

FLOOD RISK ASSESSMENT

AND

DRAINAGE STRATEGY

for

METACRE LIMITED

PROPOSED RESIDENTIAL DEVELOPMENT

on

LAND OFF PARR LANE, ECCLESTON

OCTOBER 2020

REFORD

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1. INTRODUCTION

- 1.1 This flood risk assessment and preliminary drainage strategy has been produced on behalf of Metacre Limited in support of an outline planning application for a proposed residential development on land off Parr Lane, Ecclestone. A location plan is included within Appendix A.
- 1.2 The Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (NPPG) in relation to Flood Risk and Coastal Change, and describes the existing site conditions and proposed development. It assesses the potential sources of flooding to the site from tidal, fluvial, groundwater, surface water and other sources, taking a risk based approach in accordance with National Policy.
- 1.3 The preliminary drainage strategy describes the existing site conditions and proposed development. It assesses the potential impact of proposals on existing sewers and includes a proposed strategy for the provision of new drainage to serve the proposed development.

Site summary

Site Name	Land off Parr Lane
Location	Ecclestone
NGR (approx.)	SD525171
Application site area	1.5 ha (approx.)
Development type	Residential
Vulnerability	More Vulnerable
Indicative Flood Zone	Flood Zone 1
Local Planning Authority	Chorley Borough Council

2. DESCRIPTION OF THE SITE

Existing site

- 2.1 The proposal relates to land (approx. 1.5 hectares) off Parr Lane, Ecclestone, which lies to the northeast of the village centre.
- 2.2 The current access to the site is from Parr Lane, which runs along the site's northern boundary.
- 2.3 The existing site comprises a green field. To the west of the site is a residential estate. To the south of the site are playing fields and to the north and east is farm land.
- 2.4 Running along the eastern boundary of the site lies a watercourse that runs to the north to outfall into the River Yarrow approx. 1 km from the site and ultimately the River Douglas.
- 2.5 The site falls towards its northeast corner.

Proposed development

- 2.6 It is proposed that the development will comprise 34no. residential dwellings. The indicative layout is shown on drawing 20/088/P01 accompanying the planning application.
- 2.7 It is proposed that the main access into the developed site will be from Sandringham Road with a private drive from Parr Lane. A pedestrian access will be provided from Richmond Road.

