MICHAEL EVANS
& ASSOCIATES LTD
CIVIL AND STRUCTURAL ENGINEERS

FLOOD RISK ASSESSMENT

For Planning Application:

Robin Hood Pub
131 London Road
Buxton
Derbyshire

Job No: 14-249
Prepared by: Michael Evans & Associates Ltd
Date: 23 June 2014
Rev: Final Version 1.0

Michael Evans &
Associates Ltd
34 Station Road
Draycott
Derby
DE72 3QB
Tel: 01332 871 840
Fax: 01332 871 841
www.mevans.co.uk

CLIENT DETAILS

Sam Grant
Big Tree Planning Ltd.
63 Fosse Way, Syston, Leicester LE7 1NF

CONTRACT

This report describes work commissioned by Big Tree Planning Ltd following written (e-mail) instruction on 2nd May 2014 by Sam Grant of Big Tree Planning Ltd. Mrs Nicola Dibble of Michael Evans & Associates Ltd carried out the work.

Date:	
Prepared by: [redacted]	Nicola Dibble Senior Drainage Engineer
Approved by: [redacted]	Barry Jones Principle Highways and Drainage Engineer

REVISIONS

Revision / Dated Issued	Amendment

CONTENTS

APPENDICES

DRAWINGS

1 INTRODUCTION

1.1 General

1.1.1 Michael Evans & Associates Ltd have been commissioned to undertake a Flood Risk Assessment (FRA), on behalf of Big Tree Planning Ltd relating to the proposed development of a hotel and restaurant on the site of the existing Robin Hood Pub, 131 London Road, Buxton, Derbyshire.

1.1.2 This report sets out the findings of the FRA required by the Local Planning Authority in support of the planning application for the development. The assessment has been carried out in accordance with the guidance set out in the National Planning Policy Framework (NPPF) and the Environment Agency's flood risk standing advice.

1.2 Background Information

1.2.1 The Department for Communities and Local Government (DCLG) published the NPPF in March 2012 and the Flood Risk and Coastal Change section (ID7) of the updated Planning Practise Guidance to the National Planning Policy Framework (PPG) in March 2014. The NPPF and the accompanying PPG explain how flood risk should be taken into consideration during the planning process. The guidance specifies a sequential test which local planning authorities should apply to all future proposed development sites. Table 1: Flood Zones, extracted from Table 1 of the PPG, defines the levels of flood risk within England.

Table 1: Flood Zones

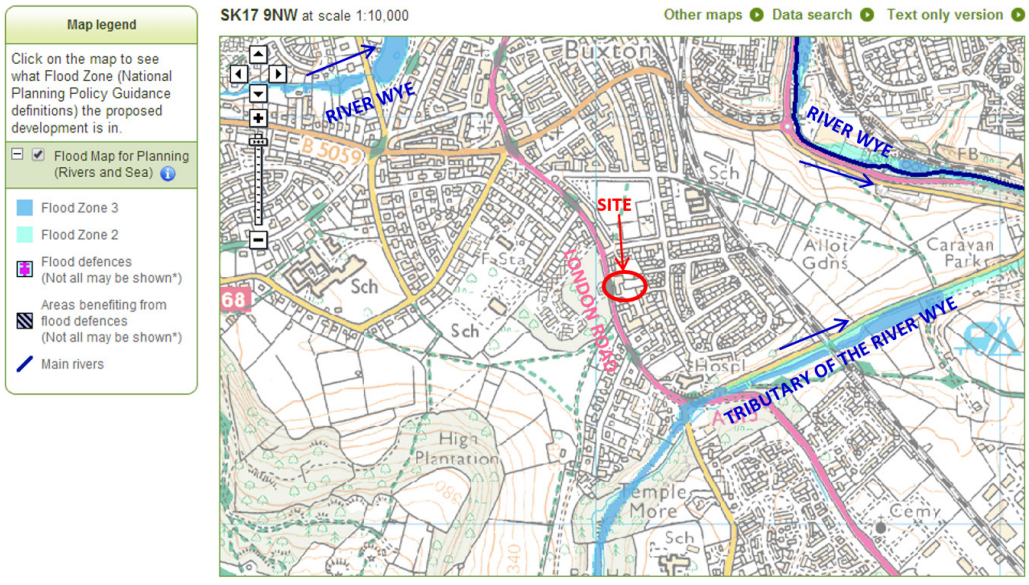
Flood Zone	Flood zone Classification	Description
Flood Zone 1	Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year (<0.1%).
Flood Zone 2	Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
Flood Zone 3a	High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding

		from the sea (>0.5%) in any year.
Flood Zone 3b	Functional Floodplain	The zone comprises land where water has to flow or be stored in times of flood.

