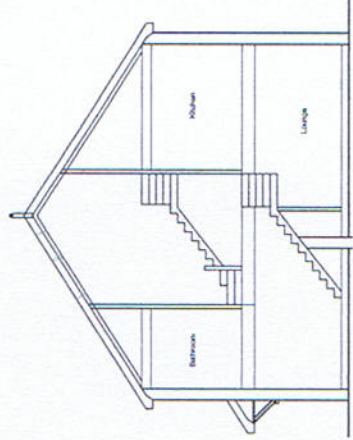
Apartment Floor Areas:

50m²

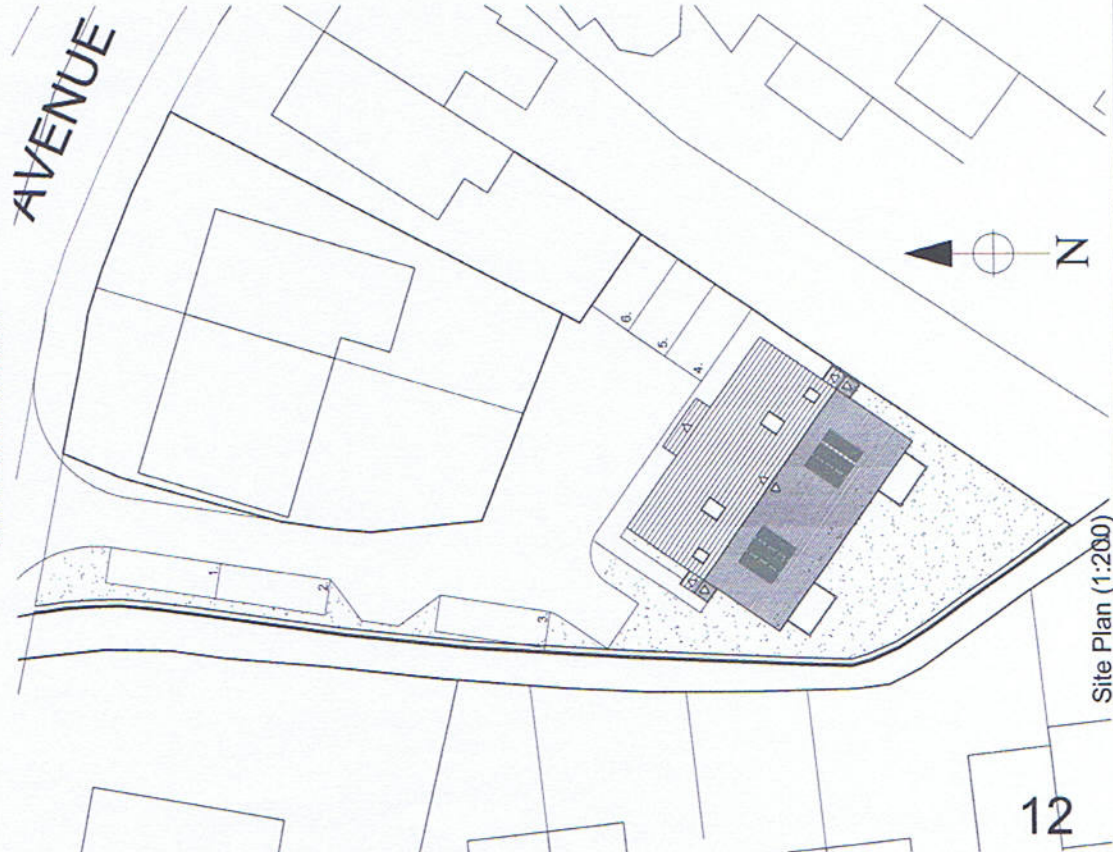
55m² + 24m² = 79m²

Ground Floor Apartments:

First Floor Apartments:



Section A-A



Site Plan (1:200)

Avalon
Chartered Town Planning

Town Planning - Architectural Design - Building Regulations - Surveying

Phone: 01282 834834 Fax: 01282 451666
Web: www.avalon.co.uk Email: planning@avalon.co.uk
2 Riverside Business Centre, Riverside Road, Burnley, Lancashire, BB10 2TY

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: WOOD01 Dwg 01	Drawn: DS		
Amendments:			