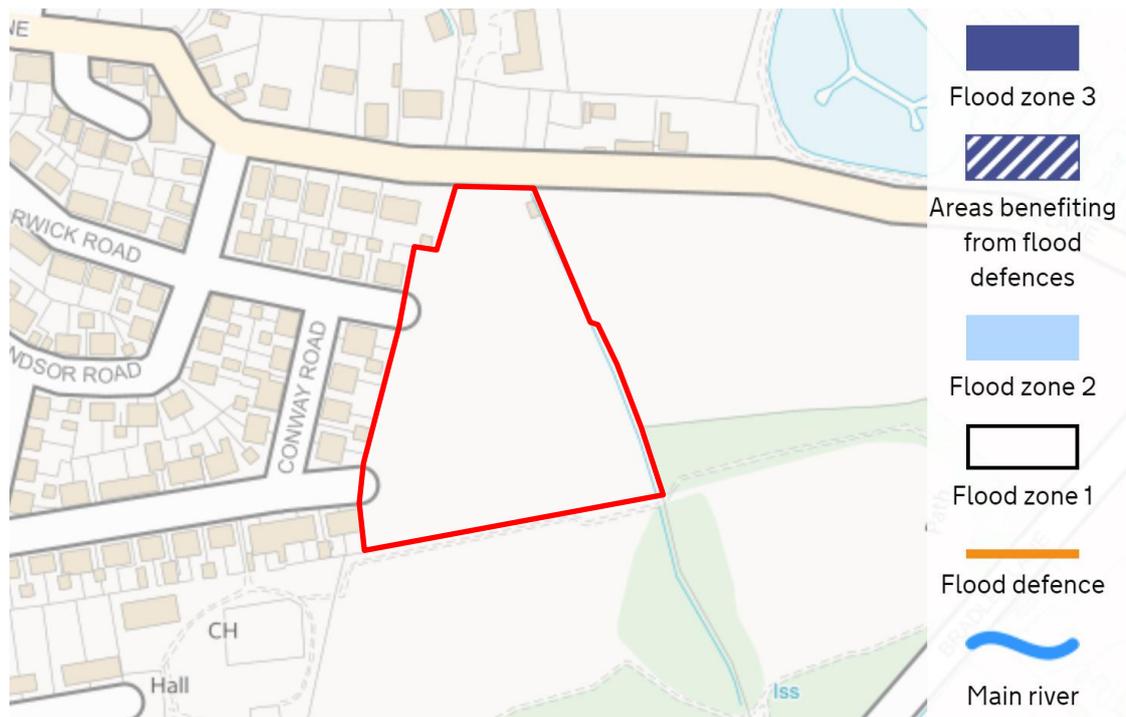
3. SCOPE OF THE ASSESSMENT

Flood risk planning policy

- 3.1 The National Planning Policy Framework (NPPF) sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Supporting Planning Practice Guidance (PPG) is also available.
- 3.2 The NPPF sets out the vulnerability to flooding of different land uses. It encourages development to be located away from areas at highest risk (whether existing or future), and states that where development is necessary in such areas, the development should be made safe for its lifetime. It also stresses the importance of preventing increases in flood risk offsite to the wider catchment area.
- 3.3 The NPPF also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.
- 3.4 As set out in NPPF, local planning authorities should only consider development in flood risk areas appropriate where informed by a site specific Flood Risk Assessment. This document will identify and assess the risk associated with all forms of flooding to and from the development. Where necessary it will demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- 3.5 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance in relation to Flood Risk and Coastal Change.

Flood zones

- 3.6 In investigating the flood risk relating to the site, the Environment Agency flood zone mapping identifies the proposed development site lies within Flood Zone 1. Flood Zone 1 is the lowest risk and is identified as land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).
- 3.7 An extract from the Environment Agency's Flood Zone Map for Planning is shown below.



Strategic Flood Risk Assessment

- 3.8 The site is within the area covered by the Central Lancashire Strategic Flood Risk Assessment, Level 1, Final Report, December 2007, produced by Scott Wilson.
- 3.9 No reference is made to any flood risk issues with regards the site within the SFRA.

Sequential Test

- 3.10 A requirement of NPPF is that all plans should apply a sequential, risk-based approach to the location of development, taking into account the current and future impacts of climate change so as to avoid, where possible, flood risk to people and property. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding.
- 3.11 Strategic Flood Risk Assessments (SFRA) refine information on the probability of flooding, taking other sources of flooding and the impacts of climate change into account. They provide the basis for applying the Sequential Test, on the basis of the flood zones in the PPG Table 1.

- 3.12 The flood zones are the starting point for this sequential approach. As already stated, the Environment Agency's flood mapping identifies the site as lying within Flood Zone 1, the lowest risk.
- 3.13 With reference to NPPF, Environment Agency Flood Maps and the SFRA, the site lies within an area identified as being potentially developable and following the sequential approach, all of the development is located within Flood Zone 1.
- 3.14 The current development proposals are classified as "More Vulnerable" for residential development. Table 3 within the PPG indicates Flood Risk Vulnerability and Flood Zone 'compatibility'. Using Zone 1 and the "More Vulnerable" classification for residential use, the PPG considers that a development of this type would be deemed appropriate for development within Flood Zone 1.
- 3.15 Subject to the suitable assessment of flood risk, the development would be considered sequentially preferable in this location.

4. CONSULTATIONS AND DATA ACQUISITIONS

Environment Agency

- 4.1 The Environment Agency's flood zone mapping confirms that the site lies within an area of Flood Zone 1, the lowest risk. There is no record of any historic fluvial flooding occurring at the site.
- 4.2 Ecclestone is included within the Rural Lostock and Yarrow Communities section of the River Douglas Catchment Flood Management Plan.