1.2.2 As part of its general obligations under the Water Resources Act 1991, the Environment Agency has carried out surveys of its existing flood defences and has published a series of nationwide 'Indicative Floodplain Maps' based upon information from historic flood events and basic hydraulic modelling. In general terms, these maps give a good indication of the areas likely to be affected by flooding. More recently the Environment Agency have published the 'Flood Map' on their website which is based on improved hydraulic modelling and detailed local data. The Flood Map indicates areas which may be affected by a 1 in 100 year fluvial flood or a 1 in 200 year tidal/coastal flood (ie Zone 3 as defined in the NPPF). It also indicates which areas may be affected by an extreme flood (ie Zone 2 as defined in the NPPF).

1.2.3 The Flood Map for the site is shown in Figure 1, and shows that the site is located wholly within Flood Zone 1.

Figure 1: Environment Agency Flood Map



1.2.4 The NPPF stipulates that all proposed development sites which are located outside of Flood Zone 1 and/or are greater than 1ha in area must be accompanied by a Flood Risk Assessment as part of the planning process which assess flood risk to the development from all sources and provides details of any mitigation which may be

required to reduce the impact of the development on area offsite. For site located within Flood Zone 1 which are less than 1ha in area, the main flood risk consideration is the management of surface water runoff from the site.

2 STRUCTURE OF THE REPORT

2.1 The report has been structured to follow the general principles set out in the Site Specific Flood Risk Assessment Checklist, included as Section 26 of the PPG.

2.2 The site is located within Flood Zone 1 and is less than 1ha in area. Therefore, in line with the standing advice issued by the Environment Agency, this report focuses on surface water management to mitigate any potential increases in surface water runoff from the site, and any corresponding increases flood risk to areas offsite, as a result of the development.

2.3 The methodology for this FRA has comprised a desktop study. Reference has been made to information readily available from the Environment Agency and to the High Peak Borough Council Strategic Flood Risk Assessment (SFRA)[1].

[1] WYG (2014) High Peak Borough Council Strategic Flood Risk Assessment, available online at: http://www.highpeak.gov.uk/sites/default/files/documents/pages/Strategic%20Flood%20Risk%20Assessment%20Level%202%20High%20Peak%20version%20April%202014.pdf [accessed 22 May 2014]

3 SITE SETTING

3.1 Site Description and Location

3.1.1 A summary of the site and its characteristics is provided in Table 2: 'Site Location Summary'.

Table 2: Site Location Summary	
Site Name	Robin Hood Pub
Site Address	131 London Road, Buxton, Derbyshire. SK17 9NW
Site Area (ha)	0.3ha
National Grid Reference	406076E, 372583N
Existing Land Use	Public House
Proposed Land Use	Hotel and Restaurant
Local Planning Authority	High Peak Borough Council
Sewer Undertaker	Severn Trent Water

3.1.2 The proposed development site is located at 131 London Road, Buxton, Derbyshire, as shown in Figure 1. The site is located at approximate National Grid Reference (NGR) 406076E, 372583N, and the postcode is SK17 9NW. The site is located within the boundary of Buxton, towards the southern extent of the town. The site is bounded by London Road to the west, existing properties along London Road to the north and south, and the rear of properties along Sherwood Road to the east.

3.1.3 The development site has an area of approximately 0.3ha comprising of an existing public house and associated car parking and gardens. The existing impermeable area on the site is approximately 0.2ha.

3.1.4 The nearest main river is the River Wye, which meanders through Buxton and at its nearest points is located approximately 525m north-east of the site and 770m north-west of the site. Other local water features include an unnamed tributary of the River Wye which is located approximately 300m south of the site at its nearest point.

3.1.5 Ground levels at the site fall from the rear of the site, the south-east, to the frontage along London Road, the north-west. The site falls approximately 2.40m from east to west and approximately 1.10m from south to north. A topographical survey has been undertaken by Oakley Building Surveyors and is included as drawing 3317-01 – Land Survey. All levels on the survey are relative to the existing building floor level.

3.2 Existing Drainage

3.2.1 It is understood that surface water runoff from the impermeable areas of the site site currently discharge to the public sewers within London Road. A number of private gullies, manholes, and pipe runs are present on the site, as shown on the topographical survey. It is assumed that the undeveloped, grassed areas of the site are not served by a formal drainage network and that surface water from these areas discharges directly to the ground.