Flood Map (NTH6802S) - Princess Avenue, Clitheroe

National Grid
Reference:
SD 74600 42300



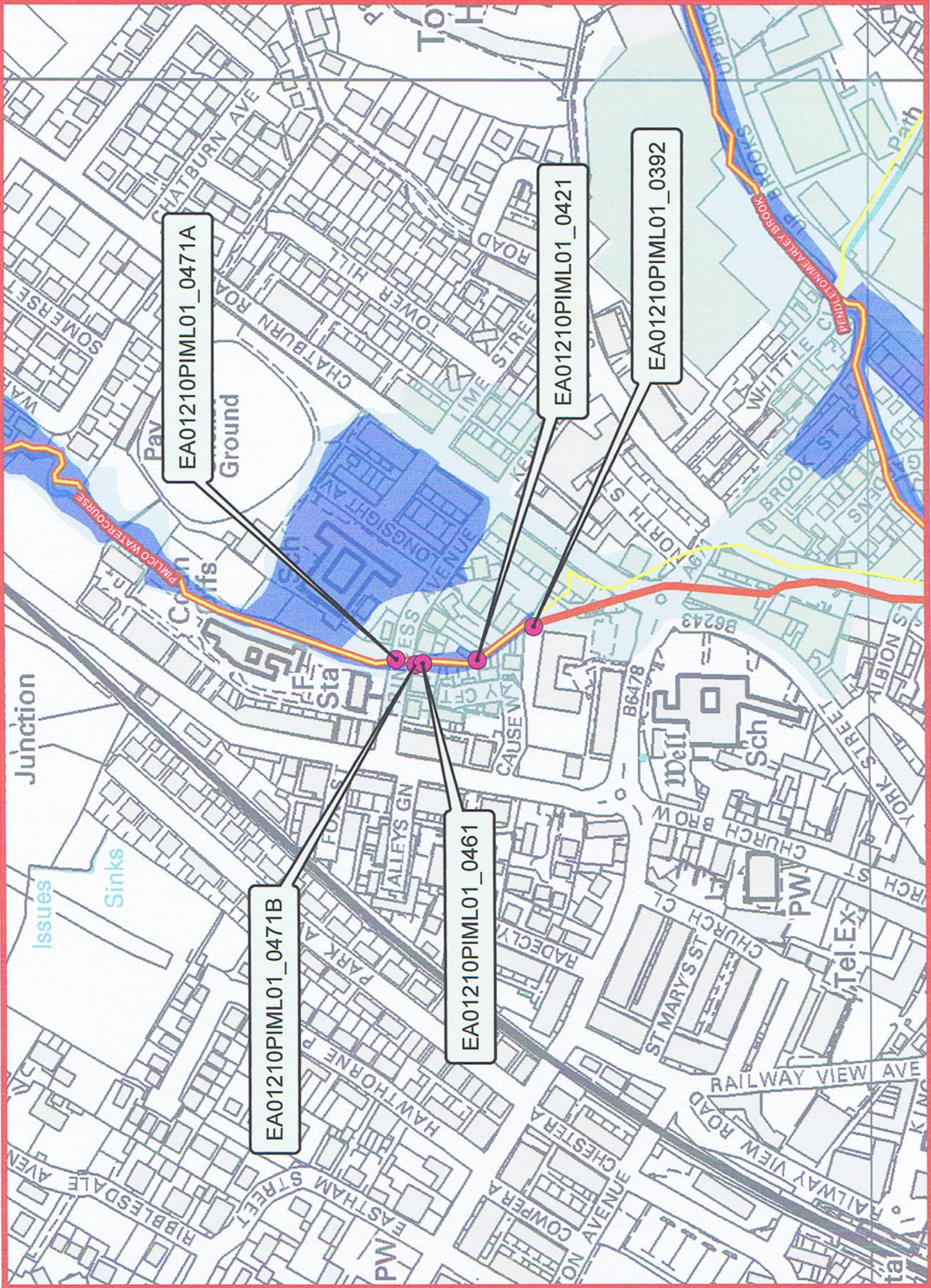
North West Region - North Area

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.