United Utilities

- 4.3 Sewer records have been obtained from United Utilities and are included within Appendix B. The records show public foul and surface water sewers within Sandringham Road, Richmond Road and Conway Road serving the residential properties to the west of the development site.
- 4.4 The surface water sewers discharge into the watercourse to the north of the development site, which is a continuation of the watercourse running along the site's eastern boundary.

Topographical Survey

- 4.5 A topographical survey has been carried out for this site. The site falls towards its northeast corner.

Site Investigation

- 4.6 Site investigations have not been carried out for the site.
- 4.7 The online Soilscales viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.

- 4.8 Based upon the ground conditions identified it can be considered that infiltration is unlikely to provide a viable drainage solution for surface water runoff generated by the site. Infiltration tests have therefore not been carried out.

Site Inspections

- 4.9 A site visit was made to examine site conditions and levels as well as any significant visible features that would affect the flood characteristics of the site. Such inspections are limited to areas that could readily and safely be accessed and no intrusive investigations or drainage surveys were carried out.

Historic flooding

- 4.10 There are no recorded instances of historic flooding at the site.

5. SOURCES OF FLOOD RISK

Potential Sources of Flood Risk

- 5.1 Potential sources of flood risk to the site are identified below. The significance of these sources is investigated further into Section 6.

Fluvial flooding

- 5.2 The site to be developed is identified as lying within Flood Zone 1 on the Environment Agency's flood maps, land assessed as having an annual probability of flooding of less than 1 in 1000 (<0.1%).
- 5.3 Running along the eastern boundary of the site lies a watercourse that runs to the north to outfall into the River Yarrow approx. 1 km from the site.

Tidal flooding

- 5.4 The site is a significant distance from the nearest tidal estuary and is, therefore, not at risk of flooding from the sea. The site is not identified as being at risk of flooding from the sea by any Environment Agency Flood Zone maps or within the SFRA for the area. As such, coastal and tidal flooding is not considered further within this assessment.

Canals, reservoirs and other artificial sources

- 5.5 There are no canals or other artificial sources local to the site.
- 5.6 The Environment Agency risk of flooding from reservoirs map identifies the site is not at risk.

Groundwater

- 5.7 Groundwater flooding tends to occur after much longer periods of sustained high rainfall. The areas that are at risk tend to be those low-lying areas where the water table is shallow. Flooding tends to occur in areas that are underlain by major aquifers,

although groundwater flooding is also noted in localised floodplain sands and gravels.

The main causes of groundwater flooding are:

- Natural groundwater rising due to tidal influence, or exceptionally wet periods leading to rapid recharge;
- Groundwater rebound due to cessation of abstraction and mine dewatering;
- Existence of confined aquifers and springs.

5.8 There are no recorded incidents of flooding associated with groundwater levels within the site.

Sewers

5.9 Flooding from a drainage system occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer flooding is often caused by surface water discharging into the combined sewerage system, sewer capacity is exceeded in large rainfall events causing backing up of flood waters within properties or discharging through manholes.

5.10 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.

5.11 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a waterbody or watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into the public sewers.

5.12 United Utilities has advised there are public foul and surface water sewers that service the residential estate to the west of the development site. The surface water sewers discharge into the watercourse to the north of the development site, which is a continuation of the watercourse running along the site's eastern boundary.

Pluvial runoff

- 5.13 The Environment Agency Risk of Flooding from Surface Water map indicates the site is at a very low risk of surface water flooding. A very low risk means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
- 5.14 The watercourse that runs along the eastern boundary of the site is shown as being at a medium to high risk from surface water flooding within its confines.
- 5.15 It should be noted that surface water flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm. In addition, local features can greatly affect the chance and severity of flooding.

Development drainage

- 5.16 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.
- 5.17 If surface water runoff is not managed appropriately, there may be an increased risk presented elsewhere from development drainage, and the aim should be to implement appropriate sustainable drainage systems (SuDS) to treat and contain flows and mimic the existing conditions.
- 5.18 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a waterbody or watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into public sewers.
- 5.19 The development of the site will increase the area of impermeable hardstanding on site and therefore has the potential to alter the surface water runoff regime of the site and to have an adverse effect on flood risk elsewhere in the wider catchment.