3.2.2 Existing surface water runoff rates from the developed areas of the site have been calculated using the Rational Method as described within the Wallingford Procedure. This method gives a runoff rate from the average annual rainfall event (approximated to a 1 in 2.3 year rainfall event) of approximately 2.12l/s from the 0.2ha of developed site. The existing surface water runoff rate for the greenfield portion of the site has been calculated using the IH124 method for small catchments. This method given a runoff rate for the average annual rainfall event of approximately 1.10l/s from the 0.1ha of undeveloped site. This gives a total existing runoff from the site of 3.22l/s, during an average annual rainfall event. Calculations are included as Appendix 1 of this report.

3.2.3 Foul water on the site is believed to be connected to the public foul sewer within London Road.

3.3 Flooding History

3.3.1 The site is shown to lie within Flood Zone 1 of the Environment Agency's Indicative Floodmap, as shown on Figure 1.

3.3.2 Information contained with the SFRA for the area does not indicate that the site would be at risk of flooding, and therefore the sites classification as being within Flood Zone 1 appears to be wholly reasonable.

3.4 Ground Conditions

3.4.1 Geological information available online through the Cranfield Soil and Agrifood Institute website shows that the site is underlain by freely draining soils. It is therefore likely that the underlying ground at this location is permeable.

3.4.2 The site is located above a Inner Zone (Zone 1) Source Protect Zone. Buxton Spring Water is world renowned resource, and whilst the primary source of the water is a distance away from the site, any potential pollution pathways into the watercourse are heavily controlled and regulated.

4 PROPOSED DEVELOPMENT

4.1 Description of Site Proposals

4.1.1 The proposed development will consist of a hotel and restaurant with associated parking and internal access.

4.1.2 The proposed impermeable area of the finished development will be approximately 0.29ha. This means that an increased impermeable area of approximately 0.09ha will be created as a result of the development. Small planted areas will remain around the site car-park, although there will still be a net increase in impermeable area across the site.

4.1.3 A copy of the proposed site development plan is shown on Drawing Number AA-473-SCP/1 – 'Site Layout and Ground Floor Plan'.

4.2 Vulnerability Classification

4.2.1 The Environment Agency Indicative Floodmap shows that the site lies within Flood Zone 1, with respect to Table 1 of the Technical Guidance.

4.2.2 The vulnerability class for the proposed development, with respect to Table 2 of the Technical Guidance, is 'More Vulnerable'.

4.2.3 Table 3 of the Technical Guidance, 'Flood Risk Vulnerability and Flood Zone Compatibility', shows that all classes of development is suitable for siting within Flood Zone 1 and, therefore, the site is suitable for the type of development proposed.

4.3 Sequential and Exception Test

4.3.1 The Sequential Test, as set out in the Technical Guidance, aims to steer development to areas with the lowest risk of flooding (ie to steer developments to Flood Zone 1 where possible). Since the development site is located wholly within Flood Zone 1, and following the guidance in Table 3 of the Technical Guidance, the Sequential Test is deemed to have been passed and there is, therefore, no requirement for the Exception Test to be carried out.

5 FLOOD RISK

Flood Risk – To the Development

5.1.1 The standing advice issued by the Environment Agency provides guidance on the nature and scale of FRA required as part of a planning application, depending upon the flood zone and site area. For sites located within Flood Zone 1, and with an area less than 1ha, no detailed analysis of flood risk to the site is required.

5.1.2 Notwithstanding the above, a brief review of flood risk to the site is provided in Table 3.

Table 3: Sources of Flood Risk

Flood Source	Presence at site?	Potential risk at site *(high/medium/low)*	Description
Fluvial	×	Low	The site is shown to be within Flood Zone 1
Tidal	×	Low	The site is not near the coast or within the tidal reaches of any watercourses
Groundwater	×	Low	There is no evidence of groundwater flooding within this vicinity
Sewers	×	Low	There is no evidence of sewer flooding within this vicinity
Canals	×	Low	There are no canals within the vicinity of the site
Other Artificial Sources	×	Low	There are no artificial sources of flooding within the vicinity of the site
Pluvial	×	Low	There is no evidence of pluvial flooding in this vicinity, and the site is not within a topographical low spot
Other	×	Low	No other sources of flooding have been identified within the vicinity of the site

5.1.3 No sources of flooding have been identified on or within the vicinity of the site and, therefore, the flood risk from all sources is identified as 'low'.