012.525 50
Metres



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

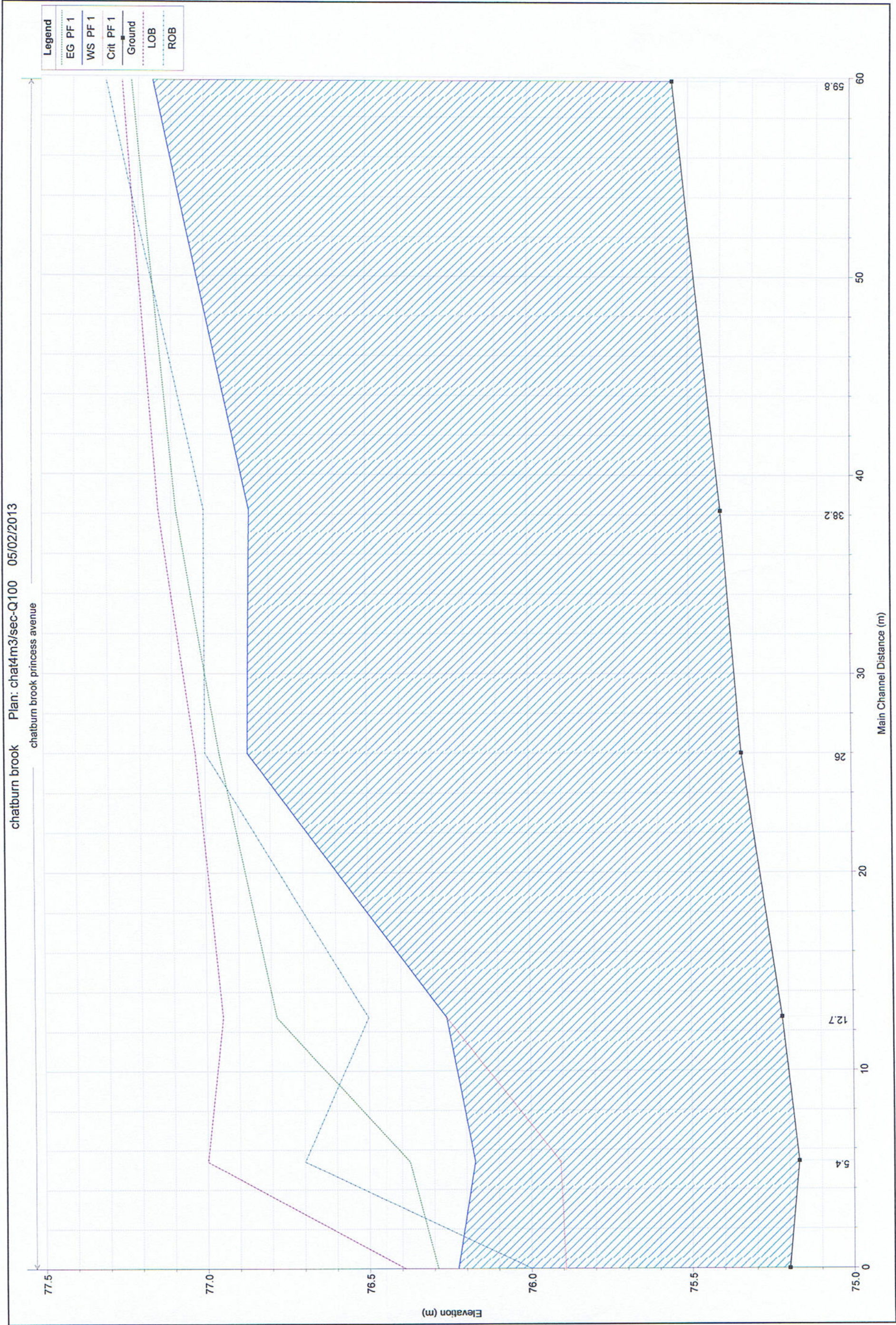
	5		10		25		50		75		100		200		1000	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
EA01210PIML01_0392	75.45	1.98	75.5	2.27	75.58	2.77	75.67	3.35	75.73	3.77	75.77	4.06	76.03	4.8	77.74	7.66
EA01210PIML01_0421	75.8	1.98	75.85	2.28	75.93	2.77	76.02	3.36	76.07	3.78	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