6. FLOOD RISK ASSESSMENT

6.1 This section of the Flood Risk Assessment looks at the flood risk to the site before any mitigation measures are put into place and hence identifies where mitigation will be required. Section 7 continues to explain the mitigation measures proposed and the residual risk following implementation of any proposed mitigation.

Risk of Flooding to Proposed Development

Fluvial Flood Risk

6.2 The watercourse that runs along the eastern boundary of the site doesn't pose a flood risk to the site.

6.3 The site to be developed is identified as lying within Flood Zone 1 on the Environment Agency's flood maps, the lowest risk.

6.4 The risk of fluvial flooding to the proposed development is therefore very low.

Canals, reservoirs and other artificial sources

6.5 There are no canals or other artificial sources that are local to or affect the site.

6.6 The Environment Agency's risk of flooding from reservoirs mapping identifies no risk of flooding from reservoirs.

6.7 As such the risk of flooding from canals, reservoirs and other artificial sources is low.

Groundwater

6.8 The River Douglas Catchment Flood Management Plan does not raise groundwater flooding as a major issue in the area.

6.9 There are no recorded incidents of flooding associated with groundwater levels within the site and the flood risk from groundwater is low.

Sewer Flooding and Pluvial Runoff

- 6.10 There are no records of any flooding from sewers in the vicinity of the site. Flooding from sewers does not therefore present a risk to the development
- 6.11 Due to the nature and topography of the adjoining areas there is only limited potential for pluvial runoff from heavy rainfall events to be conveyed towards the site. There is no record of any flooding on the site after heavy rainfall.
- 6.12 As such the risk is low from sewer flooding and pluvial runoff.

Effect of the Development on the Wider Catchment

Development Drainage

- 6.13 The proposed development will introduce an area of impermeable hardstanding on site which has the potential to significantly alter the surface water runoff regime of the site and have an adverse effect on flood risk elsewhere in the wider catchment.
- 6.14 Surface water runoff from the existing site discharges into the watercourse that runs along the site's eastern boundary.
- 6.15 The ground is not conducive to infiltration.
- 6.16 It is intended that new surface water drainage will be constructed, appropriately sized to take all surface water runoff from the new roofs and hardstanding areas, to discharge into watercourse that runs along the site's eastern boundary, mimicking the existing scenario.
- 6.17 As the surface water runoff from the development will be attenuated to pre-development runoff rates, there will be no change to the flood risk upstream or downstream of this location.
- 6.18 Outline surface water requirements have been prepared and are discussed in Sections 7 and 8 of this document. As a result of the mitigation measures, the risk of flooding from the development drainage is low.

7. PREDICTED IMPACTS AND MITIGATION

- 7.1 This section of the FRA sets out the mitigation measures recommended to reduce the risk of flooding to the proposed development and outlines any residual impacts.

Site arrangements

Access / Egress

- 7.2 The main access into the developed site will be from Sandringham Road with a private drive from Parr Lane. A pedestrian access will be provided from Richmond Road. These accesses will provide access to the site if an extreme event was to occur.

Upstream and downstream effects

- 7.3 There is no material effect on the floodplain due to the proposed development.
- 7.4 It is intended that surface water attenuation will be provided within the development site. Attenuation will be provided by a combination of oversized pipes and underground storage and a controlled discharge made into the watercourse that runs along the site's eastern boundary. The proposals will be designed so as to mimic the existing situation and therefore there will be no additional risk to upstream or downstream properties.
- 7.5 Following the granting of detailed planning permission for the development, a comprehensive drainage strategy will be agreed with the Lead Local Flood Authority to take into account proposed surface water runoff rate and volumes.