Flood Risk – From the Development

5.2 Climate Change

5.2.1 In assessing the flood risk at a site over the lifetime of a development, the NPPF and PPG stipulate that climate change should be taken into account. The Environment Agency has issued a guidance note which states the climate change allowances which should be used within planning applications. This guidance is reproduced as Table 7, and sets out the climate change allowance that should be included depending upon the life of the development.

Table 4: Recommended national precautionary sensitivity ranges

Parameter	1990-2025	2025-2055	2055-2085	2085-2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

5.2.2 In assessing the volume of storage needed to attenuate surface water flows from the site estimated peak rainfall intensities have been increase by 20% to allow for climate change during the lifespan of the development.

5.3 Sustainable Drainage Systems (SuDS)

5.3.1 Sustainable Drainage Systems (SuDS) are designed to mimic the natural drainage at a site, and are the preferred method of disposing of surface water runoff from new developments. SuDS aim to dispose of surface water as close to source as possible, with the best results being that all surface water is infiltrated to ground at source (ie on site). The hierarchy for the disposal of surface water is first to ground, then to watercourse and finally to sewer.

5.3.2 In order to determine if infiltration is a viable option for the disposal of surface water from the site, a detailed site investigation and testing will need to be undertaken at the detailed design stage. There are no watercourses within the immediate vicinity of the site, so a direct discharge to watercourse will not be possible in this instance. Therefore, if ground infiltration is not found to be suitable for use at the site, then a connection to public sewer will be required.

5.3.3 Table 5 summarises the different SuDS techniques, some of which may be appropriate to the development, depending upon the ground conditions found at the site.

Table 5: Sustainable Drainage System (SuDS)Techniques		
Type	**Device**	**Description**
Source Control	Green roof	Green roofs are systems which cover a building's roof with vegetation. They are laid over a drainage layer, with other layers providing protection, waterproofing and insulation.
	Infiltration devices	Infiltration devices temporarily store runoff from a development and allow it to percolate into the ground.
	Pervious surfaces	Pervious surfaces allow rainwater to infiltrate through the surface into an underlying storage layer, where water is stored before infiltration to the ground, reuse, or release to surface water or sewers.
	Rainwater harvesting	Rainwater harvesting reduces the amount of runoff from a site by re-using the water for non-potable uses
Permeable Conveyance	Filter drains & perforated pipes	Filter drains are trenches that are filled with permeable material. Surface water from the edge of paved areas flows into the trenches, is filtered and conveyed to other parts of the site. A slotted or perforated pipe may be built into the base of the trench to collect and convey the water.
Passive treatment/ end of pipe treatment	Underground attenuation	Underground attenuation can be used where other forms of SuDS are not appropriate for the site. Underground attenuation stores water for volumes above the allowable discharge rate and releases the water into the received at the allowable rate.

5.4 Drainage Proposals and Surface Water Management Plans

5.4.1 In line with the standing advice, the main consideration of FRAs for sites of less than 1ha and located within Flood Zone 1 is of surface water management. In situations where there is an increase in impermeable areas across the site there is likely to be a resulting increase in surface water runoff which, without mitigation, could result in an increase in flood risk to areas adjacent to the site and further downstream.

5.4.2 Surface water from the site will be discharged at a restricted rate of 5l/s. Where the calculated existing discharge rates are less than 5l/s, it is generally best practise to design new drainage systems to discharge at a rate of 5l/s, in order to prevent blockages within the drainage network.

5.4.3 At this stage, the suitability of the ground for infiltration drainage is unknown and therefore, as worst case scenario, in terms of surface water drainage, has been assumed. Under this scenario, all surface water will be discharged to the sewer within London Road.

5.4.4 Surface water discharging from the site will be restricted to 5l/s, and any additional flow will be attenuated on site for events up to the 1 in 100 year rainfall event, with an allowance for climate change. Surface water attenuation requirements have been calculated and approximately 122m^3 of storage will be required to contain the 100 year rainfall event, with a 20% allowance for climate change, on the site without posing a risk of flooding. Attenuation calculations can be found in Appendix 2 of this report.

5.4.5 If, following the site investigation, the ground is deemed to be suitable for infiltration testing, then extra care should be taken when designing the detailed drainage and soakaway arrangements to ensure that adequate protection is afforded to the underlying aquifer especially since the site overlies a source protect zone. Such measures could include installing petrol interceptors for drainage serving parking areas, or other additional levels of treatment prior to discharge to the ground. These details will be confirmed at the detailed design stage.