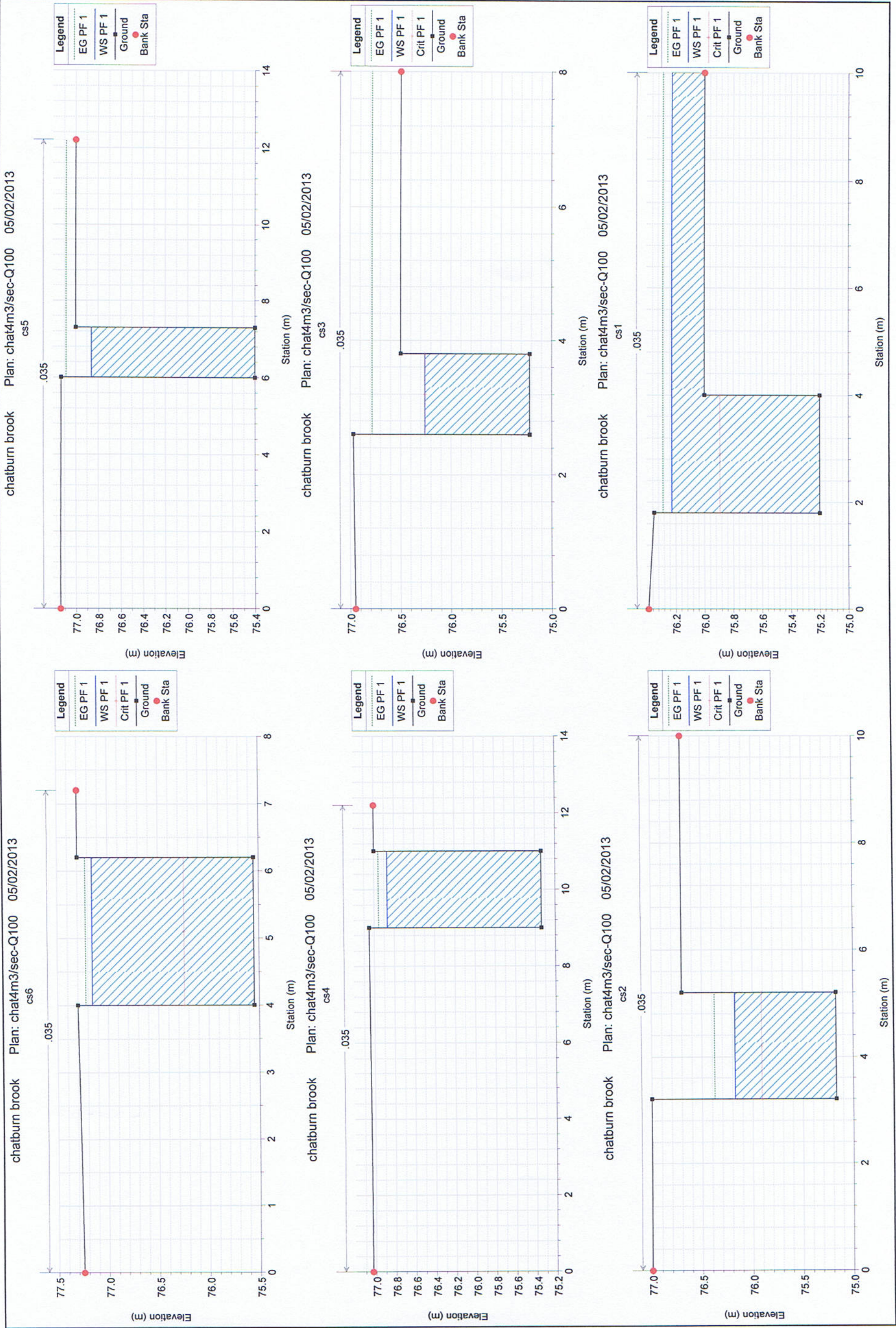
	10		50		75		100	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow
EA01210PIML01_0392	75.5	0	75.67	0	75.73	3.76	75.77	0
EA01210PIML01_0421	75.85	0	76.02	0	76.07	3.78	76.11	0
EA01210PIML01_0461	76.47	0	76.66	0	76.72	3.78	76.76	0
EA01210PIML01_0471A	76.59	0	76.87	0	76.98	3.78	77.05	0
EA01210PIML01_0471B	76.53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