8. DRAINAGE STRATEGY

Surface water drainage

- 8.1 Guidance for the disposal of surface water from a development site is for soakaways to be considered as the primary solution. If this is not practical, discharge to a waterbody or watercourse is to be considered as the next available alternative. Only if neither of these options is available, and other sustainable drainage methods not possible, should the use of the public sewerage system be considered.
- 8.2 The online Soilsclapes viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage. Based upon the ground conditions identified it can be considered that infiltration is unlikely to provide a viable drainage solution for surface water runoff generated by the site.
- 8.3 Surface water runoff from the existing site runs off into the watercourse that lies along the site's eastern boundary. In line with common practice, it is proposed the surface water discharge from the proposed development should mimic those from the existing site. It is therefore intended that the surface water runoff from the development will also discharge into the watercourse.
- 8.4 The flow into the watercourse is to be controlled such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall events will not exceed the pre-development runoff rate for the same event, allowing surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on stored volumes to discharge into the watercourse. The additional 30% is to allow for climate change and has been included in the surface water volume.
- 8.5 To determine the restricted surface water discharge rates from the developed site, the pre-development runoff has been calculated using the 'Causeway Flow' programme. The pre-development discharge rates have been calculated as follows:

Qbar – 10.6 l/s

Q1 – 9.2 l/s

Q100 – 22.0 l/s

- 8.6 Surface water within any non-drained areas of the site such as private gardens and public open space will be allowed to infiltrate into the upper strata and be stored and will be either taken up by plants or evaporated. There will, potentially, be periods where the upper strata may become saturated and surface ponding may occur but this will be shallow in depth and will disappear over a short period of time.
- 8.7 Preliminary calculations have been carried out to identify the size of the attenuation required for the development. The calculations are based upon 50% of the area of the proposed development being impermeable at the completion of the development. Attenuation in the order of 240m³ to 378m³ is required for the 1 in 100 year storm event plus climate change.
- 8.8 The calculations for the pre-development discharge rates and the size of the attenuation storage required for the development are included within Appendix C.

Foul water drainage

- 8.9 It is intended that foul sewage from the site will be collected by a piped system, and discharged into the public foul sewer system that lies within the residential estate to the west of the site. It may be necessary for a pump station to be provided to make the connection.

9. CONCLUSIONS

9.1 This flood risk assessment and preliminary drainage strategy has been produced on behalf of Metacre Limited in support of an outline planning application for a proposed residential development on land off Parr Lane, Ecclestone.

Flood risk assessment

9.2 The Site lies within Flood Zone 1, the lowest risk which is identified as land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).

9.3 The Environment Agency Risk of Flooding from Surface Water map indicates the site is at a very low risk of surface water flooding. The watercourse that runs along the eastern boundary of the site is shown as being at a medium to high risk from surface water flooding within its confines.