5.4.6 It is proposed that foul flows from the development will be connected to the public sewer network. The existing connection point will be reutilised and there will be no requirement for a new connection point to serve the site.

6 RESIDUAL RISKS

6.1 There is always a possibility of a flood in excess of that allowed for which might conceivably cause some flooding to the development. However, such an event would have a very low probability and the risk of flooding to development would be extremely small. It is therefore considered that the residual risks associated with flooding are not significant.

7 CONCLUSIONS

7.1 This report gives details of the Flood Risk Assessment, which has been carried out in relation to the proposed development site.

7.2 The site falls within Flood Zone 1 of Table 1 of the Technical Guidance, and the vulnerability class of the proposed development is 'More Vulnerable'. Table 3 of the Technical Guidance indicates that sites classified as Flood Zone 1 are suitable for all vulnerability classes of development.

7.3 The Strategic Flood Risk Assessment for the High Peak which covers the site does not identify any sources of flooding which are likely to affect the site.

7.4 A surface water management plan has been developed which would restrict flows from the site to 5l/s, and, where infiltration is not a viable option, attenuation will be provided to accommodate flows from the 100 year rainfall event, with an allowance for climate change, so as to ensure that flood risk to areas offsite is not increased as a result of the proposed development.

7.5 There are no local site specific flood risks which are likely to affect the site and there are considered to be no significant increased offsite flooding risks as a result of the development. The site is therefore considered suitable for the type of development proposed.

APPENDIX 1
EXISTING SURFACE WATER RUNOFF CALCULATIONS

MICHAEL EVANS & ASSOCIATES LTD

CONSULTING CIVIL & STRUCTURAL ENGINEERS
34 STATION ROAD, DRAYCOTT, DERBYSHIRE DE72 3QB.

TEL: **01332 871 840**
FAX: **01332 871 840**

DATE: **May 2014**

PROJECT NO.: **14-249**

SHEET NO.: **1 of 1**

PROJECT: **Robin Hood Pud, London Road, Buxton - FRA**

CALCULATION: **Rainfall Intensity**

BY: ND | CHECKED: BJ | REVISION: -

Following the Wallingford Procedure

M5-60 = 20 mm
Ratio r = 0.5
Duration (D)= 360 minutes
Z1 = 1.42

M5- 360 = M5-60 x Z1
= 28.4 mm

Return Period = 2.3
Z2= 0.83

M2 360 = M5- 360 x Z2
= 28.4 x 0.83
= **23.5 mm**

Rainfall intensity (mm/hr) = $\frac{MT-D}{D/60}$

= $\frac{\mathbf{23.5}}{\mathbf{6.00}}$

= **3.91 mm/hr**

NOTES:

MICHAEL EVANS & ASSOCIATES LTD

CONSULTING CIVIL & STRUCTURAL ENGINEERS
34 STATION ROAD, DRAYCOTT, DERBYSHIRE DE72 3QB.

TEL: **01332 871 840**
FAX: **01332 871 840**

DATE:	PROJECT NO.:	SHEET NO.:
MAY 2014	**14-249**	**1 of 1**

PROJECT:		BY:	CHECKED:	REVISION:
	Robin Hood Pub, London Road, Buxton - FRA			
CALCULATION:	**Estimation of Greenfield Runoff**	ND	BJ	-

Following IH 124 method

SAAR 1259 obtained from the HR Wallingford website
SOIL 0.5 obtained from the HR Wallingford website
Site Area 0.001 (square kilometers)

$\mathbf{QBAR_{RURAL}}$ = $0.00108AREA^{0.89}.SAAR^{1.17}.SOIL^{2.17}$

= $0.00108 \times 0.5^{0.89} \times 1259^{1.17} \times 0.5^{2.17}$

= **0.54866** m^3/second over 50 hectares

p

HYDROLOGICAL AREA = 10
GROWTH FACTOR FOR QBAR (2.3 YR) RETURN PERIOD : 1.00

$\mathbf{QBAR_{RURAL}}$ **(100YR RETURN)** = 548.658 x 1.00

= **548.66** litres/second over 50 hectares

= **10.97** litres/second/hectare

ICP SUDS (to pro-rata IH124 method for sites less than 50 hectares)

= $QBAR_{RURAL}$ /0.5 x Site area

= 1.097 x 0.001

= 0.0011 m^3/second over site area

= **1.10** litres/second over site area

NOTES:

MICHAEL EVANS & ASSOCIATES LTD

CONSULTING CIVIL & STRUCTURAL ENGINEERS
34 STATION ROAD, DRAYCOTT, DERBYSHIRE DE72 3QB.