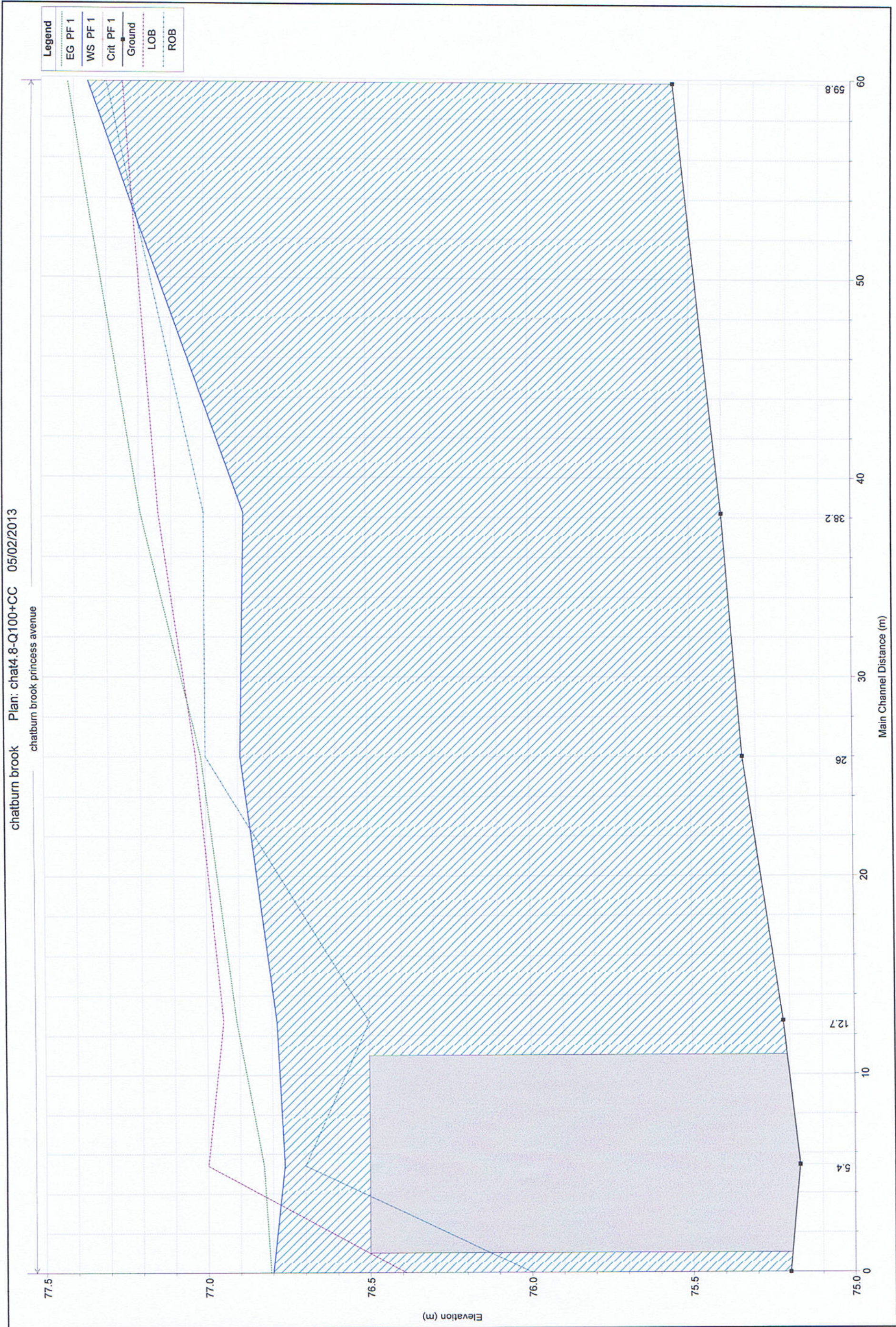
Data taken from Mearley SFRM Study



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

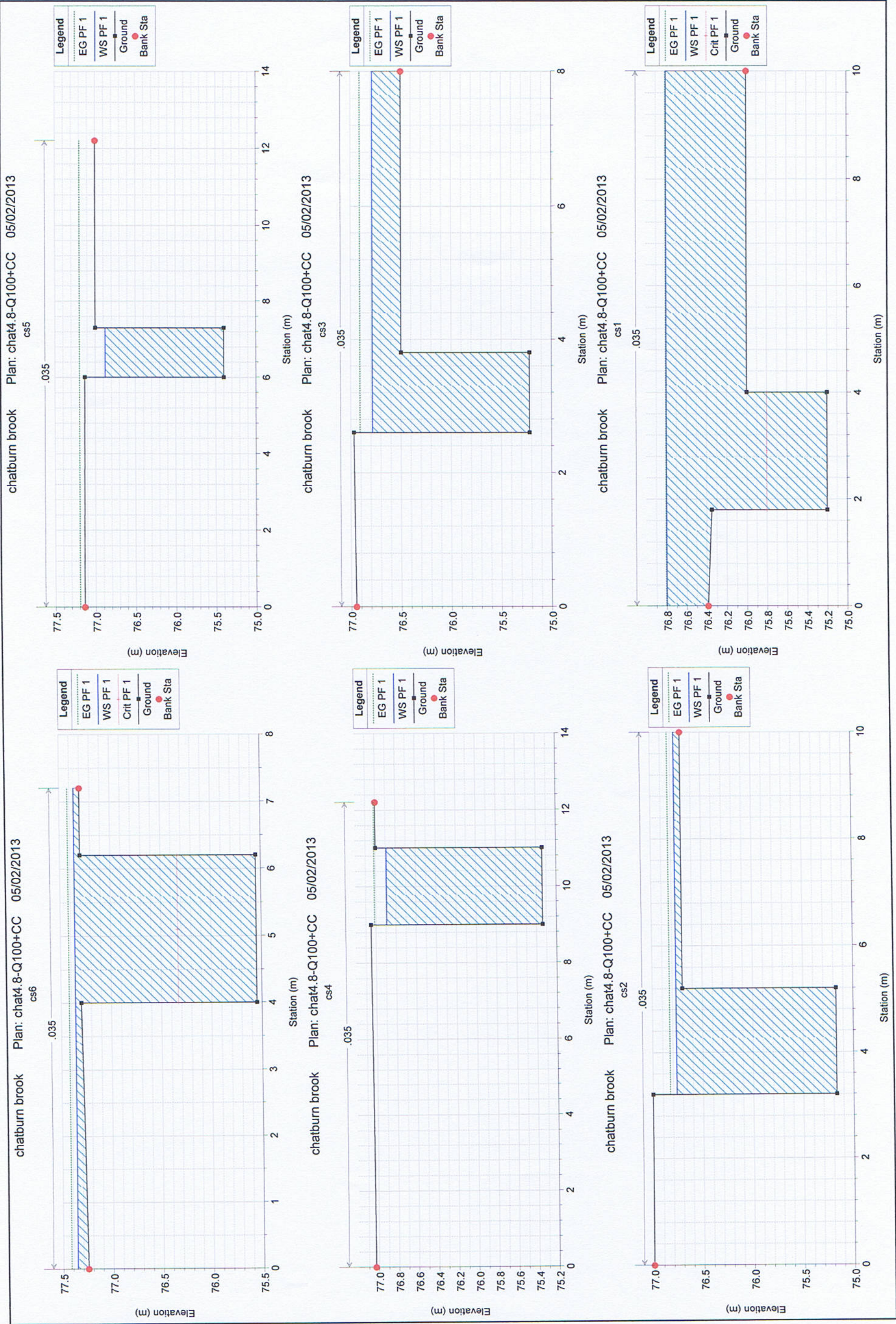
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
princess avenue	59.8	PF 1	6	75.55	77.16	76.24	77.22	0.002772	1.13	3.53	2.20	0.29
princess avenue	38.2	PF 1	5	75.40	76.86		77.09	0.015792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