9.4 There are no recorded instances of historic flooding at the site.

9.5 The risk of fluvial flooding is low.

9.6 The risk of flooding from canals, reservoirs and other artificial sources is low.

9.7 The flood risk from groundwater is low.

9.8 The risk from sewer flooding and pluvial runoff is low.

9.9 The risk of flooding from the development drainage is low.

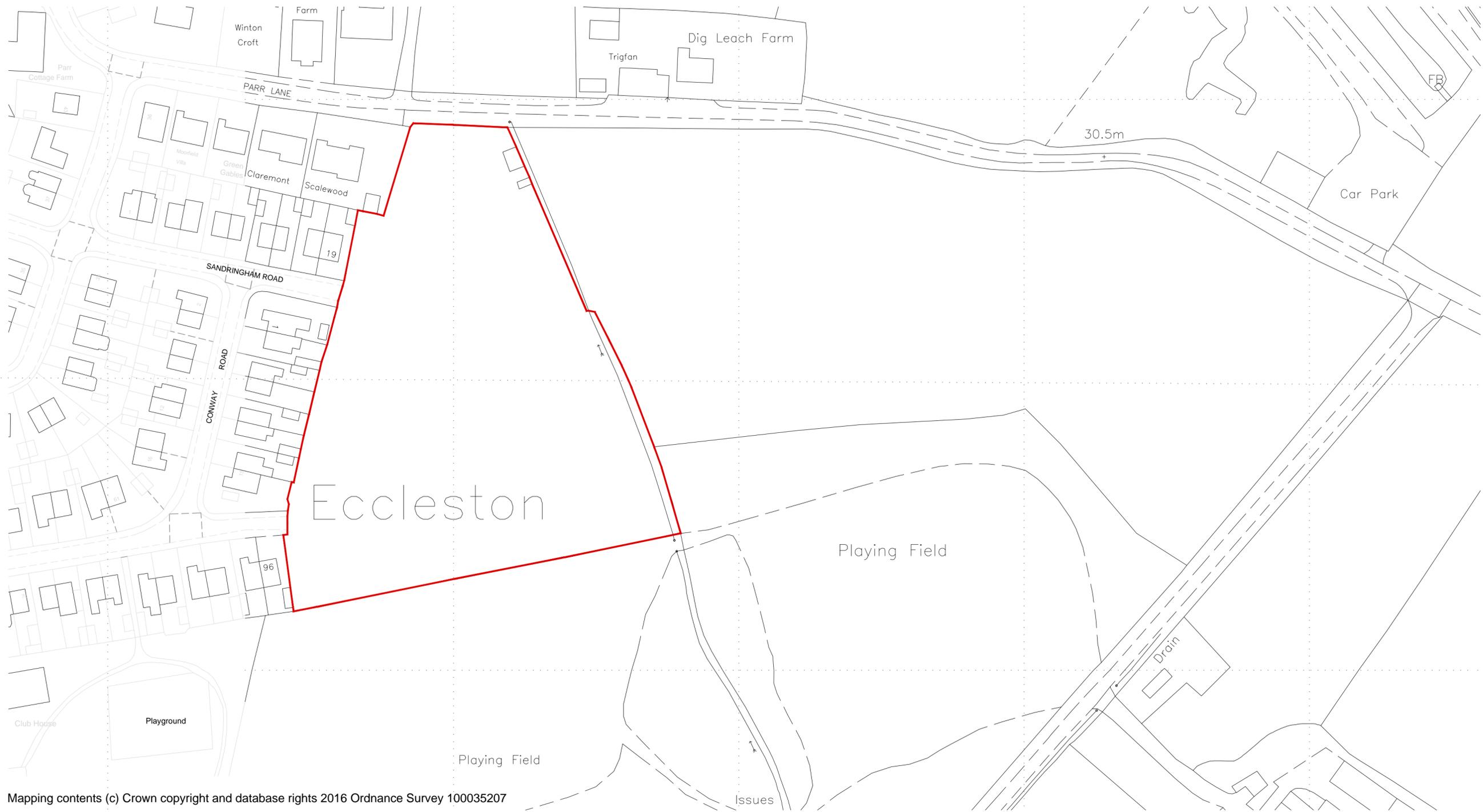
Drainage strategy

9.10 The online Soilscales viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.

9.11 Based upon the ground conditions identified it can be considered that infiltration is unlikely to provide a viable drainage solution for surface water runoff generated by the site.

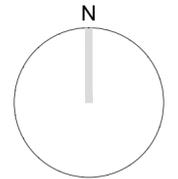
- 9.12 It is intended that the surface water runoff from the new development will be attenuated to pre-development runoff rates, and a controlled discharge made into the watercourse that runs along the site's eastern boundary, mimicking the existing scenario.
- 9.13 It is intended that foul sewage from the site will be collected by a piped system, and discharged into the public foul sewer system that lies within the residential estate to the west of the site.