TEL: **01332 871 840**
FAX: **01332 871 840**

DATE:

PROJECT NO.: **14-249**

SHEET NO.: **1 of 1**

PROJECT:	**Robin Hood Pub, London Road, Buxton - FRA**	BY:	CHECKED:	REVISION:
CALCULATION:	**Development Runoff Rate - Rational Method**	ND	BJ	-

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 3.91
A = area (hectares) = 0.2

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 3.91 x 0.2**

= **2.12 litres/second**

NOTES:

APPENDIX 2
ATTENUATION CALCULATIONS

MICHAEL EVANS & ASSOCIATES LTD
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
34 STATION ROAD, DRAYCOTT, DERBYSHIRE. DE72 3QB
TEL: 01332 871 840
FAX: 01332 871 841

DATE:	Jun-14	PROJECT NO: 14-249	SHEET NO: 1

PROJECT:	Robin Hood Pub, London Road, Buxton - FRA	BY:	CHECKED:	REVISION:
CALCULATION:	Attenuation Calculation	ND	BJ	-

Minimum Storage Required: **122 m^3** **incl cc allowance**

FACTOR	VALUE	SOURCE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.
Limiting Discharge (l/s):	5	Environment Agency, Water Authority, etc.
Contributing Area (ha):	0.3	Site plans
Impervious, PIMP (%):	100	Site plans
M5-60min (mm):	20	Volume 3 maps and site location
SAAR (mm/yr):	1259	Volume 3 maps and site location
Ratio, r:	0.3	Volume 3 maps and site location
Soil Type:	5	Volume 3 maps and site location
SOIL:	0.5	Soil Type and Volume 1, Section 7.4
UCWI:	132	SAAR and Volume 1, Figure 9.7
Calculated PR	85.03	
Percentage Runoff =	85.03	

FACTOR	VALUE
Additional Inflow (l/s):	0
Calculate/Specify PR:	Calculate
Specify PR:	100
Climate Change Allowance	20

Duration, D (min)	M5-60 (mm)	Z1 for r=0.30	M5-D (mm)	Z2 for M100	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m3)	Add. Runoff (m3)	Total Runoff (m3)	Limiting Discharge (m3/min)	Limiting Runoff (m3)	Storage Required (m3)
5	20	0.34	6.8	1.84	12.5	15.0	0.30	85	38.3	0.0	38.3	0.30	1.5	36.8
10	20	0.50	10.0	1.91	19.1	22.9	0.30	85	58.5	0.0	58.5	0.30	3.0	55.5
15	20	0.60	12.0	1.94	23.3	28.0	0.30	85	71.3	0.0	71.3	0.30	4.5	66.8
30	20	0.78	15.6	2.00	31.2	37.4	0.30	85	95.4	0.0	95.4	0.30	9.0	86.4
60	20	1.00	20.0	2.03	40.6	48.7	0.30	85	124.3	0.0	124.3	0.30	18.0	106.3
120	20	1.29	25.8	2.00	51.7	62.0	0.30	85	158.1	0.0	158.1	0.30	36.0	122.1
240	20	1.60	32.0	1.95	62.5	75.0	0.30	85	191.4	0.0	191.4	0.30	72.0	119.4
360	20	1.79	35.8	1.92	68.8	82.6	0.30	85	210.6	0.0	210.6	0.30	108.0	102.6
480	20	1.97	39.4	1.90	74.8	89.7	0.30	85	228.9	0.0	228.9	0.30	144.0	84.9
600	20	2.15	43.0	1.87	80.2	96.3	0.30	85	245.6	0.0	245.6	0.30	180.0	65.6
720	20	2.19	43.8	1.86	81.4	97.7	0.30	85	249.1	0.0	249.1	0.30	216.0	33.1
840	20	2.24	44.8	1.85	82.9	99.5	0.30	85	253.7	0.0	253.7	0.30	252.0	1.7
1440	20	2.81	56.2	1.77	99.4	119.3	0.30	85	304.3	0.0	304.3	0.30	432.0	-127.7
2880	20	3.50	70.0	1.67	117.2	140.6	0.30	85	358.7	0.0	358.7	0.30	864.0	-505.3