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

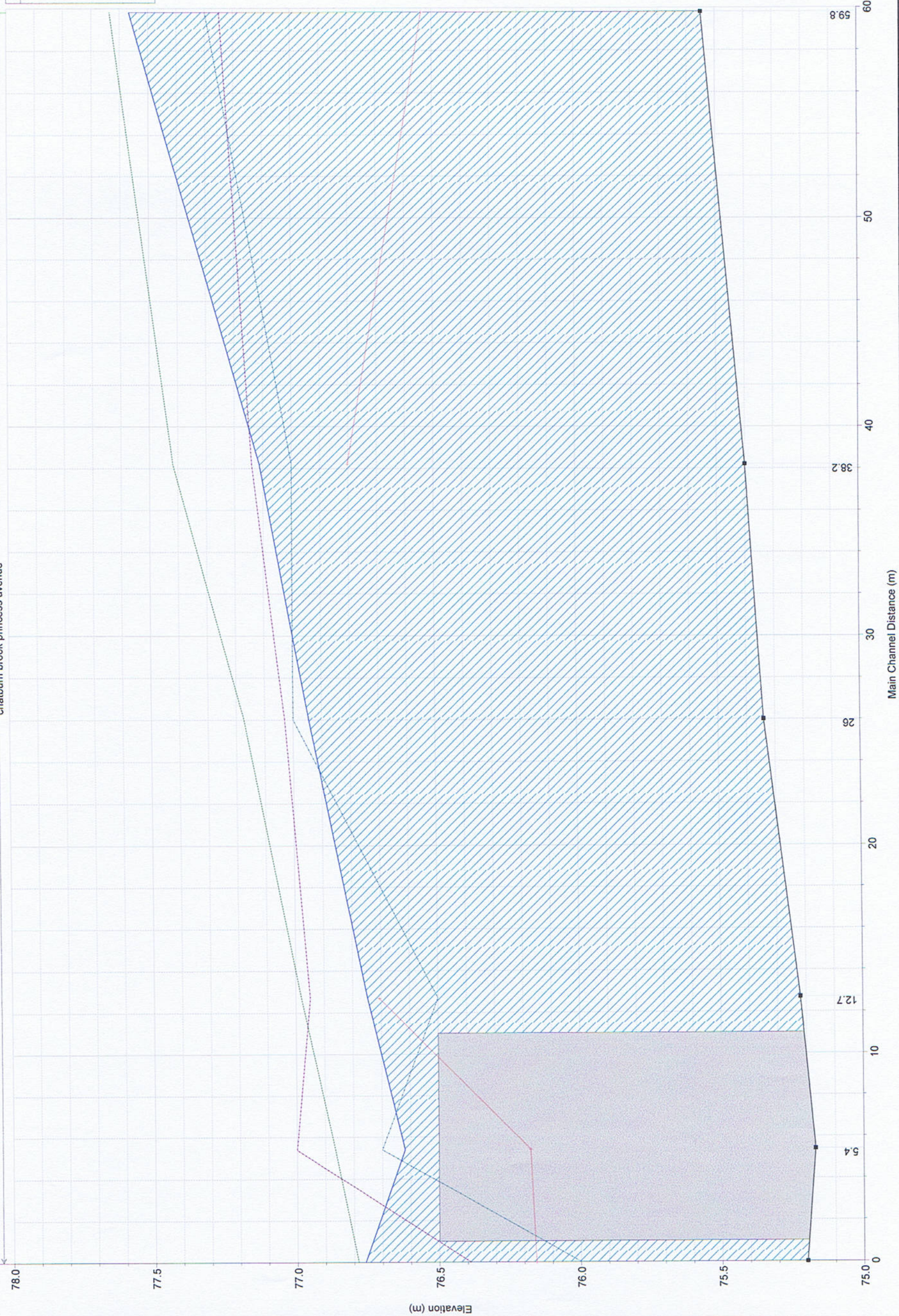
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
princess avenue	59.8	PF 1	4.80	75.55	77.36	76.33	77.42	0.005001	1.10	4.36	7.20	0.45
princess avenue	38.2	PF 1	4.80	75.40	76.88		77.20	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: chat6.8-Q1000 05/02/2013