APPENDIX A



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Site Layout 1:1000



Revision Notes:
 A: Extended to show Playground and footpath link. JRM 31:07:17



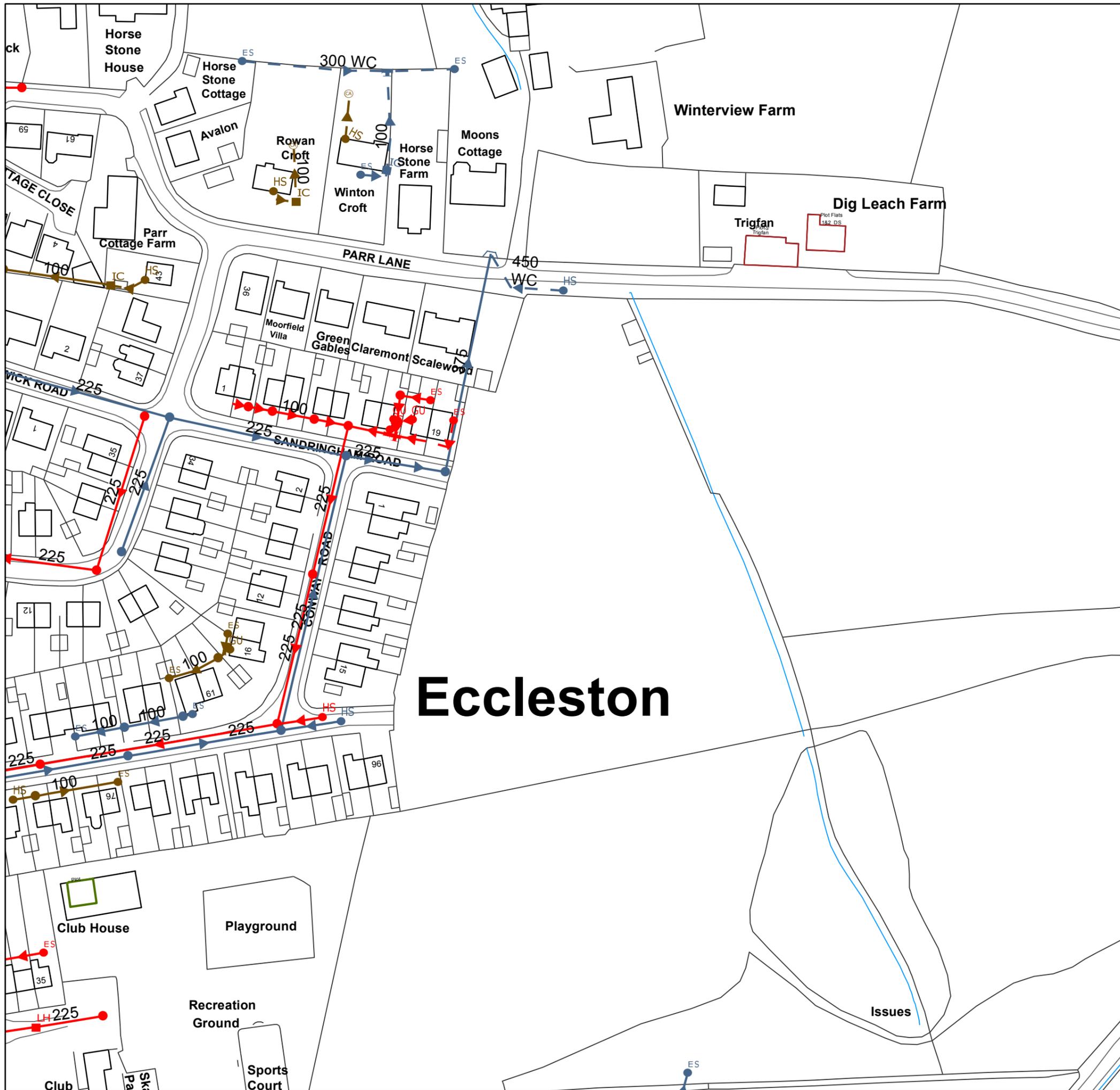
CLIENT
Metacre Ltd.

PROJECT NAME
Proposed Development at Parr Lane, Eccleston.

DRAWING NAME
Location Plan.

SCALE	DRAWN BY	DATE	DRAWING NUMBER	REVISION
1:1000 @ A2	JRM	18:07:2016	16/064/L01	A

APPENDIX B



Extract from Map of Public Sewers

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.

The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.

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Printed By: Property Searches Date: 19/06/2017

DO NOT SCALE
 Approximate Scale: 1:1250



APPENDIX C

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	1.500
SAAR (mm)	969
Soil Index	4
SPR	0.47
Region	10
Betterment (%)	0
	Calc
QBar (l/s)	10.6

Return Period (years)	Growth Factor	Q (l/s)
1	0.87	9.2
30	1.70	18.0
100	2.08	22.0

Storage Estimate

Return Period (years)	100
Climate Change (%)	30
Impermeable Area (ha)	0.750
Peak Discharge (l/s)	22.000
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m ³)	Calc
from	240
to	378
With infiltration (m ³)	
from	
to	