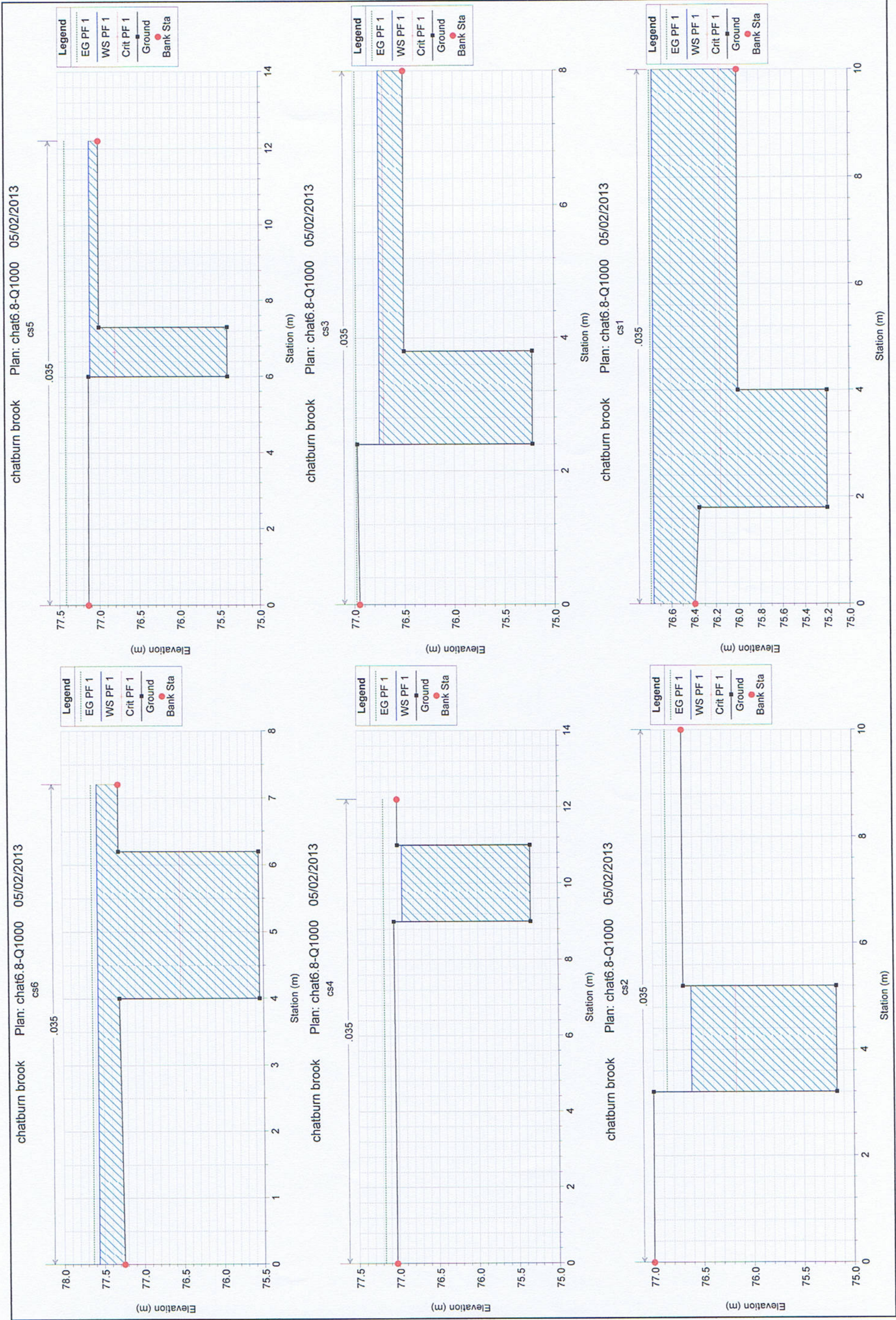
chatburn brook princess avenue

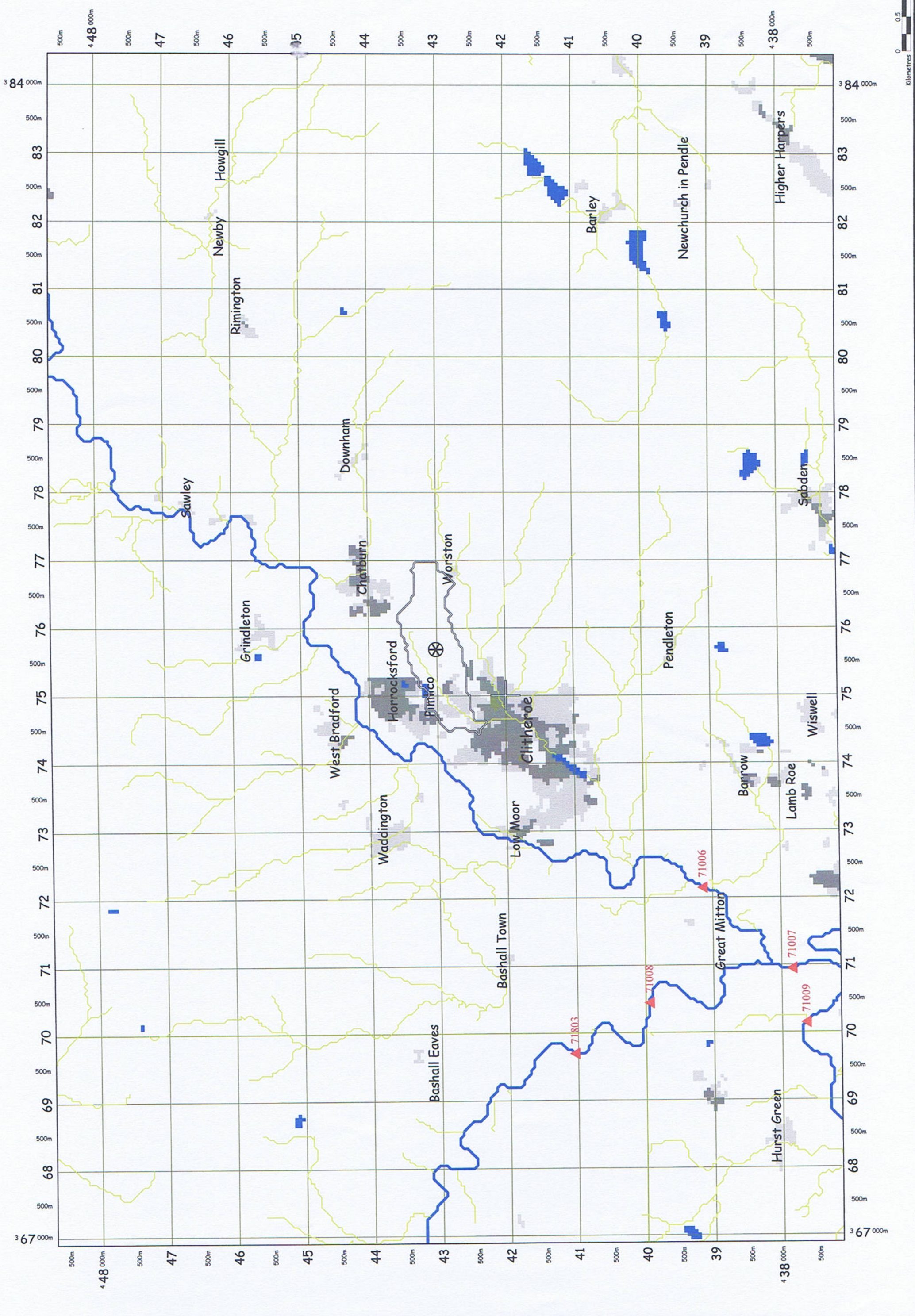
Legend	
EG PF 1	
WS PF 1	
Crit PF 1	
Ground	
LOB	
ROB	



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

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
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





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 duration											
Return period	100	1 (years)									
Annual max	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.											
			10	20	50	100	200	500			
Duration	Duration	Duration	year rainfall	year rainfall	year rainfall	year rainfall	year rainfall	year rainfall			
minutes	hours	days	mm	mm	mm	mm	mm	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	108.86			
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			